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# EFFECT OF STOCK MARKET DEVELOPMENT ON THE GROWTH OF CORPORATE BOND MARKET IN KENYA

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## Abstract

**Purpose:** The purpose of this study was to analyze how stock market development influences the growth of corporate bond market in Kenya.

**Methodology:** The study used descriptive and causal research designs. Secondary data was used. The sample of the study consisted of daily and monthly time series covering six years beginning January 2009 to December 2014. Unit root tests using Augmented Dickey-Fuller (ADF) and Phillips-Perron tests were done. The study used Eviews econometric software to facilitate empirical analysis of data.

**Results:** Regression of coefficients results shows that Stock market size and corporate bonds are positively and significant related (r=0.029, p=0.002), stock market liquidity and corporate bonds are positively and significant related (r=8.291, p=0.0008), Stock Market Concentration and corporate bonds are positively and significant related (r=0.014, p=0.017). Regression of coefficients results shows that Stock Market Volatility and corporate bonds are positively and significant related (r=0.000023, p=0.0001).

**Unique Contribution to Theory, Practice and Policy*:*** This study recommends study recommends for Policy makers to come up with measures to enhance the liquidity of the stock market which will in turn encourage investment in corporate bonds. The study recommends that concerted efforts should be made to improve market concentration in the corporate bonds market so that it can operate optimally. Policy makers should be aware of and monitor the level of stock market volatility that is appropriate for promoting the growth of the corporate bond markets and indeed other financial markets. Policy makers in Kenya should find ways and means of increasing the size of the stock market to reap the aforementioned benefits.

**Keywords**: *Stock market size, Stock market liquidity, Stock Market Concentration, Stock Market Volatility, growth, corporate bond market.*

## 1.0 INTRODUCTION

### 1.1 Background of the Study

The International Capital Markets Association, ICMA (2013) defines corporate bonds as transferable debt securities issued by Companies. They are one of a range of means, alongside equity share capital, bank lending, and other methods, by which Companies fund their business needs and their expansion (ICMA, 2013). Oji (2015) explains that corporate bonds are bonds issued by private or public firms. Investors who purchase these bonds essentially lend money to the company that issues the bond, which in turn confers on the issuer a legal commitment to pay interest on the principal and return the principal to investors when the bond matures. An important characteristic of corporate bonds is that they make it possible to raise capital without diluting ownership of the firm: unlike stock issues which confer equity ownership, investors in bonds do not own any part of the company that issues the paper. Oji (2015) observes that even in the event that a firm has financial problems, it still has a legal obligation to pay interest on its bonds and to return the principal to investors, an obligation shareholders do not enjoy.

According to this study, growth of corporate bond markets implies increase in size or liquidity of corporate bond markets (ICMA, 2013). According to Tendulkar (2015), growth is a subset of development. In the literature that follow, the term corporate bond market development has been largely used. Where corporate bond market development has been used, this term also implies corporate bond market growth. According to Tendulkar (2015), corporate bond market development is multifaceted. Three indicators of corporate bond market development in emerging market economies are corporate bond market size, corporate bond market depth and corporate bond market growth. Corporate bond market size is the amount of corporate bonds outstanding in absolute dollar terms. Corporate bond market depth is the amount of corporate bonds outstanding as a percentage of GDP and it weights the corporate bond market size by the size of the overall economy. Large corporate bond markets relative to the size of the economy are deep, while corporate bond markets that are small relative to the size of their economy are shallow. Growth in the size of corporate bond markets may be measured as the compound annual growth rate or year on year growth (Tendulkar, 2015).

Greenwood, Hanson and Stein (2010) developed a new theory to explain time variation in corporate maturity choice. In their theory, Greenwood, et al. (2010) allowed for predictability in bond market returns with the feature that corporate bond issuers tend to benefit from this predictability, that is, they use short - term debt more heavily when its expected returns are lower than the expected returns of the long- term debt. The model in Greenwood, et al. (2010) also assume that corporate issuers have a macro liquidity provision advantage relative to the other issuers. Specifically, their theory assumes that: the bond market is partially segmented, in that there are some important classes of investors who have a preference for investing at given maturities; there are shocks to the supply of long- and short-term bonds that are large relative to the stock of

available arbitrage capital; there are arbitrageurs who attempt to enforce the expectations hypothesis, but do so incompletely, leaving behind some residual predictability in bond returns.

In its April 2015 issue on accelerating emerging capital markets development, the World Economic Forum, the role that corporate bond markets play in the financial and economic development has been outlined. WEF (2015) notes that while corporate bond markets are not typically the first stage of financial development, well-functioning corporate bond markets play an important role in the financial system and broader economy. Braun and Briones (2006) assert that corporate bonds are one of the means by which companies fund their working capital and growth capital. As corporations require an increasing amount of working and growth capital as they grow, needs for financing eventually evolve beyond that which can be stably and efficiently met by the banking system alone. That becomes an important inflection point for capital markets, including corporate bond market, development which has become more urgent as financial regulatory reforms compress banks' willingness and ability to lend. Besides the size of the company, the issuer's choice among different sources of credit is also influenced by the availability and relative costs of different forms of financing, the latter is affected by the company's maturity and the amount of information available on the company as well as the depth of the corporate bond markets.

