

**EFFECT OF FIRMS' MARKET CAPITALIZATION ON STOCK
MARKET VOLATILITY OF COMPANIES LISTED AT THE
NAIROBI SECURITIES EXCHANGE**

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DECLARATION

This paper is my original work and has not been submitted for examination in any other university.

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I hereby declare that this study is from the students own work and efforts, and all other sources of information have been acknowledged. This study has been submitted with my approval.

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DEDICATION

I dedicate this research paper to my loving family, all of whom have been a source of great inspiration and support.

May God bless you abundantly.

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ABSTRACT

The main objective of this research paper was to analyze the relation between market capitalization and stock market volatility in the Nairobi Securities Exchange. Market capitalization is an important measure for investors in the determination of the returns on their investment. It is a universally acceptable metric for assessing the health of a publicly traded company and an estimate of the value of a business entity. Volatility, liquidity and business cycle dynamics across the cap classes were modeled by way of a regression model. The study analyzed the volatility in stock prices at Nairobi Securities Exchange, using data that span 5 financial years from January 2010 to December 2014. A descriptive survey design using quantitative data from secondary sources was applied in the research. The study combined the computational knowledge of volatility to draw patterns and concluded that market capitalization did affect the volatility of firms listed in the Nairobi Securities Exchange and that although there was a relationship, it was weak. The most significant factor that affected the stock market volatility of the listed firms was found to be market capitalization, followed by liquidity respectively. The study recommended that investors should consider liquidity and market capitalization in their volatility estimates and that the regulator should come up with laws that encourage trading by investors. The study however could neither acquire all the information of all the selected companies nor control for all the factors that affect stock price volatility. Further research should therefore be conducted in a different emerging market for comparison purposes, or within the same domain but controlling for more variables, with well defined market capitalization classes.

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ABBREVIATIONS

ANOVA	Analysis of Variance
ARCH	Autoregressive Conditional Heteroskedasticity
CMA:	Capital Markets Authority
ETF	Exchange Traded Fund
FTSE	Financial Times Stock Exchange
GARCH	Generalised Autoregressive Conditional Heteroskedasticity
GDP	Gross Domestic Product
IMF	International Monetary Fund
IPO	Initial Public Offering
NASI	Nairobi Securities Exchange All Share Index
NSE	Nairobi Securities Exchange
NYSE	New York Stock Exchange
S&P	Standard and Poor
UNDP	United Nations Development Program
USA	united States of America

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

The importance of stock markets in the economic growth of any country has been well documented. Capital markets are mechanisms for raising and trading long-term capital and thus represent the long end of the maturity spectrum of financial instruments (Mensah, 2003). Profitable investment require a long-term commitment to capital, which investors are unwilling to commit unless there are mechanisms that allow holders of long-term investments, such as bonds and shares, to sell quickly and cheaply if they need access to their savings or want to rearrange their portfolio. Stock markets hence play a vital role in mobilizing economic resources within and from outside the economy, serving as an important conduit through which funds flow from individuals and corporate entities across the globe to investors in a particular economy

The main characteristic of any financial asset is its return which is typically considered to be a random variable. The spread of outcomes of this variable, known as assets volatility, plays an important role in numerous financial applications. Its primary usage is to estimate the value of market risk. Volatility is also a key parameter for pricing financial derivatives, for risk and general portfolio management. The relationship between volume and volatility provides an insight into structure of financial markets, since the predicted price-volume relation depends on information flow, size of the market and short selling constraints (Ndithi, 2014). An inconsistent stock price change is perceived as a measure of risk by rational investors, financial analysts, brokers, and regulators, this makes them worry about “excessive” volatility in which observed fluctuations in stock prices do not

appear to be accompanied by any important news about the firm or market as a whole. In such situation, excessive volatility in stock returns, or “noise,” destabilizes the usefulness of stock prices as an “indicator” of the true fundamental value of a firm, (Karolyi, 2001)

1.1.1 Market Capitalization

Olson (2005) defines market capitalization as the price of a stock at any given time multiplied by the amount of shares outstanding. From a market perspective, market capitalization comprises the sum of individual outstanding shares by their prices for all the companies listed in a given stock market. According to Olson market capitalization can be classified as follows; large –cap ranging from \$10 – 100 billion; mid-cap (\$ 1 – 10 billion); Small-cap (\$100 million – 1 billion) and micro-cap (\$10 - \$ 100 million). Olson notes that there is no clear consensus or roles governing the exact cut of values and whether categorization should be dollar denominated or percentiles. However, categorization cuts need to be adjusted over time due to inflation, population change and overall market valuation. Normally, this varies on a daily basis depending on changes in prices of the respective shares hence the need to identify appropriate indicators that will help players in the stock market to monitor the changes, through which the players are able to make informed investment decisions.

Market capitalization is the value the stock market places on the entire company or, simply, market estimate of a company's value, based on perceived future prospects, economic and monetary conditions (Woo, 1981). It is, however, not necessarily the price a buyer would pay for the entire firm and is not a realistic estimate of the firm's actual size, because a share's market price is based on trading in only a fraction of the firm's total outstanding shares. Besides, preferred shares are not included in the calculation. In

addition, many companies have dominant shareholders, who may include a government entity, family, or other corporations. Market capitalization calculation might adjust for these by calculating on a free float basis, i.e. the market capitalization that uses the value of the publicly tradable part of the company (Lease, McConnell & Mikkelsen, 1983). Therefore, market capitalization is one measure of "float" i.e., share value times an equity aggregate of freely and publicly traded shares. Market capitalization thus remains a critical part of any stock valuation formula as it represents the total market value of all the company's outstanding shares. As outstanding stock is bought and sold in public markets, capitalization could be used as a proxy for the public opinion of a company's net worth and is a determining factor in some forms of stock valuation.

1.1.2 Stock Market Volatility

Volatility refers to the amount of uncertainty or risk about the size and direction of changes in a security's value. It's an inevitable market experience mirroring fundamentals, information and market expectations. According to Baskin (1989), Stock price volatility is the relative rate at which the price of a security moves up and down or simply it's the variation in stock price. The stock price volatility is estimated by calculating the annualized standard deviation of daily changes in stock prices. If the price moves up and down more rapidly over short time periods, then the stock has high volatility and if the price makes slight changes, then the stock has less volatility. A certain degree of market volatility is unavoidable, even desirable, as the stock price fluctuation indicates changing values across economic activities and it facilitates better resource allocation. But frequent and wide stock market variations cause uncertainty about the value of an asset and affect the confidence of the investor (Mao & Kao, 1990).

Stock price volatility can be used by investors to measure the potential risk of a given stock. Adjustments in equity prices echo changes in various aspects of the society such as economic, political and monetary aspects. Thus, corporate profitability, business strategy, product quality, political stability, interest rates among other factors should have a role to play in shaping the intensity of price fluctuations, as the market moves from one equilibrium to another. At the same time information about the changes in fundamentals should spark market activity changing the landscape of future prices (George, 2008). Stock volatility is associated with the business cycle; recessions, booms or recovery period. Stock volatility is higher during the recession and lower during the boom period of the economy. High stock returns imply higher overall growth of an economy and vice versa. Stock return volatility leads to uncertainty which hinders effective performance of the financial sector as well as the entire economy at large, (Olweny & Omondi, 2011).

Karungari (2006) explained that volatility is of great concern for investors or for anyone dealing with money. He noted that investors would like to know how much volatility or risk that they are exposed to. He further documented that volatility reflects the importance of variability or dispersion around the central tendency, thus it indicates the extend and the likelihood of a possible return realization hence help to give the possible range of values the stock will be in, in his work he noted that, when an investor knows how much volatility he is exposed to, he can make an informed decision on his investment..

1.1.3 Market Capitalization and Stock Market Volatility

Although many relations in finance rely on the ability of investors to trade any amount of a security without affecting the price, frictions, including those related to trading costs and short sale restrictions arising from market capitalization constraints do impact price formation. Market capitalization refers to an estimation of the value of a business that is obtained by multiplying the number of shares outstanding by the current price of a share. It is the total dollar market value of all of a company's outstanding shares. The investment community uses this figure to determine a company's size, as opposed to sales or total asset figures (Baker, 2001). While the categories of market capitalization are fluid and changing, most investors would agree that market cap is the most important determinant of a company's size since it reflects market value, and therefore, expectations about a company's future. Companies with tremendous growth potential but relatively small sales may have high market caps as investors bid up the stock price. Understanding and assessing the market capitalization of companies is crucial to making smart investment choices. Because companies with different market caps tend to perform differently over different time periods, diversifying among companies with various market caps can reduce risk and volatility in a portfolio and maximize investment returns over the long haul (DeAngelo et al., 2006).

Liquidity co-movements studied within three different market capitalization portfolios: small, mid and large revealed that the magnitude of liquidity co-movements was on average positively related to the market capitalisation of the index: liquidity co-movements were least intense among small caps and most intense among large caps. The magnitude of concurrent class-wide liquidity co movements was smaller than market-

wide liquidity movements as measured by Chordia et al. (2000) and the proportion of individual stocks that were positively and significantly affected by concurrent class-wide liquidity shocks was larger, Pierre Giot, Renaud.Beaupain & Mikael Petitjean. (2007). In contrast with prior studies focused on market-wide liquidity co-movements, their paper studied class-wide liquidity co-movements and condition the analysis on volatility regimes using the Markov switching methodology by defining three regimes of volatility (low, normal and high). They found that all three market cap portfolios exhibited the same degree of pervasiveness in class-wide liquidity co-movements, as measured by the percentage of stocks with statistically positive beta coefficients and that class wide shocks dominated stock-specific shocks in low volatility regimes for both large and mid caps, while for small caps, cross-sectional statistical evidence of liquidity co-movements was weak in both high and low volatility regimes.

1.1.4 Companies Listed in the Nairobi Securities Exchange

Emerging markets have been reported to be illiquid and characterized by low market capitalization by several scholars. For example, Kibuthu (2005) observed that many of the Africa's stock exchanges were small, underdeveloped and illiquid.. According to the United Nations Development Program Africa Stock Markets Handbook (2003), African markets are typically characterised by relatively small capitalization and low liquidity levels. Emerging markets are characterised by volatile, but substantial returns that can easily exceed 75 percent per annum (Lesmond, 2002). These returns, while substantial, are subject to increased risk and volatility relative to more developed markets.

In Kenya, dealing in shares began in the 1920's when the country was under British colony. At that time, the market was not formally organized and rules and regulations to

govern it did not exist. The NSE was formally organized in 1954 and was constituted as a voluntary association of stock brokers registered under the societies Act. In 1991 it was registered as a private company limited by shares and currently, there are sixty four listed companies, further categorized into ten groups namely; Agricultural, Commercial and Services, Telecommunication and Technology, Automobiles and Accessories, Banking, Insurance, Investment, Manufacturing and Allied, Construction and Allied and Energy and Petroleum, NSE deals with a range of securities which include; ordinary shares, treasury and corporate bonds, debenture stocks and preference shares and plays an important role in economic development in Kenya, by providing a medium for the transfer of funds from surplus to deficit spending units; companies via IPOs

The Nairobi Securities Exchange has three types of indices; these are NSE 20 share Index, NSE All Share Index and FTSE Share Index. The NSE 20-Share Index and Nairobi NASI are used to indicate market performance. The NSE 20-Share Index was introduced in 1964, a year after Africans were first allowed to trade on the NSE. The NSE – 20 Share index consists mainly of blue chip firms that have already established a strong hold on their market shares in the sectors they operate in and have a clear dividend pay-out policy. Firms currently comprising the index include; Rea Vipingo, Sasini, Kenya Airways, Centum, Nation Media Group, Safaricom, Barclays, Equity, KCB, Stanchart, Co-operative, EABL, Athi River Mining, Mumias, Bamburi, BAT, KenGen, KPLC, Kenol Kobil, Express and CMC Motors. It is an equi-weighted geometric mean of 20 large companies' ordinary stocks traded. The index measures price movement in selected, relatively stable and best performing 20 listed companies.

NASI was introduced to complement and address the shortcomings of NSE 20 share index; the NSE 20 Share index measures the average performance of 20 large capitalized stocks drawn from different industries. In contrast, experience indicates that most large cap stocks do not record a high performance as compared to low cap stocks. NASI incorporates all the traded shares of the day, irrespective of their performance and their time of listing as opposed to the 20 Share Index which measures price movement in the best performing 20 companies amongst the listed ones. Its attention is therefore on the overall market capitalization rather than the price movements of selected companies.

In November 2011 the FTSE NSE Kenya 15 and FTSE NSE Kenya 25 Indices were launched; FTSE 25 Index; which comprise the exchange's 25 most liquid stocks, while the FTSE 15 Index is made up of the exchange's 15 largest stocks by market capitalization. The launch of the indices was the result of an extensive market consultation process with local asset owners, fund managers, and FTSE International and reflects the growing interest in new domestic investment and diversification opportunities in the East African region. The index was meant to act as a gauge by which investors can measure performance of their portfolios and as a foundation for the development of index related products such as ETFs (NSE, 2015)

1.2 Research Problem

Volatility analysis in any stock market is useful in capital cost determination as well as in asset allocation decisions. As a result, policy makers rely on volatility estimates to predict how vulnerable the financial markets are. An inconsistent stock prices change is perceived as a measure of risk by rational investors, financial analysts, brokers, and regulators. In addition this makes them worry about “excessive” volatility in which observed fluctuations in stock prices do not appear to be accompanied by any important news about the firm or market as a whole. In such situation, excessive volatility in stock returns, or “noise,” destabilizes the usefulness of stock prices as an “indicator” of the true fundamental value of a firm, (Karolyi, 2001). Market capitalization is an important measure for investors in the determination of the returns on their investment. Day-to-day stock price fluctuations provide freely available information on the health of a publicly traded company; risk, which informs the investors in selection of stocks to include in their portfolios

Given that Kenya’s capital market is registering rapid growth there is need to analyze the relation between the market capitalization and volatility. Nairobi Securities Exchange is never perfect, which provides fertile breeding ground for stock return variations, caused by market imperfection (Mokua, 2003). He further added that it is important for investor to understand the stock market volatility to be able to take advantage of them

Chhachhi & Davidson, (2008) categorized companies according to their market capitalization as small cap, mid cap, or large cap and found out that because companies with different market caps tend to perform differently over different time periods, diversifying among companies with various market caps could reduce risk and volatility

in a portfolio and maximize investment returns over the long haul. However, there are no strict rules defining these categories and the ceilings for each had historically, gone up (Bhattacharya, 2009).

