CAPITAL MARKET REFORMS AND MICROSTRUCTURE PERFORMANCE OF THE NAIROBI SECURITIES EXCHANGE, KENYA

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DECLARATION

This thesis is my original work and has not been presented in any University for an award of any degree.

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DEDICATION

This thesis is dedicated to my husband Caleb Radido, our children Louise, Diana, Favour and my extended family members.

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ABBREVIATIONS AND ACRONYMS

ARMA	Autoregressive Moving Average
ASI	All Share Index
ATS	Automated Trading System
CBK	Central bank of Kenya
CDS	Central depository system
CDSC	Central Depository &Settlement Corporation
CMA	Capital Markets Authority`
CSR	Corporate Social Responsibility
DBR	Disclosure based regime
DEMAT	Dematerialization
ECM	Error Correction Mechanism
EMH	Efficient market hypothesis`
FDI	Foreign Direct Investment
FE	Fixed Effects
GARCH	Generalized Autoregressive Conditional Heteroscedasticity
GDP	Gross Domestic Product
IAPM	International Asset pricing mechanisms
IFC	International Finance Corporation
IFS	International Financial Statistics
INF	Inflation
IPO	Initial Public Offer
KIPPRA	Kenya Institute for Public Policy Research and Analysis
KLSE	Kuala Lumpur stock exchange

KNBS	Kenya National Bureau of Statistics
LM	Lagrange Multiplier
MKTCAP	Market Capitalization
ND	Number of deals
NPV	Net Present Value
NSE	Nairobi Securities Exchange
NSDL	National Security and Depository Limited
PAT	Profit after Tax
PCA	Principal component Analysis
REITs	Real Estates Investment Trusts
ROA	Return on Assets
ROE	Return on Equity
SEBI	Securities and Exchange Board of India
SEC	Security Exchange Commission
VTS	Value of Transaction
VIF	Variance Inflation Factor

OPERATIONAL DEFINITION OF TERMS

Abnormal returns	This is the difference between the expected returns and the actual returns realized for a given security over a period of time.
Capital Market reform	This is the revitalization and reinvigoration efforts the government has undertaken to reorganize and restructure the capital market in Kenya in order to improve the market microstructure performance.
Dematerialization	Dematerialization can be defined as the conversion of share certificates owned by investors to electronic form maintained in an account with the Depository Participant or CDC account so as to allow electronic transactions
Demutualization	This is conversion of a stock exchange from a member owned non-profit organization into a for profit public limited company owned by various entities including the public in order to optimize its potential of market capitalization alongside increasing its shareholders` value.
Efficiency	Efficiency refers to the speed at which the stock prices incorporate any information or changes in the stock market such that the market price of the securities equals to its intrinsic value and that no investor can make abnormal returns from stock market
Equity	A stock or any other security representing an ownership interest.
Liquidity	This is the ability of the market to have high trading activities which allows securities to be easily converted into cash without affecting their prices.

Microstructure Performance	Refers to the measure of how the interrelationship between volatility, liquidity and efficiency affect the securities prices in the stock exchanges.
Market size	This refers to the total market value of listed shares in a given securities market
Ownership composition	These are the different types of shareholders that command share ownership of an entity's equity e.g., government, institutions and domestic individual shareholders.
Ownership concentration	This is the amount of stock owned by individual investors and large block shareholders with shareholding above 5%
Ownership structure	This is the distribution of equity with regards to capital and voting rights of each shareholder and also by identity of the owners of equity. It has two components; the ownership concentration and ownership composition
Returns	The gain or loss realized from trading in a security for a given period of time.
Time	This is the number of periods taken since the reforms were implemented.
Volatility	The fluctuation or variability of stock returns which is the risks facing investors in the stock market.

ABSTRACT

The late nineties and early 2000s was an era of extensive restructurings which saw a series of reforms taking place in most emerging markets. The Kenyan Government in a bid to match the efforts of other emerging economies embarked on revitalizing the financial sector with the aim of promoting the growth of the capital market. The huge investment in reforms aimed at improving the microstructure performance of the securities market and to consequently eliminate the problems facing the Nairobi Securities Exchange. Despite undertaking the reforms, the stock market still experiences a number of challenges such as low listing, stock prices volatility, illiquid stock market, among others. This study aimed at establishing how capital market reforms have affected the microstructure performance of the Nairobi Securities Exchange, in terms of efficiency, volatility, and liquidity, specifically to investigate the effect of entry of foreign investors, demutualization of the stock market, and dematerialization of securities on the microstructure performance of the stock market, likewise to establish the moderating effect of market size and time on the relationship between the dependent and independent variables. From existing literature, it is not clear whether undertaking reforms in the capital markets were beneficial or not. Different studies have produced mixed results with some stock markets reporting positive results and others negative. Furthermore, some of the most recently undertaken reforms in the Nairobi Securities Exchange have not been explored and therefore had to be given adequate attention. This study which employed an explanatory research design was anchored on capital market efficiency theory, market microstructure theory, liquidity and agency theories. A census of all the 63 listed companies was used. Annual Gross Domestic Product values, number of Central Depository System accounts opened, weekly closing of share prices and the market index for the period 2004-2017 were used as the data for the study. Abnormal returns, standard deviation, turnover ratio as well as market capitalization ratio were also determined. A multiple regression analysis was performed to establish how reforms have affected the microstructure performance of the securities exchange. The study found that entry of foreign investors into the Nairobi Securities Exchange did not have a significant effect on microstructure performance of the securities market. The study also established that demutualization of the Nairobi Securities Exchange influenced stock market liquidity, efficiency, and the overall market microstructure performance. However, the two measures of demutualization were found to influence the performance in opposite directions. Whereas an increase in ownership concentration improved liquidity, efficiency and the overall market microstructure of the NSE. An increase in ownership composition led to a decrease in the performance of the NSE. Dematerialization of securities achieved its desired results as it improved liquidity, volatility, efficiency as well as the overall microstructure performance of the bourse. The study also found that although the size of the market had no significant effect on the relationship between capital market reforms and microstructure performance of the Nairobi Securities Exchange the passage of time was important as it influenced the relationship between the study variables. The study therefore recommends that the Capital Market Authority should relax listing requirements to encourage more firms to be listed in Nairobi Securities Exchange as well as encourage public participation in the stock market. Additionally, since dematerialization is just a precursor to automation, the securities exchanges that are not fully automated should ensure that they go the full course to achieve the desired results

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

The capital markets are a system of specialized financial institutions, series of mechanisms, processes and infrastructure that bring together suppliers and consumers of medium to long-term capital by linking the monetary sector with the real sector of the economy (Fama, 2021; Laeven, 2014). The financial sector of any economy worldwide is mostly comprised of the stock market. These markets are an indicator of the political and economic development of any economy (James, 2015).

According to Oke and Adeusi (2012), capital markets play key roles of directing resources from borrowers of funds to lenders, promoting reforms and to streamline the capacity of financial intermediaries of linking the scarcity to the excess sector of the economy. In addition to helping in price discovery mechanisms and information dissemination, Laeven (2014) asserts that they serve a critical need of raising capital funds for companies during initial public offers at a comparatively lower cost compared to other sources of finance. James (2015) adds that capital market enables corporations to raise capital/funds to finance their investment in real assets by enabling the contractual savings industry (pension and provident funds, insurance companies, medical aid schemes, collective investment schemes, etc.). This is in order to mobilize long-term savings from small individual household and channeling them into long-term investments (Roychowdhury & Srinivasan, 2019), consequently leading to

an increase in productivity within the economy thus creating more employment opportunities, increase in aggregate consumption and hence growth and development (James, 2015).

Stock market provides liquidity to the stockholders by availing ready market for their stock (Al-Jaifi, Al-rassas & Al-Qadasi, 2017). Liquidity can be termed the essence of any financial markets as well as the crucial driver for the market development (Naes, Skjeltorp & Odegaard, 2011). A liquid market is critical for the smooth operation of an economy. Its sudden wearing away even in a single market sector can cause disturbances (Vo, 2015). Despite its importance, problems in measuring and monitoring market liquidity risk persist in Kenya as portrayed in the NSE report 2012 (African Financials, 2012). Not all the sectors stock have the same liquidity (Musembi, 2018).

The stock markets participants lay emphasis on the importance of having a developed stock market that plays the vital role of improving the efficiency and effectiveness of investment. A stock market that functions well should be able to reduce the cost of equity for new firms who intend to raise capital from the stock market and also allow individuals to price their securities more effectively and evade financial risk. Additionally, stock markets have the potential of attracting foreign portfolio capital and increasing domestic resource mobilization thus expanding the resources available for investment in developing countries (Aduda, Masila, & Nyakundi, 2012).

1.1.1 Capital Market Reforms

In the recent past, reforms in the capital markets have become inevitable in most economies of the world. These reforms enable the capital markets to adopt new concepts and practices affecting them so as to improve on efficiency (Morita, 2017). The late nineties and early 2000s was a period of extensive reforms in emerging financial markets. There was extensive deregulation and opening of emerging financial markets in Asia, Latin America, and other emerging markets (Diamandis & Drakos, 2011). The Nigerian capital market, being an emerging market in Africa, followed suit by emulating the world practices by introducing a number of reforms intended to foster capital market growth (Isibor, Ojo, & Ikpefan, 2017).

The Kenyan Government in a bid to match what other emerging markets were doing made efforts to encourage growth of the capital market and the economic sector in general, since the sector did not adequately contribute to the development of the economy. The inflow of foreign savings was dwindling and there was slow economic growth (Gitari & Mohamed, 2019). Consequently, there was need to revive the sector especially if the capital market was to boost the expected economic growth (Cherotich et al., 2015). The slow growth of financial institutions, an inactive stock market with low volumes of trade meant that the capital market was underperforming its role (Gitari & Mohamed, 2019). Although the Government realized this in the early 1970s, reforms that were aimed at revitalizing the sector were only executed in the 1990s after adopting

the IFC; CBK (1984) study whose recommendations were used as roadmap in spearheading the reform process (Cherotich et al., 2015).

There was need to design and implement policy reforms that would promote a maintainable economic development with an effective and reputable financial system which would rationalize the operations of the public sector, increase the ownership base in the listed companies as well as enhancing the capital market in general (Nyasha & Odhiambo, 2014). This saw the setting up of Capital Markets Authority (CMA) in an effort to strengthen the regulatory infrastructure (CMA, 2013).

The opening of portfolio investment to foreign investors was part of the reform process that saw the slackening of capital controls in 1995 allowing the foreigners to own a maximum of 20% of the shareholding for inward portfolio investment (Gachigo, 2017). This was later revised in 2002 where new foreign investor regulations were established to restrict foreign investors particularly on initial public offers and government privatization (Kariuki, 2020). The opening of stock markets in developing economies has been extensively commended, as there are many prospective benefits of integrating the global financial sector (Hermes & Lensink, 2013). In addition to raising the growth trend, financial integration may boost economic resilience thereby reducing volatility around this trend (Al Nasser & Hajilee, 2016). Financial integration of emerging markets is also likely to deepen the financial markets leading to greater market liquidity brought about by increased likelihood of trade volumes with the emergence of new players and new instruments (Ahmed, 2016).

According to Ng *et al*. (2011) foreign direct (portfolio) investors affects the degree of information asymmetry between the firm and external investors, consequently affecting the firm's stock liquidity. Humanicki, Kelm and Olszewski (2013) argue that when foreign investors take concentrated ownership and control positions in domestic firms, they gain access to the firms' private information, resulting in stock illiquidity as their informational advantage causes an adverse selection bias. However, when they compete with other sophisticated investors over trading profits this competition improves the market efficiency, consequently enhancing the liquidity of the stock (Ng *et al*., 2016).

This trend towards greater openness has been welcomed by many academicians and researchers, with some envisaging that such liberalization will increase the flow of foreign capital in the domestic market, which will lead to greater development of the financial and economic sectors (Athukorala & Tien, 2012). Yet as liberalization has proceeded, there has been remarkable turmoil in the economic sector such as the Mexican, Asian, Russian and Brazilian devaluations and financial crises (Miles, 2002).

The capital markets in Kenya had a long history of paper certificate which Omuchesi, Bosire & Muiru (2014), cite as a reason for inefficiency in the stock market, for they saw this as a hindrance to the flow of information. The incorporation of Central Depository & Settlement Corporation, a limited liability company in 1999 was aimed at revolutionizing the industry by establishing and operating a system which would handle, deliver and settle securities in a central

position in the capital markets in Kenya (CDSC, 2021). The CDSC in conjunction with NSE took a move towards dematerialization of all quoted shares at the securities exchange. This saw the implantation of the Central Depository System (CDS) in November 2004 which was followed by the launch of the automated trading system on 11th September 2006, paving way for the switching from the paper-form securities to a "book entry" kept in an electronic registry managed by a Centralized Securities Depository (CDSC, 2021).

Stockholm Stock Exchange took the lead in demutualizing the exchange in 1993. Since then there has been rapid increase in the number of securities markets that have been demutualized or self-listed (Abukari & Otchere, 2020). This new trend has been brought about by globalization of the world economies and the changing landscape in capital and financial markets all over the world Nyangara, 2014). On the same breath, there has been growing demand from watchdogs and the public at large that stock exchanges raise their standards of governance and provide impartial representation of all stakeholders in ownership and management (Hasan, Ahsan, & Rahaman, 2013). This necessitated the process of demutualization of NSE which began in 2006 with the establishment of a demutualization committee whose task was to spearhead the process (NSE, 2014).

Demutualization alters the ownership structure of a stock exchange as it allows diverse ownership. Ownership structure is the distribution of companies' equity among the entity's owners (Gokpin, 2011). According to Shah and Hussain

(2012), ownership structure can be looked at in two ways; ownership concentration which is the total individual shareholding and large block shareholders (shareholding above 10%), and ownership composition (the percentage shareholding of an entity's equity by government, institutions and domestic individual and other shareholders).

1.1.2 Microstructure performance

According to Evans and Rime (2019), market microstructure is an area of study that is dedicated to investigating the changing landscapes of security markets. The theoretical and empirical studies focus on the role played by information in the price discovery process, the measurement and control of liquidity, and transaction costs and how they affect stock market efficiency, and regulation of alternate trading mechanisms and market structures.

The growth of market microstructure as a subject has corresponded with a period of establishment of new stock markets and renaissance of existing markets in many developing economies (Krichene & El-Aroui (2018). The revitalization of these "emerging" stock markets mainly aimed at institutional reforms, including automation of the trading and information systems, diffusing of ownership, revamping the regulatory framework, and opening access to foreign capital (Evans & Rime, 2019). According to Krichene and El-Aroui (2018), microstructure performance of emerging markets such as informational efficiency, price volatility, and stock market liquidity are affected by economic

and political frameworks of regulations of insider trading regulations, automated trading system, and enhanced standardization of accounting.

Stakeholders pay much attention in the microstructure performance of stock markets. They also monitor the trend of changes in the capital market because this affects the stability of the stock market as well as the strategies that are to be adopted by investors, bearing in mind the general and specific factors that affect their securities (Wang, Xu and Zhang, 2019).

Figure 1.1 shows the liquidity trends for the period 1993 to 2014. Generally, liquidity of the stock market has not been stable. There has been fluctuation over the years.

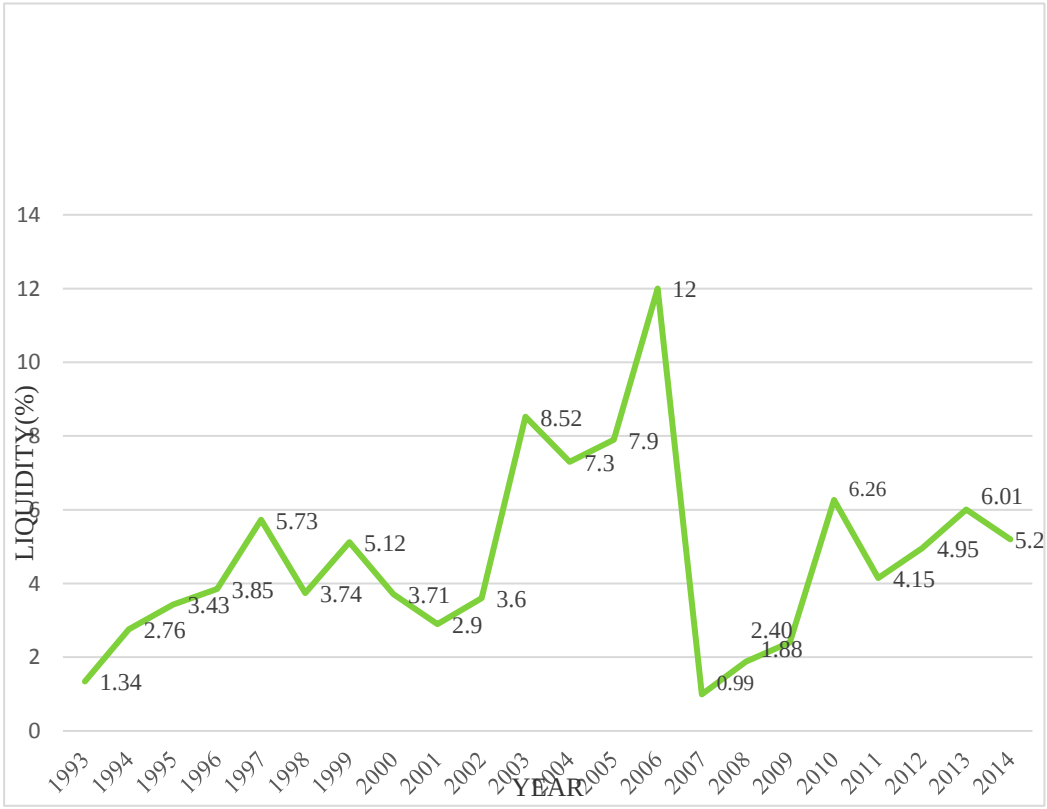

Figure 1. 1: Liquidity Trends in NSE

Source: NSE (Daily Market Reports, 2012)

There was a liquidity ratio of 1.34% in 1993 rising steadily to 5.73% in 1997, there was a sharp rise again in 2003 0f 8.52% followed by a slight fall of 1.2% before hitting it highest point of 12% in 2006. In the year 2007, the ratio plunged to 0.99%. This can partly be attributed to instability in the economy as a result of the post-election violence. For the two years that followed (2008 and 2009) liquidity ratio maintained a low value but rose to 6.26% in 2010 before declining in 2012 and 2013 by maintaining an average of 4.4%. 2014 recorded an improvement of 5.2% (NSE 2012). The liquidity ratio was not only low but it is also fluctuating. This is not desirable for potential investors who hold their securities for speculations. Speculators prefer a liquid market where they can easily dispose of their assets without loss of value (Brunetti, Buyuksahin & Harris, 2016). Liquidity enhances the stability of the market because investors are more willing to hold securities that they can easily trade in (O'Hara, 2004).

Wu (2011) argues that liquid stock markets can increase enticements for investors to get information about firms and improve corporate governance. O'Hara (2004) also argues that liquid stock markets are more and better informational efficiency since security prices reflect information about firms more precisely. High liquidity levels enable active shareholders to build positions so as to cause changes in corporate policies. According to Wang, Xu and Zhang (2019) volatility is the variability of the returns of any given security over time. It is the statistical measure of the distortion of returns for a given security or market index.

Figure 1.2 shows how the NSE has performed in terms of volatility as shown by the share index for the period 2001-2014.

Figure 1. 2: Volatility Trends at NSE

Source: (NSE reports, 2015)

The market has been very volatile. The share index closed at 2513 points in 2001. It gained 2046 points an increase of 44.5% to close at 4559 points in 2002. It shed 1091 points to close at 3468 in 2005.For the two years that followed, the index was a bit stable maintaining an average of 3114 losing slightly to 2965 points in 2006.The years 2007 to 2010, the index was on the decline hitting the period's lowest index of 1355 points. From 2011 to 2014, the market index was on the rise reaching the highest point of 5456, an increase of 29.6% from the previous year (NSE, 2015).

Volatile asset prices have a tendency of fluctuating either up or down. Increased volatility portends a rise in financial risk which can unfavorably affect the assets

and wealth of an investor. Increased volatility leads to loss of investor confidence in the market leading to exiting of the market by most investors (Brunetti, Buyuksahin & Harris, 2016). Han, Kutan and Ryu (2015) assert that volatility has a number of adverse effects in the market namely; impairment of the smooth working of the financial system, inadequate performance of the economy, limited access to capital and slow economic growth among others. When volatility increases, it is perceived as a rise in risk of equity investment and thus risk–averse investor tends to allocate funds to less risky assets (Peiris, 2011).

In Kenya, available literature on the efficiency of the NSE, though scanty shows that the exchange is efficient in its weak form. This means that stock prices do not reflect all available information. According to Banerjee, Breon-Drish & Engelberg (2020) information should be available to all investors at the same time and should not be restricted to only a few investors. Likewise, a cross country analysis of the capital markets in Africa reveal that emerging capital markets including Kenya have a weak form of efficiency (Nurunnabi, 2012).

This is in concurrence with the verdicts of Asewe *et al*. (2013) which showed that the stock returns follow a random walk, a strong indication that the market is weak form efficient. However, a study by (Azeez & Sulaiman, 2012) found that the Nigerian capital market is semi-strong-form efficient. This means that emerging markets can also achieve this level of efficiency or even surpass it to achieve a strong form efficiency if the right reforms are undertaken in those markets.

1.1.3 Capital Market Reforms and microstructure performance of emerging markets

Although there are a series of reforms that have taken place in the capital markets in Kenya, the study only concentrated on three most recent reforms namely; market opening to foreign investors, demutualization and dematerialization, mainly because these reforms were undertaken with the premise that they were going to improve the market microstructure performance which will subsequently have an impact on the overall performance of the bourse. Therefore, it was imperative to study whether the reforms were able to achieve their aim.

A demutualized exchange is expected to increase investor participation in the market therefore improving investors' confidence, consequently improving informational and operational efficiency. In support of this, Hart and Islam & Islam (2011) and Zanotti (2012) reason that demutualization makes it easier for an exchange to attract listing as well as increasing the investors' confidence. Dematerialized securities on the other hand, are also expected to increase transparency, thereby, solving the problem of information asymmetry as well as improving the flow of information in the securities exchange (Zhen-ning, 2014). Transaction period in Kenya has also been reduced tremendously and this is expected to increase the volume of traded securities which in turn will improve liquidity (CDSC, 2012; NSE, 2012).

1.1.4 Time and microstructure performance

There exists very scanty literature on how time lag affects performance since this subject matter has not attracted much debate. Nevertheless, it was important to pay attention to it as it had the potential of influencing how the market microstructure performs with regard to reforms. The immediate period right after reforms may not reflect the anticipated changes expected as investors may still be trying to comprehend the new ideas. With time as they get used to the changes, the effect may be seen or felt. Nyangara (2014) found that reforms, automation in particular, yielded positive results as time went by and cited the learning curve effects as the most likely reason for this. On the contrary, conception of new ideas can be received with excitement and felt greatly at the onset and as time goes by, the decaying effect may cause that excitement to fade away.

Vo (2016) opined that for market efficiency to occur it depends heavily on the ability of traders to analyze and interpret trends and movements and the time they have and are prepared to dedicate in order to obtain and spread information that is sensitive to price. Effects of liquidity can be manifested over different time periods. The market microstructure literature pays attention to short horizons, from minutes or hours to days or weeks (O'Hara, 2015).