The US financial system was wounded by the time the dollar funding market froze up in the third quarter of 2007. In the interim, however, the general macroeconomy had weakened, and this was pulling asset prices down. A classic debt deflation was underway, with falling asset, real estate and (beginning in 2008) commodity prices feeding one another in a downward spiral. The crisis, accordingly, spread from the interbank market outwards while simultaneously exploding globally (Rude, 2010).

Investors everywhere were scrambling to reduce their leverage, meet rising margin calls, raise capital and otherwise reduce their losses and exposures, but it was already difficult if not impossible for the major US financial institutions to flee their risky and losing investments to the safety of "money" because a safe, private sector money had ceased to exist (Rude, 2010). Then, the September 2008 US banking crisis itself – the breakdown of the international banking system based on the hegemony of the major US investment banks, commercial banks and insurance companies amplified the turmoil, sending a severe contractionary shock through the world economy. The ensuing economic slowdown has been and continues to be international in its scope and characterized by falling income, output and employment across the globe.

According to Herring and Chatusripitak (2007), the development of stock markets is the key for the efficiency of the economic system, besides the fact that it would bring more opportunities for investors and deepen the financial markets. The existence of an effective bond market plays a crucial role in reducing financial sector fragility and provides an alternative cheap capital for firms (Yoshitomi & Shirai 2001). A robust bond market will help to modify the currency and maturity mismatches, provide better tools for risk pricing, enable efficient asset management and enhance

the role of the country on the international capital markets (Plummer & Click 2005). In terms of macroeconomic policy, a well-developed bond market not only provides useful market signals for the policy makers, but it is also a tool of financing fiscal deficits (Kahn 2005).

**1.2 Statement of the Problem**

The Kenyan corporate bond market is far less developed in comparison to its treasury counterpart. Corporate bond turnover as at December 2014 was Ksh 1.9 billion compared to Ksh 504.3 billion for treasury bonds. Corporate bond turnover as a percentage of total bonds turnover stood at only 0.38% compared to Treasury bond turnover as a percentage of total bonds turnover which stood at 99.62% over the same period. Extant literature points to the economic importance of corporate bonds market (Herring & Chatusripitak, 2006; WEF, 2015; ICMA, 2013; Oji, 2015; Tendulkar, 2015; Greenwood, et al., 2010 ; Luengnaruemitchai & Ong,
2005; Turner, 2011; Mu et al., 2013; Demirguc-Kunt et al., 2008; Adelegan, 2008; Levinger & Li, 2014; Sengupta & Anand, 2012; IOSCO, 2002 and IOSCO, 2011). It will be in the interest of the Kenyan Government to enhance efficiency and financial stability by nurturing the development of a corporate bond market.

The studies carried out in Kenya focused on stock market development and/or the banking sector development. Kemboi and Tarus (2012) examined macroeconomic determinants of stock market development in emerging markets. Nyasha and Odhiambo (2014) analyzed the origin of the stock market in Kenya and traced the reforms that have been undertaken to develop the stock market. Ikikii and Nzomoi (2013) analyzed the effects of stock market development on economic growth in Kenya using the gross domestic product and two key measures of stock market development namely capitalization and trade volume. Kamau and Were (2013) analyzed the driving factors behind the impressive banking sector performance in Kenya. Putunoi and Mutuku (2012) empirically investigated the effects of domestic debt on economic growth in Kenya. Wamburu and Wainaina (2014) analyzed the determinants of stock market development in Kenya using an error correction model approach. Bitok, et al. (2014) examined the factors that influence the growth and development of Nairobi Securities Exchange in Kenya. Aduda et al. (2012) sought to investigate the determinants of development of Nairobi Stock Exchange using secondary data for the period 2005 to 2009.

All the studies mentioned above failed to operationalize stock market development and thus presenting a conceptual gap. The current study attempted to operationalize stock market development into stock market size, stock market liquidity, stock market concentration and stock market volatility. This study has contributed to knowledge by filling in this gap. The study specifically sought to determine the effect of stock market development on the growth of corporate bond market in Kenya.

### 1.3 Objectives of the Study

The main objective of this study was to determine the effect of stock market development on the growth of corporate bond market in Kenya.

The study was guided by the following specific objectives:

To analyze how stock market size influence the growth of corporate bond market in Kenya.
To determine the influence of stock market liquidity on the growth of corporate bond market in Kenya. To examine the effect of stock market concentration on the growth of corporate bond market in Kenya. To establish the effect of stock market volatility on the growth of corporate bond market in Kenya.

## 2.0 LITERATURE REVIEW 2.1 Theoretical Review

### 2.1.1 Portfolio Theory

Markowitz (1952) argued that the traditional application of one-dimensional investment criteria such as the Net Present value (NPV) criterion should be replaced by two dimensions: Expected returns and risk defined as the standard deviation of the return distribution. In the following decades, he expanded his model and used it in a famous book (Markowitz, 1991). He argued also that investors should not look at securities individually. It is unrealistic to assume that investors or investment advisors can predict the future return of individual stocks.