Consistent with other emerging markets worldwide, NSE faces stock return volatility. This volatility adds another layer of risks, not only making the prices of financial assets more difficult but also by generating portfolio flows that are potentially more unstable (Muriu, 2003). Though there have been several studies carried out in Kenya on stock market volatility which include; Equity risk and returns factors (Malamba, 2002), Volatility of stock returns (Muriu, 2003), the effect of macro-economic factors on stock return volatility (Olweny & Omondi, 2010) and the impact of inflation on stock market return and volatility (Murungi, 2012), the evidence on impact of firms' market capitalization on stock market volatility is however inadequate.

Motivated by these arguments, we study the joint dynamics of returns and volatility for size sorted portfolios of NSE stocks using 5 years data. The study aims to provide an understanding of the interaction between trading frictions as evidenced from trading volume based on market capitalization constraints and volatility across different market cap sectors using regression methodology and techniques adopted by previous studies to fill this gap.

1.3 Research Objectives

To investigate the effects of firms' market capitalization on stock market volatility

1.3.1 Specific Objectives

- (i) To determine market capitalization levels of the sample stocks from 2010 to 2014
- (ii) To determine the level of stock market volatility of the sample selected for 2010 to 2014

1.4 Value of the Study

From an academicians point of view, the study offers valuable contribution to theory and practice. First the study will add value to the financial management field especially in the demanding concerns of market capitalization and volatility. This paper sheds further light on liquidity as a factor affecting volatility in the following ways. First, liquidity is studied within three market capitalization classes: small, mid, and large caps, then we examine whether, and to what extent, liquidity risk, inherent in similar market capitalization classes affects firms' stock market volatility. The study will also form the basis of further research by identifying the knowledge gaps, create forum for further discussions and debate among financial consultants and investors thus making significant contribution by adding to the body of knowledge and theory and finally scholars would have the privilege of extending the role and advancement of market capitalization as a metric for assessing stock market volatility.

From a practical standpoint, this study is relevant because a number of practitioners have been attracted to small cap stocks owing to academic research (e.g, Fama & French, 1993) which provides evidence that expected returns of small cap stocks are systematically different from those of large cap stocks. Our analysis is of potential relevance in this context, because its results can assist in forecasting and controlling trade execution in small as well as large firms, which may be of importance for portfolio

managers and investors who commonly deal with market capitalization indices; to identify potentials ways through which they can maximize their return and mitigate market related risks. The information provided in the study will help enhance their precision in day to day decision making within emerging markets like Kenya's capital market

In addition, the study plays a major role to market makers and regulators in the financial society; market makers would find a useful tool in obtaining relevant parameters from stock data while regulators obtain greater insights in order to prevent fraudulent behavior and ensure market integrity is maintained. Volatility analysis in any stock market including NSE is useful in capital cost determination as well as in the evaluation of asset allocation decision. As a result, policy makers rely on volatility estimates to predict how vulnerable the financial markets are.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The literature deals with the effect of market capitalization on volatility of firms listed at the Nairobi Securities Exchange. The specific areas covered by this chapter include theoretical framework, determinants of stock market volatility, empirical review and chapter summary.

2.2 Theoretical Review

Within the finance there exists robust literature on stock market volatility both for developed and emerging markets. Researchers have been interested in the dynamic long run behavior of stock prices, including causes of stock volatility. Over time, several theoretical models have been devised.

2.2.1 The random Walk Hypothesis

The random walk hypothesis is a financial theory stating that stock market prices evolve according to a random walk and thus cannot be predicted. It is consistent with the efficient-market hypothesis. This theory provides that information released or to be released to the market will have no impact on the value of financial asset (Regnault, 1863). The first complete development of random walks in security prices is due to Bachelier and was later independently derived by Osborne (1962). The Bachelier Osborne model assumes that price changes from transaction to transaction in an individual security is independent, identically distributed random variables. It further assumes that transactions are fairly uniformly spread across time (Fama, 1965). Samuelson (1965) proved that properly anticipated prices fluctuate randomly.

Kalui (2004) carried out a study on the determinants of stock price volatility, an empirical investigation at the Nairobi stock exchange. The objective of the study was to establish the level of volatility of stock prices in Kenya and also to ascertain the determinants of stock price volatility. The population of the study was all quoted companies at the NSE and covered those companies that traded in ordinary share and excluded those that trade in preference shares from 1998 to 2003. The study revealed that companies quoted at NSE experience stock price volatility and supported the widely known hypothesis that security prices follow a trendless random walk

However, even though it is useful, the model is quite restrictive as it assumes that there is no probabilistic independence between consecutive price increments. Market efficiency does not necessarily imply a random walk, but a random walk does imply market efficiency.

2.2.2 Markowitz Portfolio Selection Model

Markowitz (1952, 1956) portfolio selection model is a single period model that illustrates investor forms asset portfolio at the beginning of the period and aims at maximizing the expected return. The returns are subject to acceptable risk level depending on stock volatility which is the measure of risk. The model uses variance or standard deviation of expected stock returns as a measure of volatility. The investor therefore selects portfolio along the efficient frontier.

Sharpe (1964), Mossin (1966) & Merton (1974, 1980) developed the link between asset's return to its own variance or to covariance between asset's return and the returns on market portfolio. However, divergences in literature arise on whether such relationships

are positive or negative. Poterba & Summers (1988) established that stock returns are positively correlated over a period of less than one year and negatively correlated over a period of three to eight years thus indicating transitory components in stock prices and in both the real and excess returns in the long run. However, a number of models in finance present an evidence of long tradition that stock returns volatility is negatively correlated to stock returns (leverage effect). Black (1976), Bekaert (1999) & Wu (2000) all subscribe to this principle. Within the literature it is evident that the early models treated volatility in stocks to be a linear variable.

However, the fact is that stock volatility is asymmetric rising more during bad times and falling more during good times. This is well explained by the leverage effect concept whereby volatility is negatively related to stock prices. Given this scenario, we expect investors to alter their future expectations in returns' volatility given volatility today. Unexpected rise in market volatility today could lead into an upward revision of expected future returns. As a result, investors will demand for higher rate of returns to cushion them against losses emanating from the revised future risk expectations. Higher rates of return translates into higher risk premium leading to higher discounting of expected future cash flows thus, lower stock prices today.

2.2.3 Autoregressive Conditional Heteroskedasticity Model

The term "heteroscedasticity" refers to changing volatility; variance. But it is not the variance itself which changes with time according to an ARCH model; rather, it is the conditional variance which changes, in a specific way, depending on the available data. The conditional variance quantifies our uncertainty about future observations, given everything we have seen so far. The concept of conditional probability and therefore

conditional mean and variance plays a key role in the construction of forecast intervals. It could be argued that a reasonable definition of a 95% forecast interval is one for which the future observation has a 95% probability of falling in the interval conditionally on the observed data. This is of more practical interest to the forecaster than the volatility of the series considered as a whole.

In modeling stock volatility, the need to capture the non-linear properties in financial data is crucial if valid and reliable inferences are to be obtained. Engle (1982) developed the first outstanding ARCH model to model volatility in conditional returns which is valid to date. Later Bollerslev (1986) extended the model by generalizing it to come up with the Generalized ARCH (GARCH) which is crucial in capturing volatility in stock returns as well as shocks to stock returns and how persistent they are, since the model offered more flexibility and accuracy than the ARCH model. However, their use is restricted to the long time series. GARCH models require several years of daily data in order to be trustworthy (Marius, 2009). Among further shortcomings, he found that the model took into account only the size of the movement of the returns; magnitude, not the direction as well and argued that Investors behave and planned their actions differently depending on whether a share moves up or down, which explained why the volatility was not symmetric in the stance of the directional movements; the leverage effect, which impeded accurate forecasts for both GARCH and ARCH models.

2.2.4 Mean Reversion

Mean reversion is the assumption that a stock's price will tend to move to the average price over time. Fama & French (1988) found out that there is large negative autocorrelation in stock returns for horizon period beyond one year hence the presence of mean reversion in real returns. They estimated that variations in predicting returns between three and five years due to mean reversion are 40 percent and 25 percent for small and large firms respectively. Further, they assert that the negative autocorrelation is attributed to a slowly decaying price component which strengthens as the return horizon increases from short to medium term. They were, however of the view that the random walk price component regains its influence on the variation of returns over long period horizons.

Contrary, Lo & Mackinly (1988) point out evidence of mean aversion in short – horizon stock returns which is inconsistent with the random walk hypothesis especially for the small capitalization stocks. Its noteworthy, however that mean reversion can arise due to a small – sample bias. Richard & Stock (1989) proposed that correcting for small – sample bias may reverse the evidence for mean reversion in favor of mean aversion.

From the investor's point of view, the investors' behavior may contribute towards mean reversion in stock returns. Cecchetti, Lam & Mark (1990) demonstrate that negative serial correlation in long horizon in stock returns may arise from the investor's moderate desire to smoothen consumption based on the hypothesis that asset prices are determined in equilibrium and assets returns rationally reflect market fundamentals. Using the S&P 500 index, they established that the variance ratios and regression coefficients for 1 to 10 years horizons were within 60% confidence interval and concluded that small sample bias

was responsible for much of the autocorrelation in historical stock returns although the concave utility function model proved to be a better fit for the evidence of serial correlation in stock returns.

2.3 Determinants of Stock Market Volatility

Prior to 1981 much of the literature on finance viewed the present value of dividends as the fundamental determinant of the level of stock prices. However, Shiller (1981) contradicted this theory. He found out that under the assumption of a constant discount factor, stock prices were too volatile to be consistent with movements in future dividends. This conclusion, known as the Excess Volatility Hypothesis, argued that stock markets exhibit too much volatility to be justified by fundamental variables. Since then various studies have been conducted on the determinants of stock price volatility as detailed in this section.

2.3.1 Macroeconomic Conditions

According to Fama (1990), economic growth influences the profitability of firms by affecting the expected earnings, dividends of shares and stock prices fluctuations. Volatility in stock returns does not only affect investor's portfolio selection based on the efficient frontier as per the Markowitz hypothesis but also has a bearing on consumption and income levels hence its crucial link to economic business cycles. (Fama & French, 1989; Cochrane, 1999, 2007, 2011) in their analysis, if an agent becomes risk averse during economic depression given contraction in consumption and income, then such agents will demand for higher returns on stock in times near business cycle troughs for them to take the risks associated with stocks.

Schwert (1989, 1990) related stock return volatility to the level of economic activity through financial and operating leverages. He showed that when stock prices fall relative to bond prices or when firms increase financial leverage by issuing debt to buy back their stocks, the volatility of firms' stock return increases. With an unexpected decline in economic activity, he showed that the profits of firms with large fixed costs fell more than the profits of firms that avoided large capital investment or long-term supply contracts. McMillan & Thupayagale (2011) carried out a study on measuring the volatility in African stock markets taking into account the periodic shifts in mean level of volatility where regime shifts were determined endogenously. The study found that indeed there was persistence and long memory in volatility, overestimated when regime shifts were not accounted for. As such, they proposed that when estimating volatility among African stock markets it was important to consider the effects of regime changes as this would generate an improved volatility forecasting performance for some African stock markets.

2.3.2 Information Asymmetry

Finance theorists have argued that financial markets are intrinsically efficient (Fama 1965; Friedman 1953). This argument stems from the fact that rational traders possess perfect information and play the role of arbitrageurs when stock prices deviate from their fundamental values. Thus, in the long run, security prices stay in line with their fundamental values. This belief, however, contradicts the general market sentiments of irrational markets where many investors continuously behave irrationally. The noise trading approach (Shleifer & Summers 1990) explains the phenomenon by suggesting that rational traders may adopt practical yet irrational strategies to survive in a

competitive environment faced with budget constraints and influences from the irrational traders.

2.3.3 Market Capitalization

According to Allen (1996), small firms were less involved in diversification activities, thus they would be less subjected to investor's scrutiny compared to large firms. As a result, stocks of small firm traded in a market, would be less informed, more illiquid and would face higher price volatility. It is noteworthy that the influx of foreign investors into a stock market and increased issuance of IPOs following financial sector liberalization may contribute towards market volatility through increased volume and pace of transactions.

2.3.4 Intermarket Volatility Spillovers

Nishimura & Men (2010) assessed the daily and overnight spillover effect in common stock prices between China and G5 countries. The study established a strong evidence of short-run one-way volatility spillover effects from China to the US, UK, Germany, and France stock markets. Contrary to the widespread belief, the empirical results suggested that a small stock market had significant influence on a large stock market but not vice versa. The paradox was explained by the rapid growth, economic development and severe capital regulation in China.

2.3.5 Weekend and Holiday Effects

French & Roll (1986) showed that stock volatility was higher when stock exchanges were open for trading. In particular, they found that the variance of stock returns over weekends and holidays was much less than the typical one-day variance times the

number of calendar days since trading last occurred. Pagan and William (1989) proposed that stock return volatility could be broken down into predictable and unpredictable components, and research interest has largely been placed on the determinants of the predictable part and the conditional variance of the series thus ignoring the unpredictable component of stock returns. This is because investment in any financial assets is deemed to be a function of risk premium which is predictable.

2.3.6 Liquidity

Schwert (2012) pointed out that there are at least three theories that predict a positive relation between volatility and volume. First, if investors have heterogeneous beliefs, new information will cause both price changes and trading. Second, if some investors use price movements as information on which to make trading decisions, large price movements will cause large trading volume. Finally, if there is short-term “price pressure” due to illiquidity in secondary trading markets, large trading volume that is predominantly either buy or sell orders will cause price movements

2.4 Empirical Review

Researcher and scholars have looked at the area of market capitalization and volatility extensively. The potential relationship between size of the firm and share price volatility was first shown by Atiase, (1985) who showed that as the size of the firm increases, the company share price decreases. Lo & MacKinlay (1990), Conrad, Gultekin, & Kaul (1991) studied volatility and cross-autocorrelations across small and large firms. Lo & MacKinlay (1990) showed that there were differences in stock price dynamics across small and large firms, while Conrad, Gultekin, & Kaul (1991) demonstrated the existence

of volatility spillovers across such firms. Schwert (1990) explained that the most commonly used measure of volatility of stock return was the standard deviation, and that this statistic measures the dispersion of returns. He noted that financial economists find standard deviation to be useful because it summarizes the probability of seeing extreme values of returns, that when the standard deviation was large the chance of a large positive or negative return was also large.