1.1.5 Market Size and microstructure performance

Market capitalization is the aggregate market worth of all outstanding shares of an entity Narayan, Mishra & Narayan (2011). This is used by the investment community to determine the size of an entity. Market capitalization ratio is

usually used as a proxy for stock market size. The notion behind market capitalization is that size of the market determines its ability to marshal investment funds and diversify financial risk (Banerjee, Breon-Drish & Engelberg, 2020). Brunetti, Büyükşahin & Harris (2016) argue that if the market is thinly traded, and has low market capitalization, the absorption capacity of foreign capital inflows will be reduced. This subjects the market to excess volatility which may be positive or negative depending on market size.

1.1.6 Historical Perspective of Nairobi Securities Exchange

The Nairobi Stock Exchange (NSE) is Kenya's only security market. The stock market has a long history dating back to the colonial era. It started small but has grown gradually over time. It is an average stock market with great prospects for growth, but making substantial effort to drive the economy of Kenya and the entire East African Community (Kabiru, Ochieng & Kinyua, 2015). Kenya started trading shares and stocks in the 1920s before the country got its independence. In 1951, the first professional stock broking firm was established by Francis Drummond. This was followed by the constitution of the Nairobi Stock Exchange in 1954, as an association of stockbrokers registered under the Societies Act (Nyasha and Odhiambo, 2014).

The inauguration of Capital Markets Authority in March 1990 changed the regulatory infrastructure of the Nairobi Stock Exchange which had all along operated as a self-regulatory organization (Gakeri, 2011).

According to the NSE (2012), the NSE has grown in leaps and bounds although there has been a slow growth in terms of listing. Low listing and delisting of companies have adversely slowed down the pace of growth. The number of firms listed in 2005 was less than what it was at independence in 1963 (Ngugi & Njiru, 2005). Compared to the period immediately after independence it can be noted that the trend of listings has not been desirable. There were 56 listed companies in 1960. In 1969, the figure rose to 63, and rose again to 64 in 1970. The number of listing increased by one in a span of nine years. From a peak of 64, the number of listed companies fell by 7 points (from 64 to 57) in 1979. It remained unchanged at 57 up to 1989. Nine years later, there was a slight increase of one point in 1998, before declining to 50 in 2005, and picking again to 60 in 2012 (NSE, 2012) as reported by Nyasha & Odhiambo (2015). As at December 2014 the number of listings stood at 63; what it was in 1969. The number is also small compared to the hundreds of companies that are trading in Kenya (NSE, 2015).

1.2 Statement of the problem

Evidence gathered from NSE report of 2012, displayed in figures 1.1 & 1.2 points to the fact that microstructure performance of the NSE has not been satisfactory. The securities exchange suffers from illiquidity as evidenced by low trading volumes and instability of the stock prices .Additionally, the market is weak form efficient according to a study finding by Asewe *et al*. (2013). Numerous reasons have been cited to account for the inefficiency of the Kenyan capital market. Key among them was the manual listing on the exchange and

paper certification which inhibited the flow of information, causing delays in adjusting stock prices to reflect available information on the market resulting in over and under valuation of stock prices (Onyuma, 2009) and as reported by Omuchesi, Bosire and Muiru (2014).

The unsatisfactory microstructure performance of the NSE in terms of liquidity, volatility and efficiency has brought about challenges ranging from low listing, low investor confidence, slow pace of innovativeness and flexibility and information asymmetry, resulting to overreliance on banks for loans by investors. They also have had to rely on thin financial alternatives (Nyasha & Odhiambo, 2014). The government of Kenya made huge investment in reforms with the aims of improving the microstructure performance of the securities market and consequently to eliminate the problems facing the NSE; the broader goal being to stimulate the expansion of emerging capital markets and enable investors ease of access to long-term capital.

However, existing studies on effectiveness of reforms report mixed results; a study conducted by Omuchesi, Bosire and Muiru (2014) reported that automation of NSE had not produced the expected benefits of improving efficiency in Securi-ties market. Equally a similar a study by Omuchesi, Bosire and Muiru (2014) found out that the introduction of the ATS had not improved price volatility at the securities exchange. On the other hand, Asewe et.al, (2013) reported that improvement in efficiency of securities exchange which he attributed to the automation of trading at the bourse.

Moreover, the subject matter on effects of reforms on performance of stock exchanges has not been given much attention. For instance, Nyasha and Odhiambo (2014) in their study highlighted the historical perspective of the stock market, and outlined the reforms that have been undertaken to develop the stock exchange. Mwangi and Mutuku (2013) investigated the effect of implementation of CDS system on Nairobi stock market performance. Whereas Asewe *et al*. (2013) and Omuchesi, Bosire, and Muiru (2014) carried out a study on the effect of automation on stock market efficiency. From these previous studies, it is therefore apparent that none has explored the areas of entry of foreign investors into the securities market, demutualization and dematerialization and how they have affected the market microstructure performance of the securities market.

1.3 Objectives of the study

The research study aimed at establishing the effects of capital market reforms on market microstructure performance of the Nairobi securities exchange, Kenya

1.3.1 Specific Objectives

i. To establish the effect of entry of foreign investors on market microstructure performance of the Nairobi securities Exchange, Kenya
ii. To determine the effect of demutualization of the stock market on the microstructure performance of the Nairobi securities Exchange, Kenya
iii. To determine the effect of dematerialization of securities on the microstructure performance of the Nairobi securities Exchange, Kenya

iv. To establish the moderating effect of market size on relationship between capital market re-forms and microstructure performance of the Nairobi securities Exchange, Kenya.

v. To establish the moderating effect of time taken after reforms on relationship between capital market reforms and microstructure performance of the Nairobi securities Exchange, Kenya.

1.4 Research Hypothesis

On the basis of the literature review, the study tested the following null hypotheses to determine whether capital market reforms have significantly affected the market microstructure performance of the NSE. The hypotheses tested were;

Ho1: The entry of foreign investors into the securities market has no significant effect on market microstructure performance of the Nairobi securities Exchange, Kenya.

Ho2: The demutualization of the securities market has no significant effect on market microstructure performance of the Nairobi securities Exchange, Kenya.

Ho3: The dematerialization of securities has no significant effect on market microstructure performance of the Nairobi securities Exchange, Kenya.

Ho4: The securities market size has no significant effect on the relationship between capital market reforms and microstructure performance of Nairobi securities Exchange, Kenya.

HO5: Time has no significant moderating effect on the relationship between capital market reforms microstructure performance of Nairobi securities Exchange, Kenya.

1.5 Significance of the study

The need and significance of development of capital market in any emerging markets informed the undertaking of this study as capital markets contribute a great deal to the growth of most economies. If the contribution of reforms to the general growth of financial and economic sectors is lacklustre, then the need for such costly process in both monetary as well as other resources is contestable. Therefore, this study is of importance to the government, investors, CMA, and other stakeholders, as it is expected to provide them with useful information about whether there has been improvement in the NSE and in particular the performance of its microstructure characteristics as a result of implementing various reforms in the capital markets. This will give valuable information to policy formulators who are worried about the growth of the capital market as they will be conversant with the monetary policies and financial instruments as well other economic indices in order to attain the anticipated growth of the overall economy.

The market authorities will be able to identify the areas of reforms that need improvement and those that need to be done away with. An efficient stock market will be more ideal in carrying out trade. Likewise, the management of the NSE will easily achieve their objective of maximizing the shareholder value

by using state of the art trading technologies and any other means at their disposal.

It would be of value to the general public since market reform issues may be viewed as a complex subject that should be left largely to experts and the government. This perception will contribute to the huge information gaps on reforms on the NSE and how it has affected microstructure performance at the bourse. Investors and other market players, on the other hand will be able to come up with strategies that relate to their operational environment

Academicians and researchers will use the research results as a reference material for further research. The findings will provide an understanding of the implication of reforms undertaken by market authorities that is the CMA and NSE on the microstructure performance of the NSE.

1.6 Scope of the study

The study is an explanatory research type. Although a variety of the reforms have taken place in the bourse since its inception in 1954 to date, the study focused on only three most recent reforms that have taken place in the securities exchange namely; entry of foreigner investors into the market, demutualization and dematerialization with the aim of finding whether microstructure performance of the bourse has improved as a result of these reforms. A census of all listed companies in all market segments which were listed between 2004 and 2017 was used for the study.

1.7 Organization of the study

The thesis consists of five chapters which are organized as follows: Chapter One discusses the general background to the study or to the research in form of introduction, statement of the problem, objectives of the study, research questions, hypothesis, significance of the study, scope of the study and limitation of the study. Chapter two is the theoretical framework. This chapter presents the theoretical framework needed to understand how reforms have impacted on the microstructure characteristics, that is, efficiency, volatility and liquidity. Also discussed are the empirical literature, and the conceptual framework.

Chapter three discusses the methodology, research philosophy, research design, model specification and estimation. Also discussed are operationalization, definition and measurement of variables and data analysis techniques. Chapter four discusses the data analysis and tests, describes the data variables and further performs statistical tests on research, hypothesis testing, regression analysis and summary of research findings. Chapter five discusses the summary of the study as a whole, conclusion of the study, recommendations, contribution to knowledge and lastly, suggestions for further research.

1.8 Limitations of the study

The researcher encountered various hitches in the course of the study which may have slightly affected the process. The main limitations being the fact that demutualization and dematerialization are relatively new phenomena in Kenya therefore obtaining the relevant data posed a challenge in terms of time taken. This was however overcome by ensuring due process for obtaining the data was

followed. This includes writing letters of request and obtaining the research permits from all relevant authorities so as to access the CDSC, the NSE, KNBS and where the relevant data were obtained.

Secondly, getting the actual number of dematerialized securities was not possible, however the study opted to use the number of CDS accounts opened as this was seen to be a precursor to the demutualization process and could therefore be used as a measure of dematerialization.

Lastly, the study suffered from lack of similar studies from other researchers in Kenya to enhance discussions on the study findings. The literature on entry of foreign investors and dematerialization of NSE was scanty. This limitation however was mitigated by using empirical studies from other economies.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews the literature on capital market reforms and microstructure performance. The chapter briefly explores the literature on which theoretical framework is anchored and further provides an empirical literature review from both global and local studies, a summary of the various studies and the research gaps.

2.2 Theoretical framework

The research is anchored on capital market efficiency theory, the market microstructure theory and the agency theory. This research reviewed the literature on these theories and their relevance to the subject under scrutiny.

2.2.1 Capital Market Efficiency Theory

The performance of the stock market is highly depended upon its level of efficiency. Market efficiency explains the promptness with which security prices reveal all accessible and significant information (Gupta, Yan and Basu, 2014). Efficiency guarantees accuracy of stock pricing which helps in correcting stock mispricing in the securities market. When securities are under or overvalued, it encourages share buying because investors utilize easy and accessible information trading as tools in for available assets in the capital market (Akbas et al., 2016). But for an efficient stock market, investors cannot

outdo their rivals consistently by generating abnormal returns since the market swiftly corrects itself. According to Dyckman and Morse (1986), an efficient` securities market quickly incorporates all available information in the market into their prices. The primary hypothesis for Efficient Market Hypothesis is that stock prices reflect all public information in such a way that no one can earn abnormal return by using such information. The time and speed for the adjustment to any new information is considered a critical factor; the faster the market adjusts to new information, the more it's considered to be more efficient. The alternative hypothesis is that security market is inefficient i.e., security do not accurately reflect the new information into their prices (Hadi, 2006). The model of Efficient Market Hypothesis is a key aspect of efficient market theory. It stipulates that discernment of new information varies with individual investors. EMH requires investors not to take advantage of the impartial information publicly available to them to make surplus returns (Naseer & Bin Tariq, 2015)

In an efficient capital market, stock prices reflect all available information (both private and public). There should be free flow of information which should be availed to all the potential investors simultaneously. This impartiality enables the investors to make informed decisions.

Fama (1970) categorized efficient market hypothesis (EMH) into three categories; Strong Form efficiency which states that securities prices account for all information in a market both public and private. In a semi-strong efficiency, all public information is assimilated in a stock's current share price and in weak

form efficiency the stock prices occur randomly meaning that the past stock prices cannot affect the future price of stocks.

Efficiency on the exchange guarantees correct pricing of stocks by avoiding under and over valuation of stocks. When stocks are inaccurately priced, it discourages potential investors from buying shares for fear of a decline in price when they decide to dispose of their securities and this ultimately reduces the availability of capital to firms for growth. Secondly, it ensures efficient distribution of resources in that performance of the entity is mirrored in their prices of the securities which informs prospective investors to take optimum investment decisions (Fama, 1970).

Market efficiency which is still a hypothesis introduced in the late 1960s has not yet to attained a generally irrefutable opinion in support or against it despite numerous empirical studies done on the same. Many studies carried out on the subject matter focus their attention on the level of efficiency found in most developing economies of the world (Khandoker, Siddik & Azam, 2011).

Some researchers have reported that emerging markets are weak-form efficient whereas others have found no such evidence. For instance, Asewe *et al*. (2013) study on determining the effect of automation on market efficiency confirmed that automation of trading in the stock market had improved performance and that NSE was efficient in its weak form, which is contrary to what Omuchesi and Bosire (2014) study found.

Most of the emerging market suffer from the problem of thin trading. Additionally, in smaller markets, it is easier for large traders to influence the market. Though it is generally believed that the developing and less developing markets are less efficient, the empirical evidence does not always support the thought (Khandoker, Siddik & Azam, 2011). Why do we care if stock market is efficient or not? Efficient markets are important because they are a necessary prerequisite if it is desired that fund should be allocated to the highest-valued projects. This is possible only if security prices mirror the intrinsic value of future discounted cash flows (Gupta, Yang & Basu, 2011). Also, if capital markets are efficient, it is not difficult for the firm to raise funds as the market achieves the price discovery process i.e., it determines the price at which market players are willing to exchange claims on firm's future cash flows (Nurunnabi, 2012). From a policy perspective evidence of capital market efficiency spells out a limited role of the government in the capital markets (Dhir, 2007).

Market efficiency is one of the foundation principles in financial economics. The absence of any arbitrage profit prospect is one of the fundamental characteristics of efficient markets (Akbas, 2016). Kristoufek & Vosvrda (2014) opine that market efficiency depends on the market microstructure. According to Al Ashikh (2012) informational and allocation efficiency of any market are key elements that determine the ability of a stock market to contribute to the financial development and growth of any economy. An efficient securities market relies on the availability of accurate information, wide investor- base who can quickly and precisely process the information presented to them. Liquidity

contributes to market efficiency when the market capacity can accommodate huge order flow during the period when the market is liquidity. Some of the recent researches disclose that securities mispricing is more pronounced in illiquid markets (Ibikune, 2016).

2.2.2 Market Microstructure Theory

Market Microstructure theory can be attributed mainly to the researchers such as Calamia (1999), Madhavan (2000) and O'Hara (1995). Although this theory is a relatively recent discipline in the field of finance, this field has become popular mainly because of rapid reforms that are taking place in emerging markets. The progression of market microstructure as a subject corresponded with an era of rapid growth stock markets where new markets were being established and the existing ones were being revamped in many emerging countries.

The rejuvenation of these emerging stock markets was characterized by restructurings of the financial institutions, including automation of trading and information systems, expansion of stock market membership, enhancing the regulatory framework and opening access to foreign capital. The reforms aimed at improving the stock market performance particularly increasing liquidity, enhancing transparency, reducing volatility and trading cost, consequently improving efficiency of the stock markets.

For the markets to work efficiently, the interaction of various organizational structures of a market are cardinal as it impacts on important variables such as the processing of information, volumes of trade, the level of market liquidity, transaction costs, and price volatility. In the short-run, prices reflect the process of the instantaneous matching of supply and demand from a relatively small number of investors, who are transacting a specific asset at a given time. Market's equilibrium is influenced by investors' trading tactics, which relies heavily on the information available to the individual, investor's liquidity requirement and understanding of the exchange environment (e.g., the degree of adverse selection in the marketplace and the uncertainty of the market's valuation of the security (Calamia,1999).

In order to analyze the impact of the trading methods on market performance, understanding characteristics of markets namely market efficiency and stock market liquidity and to a large extent volatility are very crucial. The accuracy and the rapidity in which security prices reflect all obtainable information is one of the most explored aspects of financial markets and it is related to some structural features. The promptness of price adjustment can be viewed as a measure of market efficiency (Malkiel, 2013). The major issues empirically investigated in market efficiency include the manner in which prices adjust to new information and revolve over time, that is, how the market maker and other informed traders learn from taking keen interest in market information and how market structure affect price adjustment (Naseer & Bin Tariq, 2015).

The ability of the market to persistently accommodate large orders with little or no impact on price, as well as market steadiness and the speed in absorbing external shocks without causing market crashes is referred to as stock market liquidity (Al-Jaifi, Al-rassas & Al-Qadasi, 2017). Price behavior and market performance largely depend on the ability of the trading mechanism to match the trading desires of buyers and sellers. The matching process involves the provision of liquidity, which arises from the market maker and other facets of the trading system. Liquidity which is related to transaction costs is one of the most important features of actual markets (Madhavan, 2000).

According to the theory of market microstructure, there is interaction between the market characteristics. For instance, liquidity levels in the market are determinants of relative volatility across emerging markets but the degree varies with the region in question. Standard market microstructure models suggest that there is an inverse relationship between price volatility and trading volumes (O'hara, 1997). According to the models trading volume depends on the number of traders in a market and thus envisage an inverse relationship between price variability and the number of traders. High trading volumes reduce the inventory risk of market makers and help them to better harmonize buy and sell orders, thus improving the level of market liquidity consequently reducing volatility (Easley & O'hara, 1995). If the number of traders is large, there is likelihood of some traders to take the opposite side of the trade. It can therefore be deduced that liberalization has the capacity to make markets more liquid by increasing

trading volumes. With more liquid markets, the price impact of liquidity trades is reduced, and price volatility falls (Pawan, 2007).

Market microstructure theories affirm that there is an inverse relationship between stock market liquidity and insider ownership. This forecast arises from the assumption that the benefit of insider ownership is superior in entities where the profit prospective is less likely because of problem of information asymmetry. The larger the insider ownership with privileged accesses to information in a firm, the higher the cost of transactions and the wider the bid-ask spread for the firm's stock. Hence, increased insider ownership contributes greatly to information asymmetry thus reducing liquidity (O'hara 1997; O'hara 2014). According to Glosten and Milgrom (1985 one of the root causes of illiquidity is the presence of privately informed traders.

Sarin, Shastri and Shastri (1996) show that the stock liquidity decreases with concentrated ownership. However, they find that for higher insider ownership this loss of liquidity is a consequence of higher adverse selection costs, while for higher institutional ownership it is the result of higher inventory carrying costs. There is no clear suggestion of what should be hypothesized about the relationship between institutional ownership in a firm and its stock liquidity. Institutional investors, as they generally hold shares larger than typical shareholders, have larger monitoring ability of a firm's operations which reduces the agency costs and increases the entity's value. Murinde (2006) proposes a theoretical model for analyzing institutional changes in the stock market, The

model is based on the expected reaction of the micro structure characteristics i.e., Volatility, liquidity and efficiency of the stock market to any reforms undertaken in the market. These can be summarized as shown in Table 2.1.

Table 2. 1: Theoretical expected market microstructure characteristics response to reforms

	MICROSTRUCTURE CHARACTERISTICS			
MARKET REFORMS	Changes in trading system	Efficiency	Volatility	Liquidity
	1.Call over to open outcry floor trading	High	Low	High
	2.Automated trading	High	Low	High
	3.Formation of market regulation	High	Low	High
	4.Entry of foreign investors	High	Low	High

Source: Murinde (2006)

2.2.3 Liquidity Theory

Foucault *et al*. (2013) are known for their market liquidity theory. They define a liquid market as a market where a large volume of trades can be instantly executed with little or no effect on price. Investors expect a financial asset to be liquid, meaning that it can easily be sold in large amount without losing its original value. A liquid market is characterized with little or no transaction cost, ease of making large trades with limited effect on the market price and prompt settlement (Naes, Skjeltorp & Odegaard, 2011).

Liquidity in secondary markets is important as it influences the achievement of public offerings, as well as reducing the cost and risk for underwriters and other market players. Likewise, it reduces investors' cost by lowering volatility and transaction cost. Thus, from a macro level standpoint, when capital markets are liquid, they can be used as a vital tool to efficiently allocate capital, which consequently lowers the cost of capital for the issuers. From the micro level perspective, a liquid market guarantees access to a diverse variety of investors with different trading strategies.

Stock market liquidity is closely associated to the economic growth of a country (Vayanos & Wang, 2013). Whereas most lucrative investment projects would likely require long-term capital funding, savers tend to have hold their investments for speculation. A liquid stock market acts to solve this incongruity by providing the short time investors with an asset that is easily convertible into cash at shortest time possible at the same time enabling entities to take advantage of long-term equity capital (Naes, Skjeltorp & Odegaard, 2011).

Essential elements of a liquid market are depth, breadth, degree of resiliency as well as the swiftness of trading in a market. Depth refers to how large trade volumes affect the on-price movements. Breadth of the market or the market tightness on the other hand connotes the proportion of the general market that is taking part in the market's upward or downward movement and hence reflects the cost of changing positions. The bid-ask spread is a common signal of market

breadth i.e., in a liquid market, spreads should be thin enough so to prevent extreme price fluctuations (Foucault et al., 2013).

Market resilience is the ability and the time taken for the security prices to adjust to expected price level in the event of substantial price fluctuations which may be caused arrival of new information in the market. (Normally negative news) or large trade volumes. In a resilient market, prices relapse to mean or fair value within a short duration and finally, the swiftness at which trades are absorbed by the market is referred to as time. When the market is liquid trades, execution is done with a minimal time lag (Sarr & Labekk, 2002).

According to Tirole (2011) market illiquidity which is lack of liquidity is a major concern of most investors because it affects the expected returns on investment. Further, illiquid markets are more volatile and in extreme cases can trigger or aggravate financial crises. A large and growing theoretical literature attributes lack of liquidity to underlying market inadequacies such as information asymmetry, various costs associated with trading, constraints in funding etc. It also studies how the problem of market imperfection affects the returns investors expect from their investment through their influence on liquidity (Tirole, 2011; Hu et al., 2013; Malkhozov, 2017).

Information asymmetry in the stock market occurs when investors do not possess the same information; others through their position can access private information about the firm's value which may not be available to other

uninformed investors. This information asymmetry gives insiders the ability to recognize and take advantage of mispricing in the shares of their own firms. In finance literature, moral hazards, adverse selection and monitoring costs have been cited as causes of information asymmetry in the financial markets (Vayanos & Wang, 2012).

Market liquidity is also often linked to stock pricing efficiency. More specifically, low market liquidity impedes stock price discovery. For instance, if stocks fail to trade frequently; then, the speed of information flow regarding the stock's fundamentals is substantially low. Ultimately, stock prices may be out of sync with fundamentals, increasing the risk of large price correction (Musembi, 2018).