However, based on empirical analysis of the co-variation of the returns of several securities, it is possible to make portfolio decisions, in which the incomplete correlation between the securities can be exploited for diversification. The focus of investors should be on the effect of combining securities. In a realistic setting, investors must make a trade-off between expected returns and risk. The available investment universe is represented by an efficient frontier with a slope and shape that reflects the interplay in the financial market between all investors with a varying degree of risk-aversion. If an individual investor wants a higher expected return, he must accept a higher risk.

In 1989, Morgan decided to develop a portfolio model, which was able to measure and explain the risks of the firm on a daily basis. In 1992, J.P. Morgan launched the Risk Metrics methodology to the marketplace for free (J.P.Morgan, 1996). The staff of the firm made daily updates of spot prices, volatility estimates and correlation estimates accessible through the internet. They explained that they did so because the firm was interested in promoting greater transparency of market risks, they wanted to establish a benchmark for market risk measurement and to use the Risk Metrics methodology to help clients to understand their portfolio risk. In 1993-1994, J.P. Morgan revised their technical document and popularized the concept Value-at-Risk (VaR) as portfolio risk measure to be applied by financial institutions in the capital adequacy calculations

to be presented to financial regulators. VaR is a downside measure estimated by means of historical statistics on volatility and correlations among a sample of financial assets and focussing on the probability of suffering losses. For a given portfolio, probability and time horizon, VaR is defined as a threshold value, which can be used to instruct the portfolio manager to keep the probability of suffering losses below a certain level.

According to Portfolio Theory, more sophisticated investors hold a portfolio consisting of both bonds and shares. If they are riskaverse, bonds represent a large part of the portfolio. If they have more risk appetite, they own more shares. The trade-off between the two types of securities is affected by both return and risk evaluations. Portfolio theory provides a nice explanation of their substitution between bond and share markets. A decline in the market interest rate makes shares relatively more attractive and gives an arbitrage incentive to move more into shares. In the context of the capital asset pricing model, a lower risk-free interest rate reduces the slope of the capital market line, which makes the market portfolio of shares more attractive. According to Patoda and Jain (2012), shares are typically viewed as financial assets that will fluctuate and be influenced by political, social, or economic distress and company's performance and investors will invest in bond market to diversify the risk of losses.

There are, however, also challenges in relation to portfolio theory. An obvious question when making the trade-off between return expectations and risk is how risk is measured. The Markowitz-model assumed that risk should be measured as the standard deviation of the portfolio return, i.e. by volatility. According to Sharpe, the investor could accept the more simple measure of beta. Jorion (2006) recommended the use of Value-at-Risk. Experience shows that investors relying on all three types of advice can suffer losses. In extraordinary times, the model assumptions concerning the shape of statistical distributions do not hold and the calculations can give misleading results.

Bonds and stocks compete for investment money at a fundamental level, which suggests that a strengthening equity market would attract funds away from bonds. This would tend to lower the demand for bonds; sellers would have to lower prices to attract buyers. Theoretically, the price of bonds would gravitate south until bond yields rose to a level that was competitive with the risk-adjusted returns found in the stock market. In the short run, rising equity values would tend to drive bond prices lower and bond yields higher than they otherwise might have been. However, there are many other variables at play in any given investment market, such as interest rates, inflation, monetary policy, government regulation and overall investor sentiments. Bull markets tend to be characterized by investor optimism and expectations of future stock price appreciation. This adjusts the risk/return dynamic in the marketplace and often leads to investors and traders becoming relatively less risk-averse. Most bonds represent a less risky investment than most stocks, which means that stocks have to offer a higher return as a premium for increased risk. This is why money leaves equities and goes into the bond market during times of uncertainty. The

opposite would tend to be true during a bear market; stocks would begin to receive funds at the expense of bonds.

**2.2 Empirical Review**

Raghavan and Sarwono (2012) sought to establish the factors that influenced the development of corporate bond market in India. Their results showed that while the growth of the government bond market was a major positive influence in the development of the corporate bond markets in India, bank lending in India slowed the development of the corporate bond market. Other factors such as size of the economy, openness, size of the stock market and institutional factors such as corruption had little or no impact on the development of the corporate bond market.

Chordia, et al. (2003) explored liquidity movements in stock and Treasury bond markets over a period of more than 1800 trading days. Cross-market dynamics in liquidity were documented by estimating a vector autoregressive model for liquidity, returns, volatility, and order flow in the stock and bond markets. The study found that a shock to quoted spreads in one market affects the spreads in both markets, and that return volatility is an important driver of liquidity. Innovations to stock and bond market liquidity and volatility proved to be significantly correlated, suggesting that common factors drive liquidity and volatility in both markets.

According to El – Wassal (2013), it is possible for stock markets to be large relative to their economies, but still concentrated. Stock market concentration may be measured by looking at the share of market capitalization accounted for by large companies in the market. In Kenya, this can be the share of market capitalization accounted for by the twenty largest stocks comprising the NSE 20 Share Index.