Haugen & Nardin (1991) did a study on the efficient market inefficiency of capitalization-weighted stock portfolios. They concluded that Market-matching to domestic cap-weighted stock indexes was likely to be a suboptimal investment strategy when investors disagree about risk and expected return, when short-selling was restricted, when investment income was taxed, when some investment alternatives were not included in the target index, or when foreign investors were in the domestic capital market. They found out that in the presence of these factors, there would be alternatives to cap-weighted portfolios that had the same expected return but lower volatility and that this would be true even in the context of an efficient market where all investors take efficient mean-variance positions within the context of their individual tax exposure and constraints placed on their portfolio weights, including the required investment in their human capital.

Tarun Chordia, Asani Sarkar & Avanidhar Subrahmanyam, (2005) estimated impulse response functions to examine the dynamics of the cross-sectional relationships in liquidity, volatility and returns between small and large cap stocks in the US. Their resulting impulse responses showed that large-cap bid-ask spreads respond to shocks in spreads, volatility and returns in the small-cap sector, with the response to volatility and

returns persisting for more than 10 days. In the reverse direction, the study showed that shocks to large-cap spreads, volatility and returns had a persistent impact on small-cap spreads, with the response peaking after a few trading days. Thus, there were spillovers in liquidity, volatility and returns across small and large stocks; moreover, the spillovers were often persistent, lasting days after the initial shock. Their results, consistent with Lo & MacKinlay (1990), indicated that the returns of large stocks lead those of small stocks and that order flows in the large cap sector played an important role in predicting small cap returns when large cap spreads widened. These results held after using mid-quote returns for the post-1993 period, demonstrating that they were not due to stale prices or a particular sample period. An interpretation of these results is that market-wide information is first traded on in the large-cap sector, causing spreads there to widen, and subsequently incorporated into prices of small-cap stocks with a lag

Further research by Pierre Giot, Renaud Beaupain & Mikael Petitjean.(2007) showed that the magnitude of liquidity co-movements was on average positively related to the market capitalization of the index and that liquidity co-movements were least intense among small caps and most intense among large caps. And although they did not investigate index inclusion, their results seemed to be in agreement with Brockman & Chung (2006) as large caps belong to many indexes routinely traded by portfolio managers. Chordia, Roll, & Subrahmanyam (2000), found that the magnitude of concurrent liquidity co-movements was smaller, but the proportion of individual stocks that were positively and significantly affected by concurrent class-wide liquidity shocks was larger, long run liquidity co-movements were found to be greater than short-run liquidity co-movements in all three market cap indices and that the magnitude of spread-based liquidity co-

movements were greater in quiet markets for both large and mid caps and that class wide shocks dominated stock-specific shocks in low volatility regimes for both large and mid caps, while for small caps, cross-sectional statistical evidence of liquidity co-movements was weak in both high and low volatility regimes

2.5 Summary of Literature Review

The literature review shows convergence in that there is some relationship between market capitalization and firms' stock price volatility; Haugen & Nardin (1991) showed that an investment strategy across market cap classes could help reduce volatility of the portfolio, consistent with Tarun Chordia, Asani Sarkar & Avanidhar Subrahmanyam, (2005), Lo & MacKinlay (1990). However, despite the vast empirical literature on stock returns behavior, there are mixed empirical results regarding the relationship between market capitalization and stock return volatility, the specific nature of this relationship is yet to be established, with scanty research on emerging markets. This study aims to fill these gaps

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents various stages and phases that were followed in completing the study. It identifies the research design, the target population, procedures and techniques that were used in the collection, processing and analysis of data. Specifically the following subsections are included; research design, target population, sampling design, data collection and analysis.

3.2 Research Design

The study adopted a descriptive survey design which according to Churchill (1991) is appropriate where the study seeks to describe the characteristics of certain groups, estimate the proportions and make predictions. Descriptive research design is a scientific method that involves observing and describing the behavior of a subject without influencing it in any way. It emphasizes on studying a situation or a problem in order to explain the relationship between the variables (Saunders, Lewis & Adrian, 2009) The research looked at past data and analyzed it in order to come up with a model on the relationship between firms' market capitalization and volatility

3.3 Population

Population refers to an entire group of individual's events or objects having a common observable characteristic. In other words, population is the aggregate of all that conforms to a given specification (Mugenda & Mugenda, 2003). The population of interest in this study was comprised of 60 companies that were listed in the Nairobi Securities Exchange between 2010 and 2014. (www.nse.co.ke, September 2015).

3.4 Sample Design

Using purposive sampling technique the study was conducted on all listed companies in the Nairobi Securities Exchange continuously traded during the 5 year period from 2010 to 2014

3.5 Data Collection

The used secondary sources of data from published audited annual reports submitted to the NSE and CMA for the selected sample from 2010 to 2014 based on the mandatory requirement of submission of periodic annual statements and market capitalization information available in the NSE handbook 2014-2015 and the daily trade summary statistics. The period was selected upon because it was representative of various economic conditions in Kenya and the most recent in the economy

3.6 Data Analysis

Data analysis was based upon a multiple regression model, test of goodness of fit, correlation and variance tests. In order to determine the relationship between market capitalization and firms' volatility in the NSE, the study conducted a correlation analysis using the model;

$$VOL = \alpha + \beta_1 CAP + \beta_2 LIQ + \beta_3 BCD + \varepsilon$$

Where:

VOL = Volatility measured by semiannual standard deviation of
stock prices

CAP = Market capitalization measured by market price multiplied by the number of shares outstanding, in billions

LIQ = Liquidity measured by daily share trade volumes in millions.

BCD = Business cycle dynamics obtained from semiannual earnings growth fluctuation percentages

α = Regression constant

β_i = Parameters relating each variable to the volatility

ε = Error term, normally distributed with a mean of zero

The direction and strength of the relationship was to be explained by the correlation coefficient while the coefficient of determination was used to determine the explanatory power of the regression model; the proportion of total variation of outcomes explained by the model

3.6.1 Tests of Significance

Using 0.05 as the level of significance, we conducted a linear regression t-test to determine whether the slope of the regression line differs significantly from zero in order to determine the significance of the relationship between market capitalization and volatility. However, according to the Institute and Faculty of Actuaries, ANOVA for a completely randomized comparative experiment on only two treatments is equivalent to a two sample t test. They further asserted that it was no coincidence that the sum of squares could be split up in the same way for ANOVA and for linear regression. They showed that a linear regression was in fact just a special type of ANOVA and that the results of a

regression analysis could be presented in an ANOVA table CT3 (2013) The Analysis of variance table was thus used to determine the significance of the model using the F-statistic at 95% confidence level with the aid of Microsoft Excel and Statistical Package for Social Sciences software version 22

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND INTERPRETATION

4.1 Introduction

This section contains data analysis that was done in the study. It also gives the findings and discussions of the results. The research aimed at finding out the relationship between market capitalization and share price volatilities of firms listed at the NSE. A multiple regression analysis was conducted with volatility as the dependent variable. This was done by use of SPSS 22, with the aid of Microsoft excel. The enter method in SPSS was used and all the variables were entered. The output and discussion of the regression analysis results are detailed in this section.

4.2 Descriptive Statistics

A brief overview of data collected in the study is contained in table 4.1 below

Table 4.1: Descriptive Statistics									
	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance	Skewness	Kurtosis
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic
CAP	319	392.35	.01	392.35	29.2165	49.50660	2450.903	3.310	14.501
BCD	319	2.16	.40	2.56	1.0635	.20682	.043	2.277	14.290
LIQ	319	58.65	.00	58.65	.7389	4.07497	16.605	11.015	140.538
Valid N (listwise)	319								

The descriptive statistics in table 4.1 show a wide gap between the maximum and minimum values, hence huge range figures for market capitalization, business cycle dynamics and liquidity. The standard deviation figures are also high, meaning that there is high level of variability in the observations, majorly since the sampled companies were not split into their respective market capitalization classes of large cap, mid and small cap stocks in the study.

The skewness and kurtosis statistics of all three independent variables show deviation from normal distribution, which has a skewness of zero and kurtosis of three. From the observations, the sample data is asymmetrical, with fat tails, more stretched on the side above the mean; positively skewed. The observations are also leptokurtic as evidenced from kurtosis figures greater than three, meaning the data is relatively peaked

4.3. Diagnostic Statistics

Collinearity is a phenomenon in which two or more predictor variables in a multiple regression model are highly correlated, which affects the validity of calculations regarding individual responses and results about which predictors are redundant with respect to others. The observed VIF statistics as shown in table 4.6 were sufficiently below 10 indicating there is no collinearity problem in the observed data set. In addition table 4.2 below shows more diagnostics which further affirm that there were no collinearity problems in the observations

Table 4.2: Collinearity Diagnostics^a

Model	Eigenvalue	Condition Index	Variance Proportions			
			(Constant)	CAP	BCD	LIQ
1	2.493	1.000	.00	.06	.00	.03
2	1.069	1.527	.00	.07	.00	.44
3	.420	2.438	.00	.87	.00	.54
4	.018	11.688	.99	.00	.99	.00

a. Dependent Variable: VOL

4.4 Correlation Analysis

Table 4.2 below contains the results of the correlation analysis conducted in the study

Table 4.3: Correlations

		VOL	CAP	BCD	LIQ
Pearson Correlation	VOL	1.000			
	CAP	.127	1.000		
	BCD	.026	-.010	1.000	
	LIQ	-.110	.465	-.023	1.000
Sig. (1-tailed)	VOL				
	CAP	.012			
	BCD	.322	.429		
	LIQ	.025	.000	.341	

The correlation analysis results above show that there is a weak positive relationship between volatility and market capitalization of firms listed in the NSE, as evidenced by the pearson coefficient of +0.012. There also exists a stronger positive correlation between business cycle dynamics as measured by semiannual earnings growth

fluctuations and liquidity, with a correlation coefficient of 0.322 and a weak negative correlation between share price volatility and liquidity with a correlation coefficient of -0.11. The minimum ratio of valid cases to independent variables for multiple regression is 4 to 1. With 319 valid cases and 3 independent variables, the ratio for this analysis was approximately 106 to 1, which satisfied the minimum requirement.

4.5 Market Capitalization and Stock Market Volatility

In order to determine the relationship between volatility and market capitalization of companies listed in the NSE, the study conducted a regression analysis which yielded the model

$$\text{VOL} = 372 + 0.03\text{CAP} - 0.348\text{LIQ} + 0.741\text{BCD}$$

Where:

VOL = Volatility measured by semiannual standard deviation of stock prices

CAP = Market capitalization measured by market price multiplied by the number of shares outstanding, in billions

LIQ = Liquidity measured by daily share trade volumes in millions.

BCD = Business cycle dynamics obtained from semiannual earnings growth fluctuation percentages

The coefficient of determination explains the extent to which changes in the dependent variable can be explained by the change in the independent variables or the percentage of variation in the dependent variable, volatility, which is explained by all the three independent variables; market capitalization, liquidity and business cycle dynamics as shown in table 4.3 below

Table 4.4a: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.231 ^a	.053	.044	6.43935

a. Predictors: (Constant), LIQ, BCD, CAP

The model explains 23.1% of the direction and strength of the relationship of the model as shown by the correlation coefficient. The three independent variables that were studied, explain 5.3% of variance in market capitalization as represented by the coefficient of determination.

Analysis of Variance consists of calculations that provide information about levels of variability within a regression model and form a basis for tests of significance. The "F" column provides a statistic for testing the null hypothesis that : $H_0: \beta_1 = \beta_2 = \beta_3 = 0$ (none of the independent variables were significant predictors of the dependent variable) against the alternative hypothesis $H_A: \beta_i \neq 0$ (at least one of the independent variables was a significant Predictor of the dependent variable). Significance level $\alpha = 0.05$. The ANOVA results are shown in table 4.4 below

Table 4.4b: ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	734.708	3	244.903	5.906	.001 ^b
Residual	13061.536	315	41.465		
Total	13796.244	318			

a. Dependent Variable: VOL

b. Predictors: (Constant), LIQ, BCD, CAP

Rejection region: reject the null hypothesis if p-value ≤ 0.05

From the findings the significance value is .001 which is less than 0.05 thus we reject the null hypothesis $H_0: \beta_1 = \beta_2 = \beta_3 = 0$ and conclude that the model is statistically significant in predicting how market capitalization, liquidity and business cycle dynamics affect the volatility of listed firms. The F critical at 5% level of significance was 2.605. Since F calculated is greater than the F critical, this shows that the overall model was statistically significant.

4.6 Test of Significance of Predictor Variables

The standardized coefficient associated with market capitalization was positive, indicating a direct relationship in which higher numeric values for market capitalization were associated with higher numeric values for stock price volatilities. At 5% level of significance and 95% level of confidence, market capitalization had a 0.00 level of significance; liquidity had a 0.001 level of significance while business cycle dynamics had a 0.672 level of significance, implying that the most significant factor is market

capitalization followed by liquidity and then business cycle dynamics as shown in the table below

Table 4.4c: Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Zero-order	Partial	Partial	Tolerance	VIF
1 (Constant)	3.632	1.906		1.906	.058					
CAP	.030	.008	.228	3.676	.000	.127	.203	.202	.783	1.276
BCD	.741	1.746	.023	.424	.672	.026	.024	.023	.999	1.001
LIQ	-.348	.100	-.215	-3.476	.001	-.110	-.192	-.191	.783	1.277

a. Dependent Variable: VOL

The Standardized beta coefficient for market capitalization was .228. This indicates that there is a positive relationship between market capitalization and stock market volatility, and that controlling for the other variables a unit increase in market capitalization will lead to a 0.228 increase in volatility. The null and alternative hypotheses for market capitalization were stated as: $H_0: \beta_1 = 0$ (market capitalization was not a significant predictor of stock price volatility) and $H_A: \beta_1 \neq 0$ (market capitalization was a significant predictor of stock price volatility). Significance level: $\alpha = 0.05$.