2.2.4 Agency theory

The concept of agency theory which was founded by Jensen and Meckling in 1976 has found its use mainly in in the field of Finance and Accounting. When exchanges are demutualized, it opens the membership to external shareholders. Due to their vast numbers, shareholders appoint a board of directors who are charged with the responsibility of guaranteeing the organization's success. The board may in turn may hand over the day to day running of the organization to managers (agents) who may have unharmonious ideas on how to carry out the operations of the organization giving rise to agency problems (Jensen and Meckling, 1976). Jensen and Meckling (1976) continue to explain that agency costs, which come in various forms, are increasingly on the rise in the present-

day corporations owing to various reasons key among them separation of ownership and control, diversification, and investor emphasis on wealth maximization. The problems caused include conflicting goal of managers with that of the organization, focusing on empire building objectives, excessive prerequisite consumption, non-optimal investment decision-making or acts of accounting mismanagement.

In support of this, Wambua (2013) asserts that these actions can adversely affect results in destruction of shareholders' wealth, which impacts widely on other corporate stakeholders, such as debt providers, employees and society in general. Agency theory brings out an understanding of the relationship between ownership concentration, foreign ownership and performance of an entity. Agency problems are seen to be more in dispersed ownership as shareholders tend to free ride and hence are less effective in their monitoring leading to unsatisfactory performance (Jensen and Meckling, 1976). On the other hand, foreign owners are portrayed to have more capacity and resources hence increasing their monitoring capabilities. Their investment decisions also tend to be more informed since they seek the services of professional managers. Foreign ownership therefore, is believed would lead to better performance (Mutisya, Onsomu & Mutunga, 2015).

The ownership structure is important given that corporate governance and the ownership structure of companies are currently undergoing transformation processes as the economies of the world become more and more globally

integrated. It is also of major importance because it affects the motivations of managers, and consequently the efficiency of firms (Mutisya, Onsomu & Mutunga, 2015).

Akhtar *et al.* (2012) argue that a wide shareholder base is likely to impose significant recurring costs to the stock market caused by the need to compensate its members. Where ownership is very widely dispersed, investors are more likely than not to be irrational in their decision-making process when a meeting is faced with the problem of quorum hitch. This is especially where the input of the current shareholders is required, consequently affecting the decisions made.

The monitoring and control school of thought argues that when ownership is concentrated, the problem of free-riding caused by dispersed ownership does not arise since the majority shareholders enjoy most of the advantages attributed to this monitoring. However, Mule, Mukras and Oginda,(2013) found out that when a few members, say below five shareholders' ownership in an entity exceeds thirty percent shareholding, the members tend to be overzealous in their monitoring, controlling and endorsement roles over managers.

The managers' creativity and innovation is then stifled which compromises on the performance of the organization. The problem is compounded when the shareholders lack the expertise to run the business of the firm. The trio further argue that there is need to sufficiently diversify shareholding as a way of attracting more skills, experiences and aptitudes among the shareholders in order

to improve firm's performance. On the same breath, the managers should be given a free hand by the shareholders to run the organization in the best way possible (Akhtar *et al*., 2012).

It is generally believed that dispersed ownership leads to increased market liquidity which can be explained by two hypotheses; the trading or free-float hypothesis and the adverse selection hypothesis. The free-float hypothesis postulates that concentrated ownership limits the free float which leads to fewer trade thereby reducing liquidity. In adverse selection, concentrated ownership is potentially costly, because block holders who are mostly institutional investors may have private information about firm value which may adversely affect liquidity (Banerjee, Breon-Drish & Engelberg, 2020). To strike a balance on level of ownership and as way of alleviating the problem of stock exchanges operating in special or limited interests, the capital market authority restricts the level of ownership by one shareholder or joint shareholding of the securities exchange to a non-controlling stake of between five to ten percent (CMA, 2014).

2.3. Empirical literature review

This section examines previous research on the types of reforms that have taken place in the capital markets and how emerging markets have responded to these reforms. It further reviews literature on the various researches that have been carried out in the NSE shedding some light on how the security market has been performing and consequently revealing the study gap to be filled by this study.

2.3.1 Opening of stock market to Foreign Investors and performance

The opening of portfolio investment to foreign investors was part of the reform process, which saw relaxation of capital controls. Miles (2002) examined the empirical relationship between financial deregulation and price volatility. To avoid ambiguity which has resulted in earlier studies on effects of market openness on volatility, the study tested for a larger variety of reforms than have been studied before. Moreover, the data set employed spanned important episodes such as the Asian, Russian and Brazilian devaluations which have occurred since previous empirical studies were written. The data was sourced from the International Financial Statistics (IFS) Emerging Markets Data Base (EMDB). GARCH (Generalized ARCH) models were used to analyze the data. The result of the study shows that reforms are often country-specific. The study findings show that Market openness in Latin American nation decreased the share price volatility whereas both Pakistan and India saw only increases in variability.

Henry (2000) studied the relationship between stock market liberalization, economic reform, and emerging market equity prices. He used a sample of 12 emerging markets: Argentina, Brazil, Chile, Colombia, Mexico, and Venezuela in Latin America, and India, Malaysia, Korea, the Philippines, Taiwan, and Thailand in Asia. Countries were chosen because of the general interest in the two regions. All emerging stock market data are taken from the International Finance Corporation's Emerging Markets Data Base (EMDB] ,including the Morgan Stanley Capital Index for Europe, Asia, and the Far East. Returns for

individual countries were sourced from the IFC Total Return Index -U.S. dollar denominated. Data on the S&P 500 came from the IMF's International Financial Statistics -IFS. Each country's U.S. dollar total return index was deflated by the U.S. consumer price index. All of the data are monthly. All returns are logarithmic. He conducted an event study since it is the most direct and transparent way of assessing the impact of stock market liberalization on emerging market equity prices. The study found that the standard IAPM makes a salient prediction about an emerging country that does not allow foreigners to purchase shares in its stock market: The country's aggregate cost of equity capital falls when it opens its stock market to foreign investors.

Lai, Lou and Shiu (2008) undertook a study in the Taiwan stock market. The trio sought to find out whether entry of foreign investors in the market causes stock price volatility. To achieve this, they used a sample of 20 firms with the highest foreign ownership in Taiwan Stock Exchange Sample period being from January 2000 to September 2006. The study found that apart from foreigner's trade having positive relation on concurrent return, it also increases conditional volatility.

The increase in stock price volatility arises due to the fact that those foreign investors prefer to buy large local stocks. This increases the stock price because foreigner's trade has the ability to predict the future returns, they further argue that by trading in local stock, foreign investors play the role of price discovery as they tend to push the prices back to equilibrium value should they deviate

from there their intrinsic value. From the findings it is also evident that opening the stock market to global investors has lowered the cost of equity capital but numerous emerging economies still view foreign investors as enemies who destabilize local markets due to excess volatility arising from their trade.

Ng *et al*. (2011) carried out a study on Heterogeneity of Foreign Investor and Stock market Liquidity around the World. The study evaluated whether foreign direct and portfolio equity investments have any deferential impacts on the stock liquidity. Data was taken from 27,976 domestic firms from 39 countries worldwide. The key study variables, together with control variables, were constructed using information from several different databases: foreign direct ownership and, daily stock trading from Data stream, financial institutional ownership from the FactSet Lion shares database, and effective spreads from transactions data managed by Thomson Reuters Tick History (TRTH); and financial variables from World scope. The study further examined the causal effect of foreign ownership on liquidity with the aim of investigating the impact of foreign ownership on stock liquidity associated with cross-border mergers and acquisitions. To achieve the objectives, a panel regressions was performed of a firm's stock liquidity measure on its foreign direct ownership (FDI) and foreign portfolio ownership (FPI) and firm-level control variables (X) as well as unreported country-, year-, and industry-fixed effects on the full sample and different sub-samples.

It is evident from the findings that foreign investors influence stock liquidity through trading and information channels. An increase in foreign direct (portfolio) ownership trading activity improves the stock market liquidity and vise-versa. Further the study found that foreign direct (portfolio) investors affect the degree of asymmetric information between the firm and outside investors, and such asymmetric information effects in turn affect the firm's stock liquidity.

Foreign direct investors, who take concentrated ownership and control positions in domestic firms, are privy to the firms' private information, but their informational advantage causes an adverse selection bias, making their stock more illiquid. Conversely, foreign portfolio investors, who are sophisticated investors with no control positions in domestic firms, face competition from other sophisticated investors over trading profits. As a result, the speed at which information gets incorporated into the stock price increases, thereby enhancing the liquidity of the stock.

2.3.2 Demutualization and Performance of stock markets

Hasan, Ahsan, and Rahaman (2013) undertook a study to examine whether demutualization of Dhaka stock exchange was desirable. To achieve this, he conducted a study to investigate the performance of the Dhaka stock exchanges before and after demutualization. The context of the study was Bursa Malaysia, Hong Kong Stock Exchange and London Stock Exchange since the three exchanges had already been demutualized: he performed two analyses; descriptive statistics analysis of the stock price performance of the three sample

demutualized stock exchanges and ratios analysis (i.e., return on profit margin, return on equity (ROE), Return on Assets (ROA), debt to total assets ratio and current ratio).

This was aimed at evaluating the microstructure performance of demutualized stock exchanges. Also, to assess the stock price performance of the exchange, the study used cumulative stock return to find the difference of the comparable index (or benchmark) of the respective stock exchanges.

Daily stock prices were gathered from www.finance.yahoo.com. However, financial statements from the official website of the sample stock exchanges, of www.londonstock exchange.com, www.hkex.com.hk and www. Bursamalaysia.com. The results found that the performance of stock prices and the operating performance of all the three exchanges are very remarkable. Although the performance of London stock exchange had gone down in 2009 and 2010 due to world economic meltdown, the overall performance of all three exchanges were much better when comparing the pre-demutualization and post-demutualization periods.

In line with the expected outcome of demutualization on liquidity Treptow (2006) found that demutualization increases stock market liquidity. This was the result of a study he conducted to establish the impact on liquidity on the exchange after demutualization. In order to achieve his objective, he examined securities that are listed on two markets simultaneously; all securities are listed in primary

markets that demutualized during the study period and all the securities which shared the NYSE which was not demutualized then and performed a comparative analysis using a quasi-experimental framework. The data which spanned a period of ten years consisted of various liquidity measures for 156 dually listed equities in the New York stock exchange and 12 stock exchanges outside the US. Comparing the demutualized and non-demutualized stock exchanges, the study concludes that demutualization brings about substantial benefits to the stock markets.

To analyse the impact of demutualization on stock market liquidity, Nyangara **(**2014**)** used a sample of 24 demutualized exchanges and 26 mutual exchanges. The study used secondary panel data from selected exchanges' websites, survey reports of the World Federation of Exchanges, as well as the IMF and World Bank databases from 1990- 2011. The study used panel data multiple regression model with cross-sectional and time effects on the regression intercept term. This approach which is a version of the Fixed Effects Model, also called the Least Squares Dummy Variable Model (LSDV) is based on the assumptions of Ordinary Least Squares (OLS) regression. From the findings it can be concluded that demutualization enhances the stock market liquidity which is in line with the findings of Hazarika and Oitchere and contrary to studies that document governance issues that arise from demutualization.

2.3.2.1 Ownership structure and performance

Nyangara (2014) studied 50 stock exchanges in order to evaluate the impact of ownership structure on their performance. Their study covered a period of twenty-one years between 1990-2011. They adopted a least square dummy variable regression (LSDV) model in order to examine the nature of the relationship between stock exchange ownership and performance as well as determine whether the relationship between the two variables was significant. The findings showed that demutualization improves the value of trades, market capitalization as well as increasing the number of listings. The study also revealed that when demutualization and automation were combined, they produced a positive effect on market capitalization while automation alone reduced the number of listings as well as the volume of trade, allegedly due to increased transparency and information efficiency arising from automation.

The increased volatility of portfolios of corporate ownership experienced in recent years has led to renewed interest in ownership structures (Mutisya, Onsomu & Mutunga, 2015).

There are numerous studies on ownership structure and performance owing to the fact that ownership structure affects the corporate governance. Alves (2012) examined the relationship between corporate ownership structure (measured by managerial ownership, ownership concentration and institutional ownership) and earnings management in Portugal. The main aim was to analyze whether they exacerbate or alleviate earnings management. From the results, it can be established that there was a negative correlation between discretionary accruals

which were proxies for earning management and both managerial ownership and ownership concentration. This result is in line with both the interest hypothesis which asserts that managers who own a significant portion of equity have less incentive to manipulate accounting information and the efficient monitoring hypothesis which suggests that large shareholders reduce the scope of managerial opportunism.

In order to establish the effect of ownership structure on the financial performance of firms listed at Nairobi securities exchange, Mokaya and Jagongo (2015) used all the 63 stocks listed at NSE during the study period. The pair used regression and correlation analyses to establish the relationship between ownership structure and performance of the firms and found that ownership structure and ownership concentration positively influence financial performances of companies listed in NSE. The research also highlighted that ownership structure influences the decision-making segment of the firm and that the degree of ownership concentration in a firm determines how power is distributed between its shareholders and managers. Ownership concentration was also found to be one of the main mechanisms of corporate governance that influence the scope of a firm's agency cost.

Shan and Gong (2017) in their study on the impact of ownership structure on firm performance of China's listed companies deduced that the concentration of ownership to the majority shareholder can significantly improve the long-term firm performance specifically that of non-state-controlled listed companies was

found to significantly perform better than that of state-owned companies. This implies that separation of ownership and control contributed to the firm's performance.

In other words, it can be construed those shareholders whose ownership is concentrated, would be more interested in enhancing the corporate governance structures especially when holding stocks for a lengthy period of time in order to improve revenue streams, consequently improving the firm's performance. Any single change in the largest shareholder's interest is a reorganization process of holding structure, thus will produce certain unpredictability which will adversely impact on the organization. Therefore, it is of cardinal importance to highly concentrate the firm's ownership to the controlling shareholder for a long time so as to keep the ownership structure stable. The study which used static and dynamic panel data had a sample of 288 Chinese A-share listed firms in Shenzhen and Shanghai securities exchanges between 2003 and 2011. Return on assets (ROA) and return on equity (ROE) were used as measures of performance whereas the shareholding ratio of 2 to 5, was used to measure ownership concentration of the largest shareholder.

Lee (2008) carried out a study on ownership structure and financial performance. The study sought to determine whether ownership structure affects firm performance in South Korea. The study focused on ownership structure which was broken down in terms of ownership concentration and ownership identity as it is believed to affect the efficiency of monitoring mechanisms. Traditionally,

agency theory opines that concentrated ownership should mitigate the agency problem but this has been negated by various studies which found that concentrated ownership does not improve performance. The study which had a sample of 579 listed firms used secondary data comprising of both financial and ownership data of the companies listed on the Korea Stock Exchange from 2000 to 2006. The data was obtained from the Korea Information Service and individual firm's annual reports, (the variables used in the study) and the proportion of shares held by a controlling shareholder for ownership concentration.

Foreign ownership is measured by the percentage of equity owned by foreign investors while institutional ownership was measured by the percentage of shares held by institutional investors. On the other hand, net income to total assets ratio (NIA) and ordinary income to total assets ratio (OIA) were used as proxies for firm performance. To test for the hypotheses, a multivariate regression analysis on panel data was used. The study finds that firm performance improves as ownership concentration increases which supports the traditional agency theory 'the effects of foreign ownership and institutional ownership on firm performance are not significant'.

Effect of Ownership Structure on financial performance of deposit money banks in Nigeria was a study conducted by Yahaya and Lawal (2018). They aimed at determining the effects of ownership structure on firm value of Nigerian deposit money banks. The study also evaluated the relationship between ownership

structure variables and firm value. Concentrated, managerial and foreign ownership variables were proxies for the independent variable whereas return on equity and return on asset were the measures for the firm value. The study used a sample of fifteen banks listed on the Nigerian Stock Exchange. Secondary data which was obtained from Nigerian deposit money banks audited report for a period of nine years between 2008 and 2016 were employed.

The study employed ex-post facto research design since it allows for the gathering of historical and multi-dimensional data which provide foundation that will aid in establishing the relationship between ownership structures on the value of deposit money banks in Nigeria. The sample of the study is fifteen (15) quoted deposit money banks on the Nigeria Stock Exchange (NSE) as at 31st July 2017 using purposive non-probability sampling method by selecting only deposit money banks that are trading on the NSE. The study outcomes reveal that only institutional ownership has positive and significant effect on financial performance while others have insignificant effect.

Alzeaideen and Al_Rawash (2014) investigated the effect of different ownership structure namely the largest, the five Greatest, Institutional and Individual Shareholder Structure on a share price volatility of listed companies in Amman Stock Exchange. The research which tested four hypotheses used panel data procedure with a sample of 51 Jordanians companies from 2005 to 2009. Ordinary Least Square (OLS) and Seemingly Unrelated Regression (SUR) were the regression models used. From the findings it is evident that SUR gave more

accurate and superior result than OLS. The findings reveal that there is a positive statistically significant relationship between the largest shareholder and share price volatility of the Jordanian firms. Likewise, the results are indicative of a positive and significant relationship between the five greatest equity holders and share price volatility. The study, however, found no significant association between the individual as well as institutional shareholder and share price volatility.

2.3.3 Dematerialization of securities and performance

Arora (2012), undertook a study on performance of National stock exchange (NSE) and Bombay Stock exchange (BSE) in India after establishment of National Security and Depository Limited and Central Depository Security Limited. The study sought to analyze the performance of the two stock exchanges by comparing the performance of 100 companies. Convenient sampling method was used to select the required sample for the study. The study used secondary data which was obtained from the national securities exchange website and India info line, newspapers, books and journals. From the findings of the study, it was established that during the period NSDL and CDSL registered significant progress. The number of companies that approached depositories to provide dematerialization services to their shareholders saw an exponential growth. The total market capitalization of securities that were available for dematerialization went up by between 27% and 60%. Participants offering dematerialization services also witnessed an encouraging growth. The value of securities dematerialized over the years witnessed a tremendous growth

in both NSDL and CDSL.A part of growth in value was attributed to the rise in prices. Dematerialization increased the volume of traded securities thus providing higher liquidity. More and more institutional investors participated in a bigger way in post –dematerialization period indicating increased level of investors' confidence in the Indian stock market.

Raju and Patil (2013) undertook a study on dematerialization and its impact on the market microstructure of Indian stock exchanges. The objective of the study was to analyze the growth trends process of dematerialization in the Indian Capital Market. To study the impact of dematerialization on Indian capital market as well as to explore the prospective of market regarding dealers in the securities market. The study used a blend of primary and secondary data. The researcher used a five-point Likert scale questionnaire targeting a population of 50 respondents. The data was analyzed using correlation analysis and factor analysis. From the findings of the study, it is evident that dematerialization of shares increased volumes traded, thus providing higher liquidity. Increased trading is an indicator of better liquidity. More institutional players participated in a bigger way in post demand period than in the period before dematerialization in the market indicating that there was increased level of confidence in the investors in Indian stock market. There was significant reduction in the bad deliveries from an average of 7 per cent of total transactions prior to dematerialization, to a negligible value after completion of the dematerialization process. There was also considerable reduction in litigation in respect of transaction frauds, which arise mainly due to physical handling of securities. The

transaction costs were also tremendously reduced. Since liquidity levels and returns increased, and volatility reduced, it can be deduced that there was improvement in Microstructure performance.

2.3.4 Capital Market Reforms and Efficiency

Asewe *et al*. (2013) undertook a study to determine the effect of automation on market efficiency. The aim of the research was to shed more light on technology-induced market changes and whether or not it has improved the market efficiency. The study focused on the automation that was carried out on Nairobi Security Exchange in 2006. Secondary data sourced from the stock market was used. The study used a skewness and kurtosis test to test for normality. The results found the mean and median to be very close. On average the measures of skewness and kurtosis measures close to zero and three respectively for all the years of study, an indication that the data was normally distributed. This was construed that the market was efficient in its weak form. The result further shows that automation of trading in the stock market improved performance.

Kimwele *et al*. (2015) investigated whether automation of bond trading enhanced the performance of bond market at Nairobi Securities Exchange (NSE). They specifically wanted to determine whether or not automation of bond trading had increased volumes of trade and the market size. A comparative research design was used for the study which targeted all firms trading on the bond market at the NSE between the years 2005 and 2012.Four years prior to

automation an equivalent period after automation data was used in order to enable ease of comparison between the two periods. The number of bonds traded and market capitalization ratio were used as bond market performance indicators. Correlation analysis was used in order to determine the degree of association between two bond market performance periods. From the findings it was evident that automation of bond trading had a significant and direct impact on the performance of the bond market.

On the contrary, Omuchesi, Bosire and Muiru (2014) study concluded that efficiency at the Nairobi Securities Exchange did not improve with the introduction of the ATS that is, automation had not produced the expected benefits of enhancing efficiency of the securities market. Their study was undertaken with the aim of determining whether automation of trading in the stock market had any effect on the efficiency of NSE. Secondary data in the form of closing monthly NSE 20-Share index and closing equity prices for the period 2002 to 2012 from which the returns on both the equity prices and the market index were determined. A longitudinal research design was adopted for the study which targeted all listed companies at the NSE. However, they only included those firms listed at the NSE by 1st January 2004 which had data covering the study period i.e., firms that had changed names, been taken over, been suspended/delisted/had merged were not included in the study. A comparative analysis of the period before and after automation was conducted. Both descriptive and inferential statistics were used for data analysis. In descriptive statistics, standard deviation and measures of skewness and kurtosis

were employed whereas chi square tests were used for inferential statistics. From the findings it can be concluded that efficiency at the Nairobi Securities Exchange did not improve with the introduction of the ATS. Overall, it can be construed that automation had not produced the expected benefits of enhancing efficiency of the securities market.

2.3.5 Capital Market Reforms and Volatility

Omuchesi and Bosire (2013) wanted to investigate whether the automation of trading on the stock market had affected price volatility in the Nairobi Security Exchange (NSE). They compared the performance before and after automation to determine whether there were any significant changes in price volatility. In order to achieve their objective, they used a longitudinal research design. Closing monthly NSE 20 Share Index and the average share closing prices of 37 NSE listed firm's variance were used for analyzing the data together with a chi-square test and t-test for testing the level of significance. The study found that volatility of the returns for the two study periods did not change. This implies that automation of trading which was expected to reduce volatility due to enhanced intensity of trading activities in the market did not improve. It was also anticipated that volatility could increase the portfolio flows thereby raising liquidity and consequently reducing volatility. However, this was not achieved.

2.3.6 Capital Market Reforms and Liquidity

Nyangara (2014) undertook a study to investigate whether demutualization had any impact on stock market liquidity. To arrive at the precise conclusion, they compared the performance of 50 stock exchanges; 24 stock exchanges that had

already demutualized and 26 mutual stock exchanges. Panel data which was purely secondary obtained from relevant exchanges' websites, reports of the World Federation of Exchanges, IMF and World Bank databases were used. A panel regression model was employed to examine the nature and significance of the relationship between demutualization and stock market liquidity. Turnover ratio and volume traded relative to GDP were used as measures of liquidity. The findings indicate that there is benefit of demutualization as it improves the liquidity of stock exchanges. From the existing literature it is clear that the trend has been to automate the stock market before demutualization as there is evidence that if the action is taken vice-versa, the process is not likely to produce the desired results. This study also affirms assertion.