Stock prices are supposed to serve as signals for resource allocation. Yet, excessive volatility which does not reflect economic fundamentals would distort the signaling function of stock markets. Many analysts argue that less volatility reflects greater stock market development. However, a certain degree of stock market volatility is unavoidable as stock price movements indicate changing values across economic activities so resources can be better allocated. Theoretically, all other things being equal, the more volatile the stock market, the fewer savers will save and hence the less investment there will be. Excessive stock market volatility would lead investors to demand higher risk premium, increasing the cost of capital which in turn would impede investment and hamper economic growth. In addition, this volatility might lead to a shift of funds to less risky assets which will cause companies to pay more for access to capital (Arestis et al, 2001).

Kapingura and Ikhide (2015) carried out a study on the econometric determinants of liquidity of the bond market using the case study of South Africa. They found that the development of South African bond market has mirrored developments in economic development as well as other markets (equity and futures). Consistent with Adelegan (2009), they found evidence that suggested that the growth in the bond market has benefited from the growth of other financial markets and

that the growth in the bond market and equity market have contributed to the growth of the futures market in South Africa by facilitating the introduction of a number of equity and bond market related instruments.

## 3.0 RESEARCH METHODOLOGY

This study used both descriptive and causal research designs. The target population of this study comprised of data for equities and corporate bond market covering a period of sixty years from 1954 when the NSE was established to 2014. This provided annual time series of 60 observations as a target population. The units of observation are daily time series, monthly time series and quarterly time series. This hence provide quarterly time series of 240 observations, monthly time series of 720 observations, and daily time series of approximately 15600 observations for each of the variables under study. The sampling method was purposive sampling. The study used Eviews econometric software to facilitate empirical analysis of data.

## 4.0 RESULTS AND DISCUSSIONS 4.1 Descriptive Statistics

This study categorized descriptive statistics into two. First, the study obtained and analyzed the summary statistics namely the mean, maximum, minimum, standard deviation, skewness, kurtosis and Jarque Bera statistics using eviews software version 20. Subsection 4.1.1 presents the details of summary statistics. Subsection 4.1.2 provides the statistics based on diagnostic tests carried out on time series data. Diagnostic tests mainly focused on multicollinearity and unit root tests. Normality properties of the data were analyzed from the summary statistics.

### 4.1.1 Summary Statistics

Summary statistics for all variables under study are presented in Table 1. The variables are corporate bonds outstanding (CBOND), stock market capitalization (MCAP), stock market concentration (MCONC) measured as NSE 20 volume as a proportion of total NSE volume, stock market turnover (TURN), NSE total volume (NVOL) and stock market volatility (NINDX). TURN and NVOL are both measures of stock market liquidity. Statistical characteristics have been captured for the mean, maximum (MAX), minimum (MIN), standard deviation (STDEV), skewness (SK), kurtosis (KR) and Jarque Bera Statistics (JB).

From the results, all the variables recorded on a daily basis were positively skewed apart from corporate bonds outstanding and NSE20 volume as a proportion of total NSE volume. All variables were also peaked apart from market capitalization and standard deviation of stock market index. Jarque Bera (JB) statistics indicated that all the daily observed variables were not normally distributed as the null hypothesis that the observations are not different from the normal distribution was rejected in the case of all variables at a level of significance of 1%, 5% and 10% respectively. Observations at monthly horizons revealed that MCAP, NINDX together with NVOL

were normally distributed. All other variables were not normally distributed. Interestingly, observations at quarterly observations revealed that all the variables except NVOL and MCONC were normally distributed. CBOND was however only significant at 10% level of significance. Since the distribution was not uniform for all horizons, the study performed a logarithmic transformation for all variables to rule out the possibility of getting non-standard estimators.