The calculated t value for market capitalization was 3.676. The tabulated t value at 5% significance level is 1.645. Since t calculated is greater than t tabulated, the study rejected the null hypothesis. Similarly the rejection region using the p value is to reject the null hypothesis if $p\text{-value} \leq 0.05$. Since $p\text{-value} < 0.05$, the null hypothesis was rejected at the 0.05 level of significance. This meant that at $\alpha = 0.05$ level of significance, there existed enough evidence to conclude that the slope associated with the market capitalization variable was not zero and hence market capitalization was a significant predictor of stock price volatility.

The Standardized beta coefficient for business cycle dynamics was 0.023. This indicates that there is a weaker positive relationship between business cycle dynamics and stock market volatility, and that controlling for the other variables a unit increase in business cycle dynamics will lead to a 0.023 increase in volatility. The Standardized beta coefficient for liquidity however was -0.215, which means that there is a negative relationship between liquidity and stock market volatility, and that controlling for the other variables a unit decrease in liquidity will lead to a 0.215 increase in volatility

The significance tests for liquidity and business cycle dynamics were done using the null hypothesis: $H_0: \beta_i = 0$ (The independent variable was not a significant predictor of dividend pay-out) and alternative hypotheses $H_A: \beta_i \neq 0$ (The independent variable was a significant predictor of dividend payout) at $\alpha = 0.05$ Significance level. The rejection region: reject the null hypothesis if $p\text{-value} \leq 0.05$. The calculated t statistic associated with liquidity was found to be -3.476 while its p-value, of 0.001 was less than 0.05; the predictor variable liquidity was found to be significant at 0.05 level hence the null hypotheses that the slopes associated liquidity was equal to zero ($\beta_2 = 0$) was rejected.

The calculated t value of business cycle dynamics was 0.424, while its associated p value of 0.672 was greater than 0.05 hence the study failed to reject the null hypothesis that the slope associated with business cycle dynamics was equal to zero ($\beta_3 = 0$) at 0.05 level of significance and concluded that business cycle dynamics were not statistically significant.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the results of the study and the main conclusions drawn from the analysis of the data in Chapter Four. The chapter is organized as follows. Section 5.2 presents the summary of the findings of the study while section 5.3 is the conclusion. Section 5.4 discusses the recommendations arising from the results of this study. Section 5.5 discusses the limitations of the study and lastly, section 5.6 presents the recommendations for further areas of research.

5.2 Summary of Findings

The study was done to find out if there is a relationship between market capitalization and share price volatility of firms listed at the NSE. Empirical results from the study revealed that there in fact exist such a relationship, the exact nature of which was unknown. The study revealed that the three independent variables followed asymmetric distributions that were leptokurtic and exhibited fat tails to the right side of their respective means. This meant that the three predictor variables were not normally distributed

From the correlation analysis, the study established that there was a weak positive relationship between market capitalization and the volatility of firms listed in the NSE. The study also revealed that there was a negative relationship between liquidity and volatility, which confirms findings of Allen (1996) The resulting regression model had a

multiple correlation coefficient of .231a, a coefficient of determination of 0.053 and an adjusted R square of 0.044, which showed that the model accounted for 4.4% of the variance in the dependent variable; volatility.

The significance value of the resulting F test statistic was found to be .001 which was less than 0.05, α significance level which resulted in the conclusion that the model was statistically significant in predicting how market capitalization, liquidity and business cycle dynamics affected the volatility of firms listed in the NSE. Further tests of the significance of the predictor variables rejected the hypothesis $\beta_i = 0$ with the exception of business cycle dynamics.

The hypothesis that market capitalization and liquidity regression parameters were equal to zero were both individually tested and rejected. This meant that the relation between market capitalization and volatility, and liquidity and volatility were both statistically significant. The significance level of business cycle dynamics, 0.671 was observed to be greater than the significance level of 0.05 hence the study failed to reject the hypothesis that business cycle dynamics slope coefficient was equal to zero. There were no collinearity problems encountered during data analysis.

5.3 Conclusions

Understanding the relationship between market capitalization and stock price volatility in financial markets is important for traders, researchers and policy makers as it has implications for various financial models and risk management practices. The contemporaneous relationship helps in understanding the market clearing process and frictions in the market. Also, the ability to forecast volatility helps agents like traders,

with a very short-term investment horizon and portfolio managers that may have a medium-to-long-term investment horizon.

The study sought to determine the nature of relationship between market capitalization and stock price volatility. This was explored by means of a regression model and based on the summary of the major findings, the study concluded that the market capitalization of the listed firms did influence their volatilities. This relationship is however, weak for the 5 year of study. These results, though inconclusive, should not be discarded since the study failed to reject the hypothesis that $\beta_i = 0$ for market capitalization, implying that it was statistically significant.

Further, analysis of liquidity revealed that liquidity had a negative slope parameter and that it was also statistically significant. The study concluded, in agreement with previous studies conducted, that liquidity as measured by traded share volume was inversely proportionate to stock market volatility. This is in agreement with the widely known fact that emerging stock markets, though illiquid and have been observed to offer better risk adjusted returns as compared to developed markets

The study also found that the regression model adopted was statistically significant at the 5% level of significance. The study failed to reject the null hypothesis that business cycle dynamics as measured by semiannual turnover and earnings growth fluctuations slope parameter was equal to zero. This implied that business cycle dynamics was statistically insignificant.

5.4 Recommendations

The main objective of the study was to determine the relationship between market capitalization and share price volatility. Given that there exists a weak but significant relationship between these variables, the research recommends that investors should not use any of the aforementioned independent variables, with the exclusion of business cycle dynamics, on a standalone basis as a measure of analyzing the variations of its stock prices at Nairobi Stock Exchange; rather they should develop a more comprehensive model, Business cycle dynamics are inconsequential.

Liquidity positions enable investors to take advantage of surplus and deficits in funds between market players. However liquidity constraints make it possible for trades to be executed at prices other than the quoted market prices leading to inconsistencies, suboptimal capital allocation, misleading market capitalization information and unforeseen risks and volatility dynamics. For this reason, the study recommends that the regulator should come up with more regulations which will improve the efficiency of the stock market to make it a fair playing ground with minimal cases of exploitation, and to incorporate laws that encourage investors to trade more regularly.

The study further recommends that the management of investment firms should monitor the liquidity and market capitalization positions of firms in their portfolios in order to ensure sound financial decisions that would guarantee a stable growth in client wealth and hence achieve enhanced risk positions when executing trades. This is because both these factors have a bearing on the stock price volatilities of firms in their portfolios.

5.5 Limitations of the Study

The study was to examine the relationship of market capitalization and stock price volatility of firms listed in the NSE. The research relied on data from firms that had been continually listed in the period under survey. However it was impossible to gather data on all the financial statements of the 60 firms that had been continually listed from the year 2010 to 2014. The data that was obtained was for 44 companies which were used to analyze and conclude on the research problem. The data was however thought to be enough to give a conclusive relationship between market capitalization and stock price volatilities.

The scope of the study focused on firms listed at the Nairobi Securities Exchange. The findings of this study may not be representative of other firms outside this scope. In addition, the study did not go into the lengths of classifying the sampled listed firms into small cap, mid cap and large cap firms owing to a lack of strict criteria for such a classification.

The study did not control for some factors such as information asymmetry, weekday and holiday effects, inflation, legal restrictions and other macroeconomic variables that may affect volatility. This includes factors other than those captured in the study, such as the investors' expectations of the market behavior. As such, investors need to consider all these factors, including market sentiment, in order to develop a comprehensive model.

5.6 Suggestions for Further Research

The three independent variables that were studied, explain 5.3% of variance in market capitalization as represented by the coefficient of determination. This therefore means

that other factors not studied in this research contribute 94.7% of variance in the dependent variable. Therefore, further research should be conducted to investigate the other factors that affect price volatility of listed firms.

Since this study explored the effect of firms' market capitalization on stock price volatilities of firms listed in the Nairobi Securities Exchange, the study recommends that; similar study should be done in other securities exchange in Africa and beyond for comparison purposes and to allow for generalization of findings on the effect of dividend policy on market capitalization

The study also recommends that studies should be done to investigate other factors that influence companies' market price volatilities. Studies can be done to include more control variables which could have a potential impact on stock price volatility for instance the effect of inflation. In addition, further research can be done on the same topic but involve the use of other models other than multiple linear regression

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APPENDICES

Appendix 1: Sampled Companies

Year 201_, Half i

AGRICULTURAL

Kakuzi Ltd Ord.5.00
Kapchorua Tea Co. Ltd Ord Ord 5.00 **AIMS**
The Limuru Tea Co. Ltd Ord 20.00 **AIMS**
Rea Vipingo Plantations Ltd Ord 5.00
Sasini Ltd Ord 1.00

AUTOMOBILES & ACCESSORIES

Car & General (K) Ltd Ord 5.00
Marshalls (E.A.) Ltd Ord 5.00

BANKING

Barclays Bank of Kenya Ltd Ord 0.50
CFC Stanbic of Kenya Holdings Ltd ord.5.00
Diamond Trust Bank Kenya Ltd Ord 4.00
Equity Bank Ltd Ord 0.50
Housing Finance Co.Kenya Ltd Ord 5.00
Kenya Commercial Bank Ltd Ord 1.00
National Bank of Kenya Ltd Ord 5.00
NIC Bank Ltd Ord 5.00
Standard Chartered Bank Kenya Ltd Ord 5.00
The Co-operative Bank of Kenya Ltd Ord 1.00

COMMERCIAL AND SERVICES

Express Kenya Ltd Ord 5.00 **AIMS**
Kenya Airways Ltd Ord 5.00
Nation Media Group Ltd Ord. 2.50
Scangroup Ltd Ord 1.00
Standard Group Ltd Ord 5.00
TPS Eastern Africa Ltd Ord 1.00
Uchumi Supermarket Ltd Ord 5.00

CONSTRUCTION & ALLIED

Bamburi Cement Ltd Ord 5.00
Crown Paints Kenya Ltd Ord 5.00
E.A.Cables Ltd Ord 0.50
E.A.Portland Cement Co. Ltd Ord 5.00

ENERGY & PETROLEUM

KenGen Co. Ltd Ord. 2.50

KenolKobil Ltd Ord 0.05
 Kenya Power & Lighting Co Ltd **Ord 2.50**
 Total Kenya Ltd Ord 5.00

INSURANCE

Jubilee Holdings Ltd Ord 5.00
 Kenya Re Insurance Corporation Ltd Ord 2.50
 Pan Africa Insurance Holdings Ltd Ord 5.00

INVESTMENT

Centum Investment Co Ltd Ord 0.50
 Olympia Capital Holdings Ltd Ord 5.00

MANUFACTURING & ALLIED

B.O.C Kenya Ltd Ord 5.00
 British American Tobacco Kenya Ltd Ord 10.00
 Carbacid Investments Ltd Ord 1.00
 East African Breweries Ltd Ord 2.00
 Mumias Sugar Co. Ltd Ord 2.00
 Unga Group Ltd Ord 5.00

TELECOMMUNICATION & TECHNOLOGY

Safaricom Ltd Ord 0.05

Appendix 2: Data Collected

Year 2010, Half1 Price data

January	February		March		April		May		June
27	10	24	10	24	7	21	5	19	2
32	34.75	37	65.5	82	73	74	77	76.5	74
94.5	94.5	90	139	140	149	145	139	140	138
305	305	305	345	325	328	325	293	312	300
12.35	13	13.95	18.55	16.5	71	19.5	18.05	19	16.8
8.15	7.95	7.95	11.45	14.4	14.45	13.9	15.1	15.1	13.45
36.5	33.5	34	34.5	34.5	35	35	19.2	54	48.5
21.75	21	19	19	19	19	19	18.1	17	55.5
50.5	49.25	50.5	52.5	51.5	53	57.5	57.5	60	59
45	43.25	43.5	45	43.75	43.75	44.5	49.5	60	68
70	72	72	74.5	78	79	84.5	85	84	84.5
16.9	15.9	15.4	15.6	15.85	15.9	17.4	18.5	19.45	22.5
18.1	17.85	17.5	17.85	17.5	16.75	17.35	22.25	22	20.5
22.5	22	21.25	20.75	21	22.5	22	22.5	21.5	20.25

39.75	39	39	40.5	52	57.5	40	43.75	42.25	40.25
35.75	35.25	35	38.25	38.5	33.5	35.75	38.25	38.5	36.75
165	168	174	191	189	193	189	197	210	216
9.85	9.65	9.75	10	10	10	10.95	11.85	12.1	12.65
9	9	9	9.5	11.9	11.2	9.95	10.5	10	8.75
49.5	49.75	49.75	48	62	60	57	56.5	53	55.5
125	125	121	126	144	137	139	140	137	141
26.75	26.25	26.5	26.75	26.75	26	27.75	28.5	31.25	33
39	37.5	37.75	38.75	40	40	41.75	41	40.5	40.5
47.75	47.75	45.5	49.75	51	63.5	64.5	63.5	63.5	60
14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
160	161	167	189	199	184	185	185	197	200
26	24	23.75	24.5	27	31	34	37	34.25	33.25
22.75	23.5	233	22.75	22.25	21.75	21.5	21.75	21.75	19.35
80	85	80	95	90.5	94	100	115	125	115
14.5	14	13.65	13.8	14.6	15	15.15	15.9	17.35	16.95
56	67	64.5	72	73.5	78	78.5	90.5	106	100
149	149	149	170	180	180	174	179	200	200
29.25	30.75	31.25	29.5	30.25	30	30.25	30.25	30.75	29.75
140	138	135	145	150	165	165	178	175	173
13.05	13.3	12.9	12.95	13.5	13.2	13.8	13.2	12.9	11.9
48	45.5	45	48.5	54.5	51	56	56	60	60
13.5	13.25	12.55	12.65	12.85	15	15.5	18	18.85	18.7
7.7	7.4	7.25	7.95	8.4	8.3	7.9	9.95	9.15	8.3
149	149	157	150	145	131	142	135	137	135
180	182	190	192	202	195	194	196	196	207
100	100	100	109	120	124	128	148	151	155
153	151	151	157	155	166	171	168	170	177
9.25	10.55	10.05	9.85	10.5	10.45	11.4	13.1	13.35	12.8
9.45	9.1	9.15	10.95	10.95	10.35	10.4	11.5	12.35	11.85
5.55	5.55	5.35	5.4	5.45	5.55	5.75	5.8	5.55	5.55