Bouresli and Abdulsalam (2019) carried out a study whose objective was to gain an in-depth understanding on the impact of the CMA Law on investors and their readiness to invest in the listed shares. The study which was titled new market reforms and stock exchange liquidity focused on analyzing the transformation in market liquidity before and after the CMA Law to determine whether the new reform improved the quality of market efficiency, and whether it reduced information asymmetries and whether liquidity improved or not. The study concentrated on the liquidity aspect of the market, because it is documented that better quality of disclosure impacts positively on market liquidity through reducing or totally eliminating information asymmetries across investors (Heflin et al., 2005). With the rebuilding of investors' confidence as expected by the

enactment of the new reform, it is expected that there will be improvement in trading and consequently enhanced liquidity.

The study used trading value, volume, market capitalization and stocks closing prices which were obtained from Kuwait Boursa website for the period from 2005 to 2017. Both non-parametric Mann-Whitney U test and parametric t-test were used to examine the hypotheses and to compare liquidity patterns around the CAM Law activation. The normalization of the data was done using logs to remove the effect of outliers. The results of the tests were all indicative of a high significance at the 0.1% level, this confirms that liquidity was impaired significantly in the period after the CAM Law. All the liquidity measures were lower in the post reforms than before the reforms were undertaken. The results were all consistent with the notion of significant liquidity deterioration post-CMA Law with smaller size firms bearing the brunt of the new laws. In conclusion, market liquidity declined contrary to the expectation that the new rules of the securities market would bring about positive changes especially as far as liquidity is concerned.

2.3.7 Market size and performance

The relationship between market size and performance has not attracted much debate and therefore there is very scanty literature on the same. Market capitalization ratio is usually used as a measure of stock market size. This is because economists assert that there is a positive correlation between market size and its ability to mobilize funds and diversify risk (Oke & Adeusi, 2012).

Nyangara (2014) in their study that analyzed the impact of demutualization on stock exchange liquidity wanted to find out if there is any moderating effect of market size on the relationship between demutualization and stock market liquidity. The study used both the market capitalization ratio and the number of listed firms as proxies for market size. From the findings it is apparent that the size stock exchange influences stock market liquidity. The bigger the size the higher the level of liquidity.

2.3.8 Time and performance

Nyangara (2014) when analyzing the impact of demutualization on stock market liquidity, they included the time lag between automation and demutualization to test if there is any merit in the observed sequencing of automation and demutualization in the stock exchanges that had already been demutualized. The findings clearly suggest that automation alone is not sufficient to achieve substantial stock market development. Thus, automation should be instigated as prerequisite for the adoption of other stock market reforms such as demutualization. The time lag between adoption of automation and demutualization seems to have a significant positive effect on the success of the two policies. Securities markets that take time to assess and improve their trading systems are likely to have superior performance than those that adopt automation and demutualization either concurrently or in quick succession. Performance of exchanges that demutualize before automating their trading systems are likely to worsen.

2.3.7 Summary of Literature Review and Research gap

Reforms in the stock markets are expected to impact positively on the microstructure characteristics of emerging markets. It is desirable in propelling the growth and performance of emerging markets, however existing literature on the subject matter report mixed results, with some studies showing that reform is desirable whereas others show that reforms affect performance negatively. Similarly, this area of study has not been substantively covered. There is scanty information on the effect of stock market reforms on performance of emerging markets. Moreover, the issue of demutualization is relatively a recent one, the process having been completed in August 2014. The researcher, therefore, proposed to undertake this study with a view to unveiling the scenarios in Kenya.

Table 2. 2: Summary of literature review

AUTHOR(s)	STUDY OBJECTIVE	FINDINGS	RESEARCH GAPS	FOCUS OF THE CURRENT STUDY
Henry (2000)	To investigate the relationship between stock market liberalization, economic reform, and emerging market equity prices.	From the findings it can implied that opening the stock market to foreign investors reduces the cost of raising ordinary shares.	Methodology used was event study and the study variables were market opening as the independent variable and equity prices as dependent variables.	The study has three independent variables for capital market reforms and three market microstructure performance and panel regression will be used to analyze the data
Miles (2002)	To examine the empirical relationship between financial deregulation and price volatility	From the findings it was established that countries respond to reforms in unique ways. Whereas some countries recorded improvement in volatility due to reforms others did not.	The study variables in the research were financial deregulation and price volatility.	This study will look at market opening to foreign investors, dematerialization and dematerialization as independent variables and dependent variables being liquidity, volatility and efficiency

Ananchotikul and Eichegreen (2009)	To determine the effects of corporate governance reforms on emerging markets	The key findings are that the exogenous components of corporate governance have significant payoffs in terms of development of equity and bond markets	The study looked at only one aspect of reform and its effect on equity and bond markets.	This study will focus on three most recent reforms and they how have affected efficiency, liquidity and volatility
Arora (2012).	To analyze the performance of the National stock exchange (NSE) and Bombay Stock exchange (BSE) in India after establishment of National Security and Depository Limited and Central Depository Security Limited.	From the findings, there was increase in; The number of companies that approached depositories to provide dematerialization services to their shareholders The total mkcapt of securities that were available for dematerialization. The value of securities dematerialized	A comparative analysis was adopted to find the difference in performance before and after establishment of National Security and Depository Limited and Central Depository Security Limited.	The study aims at finding the relationship between the No of dematerialized securities, Growth in dematerialized securities and market microstructure performance

Hasan, Ahsan and Rahaman (2013)	To examine the post-demutualization performance of stock exchanges	The result of the study shows that demutualization has impacted positively on price and the operating performance of all exchanges studied	The study looked at how exchanges have performed in terms of stock price and operating performance after demutualization. Performance was measured using ratio analysis.	This study will evaluate how dematerialization and demutualization have affected liquidity, volatility and efficiency of the bourse Performance under this study will look at microstructure characteristics of the market namely; liquidity, volatility and efficiency and will be measured using turnover ratio, standard deviation and abnormal return respectively.
Asewe *et al.* (2013)	To determine the automation effect on market efficiency.	The study found that automation improved capital market efficiency and that the market was weak form-efficient.	The study did a comparative analysis and used-statistic to establish whether there was a significant difference in	This study will look at three reforms namely; opening of the market to foreign investors, demutualization and dematerialization and performance will be liquidity,

			performance during pre- and post-automation periods and a normality test was used to determine market efficiency	efficiency and volatility which will be measured using turnover ratio, abnormal returns and standard deviation respectively. Regression analysis will be performed to establish the relationship between dependent and independent variables.
Omuchesi and Bosire (2014)	To investigate the effect of the automation on stock market price volatility of the Nairobi Security Exchange	The study found that automation did not improve volatility in securities exchange	The study zeroed in on only one aspect of reforms as well as one market microstructure characteristic-volatility	this study will look at three types of reforms and expand to three market microstructure characteristics ; efficiency, liquidity, and volatility
Omuchesi Bosire and Muiru (2014)	To determine the effect of automation on market efficiency of NSE.	From the findings it was evident that automation did not significantly affect the efficiency of the market. The presence of patterns of	The study did a comparative analysis and used chi square test to establish whether there was a	This study will look at three types of reforms and performance will also be extended to all the three market microstructure

		returns that could be used to predict future returns is an indication of an inefficient market.	significant difference in abnormal returns during pre- and post-automation periods and t-test to test if the abnormal returns are significantly different from zero.	characteristics i.e., liquidity, efficiency and volatility which will be measured using turnover ratio, abnormal returns and standard deviation respectively. Regression analysis will be performed to establish the relationship between dependent and independent variables.

Nyangara (2014)	To analyze the impact of demutualization on stock market liquidity	The findings indicate that demutualized exchanges exhibit significantly greater liquidity compared to mutual exchanges after controlling for age, size, trading technology, and level of economic development.	The study employed panel data regression model. Two measures of stock market liquidity (turnover rate and the value of volume traded relative to Gross Domestic Product (GDP) were used.	This study will three areas of reforms that is market opening to foreign investors, demutualization and dematerialization, it is also focusing on the three microstructure performance measures (liquidity, volatility and efficiency) the measure of liquidity turnover ratio
Kimwele, Bosire, Muiru and Kamau (2015)	To investigate the effect of automation of bond trading on the performance of bond market at Nairobi Securities Exchange (NSE).	The results of the study indicated that bond trading automation has a positive and a significant effect on the performance of the bond market.	The study used comparative research design to compare pre- and post- automation performance, the performance indicators being volumes of bonds traded and the market size.	This study will focus on the shares trading at the securities market. A panel regression analysis will be used to determine whether capital market reforms have affected the market microstructure performance

2.4: Conceptual Framework

The study investigated how capital market reforms particularly entry of foreign investors, dematerialization and demutualization have affected the microstructure performance (i.e., efficiency, liquidity, and volatility) of the stock exchange.

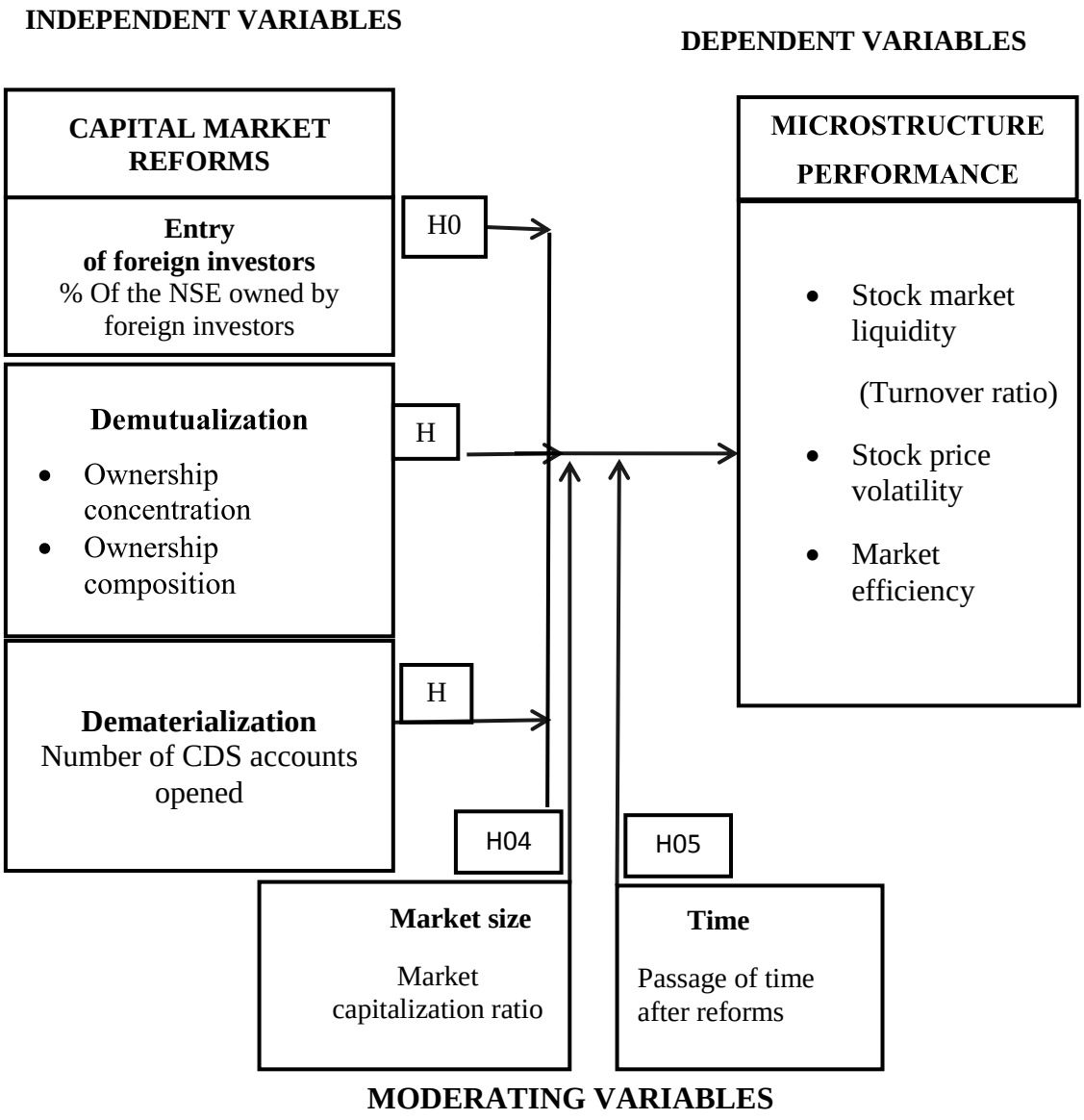

Figure 2. 1: Conceptual framework

Source: Researcher (2018)

The model in figure 2.1 shows the relationship between the independent and the dependent variables. Its aim is to relate how capital market reforms namely entry of foreign investors, demutualization of the NSE and dematerialization of securities trading at the NSE have affected the market microstructure performance captured by market efficiency, stock market liquidity and the stock price volatility. The model also suggests that time and market size could have some moderating effect on the relationship between the performance of the market microstructure and the most recent capital market reforms.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the methodology that was adopted in conducting this research study. The chapter contains separate sections describing the research design, target population and sampling procedures. The research instruments used, the data collection methods, and the analytical techniques used are also discussed in detail.

3.2 Research philosophy

Positivism relies on the hypothetic deductive method to validate prior hypotheses that are often stated quantitatively, where practical relationships can be derived between causal and explanatory factors and their expected outcomes. A principal objective of positivist investigation is to produce explanatory relations or causal relationships that eventually lead to prediction and control of the phenomena in question. (Park, Konge, & Artino, 2020).

The study embraced a positivist research paradigm which asserts that scientific knowledge is authentic knowledge that can only come from positive verification of theory through scientific method, which systematically investigates phenomena by gathering observable, empirical and quantifiable proof of a given subject matter. Positivist research is likely to use an immensely structured methodology which can be replicated without much difficulty laying the emphasis on measurable

observations that can be analysed statistically. In order to decide on the research approach to be adopted and the type of data to be collected, this study used existing theories to develop hypotheses. The hypotheses were then tested and confirmed wholly or partly affirming with the previous researches' position. Some were contested, leading to the further advancing of theory which became an area of further research (Aliyu et al., 2014). The study used time series data. The data included NSE weekly closing share prices of the relevant firms and the NSE share index from January 2002 to December 2017. This was to calculate the returns of all the securities as well as the market return. Data for the ownership structure of NSE, value of shares traded as well as market capitalization were obtained from NSE records whereas the data for GDP was obtained from Kenya National bureau of statistics database.

3.3 Research Design

The study employed an explanatory research design. Saunders, Lewis and Thornhill (2009) opine that an explanatory research seeks to establish causal relationship between dependent and independent variables. Explanatory research looks for causes and reasons and provides proof to support or disprove an elucidation or predictions. It is conducted to ascertain and report on the nature of relationships among different features of the phenomenon under study. Hypothesis testing provides an understanding of the type and nature of relationships that exist between variables.

This design was adopted as it was very vital in establishing the type and nature of relationship between the capital market reforms and the microstructure performance of the Nairobi securities market, as well as the moderating effect of time and market size on the relationship between capital market reform variables and microstructure performance of the NSE.

3.3.1 Empirical Model

In order to evaluate how capital market reforms have affected the market microstructure performance, the study adopted a multiple regression model. This assisted in establishing to what extent entry of foreign investors, demutualization and dematerialization have affected efficiency, liquidity and volatility of the NSE. The empirical model was given by;

$$Performanc = f(Fentr, Dmut, Demat, MSiz, Tsf \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots. (3.1)$$

Where;

$Performanc$	Microstructure performance (Market Efficiency, Liquidity and Volatility)
$Fentr$	Entry of foreign investors
$Dmut$	Demutualization of the securities market
$Demat$	Dematerialization of securities
$MSiz$	Market size of the securities market
Tsf	Period of time since reforms was undertaken

$\boldsymbol{\beta}_s$= Coefficient of the variables where β^1- β^5Are the parameters that will be estimated to establish how each of the reforms have affected efficiency, liquidity and volatility and the overall market microstructure performance

$\boldsymbol{\beta}_0$= Constant terms which are the intercepts of the regression equations

$\boldsymbol{\varepsilon}^{\boldsymbol{s}}$= Composite error terms

$\boldsymbol{i}$ = Various variable indicators for Demutualization (ownership composition &ownership concentration)

E_t= Efficiency which is the average abnormal returns of the market at time t

V_t= Volatility which is the average deviations of the market at time t

When broken down in its performance components, the models without the moderating variables was given by;

$E_t=\beta_0+\beta_1 Fentr_t + \beta_2 Demat_t + \beta_3 Demut_{t1} + e_t$ ……. (3.2)

$V_t=\beta_0+Fentr_1 D_t + \beta_2 Demat_t + \beta_3 Demut_{t1} + e_t$ ……. (3.3)

$L_t=\beta_0+Fentr_1 D_t + \beta_2 Demat_t + \beta_3 Demut_{t1} + e_t$ ……. (3.4)

The results obtained from each of the three performance measures were then combined into a single composite variable. Since each indicator alone doesn't provide sufficient information about the phenomena, it was imperative to combine the indicators into one variable in order to give meaningful interpretation. This was achieved by use of principal component analysis embedded in the statistical analysis tool, Stata 13.0. The PCA uses the method of simple averaging where the composite

variable (C) was created by adding all the z scores of the original variables: The z scores have a mean of 0 with a range from negative to positive numbers. Such standardization is necessary when the original variables have different variances so that the association between the composite variable and outside variables is not excessively affected by any one original variable with a large variance (Streiner & Norman, 2003).

The condensed form of the equation with a single microstructure performance indicator without the moderators becomes

$Microp_t=\beta_0+\beta_1 D_t + \beta_2 Demat_t + \beta_3 Demut_{t1} + e_t$ ……. (3.5)

The condensed form of the equation with a single microstructure performance indicator with the moderators becomes

$Microp_t=\beta_0+\beta_1 D_t + \beta_2 Demat_t + \beta_3 Demut_{t1} + \beta_4 (Tsf_t * D_t) + \beta_5 (Tsf_t * Demat_t)+\beta_6 (Tsf_t * Demut_{t1}) + e_t$ ……. (3.6)

$Microp_t=\beta_0+\beta_1 D_t + \beta_2 Demat_t + \beta_3 Demut_{t1} + \beta_4 (MSiz_{t_t} * D_t) + \beta_5 (MSiz_t * Demat_t) e_t+\beta_6 (MSiz_{t_t} * Demut_{t1}) + e_t$ ……. (3.7)

Table 3. 1: Operationalization and measurement of variables

CATEGORY	VARIABLE	OPERATIONALIZATION	MEASUREMENT	SCALE
INDEPENDENT VARIABLES	Entry of Foreign Investors	Proportion of foreign ownership	Percentage of shares owned by foreigners in the NSE	Ratio
	Demutualization	1)Ownership structure of NSE • Ownership composition • Ownership concentration	• % Of shares owned by of domestic investors in NSE • Proportion of shareholders with shareholding above 20% in NSE	Ratio
	Dematerialization	3)Proportion of dematerialized securities	Number of dematerialized securities as a percentage of all securities of a given firm in a given time period	Ratio
DEPENDENT VARIABLE	Market Efficiency	Average Abnormal returns of all the firms	Actual returns-Expected returns	Interval
	Stock Market Liquidity	Turnover ratio	This is the value of total shares traded divided by market capitalization.	Ratio
	Stock Price Volatility	This is measured by average deviation of stock returns for all firms at a given time.	This is the average variability of the returns around their historical returns	Interval

MODERATING VARIABLE	Market Size	Market capitalization ratio was used as a proxy for the size of the security market	Market capitalization ratio as a percentage of GDP	Ratio
	Time	Time since reforms were undertaken	Number of periods since reforms were undertaken	Interval

Source: Researcher (2018)

3.4 Target population

The targeted population comprised of all the 63 firms that were listed in the various market segments of the securities market from 1st January 2006 to 2017.These were drawn from all the sectors of the market namely; the agriculture, commercial and services, telecommunications and technology, automobile and accessories, banking, insurance, investment, manufacturing and allied, and energy and petroleum sectors.

3.5 Sampling procedure

The study used a census approach since the units of study were not so many, they were accessible, and therefore not prohibitive in terms of cost, time and other resources. The units of study are also heterogeneous owing to the fact they belong to different market segments. The inclusion of all the study units guaranteed a high degree of data accuracy and also helped to eliminate sampling error (Shannon & Bradshaw, 2002). All the firms that were listed on the NSE during the study period were the components of the sampling frame. However, some firms changed their names, others were taken over/ merged whereas others were suspended or delisted during the relevant period. Since this was going to affect the outcome of the study those firms were excluded from the study. Newly listed firms were also excluded. Therefore, out of the 63 firms that were listed only 41 firms were eligible for the study.

3.6 Data Collection Instrument

The data that was used in the study was purely secondary. The appropriate data was obtained using data capture sheets; weekly share prices for each firm and

the NSE 20 share index. Other data collection instruments were used to collect the yearly value of traded securities for each company, number of outstanding shares for each company and the annual GDP value for the country Kenya,. The ownership structure which comprises the ownership concentration and ownership composition of NSE were retrieved from the NSE annual reports. The number CDS accounts opened which were used as proxy for dematerialized securities for each study period were obtained from the CMA annual reports.

3.7 Data Collection Procedure

The study used time series data. The data included NSE weekly closing share prices of all the firms and the NSE share index from January 2002 to December 2017, (the reform period). This was used to determine the returns of all the securities as well as the market return. Data for the ownership structure of NSE was obtained from the CMA quarterly statistical bulletin. Value of shares traded as well as market capitalization were obtained from NSE records whereas the annual GDP data was obtained from the Kenya National Bureau of statistics records.

3.8 Data Analysis and Presentation

Data was analyzed using among others, descriptive statistics i.e., means and standard deviation. With the aid of excel spreadsheet and using the weekly stock prices and the NSE 20 share index, Ordinary Least Squares method was used to obtain the security characteristic line or the market model from which the expected returns were computed. These were then compared with the actual

return to arrive at the abnormal returns for each firm consequently establishing market efficiency. The standard deviation of the stocks returns was obtained which was used as a measure of volatility of the stock price around its historical returns. The annual averages of each performance measure (liquidity, volatility and efficiency) for all the firms were computed. The result obtained for each performance indicator was then combined into a composite variable using the principal component analysis embedded in the Stata program version 13. The combined performance measure was then regressed against the reform's variables using multiple regression analysis with the aid of computer software, Stata 13.0 so as to establish their relationship as well as evaluating how reforms have affected the performance of the security market.

3.9 Diagnostic tests

Diagnostic tests were conducted to assess the soundness of the models. The diagnostic test used in this study aimed at establishing whether the residuals were normally distributed and if they had a constant variance. The presence of autocorrelation in the error term as well as multicollinearity were also tested.

3.9.1Autocorrelation test

Autocorrelation occurs when there is a positive correlation between error terms occurring between two consecutive periods. The problem of autocorrelation affects the efficiency of the regression results as it causes bias in the standard error. In order to reduce or eliminate the bias, there is need to detect autocorrelation in the idiosyncratic error term in a time series data. The presence of autocorrelation was tested using Breusch-Godfrey LM test for

autocorrelation. This test was preferred because it is less sensitive to the assumption that the error term follows a normal distribution. It also allows for serial correlation to be tested using a number of lags.

Null hypothesis of absence of serial correlation was tested against the alternative hypothesis of presence of serial correlation in the residual. The criterion for rejecting the null hypothesis is when the prob.>chi2 is less than 0.05 or 5%, an indication that the error term in the model is autocorrelated or serially correlated.