**Table 1: Summary Statistics**

| | Data | Mean | MAX | MIN | STDEV | SK | KR | JB | Pro |
|---|---|---|---|---|---|---|---|---|---|
| **CBOND** | Daily | 54.1 | 86.6 | 8.5 | 20.2 | -1.3 | 3.6 | 432.9 | 0.0 |
| | Monthly | 54.5 | 86.6 | 8.5 | 20.3 | -1.3 | 3.7 | 21.4 | 0.0 |
| | Quarterly | 53.6 | 86.6 | 8500.0 | 21.8 | | | | |
| | | 3.2 | 5.2 | 0.1 | | | | | |
| | | | | | | -1.1 | | | |
| **MCAP** | Daily | 1290.9 | 2368.9 | 588.7 | 480.1 | 0.8 | | | |
| | | 2.3 | 174.1 | 0.0 | | | | | |
| | Monthly | 1296.6 | 2316.3 | 611.5 | 493.7 | 0.8 | | | |
| | | 2.4 | 8.8 | 0.0 | | | | | |
| | Quarterly | 1296.7 | 2303.2 | 683.0 | 496.5 | | | | |
| | | 2.4 | 3.1 | 0.2 | | | | | |
| | | | | | | 0.8 | | | |
| **MCONC** | Daily | 81.8 | 119.0 | 1.2 | 12.3 | 7.9 | 2208.9 | 0.0 | Monthly |
| 83.0 | 1.7 | 97.1 | 43.6 | 11.0 | -1.4 | 5.4 | 40.0 | 0.0 | |
| | Quarterly | 0.0 | 0.2 | 0.0 | 0.0 | 2.1 | | | |
| | | 35.7 | 0.0 | | | | | | 7.2 |
| **NVOL** | Daily | 24.0 | 161.8 | 2.9 | 17.4 | 2.5 | 13.3 | 8311.6 | 0.0 |
| | Monthly | 523.5 | 1030.5 | 150.6 | 196.9 | 0.3 | | | |
| | | 2.5 | 1.8 | 0.4 | | | | | |
| | Quarterly | 506.9 | 804.5 | 177.6 | 164.6 | | | | |
| | | 2.4 | 0.7 | 0.7 | | | | | |
| | | | | | | -0.3 | | | |
| **NINDX** | Daily | 451.7 | 1222.3 | 0.2 | 256.9 | 0.1 | | | |
| | | 2.4 | 23.6 | 0.0 | | | | | |
| | Monthly | 450.4 | 1147.0 | 9.8 | 260.8 | 0.1 | | | |
| | | 2.4 | 1.2 | 0.5 | | | | | |
| | Quarterly | 434.0 | 923.3 | 29.3 | 233.5 | 0.0 | | | |
| | | 0.4 | 0.8 | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | 2.3 |
| **TURN** | Daily | 435.0 | 6653.1 | 6.7 | 387.2 | 4.4 | 51.6 |
| | 153206.8 | 0.0 | | | | | |
| | Monthly | 9511.4 | 31583.3 | 1645.3 | 5708.9 | 1.1 | 4.8 |
| | Quarterly | 9018.6 | 19286.8 | 2549.1 | 4732.9 | 0.5 | 2.3 |

### 4.1.2 Trend Analysis

This section presents the trend analysis of the variables, corporate bonds outstanding (CBOND), stock market capitalization (MCAP), stock market concentration (MCONC) measured as NSE 20 volume as a proportion of total NSE volume, stock market turnover (TURN), NSE total volume (NVOL) and stock market volatility (NINDX). TURN and NVOL are both measures of stock market liquidity. The trend analysis is conducted so as to help establish the movement of the variables under study and thus help in performing unit root analysis as the trend analysis graphically indicates the pattern of movement in the variables.

#### 4.1.2.1Trend Analysis for Corporate Bonds Outstanding (CBOND)

The Figure 1 indicates that corporate bonds outstanding (CBOND), remained steady from 2010 to 2014. There is a sharp increase of CBOND in 2010 presiding a low and flat performance in 2009.

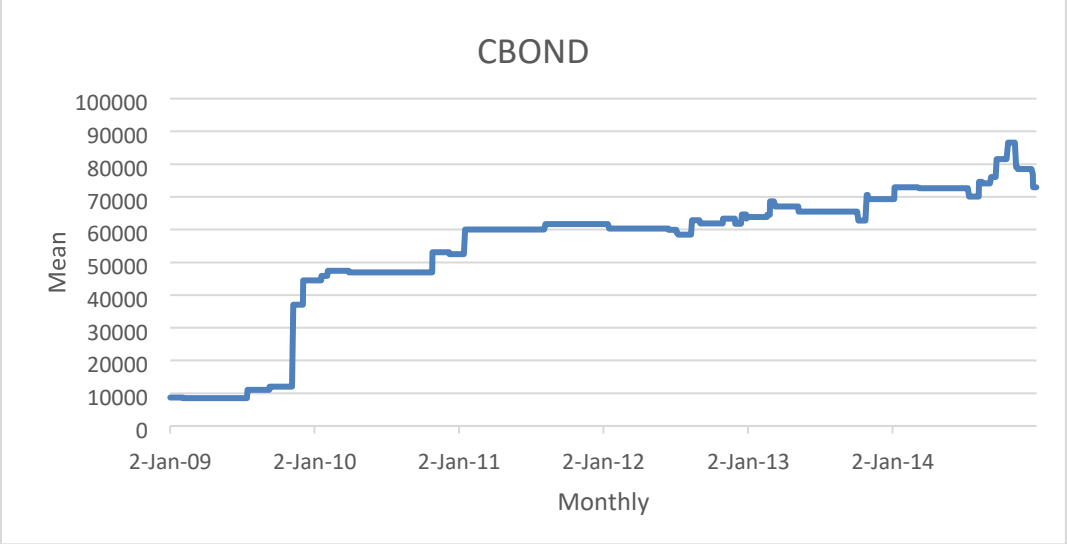


**Figure 1: Trend Analysis for Corporate Bonds Outstanding (CBOND) 4.1.2.2Trend Analysis for stock market capitalization (MCAP)**

The Figure 2 indicates that stock market capitalization (MCAP) has been consistent for all the years under the study