Year 2010, Half1

Standard	trade volume	Number of shares	Share mkt	semianual
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Deviation	millions	Outstanding	Price	cap	Growth
19.77865362	0.0013	19599999	80	1.57	1.060407298
23.65586608	0.0007	3912000	138	0.54	1.050291516
15.92377677	0	1200000	300	0.36	0.909717652
17.44770281	0.0156	60000000	16.75	1.01	2.555977104
3.059847491	0.0974	228055500	14.45	3.30	1.077089866
9.293253228	0	22279616	49	1.09	1.059823848
11.55446162	0.001	14393106	16.4	0.24	0.659524585
3.970813659	0.527	1357884000	60.5	82.15	0.941473325
8.799364718	0.0216	273684211	71.5	19.57	1.181222951
5.939743728	0.0148	163037108	85	13.86	1.115275275
2.255339344	1.8169	3702777020	24.25	89.79	1.191178187
2.02759436	0.0534	230000000	21.25	4.89	1.318824559
0.801474336	1.1792	2217777777	20.75	46.02	1.242631632
6.290645613	0.0478	280000000	40	11.20	0.951766789
1.766981104	0.0279	358997784	38	13.64	1.175446395
16.65199354	0.0352	271967810	214	58.20	1.036640608
1.122546708	0.8842	3492369900	13.25	46.27	1.050038987
1.052563009	0.0021	35403790	8.6	0.30	0.72509652
4.839364054	0.0969	461615484	49.75	22.97	1.101521553
8.303279138	0.2055	142610520	139	19.82	1.082188762
2.353484414	0.0553	220689655	35.25	7.78	1.238406425
1.389694211	0.0005	73275029	37	2.71	1.01112352
7.932921908	0.0013	105864742	63.5	6.72	1.104558213
0	0	180000000	14.5	2.61	1.061449028
15.10739333	0.0061	362959275	199	72.23	1.130551997
4.968581846	0.013	23727000	33	0.78	0.66730905
66.75592795	0.1346	202500000	21.5	4.35	1.340480371
15.66746452	0.0003	90000000	124	11.16	1.039779139
1.280147561	0.3222	2198361456	17.1	37.59	1.143800774
15.86190405	0.0262	147176120	84.5	12.44	1.479293639
19.23538406	0.0087	79128000	199	15.75	1.053748076
0.610100174	0.0118	175028706	29.25	5.12	1.154599433
16.57441134	0.0005	45000000	170	7.65	1.021824995
0.499555358	0.1704	600000000	12.25	7.35	1.10768329
5.624598751	0.0003	48000000	60	2.88	0.91130651

2.56363999	0.3718	549951880	20.5	11.27	1.457023823
0.813838641	0.0069	40000000	8.4	0.34	1.037617167
8.366600265	0.0006	19525446	135	2.64	1.369031355
8.154071921	0.1015	100000000	207	20.70	0.943881989
21.72683952	0.0017	33980265	143	4.86	0.963875651
9.538809616	0.2474	790774356	180	142.34	1.07735901
1.460821687	1.0526	1530000000	13.15	20.12	1.00566856
1.128285326	0.0117	75708873	12.25	0.93	1.07081448
0.139443338	11.8608	40000000000	5.75	230.00	1.062772048

Year 2010, Half2 Price data

June 30	July 14	July 28	August 11	August 25	September 8	September 22	October 6	October 21	November 3
78	79	77	77	79.5	78.5	85.5	81	82.5	88
145	142	140	145	131	130	131	133	130	130
300	300	300	300	300	300	299	300	300	300
18.85	17.5	17.25	17.55	18.75	18.1	18.5	18.3	17.3	17.35
14.1	14.1	13.55	14.55	13.85	13.05	13.5	13	14	14.45
48.75	48.5	48.5	49.25	53.5	44.5	45	48	48	50
16.4	16.4	16	16.4	16	16	15.85	15	14.55	14.1
60.5	64.5	63	68	65.5	64.5	68	68	68.5	67.5
73	82.5	82.5	91	93.5	87	87	87	87.5	88.5
88.5	89.5	94.5	96	110	110	106	113	128	135
23.75	22.75	23.25	25.75	24.75	25.25	25.5	26.75	26.75	26
21.25	21	20.75	26.25	24.25	23.75	25.75	26.75	29.5	28.5
18.55	17.8	18.1	18.85	19	18.95	19.45	21.75	22.75	22.75
40.5	39.25	38	40.75	41.75	39.75	39	39.25	41	39.75
39.5	39.5	39.75	44	46	46	44.5	46	50	49.25
223	230	257	291	251	251	272	271	262	271
14.9	14.45	14.8	16.5	17.55	16.2	17.05	18.95	19.4	19.85
9	8.5	9.6	10	10.25	9.8	9.2	9.55	9.7	10
46.75	46.75	45.75	50.5	51	46.5	47	45.25	44	44.25
139	142	144	148	156	158	163	167	162	163
38.75	38.75	36.25	41.25	48.5	53.5	54.5	64	65.5	69.5
38.5	39.75	39	43.25	42.5	43.5	44	47.5	46.25	46.5

57	56.5	59.5	52.5	56	59.5	65.5	63	63	69.5
14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
204	200	199	200	200	200	209	203	209	209
31.25	34.25	32	37	37.75	37	39.5	37.75	37	37
20.25	20.25	19.4	18.95	18.95	17.95	18.45	18.5	18.45	18.05
115	115	121	128	123	115	125	116	115	115
17	17.2	17	18.2	17.6	17.2	18	17.6	16.95	17.35
9.6	10.95	9.85	10	9.65	8.85	8.85	9.95	9.95	11.05
200	199	189	208	207	210	251	237	232	224
28.25	29.25	29.25	30.75	30	31.25	32	31.5	31	30.5
168	162	169	196	200	192	192	190	197	197
12	11.5	11.4	12.75	12.45	12.05	12	11.85	11.75	11.9
60	68.5	64	62	75	77.5	80	77.5	77	77
22.25	22.5	19.4	23.25	23	22.75	24.25	25	24.75	24.5
7.75	7.55	7.6	7.5	7.5	7.5	7.15	7	7.4	7.25
135	128	140	141	150	147	149	145	145	140
217	227	232	261	260	262	267	272	275	281
145	160	157	153	156	152	184	176	163	145
181	180	180	183	183	175	195	190	201	209
12.9	12.55	12.5	14.05	13.7	12.3	12	12.1	11.45	11.05
12	11.9	12	13.1	12.8	13.1	13.35	12.75	12.75	12.2
5.8	5.8	5.65	5.9	5.25	4.8	4.55	4.6	4.9	4.85

Year 2010, Half2

Standard Deviation	Trade Vol Millions	Number of shares Outstanding	Share Price	Mkt Cap Billions	semianual Growth
3.702851754	0.0003	19599999	85.5	1.675799915	1.060407298
6.498717822	0	3912000	120	0.46944	1.050291516
0.316227766	0	1200000	300	0.36	0.909717652
0.626476035	0.0241	60000000	16.2	0.972	2.555977104
0.533359374	0.1434	228055500	12.95	2.953318725	1.077089866
2.50610366	0	22279616	48	1.069421568	1.059823848
0.825025252	0	14393106	14.1	0.202942795	0.659524585

2.668749187	0.055	1357884000	64	86.904576	0.941473325
5.639395161	0.0002	273684211	83	22.71578951	1.181222951
15.65504888	0.0001	163037108	135	22.01000958	1.115275275
1.403368962	1.3132	3702777020	25.75	95.34650827	1.191178187
3.116822634	0.0379	230000000	26	5.98	1.318824559
1.887009686	0.8231	2950259818	22	64.905716	1.242631632
1.106797181	0.0228	280000000	38.75	10.85	0.951766789
3.834782335	0.0182	358997784	48.5	17.41139252	1.175446395
20.40397565	0.0274	287077133	271	77.79790304	1.036640608
1.961299173	1.4737	3492369900	19.85	69.32354252	1.050038987
0.527994108	0.0025	35403790	8.9	0.315093731	0.72509652
2.340613642	0.338	461615484	46.75	21.58052388	1.101521553
10.10830242	0.004	157118572	160	25.13897152	1.082188762
12.2880927	0.0969	234570024	58.5	13.7223464	1.238406425
3.186451353	0.0009	74059026	44	3.258597144	1.01112352
5.206833117	1.0539	156937967	68	10.67178176	1.104558213
0	0	180000000	14.5	2.61	1.061449028
4.217687623	0.0932	362959275	195	70.77705863	1.130551997
2.747157622	0.002	23727000	32	0.759264	0.66730905
0.822327321	0.0035	202500000	17.35	3.513375	1.340480371
5.006662228	0.0044	90000000	108	9.72	1.039779139
0.432563419	0.0935	2198361456	17.05	37.48206282	1.143800774
0.729611769	0.1195	1471761200	10.15	14.93837618	1.479293639
19.55078856	0.6118	633024000	29.75	18.832464	1.053748076
1.174083567	0.0091	175028706	29.5	5.163346827	1.154599433
14.19741761	0.006	49500000	191	9.4545	1.021824995
0.402802681	0.2597	600000000	11.6	6.96	1.10768329
7.479787579	0.0049	48000000	70	3.36	0.91130651
1.649924241	0.2841	604947068	24.25	14.6699664	1.457023823
0.225092574	0.0013	40000000	6.55	0.262	1.037617167
6.749485577	0.0019	19525446	141	2.753087886	1.369031355
22.04641568	0.0041	100000000	283	28.3	0.943881989
12.56494241	0.0004	33980265	146	4.96111869	0.963875651
10.84281636	0.5376	790774356	219	173.179584	1.07735901
0.921592824	1.4812	1530000000	9.9	15.147	1.00566856
0.528861461	0.0107	75708873	11.6	0.878222927	1.07081448

0.534270011 6.121 40000000000 4.55 182 1.062772048

Year 2011, Half1 Price data

January	February		March		April		May		June
26	9	23	9	23	6	20	4	18	2
84	78.5	79.5	76.5	72.5	69.5	65.5	65.5	65	74.5
130	124	125	125	115	105	105	110	105	103
300	305	305	305	305	300	300	300	300	300
17.2	17	16.5	16.4	16.5	15.05	14.2	13.5	14.45	14.1
12.65	12.05	11.5	10.05	9.5	10.45	10.2	10	9.85	12.5
50	59.5	49.5	44.75	36.25	38	36	36	35	32
14.2	14.25	14.2	14.15	14.15	14.15	14.15	14.15	12.75	12.75
63.5	60.5	68.5	67	57.5	60.5	63	66	66	71.40
77.5	78	79	79	77.5	74.5	62	59	57	53.5
147	144	145	140	137	136	148	144	150	124
29.5	28.5	27.75	26	24.5	25.25	27	27	24.75	25
28.75	27.25	26.75	27.25	26	26	26	26.25	25.75	25.25
23.75	22.5	23	23.25	22.75	25	25.5	26.25	24.75	25.25
46.75	43.75	45.75	43.75	37	38.5	38.5	38.75	36.75	35.5
50	50	50	48.75	47	48.25	45.75	45.75	46	44
271	270	269	260	260	265	250	251	251	246
20.25	20	19.95	19.25	17.4	17.55	17.15	17.65	17.4	17.4
8.05	8.05	7.75	7.1	6	6	5.8	5.9	4.55	4.85
46	43.25	39.25	37.5	35.25	32	36.75	37.25	40	40.75
171	170	174	173	175	177	186	186	183	182
64.5	60	61	50	52	52.5	55.5	62.5	60.5	51
42.5	42.5	42	39.25	39	40	36.25	35	36	35
64.5	66.5	66.5	66	67	64	66	65.5	65.5	67.5
14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	12.5
203	197	197	195	179	177	165	168	175	170
32.5	33	32.75	31.75	32	33	32	32	32.5	31.75
16	16.1	19.6	19.1	14.35	14.95	15.3	14.75	14	13.55
108	113	100	100.5	90	91	83	85	90	85
16.35	16.6	15.65	14.15	14.2	15.15	15.2	15.35	15.3	15.6
9.9	9.9	9.4	9.85	9.35	9.85	9.7	9.6	9.35	9.7

22.5	23.5	21.75	21.75	21	21	21	21.25	21.5	21.5
29	28.5	27.75	28.25	28	26.5	26	26.5	25.5	25.5
191	189	190	189	185	221	211	210	207	189
11.15	11.1	10.85	10.1	9.8	9.95	10.1	9.6	9.65	10
63.5	70	81	77	92	96.5	92	93.5	99.5	40.25
23.75	23.25	22.75	21.5	20.75	22.75	23	23	23.5	22.5
5.7	5.6	5.1	4.65	4.8	4.95	5	5.1	5	4.85
142	140	150	140	134	130	123	126	125	119
278	270	274	280	275	270	265	261	258	249
149	146	151	145	147	141	135	130	129	121
207	190	180	174	175	189	202	206	204	209
9.8	8.85	8.45	7.8	7.45	7.8	7.85	7.7	7.85	7.45
11.05	10.85	10.55	10.15	9.9	9.7	9.5	9.5	9.1	9.45
4.4	4.4	4.25	3.85	3.9	4.1	4.15	4	3.95	3.85