3.9.2 Heteroscedasticity test

Failure of the OLS assumption of a constant variance of the error term to hold for all observations indicates that the error is heteroscedastic. Heteroscedasticity leads to unbiased and inefficient estimates of the coefficients, as well as biased estimates of the standard errors and thus incorrect test statistics and confidence interval. To test for presence of heteroscedasticity, the study used Breusch Pagan test for heteroscedasticity. The test uses the standard errors obtained from the regression results. The null hypothesis is that the error variances is homoscedastic, while the alternative hypothesis is that of the error variances are a multiplicative function of one or more variables (heteroscedasticity) (Rast et al., 2020). The null hypothesis was rejected if the p-value is less than 0.05. To correct the problem of heteroscedasticity, Robust Standard Errors was used since it relaxes the OLS assumption of both independent and identically distributed error term by addressing the problem of errors that are independent and not identically distributed. Additionally, the use of robust standard errors does not

change the coefficient estimates provided by OLS, but only the standard errors and significance tests changes (Rast et al., 2020).

3.9.3 Multicollinearity test

Multicollinearity in regression exists as a result of the predictor variables being highly correlated with each other thus making it a challenge to isolate their individual effects on the dependent variable (Salvatore, 2021). The result of this is the instability of the regression coefficients and deflated t−statistics (not significant) while the F−statistic is significant. The problem of Multicollinearity does not affect R^2 (Motulsky, 2002). Multicollinearity was diagnosed with the variance inflation factor (VIF). An VIF > 10, indicates the presence of multicollinearity and thus one of the variables was dropped, in this case the domestic individual investors.

3.9. 4 Model Specification test

A correctly specified model includes all but only the relevant study variables because misspecification can have adverse and extensive effect on the regression coefficients. A specification error occurs in the model when relevant variable(s) are excluded from the model or when an irrelevant variable is included in the model (Drukker & Torres-Reyna, 2007).

It was therefore important to test whether there was omitted variable bias in the regression model. The study used the Stata link test to test for the model specification. Link test basically checks whether more variables are needed in

the model by running a new regression with the dependent against new predicted and squared predicted variable created by the link test. The null hypothesis of no specification error in the model is not rejected if the p-value of squared predicted variable is not significant, implying that the model is correctly specified and no additional variables are needed in the model.

3.9.5 Normality test

A Normal distribution, is a probability distribution that is symmetric about the mean. This means that one half of the bell-shaped distribution is a mirror image of the other half. This is not always true as some random variables tend to be skewed towards one direction. The study tested the null hypothesis that the residual in the model follows a normal distribution against an Alternative hypothesis that the residual does not follow a normal distribution. Probability of skewness and probability of kurtosis are greater than 0.05 implies that Skewness and kurtosis are asymptotically normally distributed. Likewise, a probability of the chi2 of less than 0.05 meant the null hypothesis was rejected at 95% confidence interval (Sajwan & Chetty, 2018)

3.10 Unit root test

This test was carried out to test whether the time series data was stationary or not. The presence of a unit root or non-stationarity can strongly influence behavior and properties of time series data. For example, there will be persistence of shocks for non-stationary series. If two variables are trending over time, a regression of one on the other could have a higher R^2 even if the two are

not in any way related to each other thus giving spurious results. If the variables in the regression are not stationary, then it can be proved that the standard assumptions for asymptotic analysis will not be valid (Salvatore, 2021).

To test for presence of unit root, augmented dickey fuller (ADF) unit root test was used. The null hypothesis of a unit root was tested against the alternative hypothesis of absence of a unit root. The null hypothesis was rejected if test statistic value is greater than critical value at 5% significance level. If the null hypothesis is not rejected, it is believed that there is a unit root and the data is differenced before running a regression. If the null hypothesis is rejected the data is assumed to be stationary (Drukker & Torres-Reyna, 2007). A differenced stationary series is said to be integrated and is denoted as I(d) where *d* is the order of integration.

3.11 Ethical considerations

During the study the researcher upheld high ethical standards. For instance, before carrying out the study, permission was sought which was granted by relevant authorities. The researcher also observed a high level of integrity in the study by ensuring that no work was lifted directly without citing the source, likewise the test results were not doctored so as to make conclusion that suit the researchers' expectations.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND DISCUSSION OF RESULTS

4.1 Introduction

This chapter reports the results from both descriptive analysis on study variables and inferential statistical analysis that addressed the research objectives. Diagnostic test results on the estimated models are also reported.

4.2 Descriptive statistic

The descriptive analysis of research data is presented using annual averages which provide brief descriptive quantities that summarize the data set for the entire population. They are broken down into measures of central tendency (mean) and measures of variability (standard deviation). In the study, market microstructure performance variables included liquidity, volatility and efficiency. These were measured using turnover ratio, standard deviation and abnormal returns, respectively.

The turnover ratios used in the study are based on annual averages obtained from the mean weekly value of total shares traded as a proportion of market capitalization.

Abnormal return which is the difference between the expected returns and actual returns was computed in two parts; before the study period from 2002 to 2005 and during the study period, from 2006 to 2017. First, the weekly closing share prices for each firm and the corresponding weekly closing market index for the

NSE 20 share index were used for the period before reforms. A simple regression analysis was run with each firm's share prices as the independent variable and market index as the dependent variable from which **α** and **β** for each firm were obtained and using the market model an equation in the form of :

$$R'_{k,t}=\alpha_k+\beta_k Rm'_t+e_{k,t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 4.1$$

Where;

$R'_{k,t}$ - Stock return k at period t

Rm'_t - The corresponding market return obtained by;

$Rm=\frac{m_t}{m_{t-1}}-1$ for m_t is the market index for period t

α -the constant term

β-the coefficient obtained from the regression

$e_{k,t}$-the error term for stock k at period t

The weekly stock returns for each firm were computed as the difference between the current closing price and the previous closing prices expressed as a percentage of the previous closing prices. Thus, the expected returns for each firm were computed using each firm's **α** and **β** and the market return. Thus;

$$AR_{k,t}=R'_{k,t}-\pi_{k,t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots 4.2$$

Where;

$AR_{k,t}$-Abnormal return for security *k* at period *t*

$R'_{k,t}$-the expected return for security *k* at period *t*

$\pi_{k,t}$-the actual return for security *k* at period *t*

Where π=Actual return for security k at time t given by

$$\pi = \frac{p_t}{P_{t-1}} - 1 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..4.3$$

For p=weekly closing prices at time t

Average abnormal returns for each firm were then obtained as the mean of all the firms' weekly returns given by;

$$ARR = \sum_{t=1}^{n} \frac{AR}{n} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 4.4$$

The annual average abnormal returns for each study period were then obtained as the mean of all the firms' average abnormal returns.

The weekly returns computed for the study were not only used to get the abnormal returns but also the standard deviation which was used to measure volatility.

To obtain stock price volatility, First, a mean return for each firm was obtained from which the deviation from the mean for each firm for each year was calculated by;

$$sp^2 = \frac{\sum_{i=1}^{k}(n_i-1)s_i^2}{\sum_{i=1}^{k}(n_i-1)} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..4.5$$

sp^2 is pooled variance

s_i is variance of stock i that is given by

For $i = (1,2,3 \ldots\ldots\ldots k)$

$$si^2 = \frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})^2 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..4.6$$

Where

x_i =return of stock i

$\bar{x}$= mean return of stock i

Figure 4.1 presents the efficiency trends in the Nairobi securities Exchange during the study period

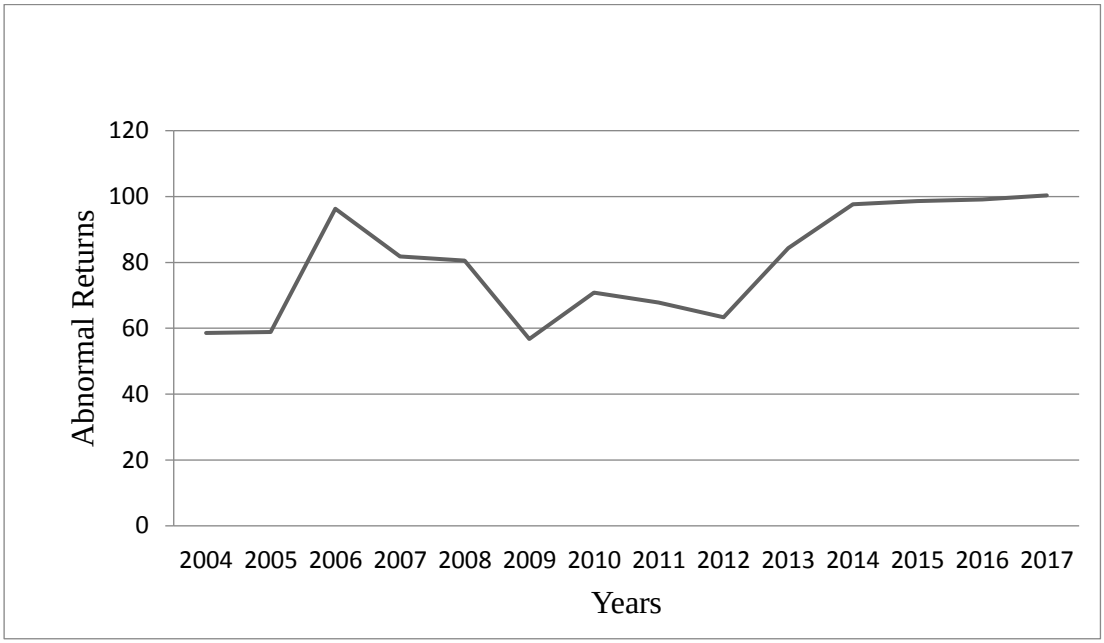

Figure 4. 1: Market Efficiency

The abnormal return which is the measure for efficiency in this study shows a fluctuating trend.in the year 2005, the abnormal returns rose from a low of about 60 to about 90. This is an indication that the market was very inefficient during these periods which could be attributed to poor flow of information in the market. The mean return shows a downward trend in the years 2006 to 2009 during which the efficiency of the security market shows an improvement, before rising slightly again in 2010. There was a steady rise between years 2012 to 2015 before it stabilized.

Figure 4.2 presents the Stock price volatility trends in the Nairobi securities Exchange during the study period.

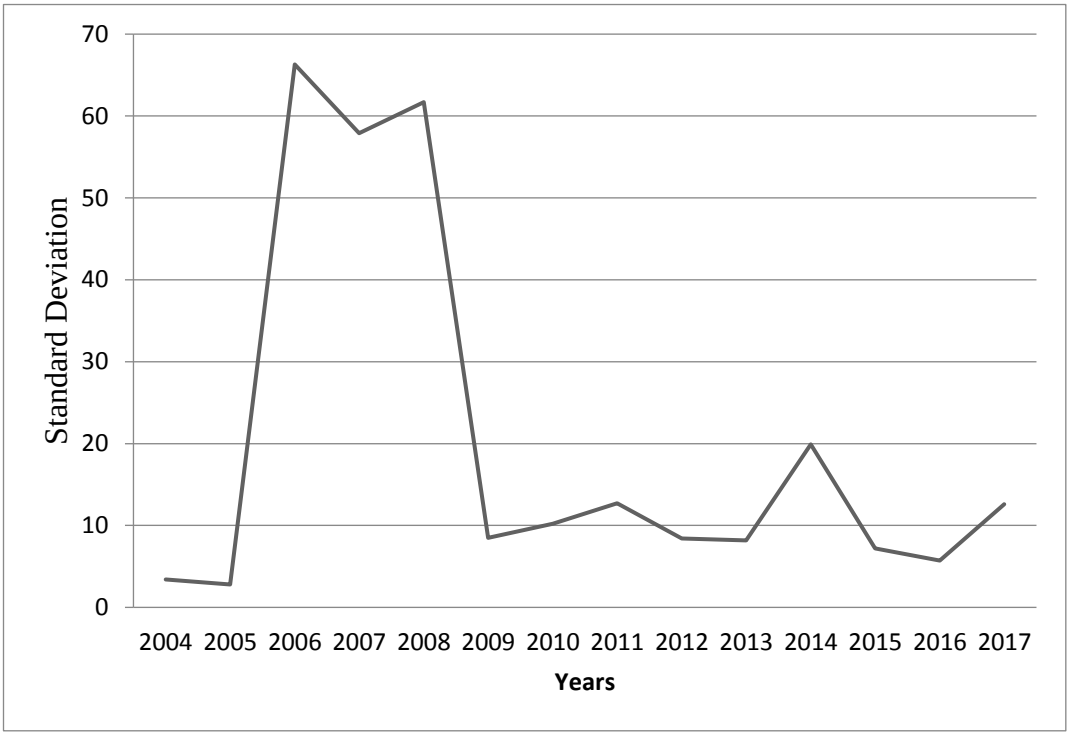

Figure 4. 2: Stock price volatility

Source: Research data (2018)

Volatility refers to the fluctuations in market returns as measured by standard deviation as well as variance of the stock prices. The variability of the stock prices was low in the years 2004 and 2005. The graph shows a steep upward trend in the amount of standard deviation between 2006 and 2008. The stock prices variation stabilized a bit in 2009 but rose in 2010 and 2011. In 2014 the variability rose to a high of 19.93 but stabilized again for the next two years. A rise was reported again 2017. Between 2010 and 2017 the fluctuations were not very big.

Figure 4.3 presents the Stock market Liquidity trends in the Nairobi securities Exchange during the study period.

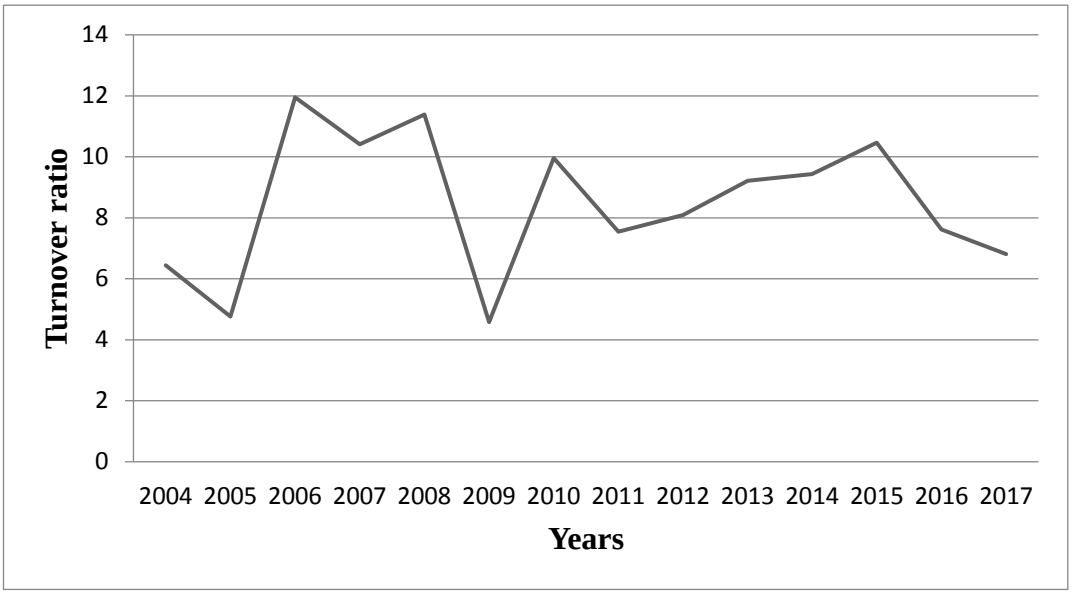

Figure 4. 3: Stock market Liquidity

Source: Research data (2018)

Turnover ratio, the measure for liquidity used in the study showed a fluctuating trend during the entire study period. The turnover ratio which is the equity turnover as a percentage of market capitalization is the measure used to determine the stock market liquidity. From the graph it is evident that the stock market liquidity fluctuated during the entire study period. In 2005 there was a fall before a big rise in 2006. In 2009 there was a sharp decline in liquidity which was caused by a fall in equity turnover. In 2010, the turnover ratio rose as the level of equity turnover as well as the market capitalization rose simultaneously. Between 2011 and 2015 there was a steady rise in the level of liquidity before falling in the two consecutive years.

Figure 4.4 presents the Microstructure performance trends in the Nairobi securities Exchange during the study period.

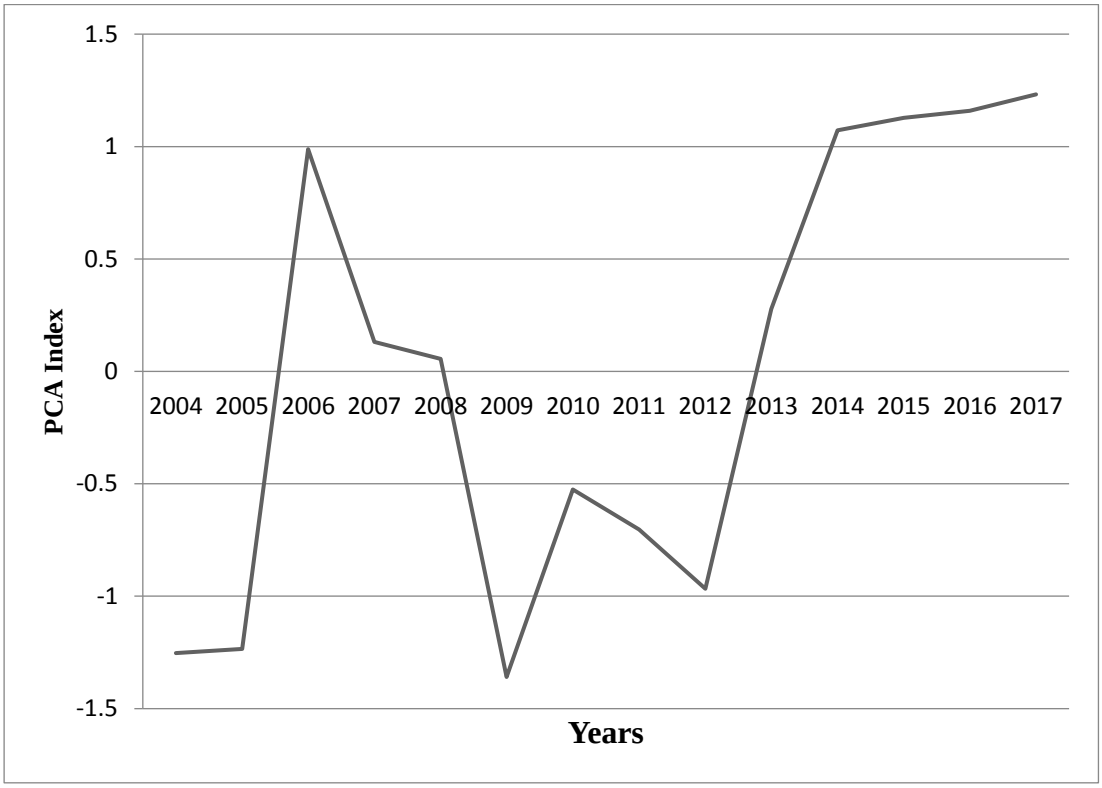

Figure 4. 4: Microstructure performance

Source: Research data (2018)

Figure 4.4 shows the microstructure performance of the NSE during the entire study period. The three variables of microstructure performance namely liquidity, volatility and efficiency were combined into one composite index using principal composite index. Figure 4.4 shows the fluctuating trend of performance which was as a result of having both negative and positive composite values.

Figure 4.5 presents the dematerialized securities trends represented by the number of CDS accounts opened during the study period.

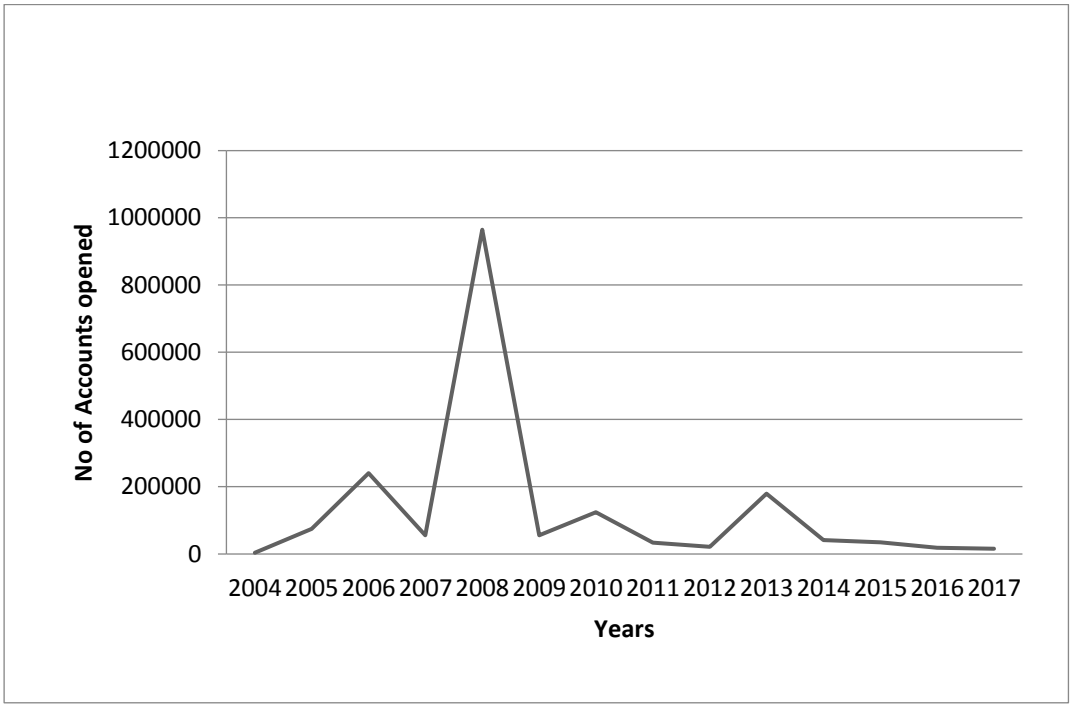

Figure 4. 5: Dematerialized securities

Source: Research data (2018)

The number of accounts opened was used as a proxy of dematerialized securities, in 2004 when the dematerialization exercise commenced, there were few CDS accounts opened. There was a rise in 2005 and 2006 before falling in 2007. In 2008 there was a sharp rise as the deadline for dematerialization dew closer. In 2010 the number of new CDS accounts opened declined, between 2010 and 2017 there was no clear trend as the new accounts opened fluctuated. In 2014 up to 2017 the new accounts reduced gradually as most of the securities had been dematerialized.

Figure 4. 6 presents the Ownership structure and Entry of foreign investors' trends during the study period.