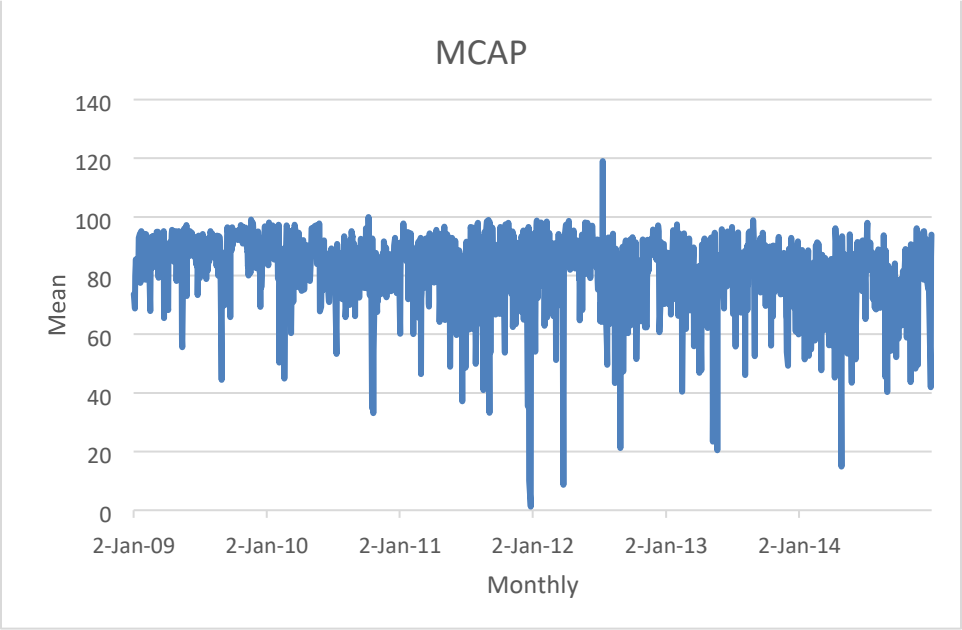


**Figure 2: Trend Analysis for stock market capitalization (MCAP)**

### 4.1.2.3 Trend Analysis for NSE Total volume (NVOL)

The Figure 3 indicates that NVOL has been fluctuating with an increasing trend for all the years under the study

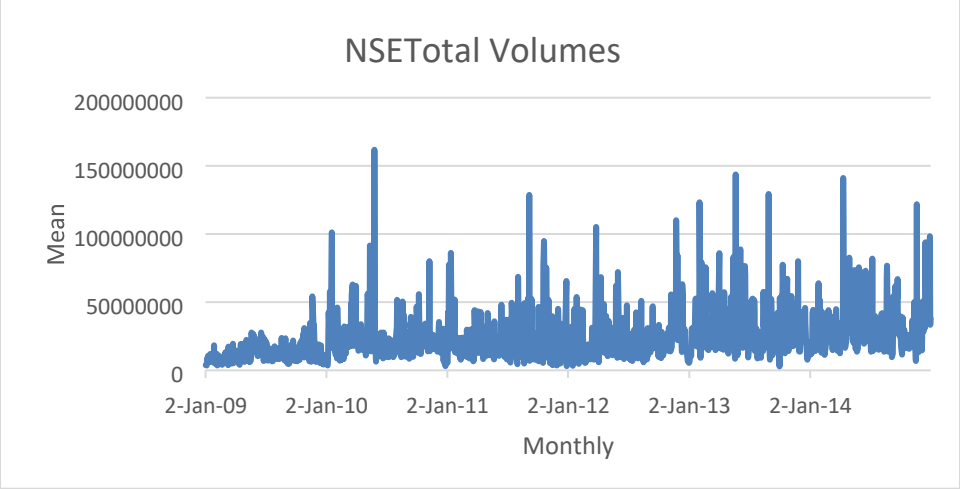


**Figure 3: Trend Analysis for NSE Total volume (NVOL)**

### 4.1.2.4 Trend Analysis for Market Turnover (TURN)

Figure 4 indicates that market turnover has moderately been increasing from the 2009 to 2013. Towards the end of the year 2013, it then shot to 6.5 billion before declining in the year 2014.