Year 2011, Half1

Standard Deviation	Trade Vol Millions	Number of shares Outstanding	Share Price	Mkt cap Billions	semianual Growth
6.640783086	0.0011	19599999	70	1.37199993	0.927187322
10.40352504	0.0009	3912000	113	0.442056	1.701092227
2.581988897	0.0005	1200000	300	0.36	1.063851598
1.370482478	0.0137	60000000	14.8	0.888	0.904431058
1.182570176	0.0184	228055500	11.2	2.5542216	1.021158613
8.839463282	0	33419424	32	1.069421568	1.042553411
0.601756688	0	14393106	12.75	0.183512102	0.943733647
4.196413813	0.235	1357884000	63.5	86.225634	1.041069573
10.45678939	0.0007	273684211	52	14.23157897	1.276137833
7.663042622	0.0117	163037108	120	19.56445296	1.182972711
1.705587224	0.6727	3702777020	25	92.5694255	1.165026129
1.010019252	0.0329	235750000	24	5.658	0.964440337
1.311275884	0.4541	2950169143	24.25	71.54160172	1.066489352
4.084183585	0.0252	280000000	34.75	9.73	2.17546258
2.153163048	0.0327	394897562	42.75	16.88187078	1.119649961
9.310090106	0.0069	287077133	237	68.03728052	1.183164868

1.289056503	4.9825	3492369900	16.75	58.49719583	1.252625719
1.269831572	0.0151	35403790	4.3	0.152236297	0.71451862
4.00312378	0.0906	360000	20.25	0.00729	1.121166078
6.074537019	0.0063	157118572	161	25.29609009	1.047808769
5.335676569	0.0053	237324273	50	11.86621365	1.044263554
3.027650354	0.0014	74059026	36.75	2.721669206	1.067475051
1.0749677	0.0155	148210640	68	10.07832352	0.988775687
0.632455532	1.2988	265426614	12.7	3.370917998	1.132000946
14.01744944	0.0549	362959275	174	63.15491385	1.022146364
0.486626711	0.0015	23727000	29.75	0.70587825	1.801171333
2.052938274	0.0552	253125000	13.05	3.30328125	1.277296441
10.30762932	0	90000000	87	7.83	0.914556707
0.784732792	0.0702	2198361456	14.25	31.32665075	1.054464017
0.224598407	4.0423	1471761200	10.95	16.11578514	0.930334719
0.791008498	1.0082	1734637374	21.5	37.29470354	1.166206257
1.297433364	0.0117	175028706	24.75	4.331960474	1.065114543
12.68244631	0.0023	49500000	180	8.91	1.120833897
0.584142296	0.1765	600000000	9	5.4	1.20238623
18.50617389	0.0105	48000000	43.5	2.088	1.229166075
0.913251213	0.0749	604947068	23	13.91378256	0.771783187
0.333541602	0.0113	40000000	4.5	0.18	1.0777266
9.926955447	0	19525446	115	2.24542629	1.154891229
9.752492559	0.0159	100000000	261	26.1	1.230738482
10.09069979	0.002	33980265	122	4.14559233	1.264915044
13.73721628	0.0263	790774356	188	148.6655789	1.112074886
0.736734537	1.0096	1530000000	7.4	11.322	0.991971277
0.654577896	0.0842	75708873	10	0.75708873	1.099562657
0.210884381	1.6512	4000000000	3.9	156	1.062196157

Year 2011, Half2 Price data

June	July		August		September		October		November
29	13	27	10	24	7	21	5	19	2
70	68.5	68	68	71.5	68	68	67	68	81.5
130	134	125	120	120	108	95.5	96	97	125

300	300	300	317	312	311	311	312	315	356
14.6	14.05	14.65	14	13.5	14.3	14.95	13.85	18.45	21
11.4	11.1	10.3	10	10.8	103	13.75	12.25	12.9	13.95
32	27.75	29	27	24.75	25	25.5	24.75	24.75	25
12.75	12.75	11.4	11.4	11.4	11.4	11.5	11.6	11.9	12.5
17.4	16.5	15.65	14	13.35	12.05	11.95	10.6	11.9	15.15
52	52	54.5	49	50	46.25	47.25	44.5	44.5	44
121	115	108	100	100	97	98.5	97	95	94
25.25	23.75	23.75	20.5	20.25	18	18.75	17.2	17.75	20
23.5	22.25	20.75	17.25	18.5	15.65	17.95	16.6	16.5	16
23.75	23	23	20.25	20.25	19.45	17.9	16	14.8	18.25
35	30.75	28.5	27.25	26.5	23.25	23.75	22.25	22.5	25.25
43.25	43.5	39.5	33.25	33	31.5	33	30.5	26.5	30
235	230	222	218	210	199	195	176	173	179
16	14.6	15.35	14.6	14	13.9	14.15	14.05	14	14.8
4.3	4.5	4.8	4.1	4	3.85	4	4.4	4	4.1
38.5	33.75	33	30	32.75	30.5	29.5	25	24	23
164	165	146	150	150	139	142	140	139	138
52.5	52	49.25	45.25	44.5	41.75	41.75	37.5	36.25	39.75
35.75	34.75	30.5	30.25	32.75	27.5	29.75	28.75	25.75	27.5
67.5	64	62.5	60	57	56	58	59.5	57	59.5
11.5	11	10.15	9.1	8.8	7.4	8.5	8.55	8.5	8.95
176	175	171	170	165	163	160	159	155	158
30	28	28.5	25.75	25.25	25.75	25.25	26	25.75	27
13.1	11.95	13.15	12.2	11.65	11.2	11.55	11.15	10.9	11.2
87	86	75	75	68.5	62	63.5	60	59	56.5
13.75	12.8	12.5	10.7	11.35	10	9.95	9.5	9.55	10.65
11.2	11.9	10.95	11.15	10.3	10	10.4	9.5	9.75	10.85
21.75	20.5	20	17.05	19.6	18.1	19.05	17.05	17	18.75
24.5	22.75	24.75	21.5	21.75	19.8	19	16.75	16.2	16.35
179	176	171	176	166	160	160	160	162	167
9	8.2	8.5	8.15	8.15	7.2	7.95	7.95	7.6	7.95
42.75	39.25	32.25	29	26.75	25	25.5	24	24.5	25
23	22.75	19.15	17.6	18.4	15.1	16.7	15	14.95	15.7
4.2	4.1	4.4	3.95	4.4	4.05	4.3	3.95	3.7	3.9

115	115	112	108	105	95.5	99	97	99	98
261	258	256	257	247	232	236	235	230	235
124	120	120	120	118	115	117	115	116	113
190	185	184	172	174	172	185	164	152	155
7.05	6.95	7.1	6.5	6	6.1	6.4	6.45	6.1	6.9
10	9.95	9.7	9.1	9	9.05	9.9	10.15	10.65	11
3.95	3.75	3.65	3.3	3.15	2.95	3.2	3.05	3.1	3

Year 2011, Half2

Standard Deviation	Trade vol Millions	Number of shares Outstanding	Share Price	Mkt cap Billions	semianual Growth
4.288550649	0.0021	19599999	78	1.528799922	0.927187322
14.72045063	0.0002	3912000	120	0.46944	1.701092227
16.27677282	0	1200000	356	0.4272	1.063851598
2.427395724	0.0134	60000000	19.55	1.173	0.904431058
28.86387063	0.0203	228055500	13.7	3.12436035	1.021158613
2.426130893	0	33419424	24.75	0.827130744	1.042553411
0.581090928	0.0001	14393106	12.25	0.176315549	0.943733647
2.26181466	0.2016	5431536000	13.55	73.5973128	1.041069573
3.678390348	0.6499	273684211	45	12.3157895	1.276137833
9.105706392	0.101	195644530	93	18.19494129	1.182972711
2.823728819	0.6819	3702777020	19.65	72.75956844	1.165026129
2.748176163	0.0369	235750000	14.85	3.5008875	0.964440337
3.016256878	0.2277	2968655481	17.05	50.61557595	1.066489352
4.063728447	0.0054	280000000	22.75	6.37	2.17546258
5.752052774	0.0057	394897562	30	11.84692686	1.119649961
22.77449841	0.0069	287077133	180	51.67388394	1.183164868
0.686961911	0.0891	3492370900	13.95	48.71857406	1.252625719
0.2910231	0.0036	35403790	4	0.14161516	0.71451862
4.869120386	0.0737	461615484	20	9.23230968	1.121166078
10.07802891	0.0027	157118572	140	21.99660008	1.047808769
5.73585216	0.1101	284789128	41.5	11.81874881	1.044263554
3.242619826	0.0005	74059026	28	2.073652728	1.067475051
3.604010112	0.003	148210640	55	8.1515852	0.988775687
1.259949294	0.0657	265426614	8	2.123412912	1.132000946

7.420691792	0.0001	362959275	158	57.34756545	1.022146364
1.609218237	0.0002	23727000	25	0.593175	1.801171333
0.79807059	0.007	253125000	11	2.784375	1.277296441
11.06106786	0.0046	90000000	58.5	5.265	0.91
1.482724594	0.3377	2198361456	9.5	20.88443383	1.054464017
0.742368582	0.1015	1471761200	9.85	14.49684782	0.930334719
1.616589345	0.0681	1734637374	18	31.22347273	1.166206257
3.230587322	0.003	175028706	15.9	2.782956425	1.07
7.379400759	0.0018	54450000	161	8.76645	1.12
0.483074643	0.1258	600000000	7.4	4.44	1.20238623
6.647054486	0.003	96000000	24	2.304	1.229166075
3.029947744	0.1255	665441775	15.5	10.31434751	0.771783187
0.23027761	0.0004	40000000	3.8	0.152	1.0777266
7.666847824	0.0009	19525446	95	1.85491737	1.154891229
12.32927861	0.0353	100000000	231	23.1	1.230738482
3.259175083	0.0013	33980265	101	3.432006765	1.26
13.10682604	0.1581	790774356	167	132.0593175	1.112074886
0.418628714	1.8777	1530000000	5.55	8.4915	0.991971277
0.669576981	0.0697	75708873	11	0.832797603	1.099562657
0.348648183	16.8578	40000000000	2.95	118	1.062196157

Year 2012, Half1 Price Data

January	February		March		April		May		
25	8	22	7	21	4	18	2	16	30
70	75	79.5	74	74	80	80.5	81	81	80
120	114	123	123	112	114	121	115	117	124
335	350	394	400	400	400	430	430	410	455
17.35	16.45	16	16	15.85	15.7	15.05	15.6	15.85	16.85
12.5	10.45	11	11.05	10.35	11.3	11.4	11.45	11.35	12.3
24	23.5	24	26.25	26	23.5	25	29	29	28
12.7	12.45	12.45	12.4	12.4	12.05	12.05	12.5	12.5	12.5
12.45	12.3	13.15	13.75	13.45	11.8	12.3	12.8	13	12.95
40.5	40.5	40	42.25	40	40	40.25	41	43	41.75
89	88.5	90	95	87.5	93.5	94	95.5	100	96.5

16	17.45	18.95	19.4	17.45	19.25	19.9	20.75	20.75	21
13.75	12.25	13.8	14.45	13.55	14.4	14.85	14.8	15.55	15.2
17.5	19.3	19.9	22.5	20.75	22.5	23.75	22.5	24.25	22.75
20.75	21	20	21.75	17.45	18.7	18.7	19.2	20	20.5
26.5	25.25	25	29	26.75	25.5	27.25	30	33	32.75
155	158	160	175	171	174	169	165	168	178
12.6	12.4	11.95	12.95	12.4	12.85	12.9	13.65	14.1	13.65
3.5	3.9	3.95	4.1	4.1	4.4	4	4	3.7	3.7
20	18.65	17.05	17.5	14.5	13.95	14	14.85	14.75	14.85
137	141	142	154	158	165	163	167	171	167.00
38	42.25	40.5	42.5	47.5	51.5	15.5	54.5	52	51.00
26.25	26.5	23.5	22	23.5	23	22.75	21	24	22.00
48.75	48.5	48	47	48	47.5	45	46	44	44.00
7.5	7.2	6.8	8.2	9.6	12.45	14.05	14.25	16.35	16.70
135	128	130	155	155	150	149	148	185	149.00
21.25	24.75	24	26.25	26.25	26	28	27.5	26	29.75
11.55	11.25	10.95	11.4	10.9	11	10.7	11.1	10.9	10.80
56	56	56	56	56	56	56	60	60	64.00
7.95	7.5	7.2	7.35	7.2	7.35	7.9	8.25	8.6	8.00
10.05	10.25	11.05	11.05	11.2	12.05	12.65	12.45	12.5	12.50
15.9	15.9	15.8	14	14.45	14.5	15.25	15.4	15.25	14.65
15.9	16.45	17	17.65	16.4	13.2	15.4	15.6	15.8	15.90
155	150	150	163	185	173	173	181	180	175.00
7.85	7.2	7.4	7.45	7.25	7.6	7.6	9.75	11.95	12.30
20	19.8	20	24	25.75	24.5	28	28.25	26.75	30.50
14.35	13.3	13.6	14.05	12.95	13.25	14.65	15.5	14.9	14.75
3.6	3.3	3.85	3.95	3.8	3.15	3.45	3.45	3.5	3.85
100	118	123	118	115	115	115	115	110	109.00
260	258	260	303	308	286	303	323	333	336.00
89	90.5	98	91	99	88	97	100	101	104.00
164	173	183	197	184	202	203	210	218	217.00
5	5	4.8	4.85	4.85	4.65	5	5.2	5.5	5.60
9.1	9.2	9.05	9.45	9.6	9.9	10.15	10.35	11.95	12.65
3.25	3.2	3.2	3.3	3.1	3.15	3.2	3.3	3.45	3.25