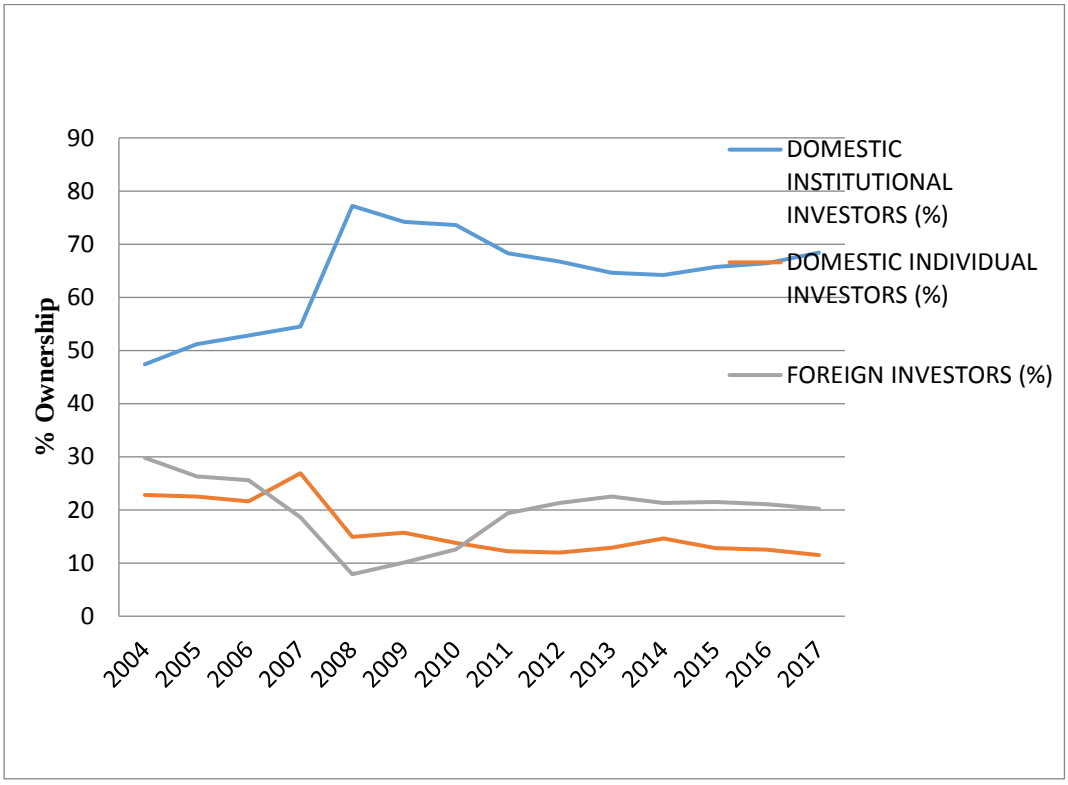

Figure 4. 6: Ownership structure and Entry of foreign investors

Source: Research data (2018)

The ownership of NSE is composed mostly of domestic institutional investors as can be seen from figure 4.6. The domestic individual investors' participation in the NSE has been low during the whole study period. As the domestic institutional investors increased their percentage shareholding, the domestic individual investors' shareholding decreased between 2004 and 2008. The foreign investors' percentage shareholding was stable between 2004 and 2006 before rising slightly in 2007. From 2008 to 2017the percentage shareholding remained relatively stable.

Figure 4.7 shows how the NSE performed in terms of market capitalization and the gross domestic product over the entire study period.

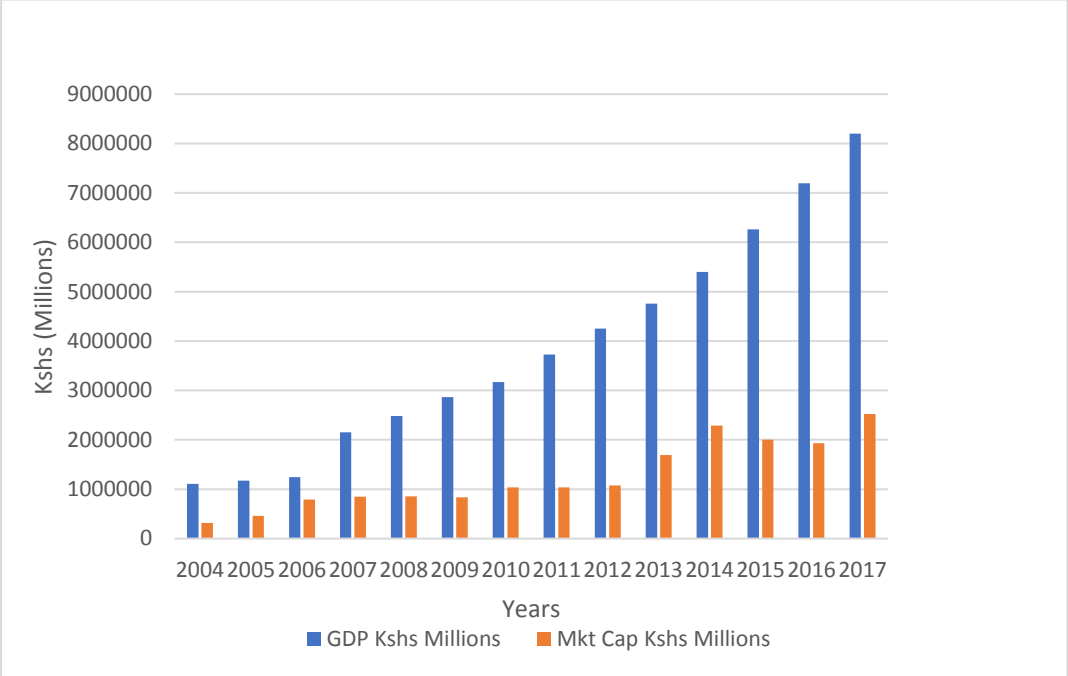

Figure 4. 7: Market capitalization and Gross domestic product

Source: Research data (2018)

The gross domestic product has been growing steadily over the years. There is a steady growth in all the year of the study. Besides the market capitalization being low compared to the reported GDP, there has been a fluctuation during the entire study period. The proportionate rise in the market capitalization and GDP figure resulted in a relatively stable market size over the entire study period.

4.3 Inferential analysis and discussion of results

This section presents the results of the data analyses, and all the diagnostic tests performed. The study tested the effects of reforms on each performance indicator. It was imperative to find out whether capital market reforms had any significant effect on each component of the microstructure performance and how each contribute to the overall microstructure performance.

4.3.1 Summary of Diagnostic tests results

In order to test implicitly whether the regression models were correctly specified in terms of the regressors that have been included, and also to use the findings to test the study hypothesis, the study performed the unit root test. Skewness kurtosis test for normality, Breusch-pagan/Cook-Weisberg test for heteroscedasticity, Breusch-Godfrey LM test for autocorrelation and link test to test if the models were correctly specified were conducted. From the results are summarized in table 4.1 to 4.6 it can be concluded that all the models were statistically sound and could be relied upon to make inferences.

4.3.1.1 Unit root test results

This section presents the unit root test results for all the study variables; the test results for dependent variables (microstructure performance of the NSE), the independent variable (capital market reforms) and finally the results of the moderating variables. The Augmented Dickey Fuller (ADF) test was used. It is based on the model of first order autoregressive process. The null hypothesis of a data series having a unit root was tested against the alternative hypothesis of no unit root. The criteria for rejecting the null hypothesis were if the test statistic was greater than the critical value at 5% significance level. The test results are displayed in Table 4.1

Table 4. 1: Unit root test results

VARIABLES		Test statistic	Critical value at 5%	Remarks
Liquidity	Level	-3.865	-3.000	Stationary I (0)
Volatility	Level	-2.106	-3.000	Non stationary
	First differencing	-3.645	-3.000	Stationary I (1)
Efficiency	Level	-2.741	-3.000	Non stationary
	First differencing	-4.181	-3.000	Stationary I (1)
Micros. Perform	Level	-1.775	-3.000	Non stationary
	First differencing	-4.188	-3.000	Stationary I (1)
Foreign Investors	Level	-2.147	-3.000	Non stationary
	First differencing	-3.664	-3.000	Stationary I (1)
Ownership Compo	Level	-2.208	-3.000	Non stationary
	First differencing	-3.345	-3.000	Stationary I (1)
Ownership Concen	Level	-0.403	-3.000	Non stationary
	First differencing	-3.539	-3.000	Stationary I (1)
Dematerialization	Level	-3.847	-3.000	Stationary I (0)
Market Size	Level	-2.466	-3.000	Non stationary
	First differencing	-4.186	-3.000	Stationary I (1)

Source: Research data (2018)

From table 4.1, it was evident that all the time series data for the study variables were found to be non-stationery except for those for liquidity and dematerialization. This was however corrected by method of differencing.

4.3.1.2 Multicollinearity Test Results

The multicollinearity is brought about when one explanatory variable in a multiple regression model highly correlates with one or more explanatory variables. A high correlation between independent variables inflates the standard error resulting in unstable coefficients which are less statistically significant. The study used the variance inflation factor to test for multicollinearity.

Table 4.2 shows the results of multicollinearity for all the study variables.

Table 4. 2: Multicollinearity test results

	Without moderating variables		**With market size as moderating variables**		**With time as moderating variable**	
Variable	**VIF**	**1/VIF**	**VIF**	**1/VIF**	**VIF**	**1/VIF**
Market size			2.46	0.406		
Time					1.25	0.7997
Foreign entry	1.37	0.731	1.85	0.541	1.38	0.726
Own. Comp	3.67	0.273	4.38	0.228	3.96	0.252
Demat	3.86	0.259	7.82	0.128	4.44	0.225
Own. Concen	1.66	0.603	2.32	0.430	2.05	0.488
Mean VIF	2.64		3.77		2.62	

Source: Research data (2018)

The mean VIF for the models without moderating variables and with market size and time as moderating variables all have VIFs that are less than 10. This indicated that there was no problem of multicollinearity (Motulsky, 2002).

Table 4. 3: Skewness kurtosis Normality test results

Variables Without moderators		
Model	**P value of Test statistic**	**Conclusion**
Liquidity	0.3791	normally distributed
Volatility	0.9184	normally distributed
Efficiency	0.0850	normally distributed
Microstructure Perform	0.0848	normally distributed

Source: Research data (2018)

Table 4.3 presents the summary of the Skewness kurtosis test results for all the residual in the regression models without the moderators used in the study. From the results is evident that the residuals in the models are all normally distributed. These are shown by prob> chi2 values greater than 0.05 for all the models thus the null hypothesis could not be rejected at 5% significance level

Table 4. 4: Heteroscedasticity test results

Model variants Without moderating variables		
Model	Prob>chi2	**Conclusion**
Liquidity	0.2888	Homoscedastic
Volatility	0.2888	Homoscedastic
Efficiency	0.9673	Homoscedastic
Microstructure Performance	0.9667	Homoscedastic

Source: Research data (2018)

Table 4.4 shows the summary of the heteroscedasticity test results conducted on all the models used in the study. The test was based on Breusch-pagan/Cook-Weisberg test. The results indicate that the residual in all models is homoscedastic since their Prob>chi2 are all greater than 0.05 5 % significance level. Therefore, the null hypothesis could not be rejected and was concluded that the error term is not heteroscedastic. The results show that there was no violation of the OLS assumption of constant variance of residuals.

Table 4. 5: Autocorrelation test results

Model variants With no moderating variables		
Model	Prob>chi2	**Conclusion**
Liquidity	0.0688	No serial correlation
Volatility	0.9347	No serial correlation
Efficiency	0.4794	No serial correlation
Microstructure Performance	0.4784	No serial correlation

Source: Research data (2018)

The summary results of the autocorrelation test results based on Breusch-Godfrey LM test are displayed in table 4.5.Since all the models have Prob > Chi2 larger than 0.05, the null hypothesis of no serial correlation could not be rejected at 5 % significance level. It was therefore concluded that there is no autocorrelation in the residuals of all the empirical models. Table 4.10 presents the summary of the model specification tests based on the link test for all the empirical models used in the study.

Table 4. 106: Model specification tests results

Model Without moderating variables		
Model	**P – value of *hat* squared**	**Conclusion**
Liquidity	0.589	No specification error
Volatility	0.888	No specification error
Efficiency	0.624	No specification error
Microstructure Performance	0.624	No specification error

Source: Research data (2018)

The null hypothesis of no specification error in the model could not be rejected since the p-values of squared predicted variable (hat squared) for all the empirical models are not significant at 95% confidence interval. This is indicative that the model is correctly specified and that no additional variables are needed in all the models used in the study.

4.3.2: Multiple regression models

This section presents the multiple regression results for individual performance variables; stock market liquidity, stock price volatility and market efficiency to establish how each has responded to capital market reforms. To enable meaningful conclusion to be made, the individual performance variables were combined into a single performance indicator called microstructure performance which was also regressed on the independent variables. The models were further extended to show the moderating effect of market size and time on each performance variable. The regression results and their diagnostic tests are presented in the following subsections

4.3.2.1: Multiple regression with stock market liquidity as dependent variable

Liquidity ratio which was used as a measure of Stock market liquidity was regressed on the capital markets reforms variables. According to Murinde (2006) it is expected that entry of foreign investors into the market, demutualization of the stock exchange and dematerialization of securities would improve stock market liquidity. The results are displayed in Table 4.7.

Table 4. 7: Multiple regressions with stock market liquidity as dependent variable

Variables	Without moderating variable		
	Coeff.	Std. error	P>[t]
Foreign entry	-21.57	13.01	0.149
Own. Composition	-43.65	16.16	0.036
Dematerialization	2.83	0.57	0.002
Own. Concentration	90.26	31.08	0.027
Constant	-1.62	0.94	0.136
Prob. > F = 0.008 R-squared =0.869 Adj. R-squared = 0.782			

Source: Research data (2018)

The results in table 4.7 show an adjusted R-squared of 0. 78.. This suggests that 78 percent of the variations in stock market liquidity in the study period were explained by the capital market reforms that took place. The F- statistics which tests the overall significance of the model had a p-value of 0.008 which is less than 0.05 indicating that at least some of the coefficients estimated are statistically significant and the individual variables are important in explaining the variations in stock market liquidity. Moreover, the results reveal that demutualization (ownership composition and ownership concentration) and dematerialization have significant effect on the stock market liquidity during the study period. P-values are less than 0.05 implying that the null hypothesis was rejected in favor of the alternative hypothesis. Entry of foreign investors however did not have a significant effect on the stock market liquidity of the NSE.

4.3.2.2: Multiple regression with stock price volatility as dependent variable

Stock price volatility adversely impairs the smooth functioning of the financial system. An increase in volatility is seen as a rise in financial risk which can unfavorably affect the assets and wealth of an investor. It also results to loss of investor confidence in the market leading to exiting of the market by most investors (Brunetti, Buyuksahin & Harris, 2016). According to Murinde (2006) it is expected that entry of foreign investors into the market, demutualization of the stock exchange and dematerialization of securities will reduce stock price volatility. The regression outcomes are displayed in table 4.8.

Table 4. 8: Multiple regression analysis results with stock price volatility as the dependent variable

	Without moderating variable		
Variables	Coefficient	Std. error	P>[t]
Foreign entry	-54.598	115.07	0.652
Own, composition	-192.238	142.86	0.227
Dematerialization	14.201	5.01	0.030
Own, concentration	634.057	274.77	0.060
Constant	-11.8613	8.30	0.203
Prob. > F = 0.094 R-squared = 0.687 Adj. R-squared = 0.478			

Source: Research data (2018)

Results displayed in table 4.8 above show the F- statistics with a probability value of 0.094. This suggests that at least one of the reform variables is helpful in predicting the stock price volatility of the NSE. The coefficient of determination implies that 48 percent of the variation in stock price volatility was explained by capital market reforms that were undertaken during the study

period. The difference of 52% which is the unexplained variations may have been caused by other factors that are not part of the variables in the model. (Mule, Mukrs & Oginda, 2013).

The P>[t] values of 0.652 and 0.227 which are greater than 0.05 implies that entry of foreign investors into the NSE and ownership composition respectively were not statistically significant in predicting the stock price volatility during the study period. On the other hand, the P>[t]values of 0.030 and 0.060 suggest that dematerialization and ownership concentration had statistically significant effect on the stock price volatility at 5% and !0% significance levels, respectively.

4.3.2.3: Multiple regression results with market efficiency as the dependent variable

Market efficiency explains the promptness with which share prices reflect all available and relevant information influences the performance of the stock market. Gupta and Basu (2005) Market Efficiency guarantees accuracy of stock pricing which helps in correcting stock mispricing in the securities market. According to (Murinde, 2006) it is expected that entry of foreign investors into the market, demutualization of the stock exchange (ownership concentration and ownership composition) and dematerialization of securities will improve market efficiency. The regression results are displayed in table 4.5.

Table 4. 9: Multiple regression results with market efficiency as the dependent variable

	Without moderating variable		
Variables	Coefficient	Std. error	P>[t]
Foreign entry	14.98	47.48	0.763
Own. Composition	-205.83	58.95	0.013
Dematerialization	13.02	2.07	0.001
Own. Concentration	402.41	113.39	0.012
Constant	-6.87	3.43	0.092
Prob. > F = 0.0052 R-squared = 0.89 Adj. R-squared = 0.81			

Source: Research data (2018)

The results as presented in table 4.9 above show an overall P value of 0. 0052. This implies that at five percent significance level, at least some variables had significant influence on market efficiency. The null hypotheses of capital market reforms having no significant effect on market efficiency was rejected in favor of alternative hypotheses at 95% confidence interval. The results further reveal that demutualization (ownership composition and ownership concentration) and dematerialization significantly influenced the stock market efficiency during the study period. This is evident from the individual p-values that are all less than 0.05. However, entry of foreign investors into the stock market did not influence the efficiency of the NSE as shown by the p (t) of 0/763 which is greater than 0.05. Positive coefficients of 13.02 and 402.41 implies that a one-point increase in dematerialized securities and ownership concentration improved the efficiency of the NSE by 13.02 and 402.41 points respectively. On other hand a negative coefficient of -205.83 implies that a one-point increase in ownership composition led to a decline in the efficiency of the NSE during the study period.

The four capital market reforms variables used in the study explain 81% of the variation in market efficiency during the period under review.

4.3.2.4: Multiple regression results with microstructure performance as the dependent variable

In order to evaluate the overall effect of capital market reforms on the microstructure performance and to enable a valid conclusion, the individual performance variables were combined into a single performance indicator called a microstructure performance using principal component analysis. This was then regressed on the various capital market reforms variables i.e., demutualization (ownership concentration and ownership composition), dematerialization and entry of foreign investors. The outcome of the regression is displayed in table 4.10.

Table 4. 10: Multiple regression results with microstructure performance as the dependent variable

	Without moderating variable		
Variables	**Coefficient**	**Std. error**	**P>[t]**
Foreign entry	0.8914	2.822	0.763
Own. Composition	-12.23	3.503	0.013
Dematerialization	0.7736	0.1229	0.001
Own. Concentration	23.91	6.739	0.012
Constant	-0.4082	0.203	0.092
Prob. > F = 0.0052 R-squared = 0.89 Adj. R-squared = 0.81			

Source: Research data (2018)

The results obtained in the primary model as captured in table 4.10 indicates that at least some of the coefficients estimated have a statistically significant effect because the p value of the F statistic of 0.0052 was greater than 0.05.Additionally, the P>[t] values less than 0.05 corresponding to the coeffients of the ownership composition, dematerialization of securities and ownership concentration show that the three variables had statistically significant effect on microstructure performance of the NSE during the research period. On the contrary, entry of foreign investors did not have any statistically significant effect on the microstructure performance of the NSE. The four independent variables used in the study explain 81% of variation in the microstructure performance of the NSE.

4.4 Hypothesis testing and discussion of results

The study tested the hypothesis that capital market reforms namely entry of foreign investors into the NSE, demutualization and subsequent self-listing of the NSE and dematerialization of securities had no significant effect on market microstructure performance of the Nairobi securities Exchange. The hypothesis tests were based on the regression results of the various regression analyses are presented in the tables 4.3 to 4.6. The coefficients from the regression models provided estimates of the effect of individual independent variables on the outcome (dependent) variable. The study used these coefficients, their p-values

and sign (direction of effects) to test the research hypotheses specified in Chapter 1 section 1.4, towards achieving the research objectives.

4.4.1: Entry of foreign investors and microstructure performance of the NSE

The first specific objective was to determine the effect of entry of foreign investor into the market on the microstructure performance of the Nairobi securities exchange. The null hypothesis being entry of foreign investors does not have a statistical significance on the microstructure performance of the NSE. Table 4.11 presents the summary of the estimated Coefficients for entry of foreign investors on the four measures of market microstructure used in the study.

Table 4. 11: Coefficients of entry of foreign investors on Microstructure performance

Dependent variable	Coefficient (Entry of foreign investors)	P-value
Stock market Liquidity	-21.57	0.149
Stock price Volatility	-54.598	0.652
Market Efficiency	14.98	0.763
Microstructure Performance	0.8914	0.763

Source: Research data (2018)

The study found out that allowing foreign investors access to the market had no significant effect on stock market liquidity of the NSE since the p-value of 0.149 was larger than 0.05; therefore, the null hypothesis could not be rejected. at 5% significance level. This is contrary to the findings of Ng et al. (2011) that foreign

investors influence stock liquidity through securities trading and information networks. An increase in the trading activities of the foreign direct (portfolio) ownership improves the stock market liquidity and vise-versa. This is because foreign direct (portfolio) investors improve the degree of information asymmetry between the firm and external investors, consequently affecting the firm's stock liquidity.

The results also show that entry of foreign investors into the NSE did not have a statistically significant effect on the stock price volatility during the study period. A coefficient of -54.598 implies that the there is a negative relationship between entry of foreign investors and stock price volatility. However, a p-value of 0.652>0.05 is indicative that the relationship is not statistically significant at 5% significance level. This finding contradicts (Lai, Lou & Shiu, 2008) who found that apart from foreigner's trade having positive relation on concurrent return it also increases conditional volatility. According to the study findings, stock price volatility increases due to the fact that those foreign investors prefer to buy large local stocks which increases the stock price because of the foreigner's trade ability to predict the future returns, they further argue that by trading in local stock, foreign investors play the role of price discovery as they tend to push the prices back to their intrinsic value when they deviate upward or downward.

Additionally, the results in table 4.11 showed that entry of foreign investor into the market does not have a significant effect on market efficiency. Ng, Wu, Yu, and Zhang (2011) opined that foreign direct (portfolio) investors improves the

degree of information asymmetry between the firm and outside investors, consequently affecting the firm's stock speed of adjusting to the any information. However, when foreign direct investors, take concentrated ownership and control positions in domestic firms, they have access to the firms' private information, but this results to stock illiquidity as their informational advantage causes an adverse selection bias. Ng, *et, al* further argue that when foreign portfolio investors with no control positions in domestic firms face competition from other sophisticated investors over trading profits, competition affects the speed at which information gets incorporated into the stock price and hence market efficiency.

Moreover, it is evident that entry of foreign investors into the NSE was found to have no effect on microstructure performance of the stock market. This is an indication that opening the market to foreigners did not affect microstructure performance of NSE. Since the p-value of 0.763 is greater than 0.05, a change in the level of foreign investing does not have a significant effect of the microstructure performance of the NSE. This is inconsistent with the outcome of Ng *et al*. (2011) study on foreign investor heterogeneity and stock liquidity around the World, and Lai, *et, al* (2008) study on entry of foreign investors and stock price volatility. The study also found that apart from foreigner's trade having positive relation on concurrent return it also increases conditional volatility. According to Lai, *et,al* (2008), an increase in stock price volatility arises due to the fact that foreign investors prefer to buy large local stocks which increases the stock price because of the foreigner's trade ability to predict the

future returns, the study further argues that by trading in local stock, foreign investors play the role of price discovery as they tend to push the prices back to their intrinsic value when they deviate upward or downward thus affecting the overall market microstructure performance.