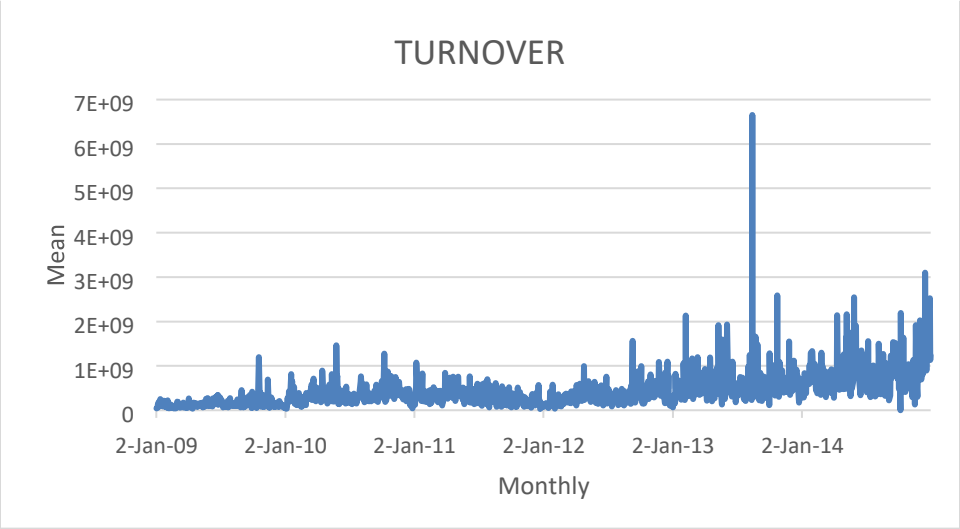


**Figure 4: Trend Analysis for Market Turnover (TURN)**

### 4.2.2.5 Trend Analysis for Stock Market Volatility

Figure 5 indicates that stock market volatility has been on an increasing trend from the 2009 to 2015.

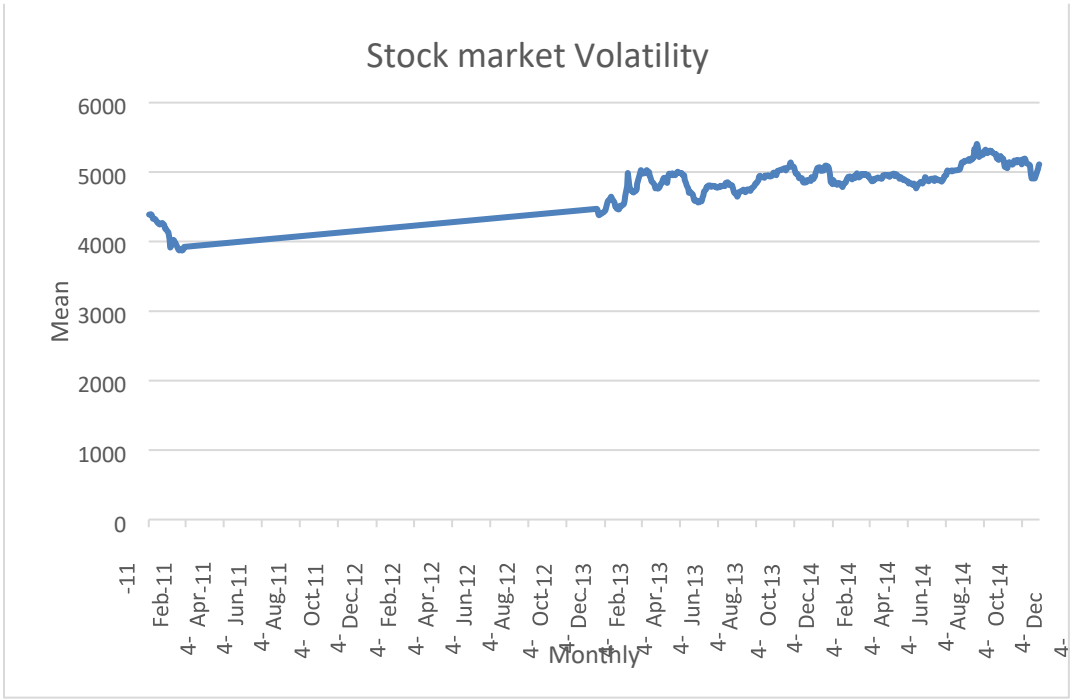

**Figure 5: Trend Analysis for Stock Market Volatility**

### 4.1.3 Diagnostic Tests

Time series properties of the data were carefully evaluated prior to estimating the model to avoid spurious regression results from being obtained. The tests included unit roots tests and correlation analysis.

#### 4.1.3.1 Multicollinearity Test

Multicollinearity was assessed in this study using correlation matrix. Table 2 presents the results of the correlation matrix between the dependent and the independent variables. From the analysis, stock market concentration (MCONC) and stock market volatility (NINDX) are negatively related with the corporate bond market (CBOND). MCONC is also negatively related to stock market size as measured by stock market capitalization (MCAP) and stock market liquidity as measured by turnover (TURN). Stock market volatility (NINDX) is negatively related to stock market liquidity as measured by total volume (NVOL). On the other hand, stock market size (MCAP) is positively correlated with stock market liquidity as measured by both NVOL and TURN.

**Table 2: Correlation Matrix**

| | MCAP | MCONC | NVOL | NINDX | TURN | CBOND |
|---|---|---|---|---|---|---|
| **MCAP** | 1.00 | | | | | |
| **MCONC** | -0.26 | 1.00 | | | | |
| **NVOL** | 0.34 | 0.15 | 1.00 | | | |
| **NINDX** | 0.16 | 0.02 | -0.03 | 1.00 | | |
| **TURN** | 0.62 | -0.06 | 0.64 | 0.06 | 1.00 | |
| **CBOND** | 0.73* | -0.27 | 0.33 | -0.25 | 0.46 | 1.00 |

The negative correlation between stock market volatility (NINDX) and the corporate bond market (CBOND) is consistent with Chabchitrchaidol and Panyanukul (2005) who found out that volatility is negatively related with bond market liquidity. MCONC is negatively related to stock

market size as measured by stock market capitalization (MCAP) and stock market liquidity as measured by turnover (TURN). This is consistent with El-Wassal (2013) who predicted a negative relationship between high stock market concentration and stock market liquidity.