Year 2012, Half1

Standard Deviation	Trade Vol Billions	Number of shares Outstanding	Share Price	Mkt cap Billions	semianual Growth
3.901566637	0.0011	19599999	75	1.469999925	0.823109105
4.423422506	0	3912000	148	0.578976	0.983688035
36.03146773	0.0001	1200000	500	0.6	0.947688761
0.657942922	0.0165	6000000	16	0.96	1.08303737
0.687204482	0.0399	228055500	12.75	2.907707625	1.006624203
2.192316127	0	33419424	28	0.935743872	0.993392117
0.202758751	0.1199	14393106	12	0.172717272	0.99176528
0.589938792	2.3471	5431536000	13	70.609968	0.924741007
1.060987486	0.0035	273684211	42.25	11.56315791	1.258918647
4.058256331	0.0033	195644530	103	20.15138659	1.095560522
1.662795504	1.0054	3702777020	21.75	80.53540019	1.044493707
0.957949198	0.0125	235750000	16	3.772	1.277110348
2.137002054	0.4751	2968655481	23.25	69.02123993	1.015513199
1.291736557	0.0011	280000000	19.65	5.502	0.395831487
2.974894956	0.0233	394897562	35	13.82141467	1.053000896
7.689097621	0.0022	287077133	182	52.24803821	1.075013756
0.670178252	0.7352	3492370900	13.8	48.19471842	1.043545293
0.253913809	0.0011	35403790	3.95	0.139844971	1.298244209
2.135259547	0.0985	461615484	13.9	6.416455228	0.957206454
12.40295664	0.0119	157118572	169	26.55303867	1.040755182
11.32993209	0.0779	284789128	54.5	15.52100748	0.98925452
1.774823935	0.0004	74059026	25	1.85147565	1.154108325
1.810655191	0.0013	148210640	43	6.37305752	1.129224023
3.890858232	0.3031	265426614	17.15	4.55206643	1.02
16.20836547	0.001	362959275	155	56.25868763	0.951295884
2.322743828	0.0002	23727000	33.5	0.7948545	1.078796644
0.270236522	0.0061	253125000	10.35	2.61984375	0.88
2.796823595	0.0005	90000000	63	5.67	1.040512925
0.480855719	0.2728	2198361456	8.1	17.80672779	1.014154305
0.979299636	0	1471761200	12.5	18.397015	0.754800373
0.674866242	0.895	1951467045	14.45	28.1986988	0.87
1.176435294	0.0001	175028706	16	2.800459296	1.136142851

13.08306794	0.0012	54450000	160	8.712	1.081669414
1.98130849	0.137	600000000	10.05	6.03	1.05360698
3.817026912	0.0103	96000000	34.25	3.288	1.347913523
0.837721778	0.9092	665441775	14.7	9.781994093	0.885220712
0.265413723	0.0054	40000000	3.8	0.152	1.03218822
6.268084946	0.0029	19525446	109	2.128273614	1.04
29.93697083	0.0233	100000000	356	35.6	1.069879541
5.643334318	0.0015	33980265	114	3.87375021	1.016721012
18.45384633	0.2099	790774356	218	172.3888096	1.03
0.305004554	0.6394	1530000000	6.1	9.333	0.877128098
1.2292274	0.0021	75708873	12.75	0.965288131	0.973525806
0.096609178	31.8149	40000000000	3.4	136	1.077783506

Year 2012, Half2 Price Data

June		July		August		September		October	
27	11	25	8	22	5	19	3	17	31
75.00	74.00	76.50	75.00	75.50	75.00	70.00	70.00	74.50	72.00
144.00	132.00	132.00	139.00	135.00	130.00	117.00	125.00	120.00	120.00
450.00	450.00	450.00	450.00	450.00	450.00	450.00	450.00	450.00	450.00
16.00	16.15	16.70	17.05	16.95	16.50	16.30	17.40	17.10	18.20
11.50	12.05	12.30	11.00	11.35	11.40	11.25	11.35	11.05	11.60
27.75	27.00	25.00	25.00	24.00	25.00	22.00	24.50	25.00	25.00
12.45	12.40	12.30	12.50	12.00	12.00	12.00	13.00	13.05	14.00
13.50	13.65	14.25	14.05	14.00	14.40	14.60	14.50	14.15	15.80
43.00	45.25	43.00	43.75	43.00	49.50	43.00	41.00	38.00	38.75
104.00	95.00	93.00	95.50	99.50	100.00	104.00	114.00	120.00	120.00
21.75	21.50	22.25	21.25	21.00	23.50	24.00	22.50	23.50	24.00
15.80	15.00	15.90	15.65	15.35	14.95	13.25	14.20	14.80	15.45
23.00	23.25	24.00	24.25	25.50	26.00	27.00	27.50	28.25	30.00
19.00	19.55	19.10	19.05	18.60	18.85	18.55	18.15	18.10	19.40
36.00	36.75	37.00	34.50	32.25	33.75	33.25	34.75	36.25	38.00
200.00	191.00	200.00	196.00	199.00	208.00	220.00	208.00	218.00	229.00
11.35	11.40	11.50	11.30	10.90	11.70	12.30	11.75	12.20	12.55
3.95	3.95	3.90	3.70	3.60	3.85	3.90	4.00	4.00	3.90

12.85	14.25	14.30	13.60	13.70	13.30	12.85	11.75	11.80	12.45
175.00	178.00	171.00	178.00	188.00	203.00	207.00	204.00	215.00	220.00
53.50	50.50	54.50	57.50	57.00	57.00	59.00	58.00	56.00	60.00
23.75	25.00	25.00	25.00	23.75	21.50	24.00	24.75	24.00	25.75
42.50	45.50	43.00	41.00	39.75	39.00	40.00	39.75	38.50	38.00
16.10	15.75	15.30	15.75	15.10	16.00	16.95	18.45	19.90	19.55
158.00	165.00	180.00	180.00	179.00	175.00	175.00	168.00	167.00	177.00
33.75	34.75	32.00	33.50	34.75	36.00	36.00	35.00	35.50	38.00
10.50	10.40	10.50	10.45	10.25	10.05	10.30	10.60	11.25	11.05
60.00	58.50	57.00	57.00	56.00	56.00	55.00	52.00	49.00	54.00
8.85	8.55	8.30	8.55	8.35	8.30	8.30	8.70	8.60	9.20
15.95	15.80	16.15	15.55	15.00	14.85	15.45	15.05	14.00	14.45
14.90	15.15	15.15	15.40	16.00	16.50	17.10	17.50	18.30	18.55
15.05	15.45	15.55	16.85	17.95	15.50	15.50	15.20	14.65	14.10
162.00	165.00	174.00	165.00	170.00	168.00	165.00	165.00	164.00	166.00
10.45	10.60	9.90	10.90	10.30	10.80	11.95	12.10	12.10	12.50
36.00	35.50	35.00	34.75	35.75	39.25	38.50	36.25	35.00	38.75
13.75	13.05	12.65	12.30	11.65	12.25	11.85	12.20	12.00	13.25
3.80	3.70	3.65	3.75	3.35	3.55	3.65	3.70	3.60	3.65
115.00	130.00	120.00	111.00	111.00	101.00	102.00	102.00	102.00	112.00
369.00	363.00	378.00	388.00	398.00	414.00	415.00	430.00	450.00	467.00
115.00	124.00	127.00	124.00	121.00	120.00	123.00	120.00	111.00	120.00
226.00	236.00	227.00	223.00	229.00	226.00	228.00	234.00	237.00	240.00
6.25	6.85	6.85	7.00	6.80	6.25	6.05	6.25	6.15	6.00
12.40	12.25	12.25	12.60	12.80	12.90	15.45	12.00	13.40	13.00
3.50	3.55	3.85	3.85	3.75	3.95	4.00	4.05	4.10	4.40

Year 2012, Half2

Standard Deviation	Trade Vol Millions	Number of shares Outstanding	Share Price	Mkt cap Billions	semianual Growth
2.288255036	0.059	19599999	71	1.391599929	0.823109105
8.82169044	0.0004	3912000	120	0.46944	0.983688035
0	0	1200000	430	0.516	0.947688761
0.65787959	0.0014	60000000	18.5	1.11	1.08303737

0.410994728	0.0295	228055500	11.9	2.71386045	1.006624203
1.556572088	0.0039	33419424	24	0.802066176	0.993392117
0.628578644	0	14393106	14.2	0.204382105	0.99176528
0.634997813	0.2316	5431536000	15.2	82.5593472	0.924741007
3.242619826	0.0075	395321638	38.5	15.21988306	1.258918647
10.11050059	0.0009	220100096	118	25.97181133	1.095560522
1.151388051	1.1659	3702777020	25	92.5694255	1.044493707
0.811736821	0.1294	235750000	15.4	3.63055	1.277110348
2.310152713	0.4723	2970249681	30.25	89.85005285	1.015513199
0.485369275	0.0459	280000000	18.95	5.306	0.395831487
1.840893503	0.1445	493621953	41.5	20.48531105	1.053000896
12.08718329	0.2613	287077133	234	67.17604912	1.075013756
0.515024271	1.406	4190845080	12.55	52.59510575	1.043545293
0.129636243	0.0045	35403790	3.6	0.127453644	1.298244209
0.911058603	0.0999	1496469035	12.25	18.33174568	0.957206454
17.96570808	0.0093	157118572	233	36.60862728	1.040755182
2.810693865	0.075	284789128	65.5	18.65368788	0.98925452
1.17260394	0.0002	81481478	23.5	1.914814733	1.154108325
2.332738019	0.1066	148210640	38.75	5.7431623	1.129224023
1.773892456	0.2722	265426614	19.35	5.136004981	1.02
7.486283754	0.0149	362959275	176	63.8808324	0.951295884
1.637452289	0.0005	23727000	38	0.901626	1.078796644
0.362131038	0.001	253125000	11.05	2.79703125	0.88
3.183725979	0.0215	90000000	44.75	4.0275	1.040512925
0.29078438	0.2066	2198361456	9.55	20.9943519	1.014154305
0.682418086	0.1393	1471761200	14.65	21.56130158	0.754800373
1.351840309	6.514	1951467045	18.3	35.71184692	0.87
1.092448829	0.0042	175028706	13.9	2.432899013	1.136142851
3.438345856	0.0002	59895000	170	10.18215	1.081669414
0.91463411	1.1692	700000000	12.3	8.61	1.05360698
1.701510767	0.023	96000000	40	3.84	1.35
0.66976364	0.5272	665441775	12.2	8.118389655	0.885220712
0.124275679	0.0002	40000000	3.65	0.146	1.03218822
9.430447144	0	19525446	113	2.206375398	1.037155237
34.56652202	0.002	100000000	450	45	1.069879541

4.648775227	0.0024	33980265	115	3.907730475	1.02
5.699902533	0.0639	790774356	242	191.3673942	1.03138406
0.382571707	0.8976	1530000000	5.5	8.415	0.877128098
0.986984746	0.0297	75708873	13.2	0.999357124	0.973525806
0.265622958	18.0752	40000000000	4.6	184	1.077783506

Year 2013, Half1 Price Data

January y	February		March		April		May			
	23	6	20	6	20	3	17	2	15	29
70.00	75.00	77.00	77.00	81.50	80.00	85.00	86.00	86.50	86.00	
	118.0	120.0	115.0	115.0	125.0	125.0	125.0	126.0	127.0	
118.00	0	0	0	0	0	0	0	0	0	0
	430.0	430.0	430.0	470.0	460.0	470.0	470.0	470.0	470.0	470.0
430.00	0	0	0	0	0	0	0	0	0	0
20.00	20.00	20.75	21.75	22.00	22.25	22.50	21.00	21.00	22.00	
12.40	11.60	11.95	11.20	12.45	12.40	13.45	12.90	13.50	13.85	
25.50	24.00	26.00	24.00	22.00	25.75	26.75	26.00	25.00	25.75	
14.15	14.15	12.80	12.50	12.40	12.40	12.30	12.00	12.30	12.40	
16.10	16.15	16.35	17.00	16.60	18.00	17.50	17.70	17.55	18.55	
45.00	42.75	46.00	48.25	57.50	64.50	64.00	59.50	60.00	63.00	
	131.0	140.0	142.0	143.0	150.0	153.0	154.0	158.0	169.0	
135.00	0	0	0	0	0	0	0	0	0	
26.00	26.75	27.50	28.50	29.75	35.50	34.00	31.25	32.75	36.25	
17.25	17.90	20.00	19.65	22.75	25.75	25.00	24.75	25.50	25.50	
33.00	34.25	36.75	35.50	38.75	42.50	42.00	42.00	40.50	41.75	
18.50	18.00	19.55	19.10	21.25	23.00	22.50	20.50	22.25	22.00	
44.75	42.50	45.25	45.25	48.50	56.00	52.50	51.50	54.00	55.50	
	264.0	276.0	279.0	289.0	312.0	318.0	279.0	302.0	302.0	
259.00	0	0	0	0	0	0	0	0	0	
13.05	13.20	13.30	14.45	14.95	17.80	16.90	16.25	16.25	16.65	
3.50	3.50	3.25	3.40	3.90	3.80	4.25	4.20	3.95	4.00	
10.95	10.85	10.70	10.60	11.25	10.95	10.95	10.95	11.30	11.25	
	264.0	265.0	269.0	282.0	366.0	314.0	280.0	294.0	312.0	
256.00	0	0	0	0	0	0	0	0	0	
63.50	72.00	69.50	67.00	72.00	71.50	69.00	66.00	67.50	66.50	
24.75	23.50	24.50	24.50	23.00	33.50	33.75	29.75	29.50	30.25	
42.75	42.00	42.75	43.50	52.00	55.50	53.50	53.00	53.00	53.50	

19.10	19.15	19.45	19.30	20.75	23.25	22.50	19.75	20.50	20.00
	203.0	220.0	203.0	217.0	225.0	205.0	204.0	204.0	210.0
201.00	0	0	0	0	0	0	0	0	0
42.50	42.50	43.00	42.50	47.50	49.50	55.00	56.50	54.50	56.50
13.30	13.40	13.45	14.30	15.45	17.20	17.15	16.40	15.00	14.65
45.00	45.00	46.50	50.00	54.00	53.00	53.50	53.50	53.00	56.50
13.10	11.95	11.75	12.25	13.70	15.95	15.75	14.85	14.65	14.95
13.70	13.65	13.70	12.35	10.80	10.65	10.50	9.65	9.15	10.40
17.90	17.95	18.00	17.80	18.55	20.00	19.20	18.30	17.10	17.00
13.85	13.65	13.85	14.25	14.90	13.85	17.00	16.35	16.60	17.40
	186.0	191.0	200.0	210.0	264.0	271.0	260.0	249.0	265.0
190.00	0	0	0	0	0	0	0	0	0
11.75	12.15	12.85	12.90	14.55	16.80	18.25	16.00	16.85	17.15
42.00	42.00	45.00	52.50	56.50	62.50	62.00	61.00	62.50	57.00
12.95	13.45	14.80	14.55	16.90	21.50	21.00	20.25	21.75	22.00
3.70	3.60	3.65	3.80	3.85	4.00	5.25	4.20	4.60	5.15
	105.0	100.0	106.0		102.0	110.0	110.0	110.0	115.0
95.00	0	0	0	99.50	0	0	0	0	0
	521.0	535.0	537.0	530.0	540.0	544.0	549.0	530.0	550.0
530.00	0	0	0	0	0	0	0	0	0
	124.0	122.0	126.0	122.0	140.0	130.0	136.0	150.0	139.0
124.00	0	0	0	0	0	0	0	0	0
	306.0	277.0	287.0	307.0	310.0	304.0	305.0	355.0	377.0
294.00	0	0	0	0	0	0	0	0	0
5.10	5.00	4.95	4.55	4.60	4.70	4.80	4.75	4.45	4.45
14.00	14.10	14.40	14.45	14.95	15.35	15.50	15.50	15.65	15.45
5.65	5.40	5.65	5.95	5.95	6.00	6.40	6.85	7.10	7.05