4.4.2: Demutualization of the stock market and microstructure performance of the Nairobi

The second specific objective of the study was to investigate the effect of demutualization of the stock market on the market microstructure performance of the NSE. The no significant effect of demutualization on the market microstructure performance of the NSE was the null hypothesis. Table 4.12 below presents the summary of the estimated Coefficients for demutualization on the four measures of market microstructure used in the study.

Table 4. 12: Coefficients of demutualization on Microstructure performance

Dependent variable	**Coefficient Demutualization**	
	Ownership composition	**Ownership concentration**
Stock market Liquidity	-43.65, (0.036)	90.26, (0.027)
Stock price Volatility	-192.24, (0.227)	634.06, (0.060)
Market Efficiency	-205.83, (0.013)	402.41, (0.012)
Microstructure Performance	-12.23, (0.013)	23.91, (0.012)

Source: Research data (2018)

NB: The values in parentheses are the p-value for each corresponding dependent variable. From table 4.12 the results indicate that ownership composition and ownership concentration have statistically significant effects on stock market liquidity of NSE at 5% significance level. Whereas the relationship between

ownership concentration and liquidity were positive the relationship between ownership concentration and liquidity were found to be negative. A one-unit change in ownership composition decreased the turnover ratio by 43.65 points. This contradicts the findings by Bar-Yosef & Prencipe (2013), who concluded that ownership composition improves stock's liquidity especially for listed firms that are owned by government and foreign investors.

Alzeaideen and AL-Rawash (2014) attributes this finding to the fact that the ownership of NSE is composed mostly of institutional investors who may have a shareholding in a firm for a relatively short period of time thus they may not exert control over the firm's decisions.

The positive relationship between the dependent and predictor variables implies that a one-unit change in ownership concentration will improve the turnover ratio by 90.26 points. This is in line with the expected outcome as outlined by Murinde (2006) in his model of the theoretical expected market microstructure characteristics response to reforms. However, it is contrary to the finding of Bar-Yosef & Prencipe (2013) that firms with a large insider block holder exhibit significantly lower liquidity. The study further found that ownership concentration effect on liquidity varies with the type of ownership concentration; Pyramid structures negatively affect liquidity whereas double voting right shares increases liquidity. Ng, *et,al* (2019) attributed their supposition to the fact that Pyramids are intricate and opaque mechanisms that allow majority shareholder to trade on private information to reap private benefits therefore increasing

asymmetric information. On the contrary double voting rights are transparent, and hence restrict insiders from using sell/buy back trades thus reducing the degree of asymmetric information on the market.

The regression displayed in table 4.12 further show that ownership composition has no significant effect on the stock price volatility while at 10% significant level, ownership concentration was found to have significant effect on stock price volatility at the NSE during the study period. However, this effect is undesirable as the positive coefficient implies that a one percent increase in the type of investors will increase stock price volatility by 634.06 units. As ownership concentration increases so does the stock price volatility at the NSE. Vayanos & Wang (2013) argues that a concentrated ownership increases stock prices volatility because it reduces the accuracy of the price signals. This is supported by Jankensgard and Vilhelmsson (2018) who found that an expansive shareholder base improves the information content of stock prices leading to lower volatility. Furthermore, volatility surges with the number of shareholders with respect to large shareholding whose ownership concentration is below 0.1%. Volatility is also positively related to the number of institutional investors.

The results further indicate that ownership composition and ownership concentration have statistically significant effects on market efficiency of the NSE at 5% significance level. The negative coefficient implies that a one percent increase in the ownership concentration increased the level of market efficiency at the NSE during the study period. This outcome resonates with Cao, Liang, Lo

and Petrasek (2014) findings that fund ownership concentration to be positively related to improvements in the informational efficiency of equity prices. The findings support the hypothesis that hedge fund trading improves the informational efficiency of stock prices which can be attributed to the fact that hedge funds have been perceived as both as rational arbitrageurs who improve market efficiency by taking advantage of mispriced securities and also as leveraged opportunists whose active trading strategies can destabilize markets.

Additionally, the result show that ownership composition negatively affects market efficiency, thus a one percent increase in the types of shareholders led to a unit decrease in the market efficiency during the study period. Efficiency of the stock exchange decreases with the increase in the number of institutional investors at the NSE. Kacperczyky, Sundaresan and Wang (2018) document that institutional investors have a strong advantage over individual investors in identifying inefficiencies in asset prices and correcting them through their trading expertise. Besides possessing superior resources, they use their large size to influence the firm's decision making either through monitoring or taking active ownership role. However, this finding does not depict the position at NSE as the ownership is composed mostly of institutional investors. The result of the study refutes the findings of Ambarita & Afriani (2017) who assert that director's ownership in a company increase the likelihood of incorporation of firm's specific information to stock prices, thereby making firm's stock prices less susceptible to the market and the industry fluctuations. The study findings by Ng, *et,al* (2019) backs the argument that ownership structure plays a

substantial role in influencing the firm's information environment hence improving market efficiency.

From the result, Ownership concentration and ownership composition had p-values of 0.013 and 0.012 respectively in the microstructure model. This implies that the null hypotheses were rejected in favor of the alternative hypothesis at 5% significance level; thus, ownership concentration and ownership composition had a significant effect on the microstructure performance of the NSE. Whereas ownership concentration has a direct relationship with market microstructure performance, ownership composition negatively affects the microstructure performance of the NSE. When ownership is concentrated more by one unit it will lead to an increase in microstructure performance of 23.91 units. On the other hand, a unit increase in ownership composition will reduce the microstructure performance by 12.23 units. This could be attributed to the fact that most institutional shareholders who may have a shareholding in a firm for a relatively short period of time may not exert control over the firm's decisions thereby unfavorably affecting performance (Alzeaideen & AL-Rawash, 2014).

The direct relationship between ownership concentration and microstructure performance confirms the agency theory standpoint that higher ownership concentration increases shareholders' power and control which aligns managers' and shareholders' interests resulting to an increase in performance. Concentrated ownership has always been perceived to provide better monitoring

inducements, and thus lead to better performance. Bar-Yosef & Prencipe (2013) indicated that when ownership is concentrated the controlling shareholders use their vast voting rights to reap private benefits at the expense of the minority shareholders. The study arguably explains that if firms that are controlled by the owners are more profitable than manager-controlled firms, it would mean that concentrated ownership provides better monitoring which leads to superior performance.

This is contrary to Ongore and K'Obonyo (2011) findings that there is a significant negative relationship between ownership concentration and firm performance attributed to free-rider problems that is linked with diffused ownership. However, the monitoring and control school of thought argues that the free-rider problems associated with diffuse ownership do not arise with concentrated ownership, since the majority shareholder captures most of the benefits associated with this monitoring.

Mule, Mukras and Oginda (2013) contend that when more than 30 per cent or more of shares are concentrated on a few hands (that is., five shareholders or less), there is a propensity for the shareholders to be obsessive in their monitoring, controlling and ratification roles over managers depressing the managers' creativity and innovation, and hence adversely affecting firm performance.

4.4.3: Dematerialization of securities and market microstructure performance

The third specific objective aimed at determining the effect of dematerialization of securities on market microstructure performance. Dematerialization which paves way for automation of stock markets was aimed at solving the problem of inefficiency which according to Omuchesi, Bosire & Muiru (2014) was caused by paper certificates. Dematerialized securities are also expected to increase transparency thereby solving the problem of information asymmetry as well as improving the flow of information in the securities exchange. The reduction of transaction period is expected to increase the volume of traded securities which in turn will improve liquidity (CDSC, 2012; NSE, 2012). Table 4.13 below presents the summary of the estimated Coefficients for dematerialization on the four measures of market microstructure used in the study.

Table 4. 13: Coefficients of dematerialization on Microstructure performance

Dependent variable	Coefficient dematerialization	P-value
Stock market Liquidity	2.83	0.002
Stock price Volatility	14.20	0.030
Market Efficiency	13.02	0.001
Microstructure Performance	0.774	0.001

Source: Research data (2018)

The coefficient of dematerialization was positive and statistically significant at one percent level indicating that stock market liquidity in the NSE increased directly with the increase in dematerialized securities over the study period. The magnitude of the coefficient indicates that one percentage point increase in dematerialized securities lead to 2.803 units increase in turnover ratio. This is

in line with the expected microstructure response to reforms. It also confirms the findings of Arora (2012) that dematerialization increases the volume of traded securities thus providing higher liquidity. The findings also support Zhenning (2015) findings that dematerialization of shares increased volumes traded, thus providing higher liquidity in the Indian stock exchanges. Increased trading is an indicator of better liquidity as more and more institutional players participated in a bigger way in post dematerialization period in the market indicating increased level of confidence in the Indian stock market.

A one percentage point increase in dematerialized securities increased the stock price volatility during the study period. This can be confirmed from the results in table 4.13 above which shows a p-value of 0.030 which is an indication that the results are statistically significant at 5% level of significance. The increase in volatility is undesirable as it depicts increase in stock price risk. The findings are consistent with Assaf (2018) who argue that following the commencement of automation, which comes right after securities have been dematerialized, new information is incorporated into stock prices leading to an increase in volatility.

The results further reveal that there was a 13.12 increase in market efficiency with each percentage point increase in dematerialized securities. A p-value of 0.001 show that the null hypothesis was rejected in favor of the alternative hypothesis at 99% level of confidence. This is in line with the expected microstructure response to reforms. On the contrary, Omuchesi, Bosire and Muiru, (2014) study concluded that efficiency at the Nairobi Securities

Exchange did not improve with the introduction of the ATS to suggest that, automation which succeeds dematerialization did not produce the expected benefits of enhancing efficiency of the securities market. Asewe *et al*,(2013) also found that the efficiency of the market improved after dematerialization of securities and subsequently automation. The result was confirmed by the statistically significant difference between manual and automation in the stock market performance during the year of transition, 2005 to 2006. The result further show that the NSE was weak form efficient.

As exhibited in Table 4.13 a p-value of 0.001 is an indication that the null hypothesis could not be accepted, thus dematerialization which is one of the reform variables was found to significantly influence the microstructure performance of the NSE. When dematerialized shares are increased by one unit it will lead to an increase in microstructure performance by 0.7736 points.

Dematerialization which sets the stage for automation on the stock market was implemented on the premise that it was going to bring about positive changes. These include but not limited to reduction in settlement period and thus increasing speed of executing trade at the stock market which would consequently reduce the transaction costs. Enhancing transparency in trading activities is another benefit which is expected to reduce information asymmetry and problem of adverse selection and moral hazards as well as boosting investor confidence in the market. From the outcome of the study, it can be concluded

that dematerialization of securities significantly influences the microstructure performance of the NSE during the study period.

When securities are immobilized and consequently dematerialized there is an increased volume of traded securities which provides higher liquidity**.** This is in line with the expected microstructure response to reforms. It also confirms the findings of Arora (2012) that dematerialization increases the volume of traded securities thus providing higher liquidity. The increased number of institutional investors' participation during the post–dematerialization period indicates that there was increased level of investors' confidence in the Indian stock market. Dhnada, Singh and Chawla (2015) also found that there was general improvement in securities market operations ranging from reduced litigation in respect of trading frauds, which were majorly due to physical security handling, reduction in delivery periods as well as the transaction costs thus market microstructure performance improved by providing higher liquidity, higher returns and lower volatility.

4.4.4: Moderating effect of time and market size on the relationship between capital market reforms and microstructure performance of the NSE

The study tested two hypotheses to investigate whether the moderating variables had any interaction effect with independent variable and whether this interaction had significant influence on the relationship between the dependent and independent study variables. Specifically, the study sought to investigate whether the size of the securities market and time taken after the reforms had

any significant effect on the relationship between the capital market reforms and the microstructure performance of NSE.

4.4.4.1: Moderating effects of market size on the relationship between capital market reforms and market microstructure performance

The fourth specific objective sought to investigate the moderating effect of market size on the relationship between capital market reforms and market microstructure performance of the NSE. The null hypothesis formulated from this objective proposed that market size does not have a significant moderating effect on the relationship between capital market reforms and market microstructure performance of the NSE. Several multiples regression analyses were run to test the moderating effect of market size on the relationship between the various capital market variables used in the study and microstructure performance of the NSE. The results are displayed in various tables 4.14, 4.15, 4.16 and 4.17.

Table 4. 14: The moderating effect of market size on the relationship between entry of foreign investors into the stock market and microstructure performance of the NSE

	Model without moderators		Model with market size as the moderator	
Variables	**Coeffic**	**P>[t]**	**Coeffic**	**P>[t]**
Fore entry*Mkt size			-19.4	0.582
Foreign entry	0.8914	0.763	-2.10	0.257
Own. Composition	-12.23	0.013	-12.4	0.014
Demat	0.7736	0.001	0.67	0.005
Own. Conc	23.91	0.012	19.7	0.041
Constant	-0.4082	0.092	-0.37	0.114
Prob. > F = 0.0052 R-squared = 0.89 Adj. R-squared = 0.81			Prob. > F = 0.010 R-squared = 0.92 Adj. R-squared = 0.83	

Source: Research data (2018)

Table 4.14 show the results of the moderating effect of market size on the relationship between entry of foreign investors into the stock market and microstructure performance of the NSE. When the interaction term between entry of foreign investors into the stock market and market size is added as an extra explanatory variable besides other capital market reform variables, the results show that capital market reforms, and the interaction term of market size and entry of foreign investors jointly do not have a significant influence on microstructure performance of the NSE. An overall p-value of 0.010 which is less than 0.05 confirms that inclusion of the moderating variable in the model does not affect the overall significance of the model.

The inclusion of the interacting term improves the model fit as well as the model's explanatory power. This can be seen from the adjusted R–squared which

improved from 81 percent to 85 percent. The results however reveal that market size did not significantly influence the relationship between entry of foreign investors into the stock market and microstructure performance of the NSE. This is because the coefficient is statistically insignificant. The negative coefficient indicates that as economy expands, entry of foreign firms in the stock would lead to a decline in the microstructure performance.

Table 4. 15: The moderating effect of market size on the relationship between ownership composition and microstructure performance of the NSE

	Model without moderating variable		**Model with market size as moderator**	
Variables	**Coeff**	**P>[t]**	**Coeff**	**P>[t]**
Foreign entry	0.8914	0.763	2.16	0.33
Own Comp*Mkt size			-289.40	0.040
Own. Composition	-12.23	0.013	12.16	0.004
Dematerialization	0.7736	0.001	0.803	0.000
Own. Concentration	23.91	0.012	13.38	0.076
Constant	-0.4082	0.092	-0.23	0.193
Prob. > F = 0.0052 R-squared = 0.89 Adj. R-squared = 0.81			Prob. > F = 0.0022 R-squared = 0.96 Adj. R-squared = 0.91	

Source: Research data (2018)

Table 4.15 shows the results of the moderating effect of market size on the relationship between ownership composition and microstructure performance of the NSE. When the interaction term between ownership composition and market is added as an extra explanatory variable besides other capital market reform variables, the overall significance of the model improves. At 5 percent level of significance, the null hypothesis was rejected in favor of the alternative

hypothesis, thus the results show that capital market reforms, and the interaction term of market size and ownership composition jointly had a significant influence on microstructure performance of the NSE. A p-value of 0.040 which is less than 0.05, points to the fact that the interactive term significantly influenced the relationship between ownership composition and microstructure performance of the NSE. A negative coefficient of interaction of -289.40 implies that if the market is large even if more categories of investors (ownership composition) invest in the securities market the microstructure performance of the NSE during in the study period would still improve.

Table 4. 16: The moderating effect of market size on the relationship between dematerialization and microstructure performance of the NSE

	Model without moderator		**Model with market size as the moderating**	
Variables	**Coefficient**	**P>[t]**	**Coefficient**	**P>[t]**
Foreign entry	0.8914	0.763	- 1.61	0.704
Own. Compo	-12.23	0.013	-11.79	0.022
Demat*Mkt size			-0.44	0.413
Dematerialization	0.7736	0.001	0.73	0.003
Own. Concen	23.91	0.012	21.3	0.035
Constant	-0.4082	0.092	- 0.38	0.134
Prob. > F = 0.0052 R-squared = 0.89 Adj. R-squared = 0.81			Prob. > F = 0.0143 R-squared = 0.90 Adj. R-squared = 0.81	

Source: Research data (2018)

Table 4.16 shows the results of the moderating effect of market size on the relationship between dematerialized securities and microstructure performance of the NSE. When the interaction term between dematerialized securities and

market is added as an extra explanatory variable besides other capital market reform variables, the results show that capital market reforms, and the interaction term of market size and dematerialization jointly have a significant effect on microstructure performance of the NSE since the null hypothesis was rejected at 95 percent confidence interval..(Overall p-value 0.0143 < 0.05).the inclusion of the interacting term improves the model fit by one percent whereas the model's explanatory power remained the same. The results however reveal that market size did not have a significant moderating effect on the relationship between dematerialization of securities and the microstructure performance of the NSE in the study period.

Table 4. 17: The moderating effect of market size on the relationship between ownership concentration and microstructure performance of the NSE

	Model without moderating variable		**Model with Market size as the moderating**	
Variables	**Coeff**	**P>[t]**	**Coeff**	**P>[t]**
Foreign entry	0.8914	0.763	-0.96	0.744
Own. Comp	-12.23	0.013	-25.1	0.035
Demat	0.7736	0.001	0.86	0.001
Own. Conc*Mkt size			63.9	0.175
Own. Conc	23.91	0.012	28.3	0.008
Constant	-0.4082	0.092	-0.48	0.051
Prob. > F = 0.0052 R-squared = 0.89 Adj. R-squared = 0.81			Prob. > F = 0.007 R-squared = 0.93 Adj. R-squared = 85	

Source: Research data (2018)

The results in table 4.17 show an overall p-value of 0.007.This shows the overall significance of the model in describing the relationship between the capital

reforms variables with the interaction term of market size and ownership concentration and microstructure performance of the NSE. The study established that the interaction of market size and ownership concentration and other capital market reform variables jointly had a significant effect on the relationship between capital market reforms and microstructure performance of the NSE. This is evident form the overall p-values which is greater than 0.05, meaning that at 5% significance level, the null hypothesis could not be rejected.

The inclusion of market size in the model improved the model's explanatory power by 4%. Thus, the model explains 85% of the variations in the microstructure performance of the NSE. Conversely, the test statistics for the interaction term reports a p-value of 0.175 which is greater than 0.05 indicates that the null hypothesis could not be rejected at 5 % level of significance. It can therefore be inferred that the size of the market did not moderate the relationship between ownership concentration and microstructure performance of the NSE during the study period.

According to Petrović-Ranđelović, Janković-Milić & Kostadinović (2017), market size is one of the crucial determinants of foreign investment inflows, and in particularly market-oriented projects of foreign direct investment. The findings support the allusion that larger firms tend to produce more information and to disclose such information faster, thus reducing information asymmetry and consequently improving market efficiency (Cerqueira and Pereira, 2017).

4.4.4.2: Moderating effects of time on the relationship between capital market reforms and market microstructure performance

The fifth and the last specific objective sought to investigate the moderating effect of time on the relationship between capital market reforms and market microstructure performance of the NSE. The alternative hypothesis sought to ascertain whether time has a significant moderating effect on the relationship between capital market reforms and market microstructure performance of the NSE. The duration or the amount of time taken for execution of the reforms has the potential of influencing how the market microstructure performance will responds to capital market reforms. The immediate period right after reforms may not reflect the anticipated changes as investors may still be trying to grasp the new ideas.

On the contrary, conception of new ideas can be received with excitement and felt greatly at the onset and as time goes by the decaying effect may cause that excitement to diminish. The null hypothesis formulated from this objective proposed that time does not have a significant moderating effect on the relationship between capital market reforms and market microstructure performance of the NSE. Several multiple regression analyses were run to test the moderating effect of time on the relationship between the various capital market variables used in the study and microstructure performance of the NSE the results are displayed in various tables

Table 4. 18: The moderating effect of time on the relationship between entry of foreign investors into the stock market and microstructure performance of the NSE

	Model without moderating variable		Model with time as the moderator	
Variables	**Coefficient**	**P>[t]**	**Coefficient**	**P>[t]**
For entry*Time			-0.44	0.360
Foreign entry	0.8914	0.763	5.36	0.355
Own. Composition	-12.23	0.013	-10.7	0.038
Dematerialization	0.7736	0.001	0.75	0.002
Own. Concen	23.91	0.012	21.14	0.033
Constant	-0.4082	0.092	-0.36	0.143
Prob. > F = 0.0052 R-squared = 0.89 Adj. R-squared = 0.81			Prob. > F = 0.013 R-squared = 0.91 Adj. R-squared = 0.81	

Source: Research data (2018)

Table 4.18 shows that capital market reforms and the interaction term entry of foreign investors into the stock market and time do not have a joint significant effect on microstructure performance of the NSE implying that time does not moderates the relationship between capital market reforms and microstructure performance of the NSE. These five variables jointly explain 81% of variation in the microstructure performance of the NSE. (Although the introduction of interaction term did not increase the model's explanatory power).

Table 4. 19: The moderating effect of time on the relationship between ownership composition and microstructure performance of the NSE

	Model without moderating variable		Model with time as the moderating variable	
Variables	**Coeff**	**P>[t]**	**Coefficient**	**P>[t]**
Foreign entry	0.8914	0.763	2.13	0.323
Own Comp*Time			61.50	0.034
Own. Compos	-12.23	0.013	-12.16	0.004
Demat	0.7736	0.001	0.8	0.000
Own. Concen	23.91	0.012	13.17	0.074
Constant	-0.4082	0.092	-0.27	0.120
Prob. > F = 0.0052 R-squared = 0.89 Adj. R-squared = 0.81			Prob. > F = 0.0019 R-squared = 0.96 Adj. R-squared = 93	

Source: Research data (2018)

The result of the moderating effect of time on the relationship between ownership composition and microstructure performance of the NSE as captured in Table 4.19 shows that capital market reforms and the interaction term of ownership composition and time have a joint significant P value of 0.0019. This means that at α=0.05, the null hypothesis was rejected in favor of the alternative hypothesis. It can therefore be deduced that time moderates the relationship between capital market reforms and microstructure performance of the NSE.

The five variables jointly explain 93% of variation in the microstructure performance of the NSE. The introduction of interaction term into the model increased the model's explanatory power by 12%. The results further reveal that time had a significant moderating effect on the relationship between ownership composition and the microstructure performance of the NSE. The moderation effect is negative meaning that passage of time since undertaking reforms led to

a decrease in the microstructure performance of the NSE. Hence, this study rejects the null hypothesis that, time since reforms were undertaken does not significantly moderate the relationship between ownership composition and microstructure performance of the NSE.

Table 4. 20: The moderating effect of time on the relationship between Dematerialization and microstructure performance of the NSE

	Model without moderating variable		**Model with time as the moderating variable**	
Variables	**Coefficient**	**P>[t]**	**Coefficient**	**P>[t]**
Foreign entry	0.8914	0.763	-1.26	0.515
Own. Compo	-12.23	0.013	-14.33	0.001
Demat*Time			-0.026	0.019
Demat	0.7736	0.001	1.05	0.000
Own. Concen	23.91	0.012	18.6	0.008
Constant	-0.4082	0.092	-0.30	0.066
Prob. > F = 0.0052 R-squared = 0.89 Adj. R-squared = 0.81			Prob. > F = 0.0011 R-squared = 0.97 Adj. R-squared = 93	

Source: Research data (2018)

The result of the moderating effect of time on the relationship between dematerialization and microstructure performance of the NSE is displayed in Table 4.20. It is evident form the result that the null hypothesis was rejected in favor of the alternative hypothesis since the overall p-value of 0.0011 is less than α=0.05. Thus, it can be construed that time moderates the relationship between capital market reforms and microstructure performance of the NSE. The five variables including the interaction term of dematerialization and time jointly explain 93% of variation in the microstructure performance of the NSE which is an improvement of 12% from 81% to 93%.