Year 2013, Half1

Standard Deviation	Trade Vol Millions	Number of shares Outstanding	Share Price	Mkt cap Billions	semianual Growth
5.606543796	0	19599999	83	1.626799917	1.104856343
4.695151163	0.0014	3912000	147	0.575064	0.584481833
20.02775851	0.0001	1200000	490	0.588	0.975996073
0.905615199	0.0282	60000000	23	1.38	0.902846008

0.860297106	0.0071	228055500	13.75	3.135763125	0.990316946
1.389694211	0.0002	33419424	25.25	0.843840456	0.96813948
0.768765244	0	14393106	13	0.187110378	0.979611031
0.838980863	2.7428	5431536000	16.75	90.978228	1.050759517
8.585193973	0.0311	395321638	66	26.09122811	1.032436336
11.48186977	0.005	220100096	165	36.31651584	1.085258543
3.693180653	3.2788	3702777020	32.25	119.4145589	1.084806381
3.382015343	0.2908	235750000	24.5	5.775875	0.840163959
3.576155602	4.0494	2984137017	37.75	112.6511724	1.12253623
1.793979128	0.1167	280000000	22.25	6.23	0.847997964
4.945606917	0.5568	542984148	52.5	28.50666777	1.115235049
19.97776542	0.0119	309159514	289	89.34709955	1.036439005
1.72404563	0.4272	4190845080	15.8	66.21535226	1.002010727
0.345004026	0.0001	35403790	4	0.14161516	0.668239245
0.233630763	0.1416	1496469035	9.9	14.81504345	1.035526139
33.18902094	0.0123	157118572	309	48.54963875	0.999162184
2.852386915	0.0014	284789128	60	17.08734768	1.155446178
4.124452826	0.007	81481478	30.5	2.485185079	0.996241074
5.586690533	0.0245	182174108	47.75	8.698813657	0.964355899
1.437832087	0.1457	265426614	19	5.043105666	1.01
8.456424251	0.3212	362959275	216	78.3992034	1.030497576
6.18241233	0.0018	23727000	56	1.328712	1.081937767
1.493727627	0.0453	253125000	14.15	3.58171875	0.93
4.123105626	0.0023	90000000	58	5.22	0.991596311
1.56414691	0.4135	2198361456	15.95	35.06386522	1.029009918
1.743949859	0.0212	1471761200	9.6	14.12890752	0.912418863
0.904986188	0.418	1951467045	15.1	29.46715238	1.26
1.498740212	0.0164	175028706	16.5	2.887973649	1.050770528
35.99444402	0.0001	59895000	238	14.25501	1.119494801
2.373727729	0.6405	700000000	15	10.5	1.095049656
8.453138799	0.0008	96000000	54	5.184	0.871817821
3.739581825	0.4331	665441775	20.5	13.64155639	1.011442101
0.61427464	0.0066	40000000	5	0.2	0.778983059
6.142972498	0.0005	19525446	110	2.14779906	0.949419939
9.28798507	0.0011	100000000	540	54	0.99

9.522488004	0.0025	33980265	140	4.7572371	0.931422024
30.59702237	0.5944	790774356	339	268.0725067	1.018706096
0.228582589	1.4617	1530000000	4.45	6.8085	1.045706805
0.639465923	0.0131	75708873	15.5	1.173487532	1.059648916
0.61508807	58.6462	40000000000	6.95	278	0.960539544

Year 2013, Half2 Price Data

June		July		August		September		October	
26	10	24	7	21	4	18	2	16	30
83.00	80.00	84.00	85.00	86.00	90.00	85.00	85.50	88.00	88.00
144.00	135.00	135.00	125.00	122.00	122.00	122.00	110.00	112.00	120.00
490.00	490.00	490.00	490.00	490.00	490.00	490.00	490.00	500.00	500.00
21.50	24.25	27.00	26.75	27.25	27.75	26.50	26.25	27.25	26.25
13.50	11.95	14.25	13.95	13.95	13.90	12.90	13.30	13.55	13.95
25.00	23.50	23.50	22.00	25.00	25.00	23.00	21.50	23.75	23.75
13.00	13.00	12.50	12.00	12.00	11.50	11.50	12.00	12.00	11.90
15.80	16.85	17.65	17.30	17.60	17.05	17.00	17.10	18.40	18.75
64.50	65.00	66.00	69.50	71.50	68.00	70.00	72.50	76.00	75.00
165.00	170.00	170.00	169.00	176.00	172.00	172.00	180.00	184.00	179.00
31.50	33.75	33.25	33.75	34.75	33.75	33.50	33.75	36.00	35.00
25.25	25.75	26.75	25.25	25.25	24.25	25.00	25.25	25.50	26.25
36.50	39.75	42.00	43.25	44.75	42.25	44.75	46.50	47.25	48.50
22.00	21.25	22.25	21.75	21.75	21.75	20.50	20.25	20.50	20.25
52.50	53.00	56.50	55.00	57.00	57.50	57.00	59.00	59.00	59.00
285.00	282.00	298.00	303.00	296.00	293.00	298.00	300.00	304.00	304.00
15.05	15.60	16.20	16.20	16.55	15.75	16.00	16.15	17.15	17.45
4.00	3.75	3.60	3.70	3.90	4.20	3.90	3.90	3.95	3.95
9.90	9.90	9.70	9.55	9.00	9.15	9.40	10.15	10.45	10.45
308.00	298.00	311.00	310.00	319.00	302.00	300.00	309.00	321.00	320.00
60.00	60.00	60.50	63.50	69.50	61.00	60.50	60.50	59.50	58.00
28.00	29.50	27.50	27.50	27.00	27.00	27.00	26.00	26.00	29.00
46.00	48.50	51.00	45.25	49.75	48.50	48.00	46.25	44.75	46.00
20.00	20.25	19.75	19.70	19.65	19.00	19.60	19.85	21.50	21.50
215.00	210.00	216.00	217.00	217.00	201.00	205.00	214.00	211.00	210.00
57.00	57.00	57.00	57.00	61.50	62.00	64.00	64.00	66.00	69.50
15.25	15.10	16.10	16.50	16.30	15.90	16.30	16.35	16.50	16.50

57.50	56.50	56.50	55.00	54.00	54.50	56.50	60.00	62.50	69.50
15.80	15.00	16.45	16.00	16.90	15.90	16.35	16.55	17.10	17.05
9.00	8.15	8.65	8.80	8.45	8.40	8.20	8.15	8.70	9.10
14.90	14.45	14.25	13.85	14.40	13.90	14.85	14.35	14.05	14.25
16.85	16.80	15.25	16.65	16.90	17.20	17.50	18.85	25.25	26.50
234.00	239.00	262.00	276.00	274.00	264.00	260.00	260.00	262.00	275.00
14.90	16.10	16.45	16.90	16.15	15.15	14.35	14.55	14.60	14.50
53.50	54.50	54.50	56.00	61.50	60.00	60.50	61.00	64.50	62.50
21.00	22.00	23.00	23.00	25.00	23.75	24.00	26.75	27.75	28.75
5.00	3.50	4.35	4.50	3.95	3.85	4.20	5.10	4.60	4.35
110.00	116.00	116.00	115.00	114.00	119.00	124.00	125.00	114.00	120.00
554.00	550.00	575.00	570.00	570.00	570.00	569.00	575.00	570.00	572.00
142.00	140.00	140.00	140.00	145.00	147.00	146.00	147.00	145.00	205.00
335.00	327.00	350.00	339.00	314.00	285.00	299.00	326.00	316.00	310.00
4.30	4.25	4.30	4.15	4.00	3.50	3.85	3.65	3.75	3.55
16.00	15.55	16.00	15.65	16.05	16.50	16.20	16.90	17.00	17.95
6.75	6.70	7.05	7.30	8.20	7.75	8.15	8.70	9.15	9.00

Year 2013, Half2

Standard Deviation	Trade Vol Millions	Number of shares Outstanding	Share Price	Mkt cap Billions	semianual Growth
2.832843095	0.0087	19599999	94	1.842399906	1.104856343
10.57302648	0.0003	3912000	125	0.489	0.584481833
4.216370214	0	1200000	500	0.6	0.975996073
1.867299	0	60000000	27.5	1.65	0.902846008
0.677495387	0.0721	228055500	14.15	3.226985325	0.990316946
1.21449578	0.0007	33419424	26	0.868905024	0.96813948
0.533749837	0	14393106	12.5	0.179913825	0.979611031
0.826303684	0.4011	5431536000	18.6	101.0265696	1.050759517
4.008324671	0.0144	395321638	82	32.41637432	1.032436336
5.869885481	0.0333	220100096	189	41.59891814	1.085258543
1.1914044	1.3265	3702777020	35	129.5971957	1.084806381
0.68516016	0.1888	235750000	28	6.601	0.840163959

3.622460797	1.0645	2984137017	46.5	138.7623713	1.12253623
0.776834746	0.0463	280000000	22.25	6.23	0.847997964
2.374049517	0.1209	542984148	59	32.03606473	1.115235049
7.645623294	0.0106	309159514	307	94.9119708	1.036439005
0.708205871	0.7323	4190845080	17.85	74.80658468	1.002010727
0.168407574	0.0014	35403790	3.65	0.129223834	0.668239245
0.50224496	0.8617	1496469035	14.05	21.02538994	1.035526139
8.270429251	0.0016	188542286	310	58.44810866	0.999162184
3.190262964	0.0072	284789128	58.5	16.66016399	1.155446178
1.141392911	0.002	81481478	27.5	2.240740645	0.996241074
2.058856209	0.0009	182174108	45	8.19783486	0.96
0.813497251	0.0218	265426614	21	5.573958894	1.006533707
5.337498374	0	362959275	214	77.67328485	1.030497576
4.447221355	0.0004	23727000	68	1.613436	1.08
0.514349643	0.0225	253125000	16.9	4.2778125	0.931074409
4.715518117	0.0024	90000000	76	6.84	0.991596311
0.653112207	0.223	2198361456	15.7	34.51427486	1.029009918
0.345446571	0.3259	1471761200	8.9	13.09867468	0.91
0.352963643	2.6437	1951467045	15	29.27200568	1.259947175
3.855389446	0.0137	175028706	25.75	4.50698918	1.050770528
14.19859148	0.0006	59895000	288	17.24976	1.119494801
0.941644543	2.1973	700000000	16.75	11.725	1.095049656
3.88050684	0.0226	96000000	69	6.624	0.871817821
2.533114026	0.565	665441775	31.75	21.12777636	1.011442101
0.497102717	0.0135	40000000	4.5	0.18	0.778983059
4.691600059	0.0015	19525446	127	2.479731642	0.949419939
8.488554385	0.0008	100000000	578	57.8	0.988606395
19.64150933	0.0087	33980265	240	8.1552636	0.931422024
19.40475314	0.1559	790774356	319	252.2570196	1.018706096
0.311982906	0.5669	1530000000	3.5	5.355	1.045706805
0.72923095	0.0075	75708873	19.15	1.449824918	1.059648916
0.908371559	5.7268	40035982000	9.8	392.3526236	0.960539544

Turnover

2010 2011 2012 2013 2014

2113774	2376862	2043332	1384375	1689917
1130108	1246636	3607409	3490681	1192483
123859	102504	116012	104192	99250
103910	678846	555293	651342	530929
2297927	2665877	2779883	2816834	2762547
3344895	3757075	4083631	4029841	3777146
604815	263078	234306	230463	221161
13553	12013	13020	11134	12293
2005967	2798901	4558088	7224005	7700246
3462999	4307413	6027899	7235003	8521286
9045000	12834000	17419407	19004000	22364000
561028	975795	907631	1480356	1044947
9797971	15129374	17208143	17746191	22361755
2697823	2443850	11565856	1812168	1303131
2608392	3603948	4517967	5009571	6230650
7681884	8255135	11556191	13354965	14345981
5771000	6363000	9984000	10872444	10916211
856512	450324	229907	387494	173033
70743000	85836000	107897000	98860000	106009000
9602500	11245800	12346800	13373700	13351300
2345554	3597260	3922763	3838912	5125162
3105436	3174907	3617816	4818808	4782649
4480128	5465975	5343960	6814334	6337210
9559962	10770961	13802191	14270598	14457687
28075000	35884000	37491000	33928000	36029000
3068468	1366393	4432877	5158992	6039061
258645	464756	758243	585400	507483
9408711	10172140	8508120	9211462	9057292
10998429	14389027	15999078	16455195	17423771
101649560	222440715	192527486	109687453	91315702
5632957	6254751	8506693	6424340	10198427
79206640	105590360	119788989	154626092	170725560
2053287	2143891	2693303	3151188	3949285
1660016	2036777	2944635	3268803	3919732
665200	552435	834646	1516444	1152598

1080790	2294429	1366675	1070948	1095596
619170	666629	774286	824934	500582
114685	214948	286692	308392	277984
22603910	20138122	30503560	34915663	34124565
620083	576092	921753	952836	826630
38679196	44895037	55522166	59061875	61292176
15617738	15795300	15542686	11957823	13075912
11524454	13214442	15976763	15142017	17002302
83960677	94832277	106995529	124287856	114672477