The results further reveal that time had a significant moderating effect on the relationship between entry of dematerialized securities and the microstructure performance of the NSE.A negative interactive term connotes that that the passage of time since undertaking reforms led to a decline in the microstructure performance of the NSE.

Table 4. 21: The moderating effect of time on the relationship between Ownership concentration and microstructure performance of the NSE

	Model without moderating variable		**Model with time as the moderating variable**	
Variables	**Coefficient**	**P>[t]**	**Coefficient**	**P>[t]**
Foreign entry	0.8914	0.763	1.43	0.839
Own. Compo	-12.23	0.013	-12.41	0.034
Demat	0.7736	0.001	0.76	0.011
Own.Conc*Time			0.095	0.931
Own. Conc	23.91	0.012	23.44	0.047
Constant	-0.4082	0.092	-0.40	0.138
Prob. > F = 0.0052 R-squared = 0.89 Adj. R-squared = 0.81			Prob. > F = 0.0203 R-squared = 0.89 Adj. R-squared = 76	

Source: Research data (2018)

The results in Table 4.21 reveal that the five variables (capital reform variables and the interaction term of ownership concentration and time) jointly explain 76% of the variation in the microstructure performance of the NSE, A decrease of 5% from 81% to 76%. However, the p- values for the test statistic reveal that time taken since reforms were undertaken does not have a significant effect on the relationship between ownership concentration and microstructure performance of the NSE. This result echoes the findings of (Nyangara, 2014) of a positive result attained with passage of time which they attributed to the learning curve effect.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter gives the summary and conclusion of the research findings of this study which sought to investigate the effect of capital market reforms on the microstructure performance of Nairobi securities exchange, Kenya. It also gives recommendations to the relevant groups. The contribution of the research study to the body of knowledge is also of great importance and cannot be ignored. Finally, there is a suggestion for areas of further research.

5.2 Summary

The study investigated the effect of capital market reforms on the microstructure performance of the Nairobi securities exchange. Among the reforms studied was demutualization of the stock market as measured by ownership concentration and ownership composition, entry of foreign investors and dematerialization of securities. The study sought to determine whether the capital market reforms had any significant effects on the microstructure performance of the NSE in terms of efficiency, volatility, and liquidity. The study specifically investigated the effect of entry of foreign investors into the stock market, the effect of demutualization of the stock market and the effect of dematerialization of securities on the microstructure performance of the stock market. The study also aimed to establish whether there are moderating effects of market size and time on relationship between the dependent and independent study variables. From existing literature, it was not clear whether undertaking

reforms in the capital market was valuable or not. Different studies had produced mixed results with some stock markets reporting positive results and others negative. Furthermore, there are some reforms that had been undertaken in the Nairobi securities exchange that have not been given adequate attention that is why the study focused on three reform variables; entry of foreign investors into the market, dematerialization and demutualization and to establish whether they have had any effect in the microstructure performance of bourse. This study was anchored on capital market efficiency theory, market microstructure theory, liquidity theory and agency theory which provided a frame work that was used to base our arguments.

A positivist research paradigm was adopted since positivism uses an immensely structured methodology which can be replicated without much difficulty, laying the emphasis on measurable observations that can be analyzed statistically. The time series data which was purely secondary included NSE weekly closing share prices of the relevant firms and the NSE share index from January 2002 to December 2017 was used. 2002-2004 (event window) and 2004-2217 was the reform period. Data for the ownership structure of NSE, value of shares traded as well as market capitalization were obtained from NSE records whereas the data for GDP was obtained from Kenya National bureau of statistics database. An explanatory research design was employed for the study. This design was adopted as it was very vital in establishing the relationship between the capital market reforms and the microstructure performance of the Nairobi securities market, Kenya. Although the census approach was used only 41 out of the 63

listed firms during the study period were used. This is because some firms had been delisted/suspended, others had not been listed before the study period while others had merged and thus had their names changed and as such their inclusion would bring inconsistency and hence result bias.

Descriptive analysis of data representing volatility, liquidity ratio, abnormal returns (efficiency), market capitalization ratio, was performed to come up with summarized mean which was used for regression analysis. The market efficiency which was measured by abnormal returns showed a fluctuating trend throughout the study which is an indication that the market was very inefficient during this period which could be attributed to poor information flow in the market. Generally, stock prices at the NSE during the study period were volatile with lower variations during the early years of the study and wider fluctuations as the years progressed.

Turnover ratio; the measure for stock market liquidity used in the study also showed a fluctuating trend during the entire study period. The number of CDS accounts opened was used as a proxy of dematerialized securities. In 2004 when the dematerialization exercise commenced, there were few CDS accounts opened. As more and more people became aware of the dematerialization exercise the number of accounts opened increased exponentially falling again towards the end of the exercise as most of the securities had been dematerialized. The ownership of NSE was composed mostly of domestic institutional investors. The domestic individual investor's participation in the NSE was low during the

whole study period. As the domestic institutional investors increased their percentage shareholding, the domestic individual investors' shareholding decreased between 2004 and 2008. The foreign investors' percentage shareholding was stable between 2004 and 2006 before rising slightly in 2007. From 2008 to 2017 the percentage shareholding remained relatively stable. The gross domestic product grew steadily over the years. Besides the market capitalization being low compared to the reported GDP, there was fluctuation during the entire study period. The proportionate rise in the market capitalization and GDP figure resulted in a relatively stable market size over the entire study period.

Diagnostic tests were performed in order to ensure that data was free from any bias before running multiple regression of the dependent variable on independent variables. The study found that entry of foreign investors into the NSE did not have a significant effect on all the microstructure performance variables of the securities market. The study also established that demutualization of the NSE influenced the stock market liquidity, the market efficiency, as well as the overall market microstructure performance. However, the two measures of demutualization were found to influence the performance in opposite directions. Ownership concentration was found to improve liquidity, efficiency of the stock and the overall market microstructure of the NSE while increase in ownership composition affected the performance of the NSE negatively.

Dematerialization produced the expected benefits of enhancing transparency hence improving the flow of information thus solving the problem of information asymmetry in the securities exchange which in turn improved stock market liquidity, market efficiency and overall microstructure performance of the bourse.

The study found that market size did not significantly influence the relationship between entry of foreign investors into the stock market and microstructure performance of the NSE. Likewise, there was no significant effect of the market size on the relationship between dematerialization of securities and the microstructure performance of the NSE in the period under review. On the contrary the findings reveal that there was a significant influence of the size of the stock market on the relationship between ownership composition and microstructure performance of the NSE. A negative coefficient of interaction of -289.40 implies that market size significantly reduced the effect of ownership composition on the relationship between capital market reforms and microstructure performance of the NSE during in the study.

The results further revealed that time did not have a significant moderating effect on the relationship between entry of foreign investors into the stock market and the microstructure performance of the NSE. Likewise, passage of time since reforms were undertaken does not have a significant effect on the relationship between ownership concentration and microstructure performance of the NSE. Conversely, passage of time since reforms were undertaken had a significant moderating effect on the relationship between ownership composition and the

microstructure performance of the NSE. The moderation effect was negative meaning that passage of time since undertaking reforms led to a decrease in the microstructure performance of the NSE. The results further reveal that time had a significant moderating effect on the relationship between dematerialized securities and the microstructure performance of the NSE.A negative interactive term connotes that that the passage of time since undertaking reforms led to a decline in the microstructure performance of the NSE.

5.3 Conclusion

The study tested the effects of capital market reforms on the market microstructure performance of the NSE. The capital reforms variables were demutualization, dematerialization and entry of foreign investors, whereas the market microstructure variables were liquidity, volatility and efficiency. First, the effect of capital market reforms was tested on each component of the microstructure performance before combining them into one measure of performance in order to give meaningful interpretation.

The study however found out that allowing foreign investors into the Nairobi securities exchange had no significant effect on stock market liquidity, stock price volatility, market efficiency as well as the overall microstructure performance of the bourse during the study period. Since all the p-values were greater than 0.05 implies that the null hypothesis was rejected in favor of the alternative hypothesis. It can therefore be concluded that entry of foe reign

investors into the market as part of capital market reforms did not achieve the desired results. This may be attributed to the new foreign investor regulations which were established to restrict foreign investors particularly on initial public offers and government privatization which impeded the number of foreign investors allowed to invest in the NSE.

The study also established that demutualization of the NSE influenced the stock market liquidity, the market efficiency, as well as the overall market microstructure performance. However, the two measures of demutualization were found to influence the performance in opposite directions. Whereas ownership concentration was found to improve liquidity, efficiency of the stock and the overall market microstructure of the NSE, ownership composition affects the performance of the NSE negatively. Nevertheless, the demutualization effect on volatility was undesirable. As ownership concentration increases so does the stock price volatility. Ownership composition on the other hand did not have any significant effect on the volatility of the stock prices at the NSE. It can be concluded that apart from increasing the stock price volatility, demutualization of the Nairobi securities exchange was desirable as it improved the stock liquidity, market efficiency and overall microstructure performance of the securities market.

The coefficient of dematerialization was positive and statistically significant indicating that stock market liquidity in the NSE improved with the increase in dematerialized securities. A one percentage point increase in dematerialized

securities also increased the stock price volatility during the study period. However, the increase in volatility is undesirable as it depicts increase level in stock price risk. The study also found that when securities are dematerialized, efficiency of the stock market improves as well as the overall microstructure performance of the securities market improved during the study period. Thus, dematerialization succeeded in producing the expected benefits of enhancing transparency and the speed of trade execution transparency thereby solving the problem of information asymmetry as well as improving the flow of information in the securities exchange hence improvement in liquidity, efficiency and overall microstructure performance of the bourse.

The results obtained negate the assertion that there is an interaction between market size and capital market reforms. This is evidence in the results which shows that there was no moderating effect of market size on the relationship between capital market reforms and microstructure performance of the NSE. We can conclusively say that despite its relatively large size, the Nairobi securities exchange has not been able to produce more information and to disclose such information faster, thus reducing information asymmetry and consequently improving market efficiency and the overall market microstructure performance.

5.4 Recommendations to Policy and Practice

The opening of stock markets to foreign investors in developing economies has been extensively praised, because of the many perceived potential benefits of integrating the financial sector with the rest of the world. This study therefore

recommends that the government should enact laws to relax the restriction imposed on new foreign investors on initial public offers and government privatization as this will attract many foreign investors and improve the market capitalization ratio.

Ownership concentration was found to improve stock market liquidity, efficiency of the stock and the overall market microstructure of the NSE .Increase in ownership composition on the other hand influences the performance of the NSE negatively. This may have been due to the fact that most institutional shareholders who may have a shareholding in a firm for a relatively short period of time may not exert control over the firm's decisions thereby unfavorably affecting performance. The study therefore recommends that institutional investors who are predominant shareholders should take an active role in monitoring the management to ensure that their interests are aligned with that of the firm. They should also use their superior resource and their large size to influence the firms' decision making as way of improving the firm's performance.

The study also found that an increase in ownership concentration would lead to an increase in the stock price volatility at the NSE. An expansive shareholder base is expected to improve the information content of stock prices leading to lower volatility. This improved information content of the stock price in turn lowers its volatility. The study therefore recommends that the capital market authority should relax listing requirements to encourage more firms to be listed

in NSE. The larger the number of investors, the higher the magnitude and speed of trade execution in the market. A high liquidity will result in smaller price fluctuations, thus solving the problem of volatility. Additionally, the government of Kenya should come up with modalities to ensure that there is free flow of information to the masses as this may help in improving the public participation in the stock market. Similarly, the public needs to be more informed about the on goings of the market.by adopting communication channels that will reach as many potential investors as possible.

Furthermore, the research found that when securities are dematerialized, stock market liquidity, stock price volatility, market efficiency as well as the overall microstructure performance of the securities market improved during the study period. Thus, dematerialization succeeded in producing the expected benefits of enhancing transparency and the speed of trade execution transparency thereby solving the problem of information asymmetry as well as improving the flow of information in the securities exchange hence improvement in liquidity, efficiency and overall microstructure performance the bourse. The study therefore recommends that since dematerialization is just a precursor to automation the securities exchanges that are not fully automated should ensure that they go the full course to ensure that automated trading which will give rise to real time trading is fully implemented.

5.5 Contribution to Knowledge

The contribution this study has made to the body of knowledge is threefold; the Theoretical Development., has produced more evidence which will enable one to support/negate the validity and reliability of assertions made by other researchers and lastly the areas of dematerialization of securities and demutualization of Nairobi securities exchange are relatively new and hence not been given much attention.

This study has contributed to the market microstructure theory, the agency theory and market efficiency theory, practice and policy in several ways. Firstly, there are contributions to market microstructure theory of how the market microstructure variables; liquidity, volatility and efficiency interact with each other when reforms are implemented in the capital market. The study shows how information flow among the investors influences trading in the stock market which subsequently influences efficiency and the level of stock price volatility. By demutualizing exchanges, outside owners are given a chance to own shares in the exchanges. Due to diffused and expansive ownership, shareholders appoint a board which in turn delegates the day to day running of the organization .The managers (agents) on the other hand may have conflicting ideas on how to run the exchange affairs of the organization. The findings support the agency theory standpoint that higher concentration increases shareholders' power and control which aligns managers' and shareholders' interests resulting in an increase in performance.

The study also contributes to the ongoing debate of the effect of capital market reforms on microstructure performance of securities markets. It is evident from the findings that capital market reforms and in particular demutualization and dematerialization of securities account for market microstructure performance. Dematerialization mitigates the risk of inefficiencies such as delayed settlements and deliveries, thus allowing quicker and safer transactions. Investors are also able to monitor shares at any time from the convenience of their homes, which increases the potential for profits due to more interest and participation as well as increasing their confidence in the market.

Demutualization of the NSE too was found to influence the stock market liquidity, efficiency, as well as the overall market microstructure performance. The study also contributes to the body of knowledge on how ownership structure affects liquidity, volatility and efficiency. This will help in formulating policies that will help to come up with ownership structure that will optimize the microstructure performance of the NSE. Since there is need to sufficiently diversify shareholding as a way of attracting more skills, experiences and aptitudes among the shareholders in order to improve firm's performance.

Dematerialization of securities which paved way to automation of trade at the NSE and the demutualization of the securities market which were recently completed are areas which are new, unique and deficient of similar empirical studies in the Kenyan capital market. This study will not only shed light on importance of reforms in the capital market but will also help in formulating policies that will help solve the problems affecting the capital market in Kenya,

key among them; low listing, low investor confidence, slow pace of innovativeness and flexibility and information asymmetry among others.

Literature on effect of market size and in particular market capitalization ratio and time on performance are also very scanty. This study has shed more light on the influence that these two variables have on stock market liquidity, stock price volatility, market efficiency and the overall microstructure performance of the Nairobi securities exchange.

5.6 Suggestion for further research

This study focused on the effect of capital markets reforms on market microstructure performance of the Nairobi securities market. There is a need to consider out a similar study on the effect of demutualization on the financial and non-financial performance of the bourse as this will give another perspective of whether demutualization was really desirable or not. Dematerialization is seen to be a precursor to the automating trading in many emerging markets. Since studies on dematerialization of securities are scanty there need to investigate the effect of dematerialization of shares on the market capitalization.

There is also need to look into the effects of reforms on financial engineering and innovation at the stock market. This will give insight on the basket of products that needs to be included in the Nairobi securities market that will attract more participation in the stock market.

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APPENDICES

Appendix 1: Listed firms at the Nairobi Securities Exchange as at January 2006

	MAIN INVESTMENT MARKET SEGMENT (MIMS)
	AGRICULTURAL
1.	Kakuzi
2.	Rea Vipingo
3.	Sasini
	COMMERCIAL AND ALLIED
4.	Car & Gen
5.	CMC
6.	Kenya Airways ltd
7.	Marshalls
8.	Nation Media Group.
9.	Tourism Promotion Services
10	Standard Newspapers
	FINANCE & INVESTMENT
11.	Barclays Bank
12.	CFC Bank
13.	Diamond Trust
14.	HFCK
15.	Jubilee Insurance
16.	National Bank
17.	National Industrial Credit
18.	Pan Africa Insurance Holdings Ltd
19.	Standard Chartered Bank
20.	Kenya Commercial Bank
	INDUSTRIAL & ALLIED
21.	Athi River Mining Ltd
22.	BOC (K)
23.	Bamburi
24.	British American Tobacco

25.	Carbacid
26.	Crown Berger
27.	E.A.Cables
28.	E.A.Portland
29.	Kenol
30.	Mumias
31.	K.Pow.& L.
32.	Total
33.	Unga
	ALTERNATIVE INVESTMENT MARKET SEGMENT (AIMS)
34.	A.Baumann
35.	City Trust
36.	Eaagads
37.	Express
38.	Williamson Tea
39.	Kapchorua
40.	K.Orchads
41.	Limuru Tea

Source: NSE Reports (2006)

Appendix 2: NSE Ownership composition and Entry of Foreign Investors

YEAR	DOMESTIC INSTITUTIONAL INVESTORS (%)	DOMESTIC INDIVIDUAL INVESTORS (%)	FOREIGN INVESTORS (%)
2004	47.4	22.8	29.8
2005	51.2	22.5	26.3
2006	52.8	21.6	25.6
2007	54.5	26.9	18.6
2008	77.2	14.9	7.9
2009	74.2	15.7	10.1
2010	73.6	13.8	12.6
2011	68.3	12.2	19.4
2012	66.7	12	21.3
2013	64.6	12.9	22.5
2014	64.2	14.6	21.3
2015	65.7	12.8	21.5
2016	66.4	12.5	21.1
2017	68.4	11.5	20.2

Source :(CMA, 2018)

Appendix 3: Annual averages for Volatility and Efficiency

Year	Liquidity	Volatility	Efficiency	Microstructure Performance
2004	6.44	3.4	58.525	-1.253
2005	4.76	2.8	58.840	-1.234
2006	11.95	66.3	96.239	0.988
2007	10.41	57.9	81.812	0.131
2008	11.39	61.7	80.543	0.055
2009	4.58	8.5	56.732	-1.359
2010	9.96	10.2	70.769	-0.525
2011	7.54	12.7	67.778	-0.703
2012	8.09	8.4	63.343	-0.967
2013	9.21	8.2	84.290	0.278
2014	9.43	19.9	97.651	1.072
2015	10.46	7.2	98.588	1.127
2016	7.62	5.7	99.124	1.159
2017	6.81	12.6	100.345	1.232

Source: research data (2018)

Appendix 4: Gross domestic product, Market capitalization and Market Size

Year	GDP Kshs Millions	Mkt Cap Kshs Billions	Market Size
2004	1,109,338	316.2	28.5
2005	1,172,784	462.5	39.44
2006	1,244,445	791.6	63.61
2007	2,151,264	851.1	39.56
2008	2,482,906	855.7	34.46
2009	2,863,689	834.2	29.13
2010	3,169,334	1,039.20	32.79
2011	3,726,054	1,035.80	27.8
2012	4,254,777	1,072.90	25.22
2013	4,757,536	1,691.50	35.55
2014	5,402,410	2,286.90	42.33
2015	6,260,646	2,000.80	31.96
2016	7,194,146	1,931.61	26.85
2017	8,196,664	2,521.77	30.77

Source: Study data (2018)

Appendix 5: Number of CDS Accounts opened

Year	Number Of Accounts	Log of No. of Accounts
2004	3736	8.225771
2005	74433	11.21765
2006	240897	12.39212
2007	55549	10.92502
2008	964673	13.77954
2009	55549	10.92502
2010	124737	11.73396
2011	33708	10.42549
2012	21182	9.960907
2013	179549	12.0982
2014	41010	10.62157
2015	34834	10.45835
2016	18974	9.850825
2017	15533	9.650722

Source :(CMA,2018)

Appendix 6: Summary of the Turnover Ratio

Year	Equity Turnover	Average Market Capitalization	Turnover Ratio
2004	20.35	316.2	6.44
2005	22.03	462.5	4.76
2006	94.6	791.6	11.95
2007	88.6	851.1	10.41
2008	97.5	855.7	11.39
2009	38.2	834.2	4.58
2010	103.5	1039.2	9.96
2011	78.1	1035.8	7.54
2012	86.8	1072.9	8.09
2013	155.75	1691.5	9.21
2014	215.7	2286.9	9.43
2015	209.35	2000.8	10.46
2016	147.18	1931.61	7.62
2017	171.61		

Appendix 7: Ownership Concentration

YEAR	TOP 20 SHAREHOLDERS	DIRECTORS	OTHERS	TOTAL
2013	59.69	0.0241	40.2859	100
2014	72.26	0.049	27.691	100
2015	72.244	0.043	27.713	100
2016	73.014	0.043	26.943	100
2017	74.257	0.075	25.668	100

Source: NSE annual reports

Appendix 8: Approval by NACOSTI

THIS IS TO CERTIFY THAT:
MISS. JENNIFER AKINYI OWINO
of KENYATTA UNIVERSITY, 400-507
NAIROBI,has been permitted to conduct
research in *Nairobi County*

on the topic: *CAPITAL MARKETS REFORMS AND MICROSTRUCTURE PERFORMANCE OF THE NAIROBI SECURITIES EXCHANGE,KENYA*

for the period ending:
1st February,2020

Permit No : NACOSTI/P/19/70711/27633
Date Of Issue : 1st February,2019
Fee Recieved :Ksh 2000

.....
Applicant's Signature

.....
Director General
National Commission for Science, Technology & Innovation

Appendix 9: Approval by Nairobi County Commissioner

Republic of Kenya

MINISTRY OF EDUCATION
STATE DEPARTMENT OF EARLY LEARNING AND BASIC EDUCATION

Telegrams: "SCHOOLING", Nairobi
Telephone; Nairobi 020 2453699
Email: rcenairobi@gmail.com
cdenairobi@gmail.com

When replying please quote

REGIONAL COORDINATOR OF EDUCATION
NAIROBI REGION
NYAYO HOUSE
P.O. Box 74629 – 00200
NAIROBI

Ref: RCE/NRB/RESEARCH/1/64/VOL.I **Date: 20th February, 2019**

Jennifer Akinyi Owino
Kenyatta University
P. O. Box 43844-00100
NAIROBI

RE: RESEARCH AUTHORIZATION

We are in receipt of a letter from the National Commission for Science, Technology and Innovation regarding research authorization in Nairobi County on *"Capital markets reforms and microstructure performance of the Nairobi Securities Exchange, Kenya."*

This office has no objection and authority is hereby granted for a period ending **1st February, 2020** as indicated in the request letter.

Kindly inform the Sub County Director of Education of the Sub County you intend to visit.

REGIONAL COORDINATOR OF EDUCATION NAIROBI 20 FEB 2019 MINISTRY OF EDUCATION P. O. Box 74629, NAIROBI

JAMES KIMOTHO
FOR: REGIONAL COORDINATOR OF EDUCATION
NAIROBI

Copy to: Director General/CEO
National Commission for Science, Technology and Innovation
NAIROBI