High stock market concentration is not desirable as it can adversely affect liquidity, and it is common to find a negative correlation between concentration and liquidity. Stock Market Concentration adversely affects market development as it hampers market breadth by the concentration of capitalization within a handful of large companies, limiting the range of attractive investment opportunities and thus adversely affecting liquidity in the stock market in question.

Having a stock market which is driven by only few companies could weaken the link between stock prices for non-leading companies and/or their performance and growth prospects. This distorts the signaling function of stock markets. Stock market concentration might also encourage speculative activities as investment alternatives are limited and diversification possibilities are limited as well. Stock market volatility (NINDX) is negatively related to stock market liquidity as measured by total volume (NVOL).

On the other hand, stock market size (MCAP) is positively correlated with stock market liquidity as measured by both NVOL and TURN. This liquidity of the stock market drives the corporate bond market in the same direction. The positive correlation between MCONC and NVOL and also MCONC and NINDX are in agreement with empirical studies. Overall, the results in Table 4.2 indicate that there was no multicollinearity for almost all variables under study. However, the correlation coefficient between stock market capitalization and corporate bonds was highest at +0.73 which was close to +1.0 which indicates some level of multicollinearity between the two variables.

#### 4.1.3.2 Unit Root Tests

Most economic variables are usually non-stationary in nature and prior to running a regression analysis, a unit roots tests was conducted to establish whether the variables were stationary or non-stationary. The purpose of this is to avoid spurious regression results being obtained by using non-stationary series. The tests were conducted using Augmented Dickey Fuller (ADF) and Phillips Peron (PP) tests of unit roots. Results in Table 3 conducted using ADF test indicated that all variables are non-stationary (i.e. presence of unit roots) at 1%, 5% and 10% levels of significance with the exception of NSE total volume. Unit roots test was also conducted using PP tests and gave similar results as ADF test. However, upon first differencing, all the variables were stationary. This results suggested that all the variables are I(1). The optimal lag order was determined empirically.

**Table 3: Unit Root Tests at Level ADF**

| Variable | Null | Computed *t*-Statistic | p-value | Decision |
|---|---|---|---|---|

| | Hypothesis | Daily | Monthly | Quarterly | Daily | Monthly | Quarterly | Daily | Monthly | Quarterly |
|---|---|---|---|---|---|---|---|---|---|---|
| **LEVELS** | | | | | | | | | | |
| CBOND | $H_0$: series | -1.8486 | -1.9210 | -1.9988 | 0.6804 | 0.6331 | 0.5713 | Accept | Accept | Accept |
| MCAP | has a $H_0$: series unit | -1.7534 | -1.8878 | -3.3345 | 0.7268 | 0.6504 | 0.0880* | Accept | Accept | Reject |
| NINDX | has a $H_0$: series unit | -2.0529 | -1.8978 | -3.8248 | 0.5711 | 0.6453 | 0.0356* | Accept | Accept | Reject |
| NVOL | has a $H_0$: serunit ies | -11.718 | -3.5721 | -4.1667 | 0.0000* | 0.0396* | 0.0191* | Reject | Reject | Reject |
| TURN | has a $H_0$: series unit | -9.4151 | -2.6175 | -2.1822 | 0.0000* | 0.2741 | 0.4765 | Reject | Accept | Accept |
| MCONC | has a $H_0$: series unit | -22.359 | -7.6054 | -3.1594 | 0.0000* | 0.0000* | 0.1170 | Reject | Reject | Accept |
| **DIFFERE$_{ICES}$** | has a unit | | | | | | | | | |
| CBOND | $H_0$: series | -38.914 | -7.7652 | -3.8183 | 0.0000* | 0.0000* | 0.0398* | Reject | Reject | Reject |
| MCAP | has a $H_0$: series unit | -21.284 | -11.2246 | | 0.0000* | 0.0000* | | Reject | Reject | |
| NINDX | has a $H_0$: series unit | -20.666 | | | 0.0000* | | | Reject | Reject | |
| TURN | has a $H_0$: series unit | | -13.8238 | -5.4432 | | 0.0001* | 0.0012* | | Reject | Reject |
| MCONC | has a $H_0$: series unit | | -11.3612 | -5.4471 | | 0.0000* | 0.0014* | | | Reject |

has a unit

### 4.2 Co-integration Analysis

This section presents the results of co-integration analysis. Co-integration test was conducted to check whether the error term was stationary. A stationary error tem implies that co-integrated relationship between long run variables exist. In addition, the presence of co-integration indicates that there exists an underlying short run relationship. Such a short run relationship can be modeled through an error correction modeling approach. The purpose of an error correction modeling approach is to link the long run relationship to the short run relationship through an error correction term.

The study tested the null hypothesis that all the series were co-integrated. Table 4 shows the results of the co-integration analysis. The results in Table 4 below indicates that all variables are co-integrated at daily and monthly time series except NSE 20 volume as a proportion of NSE total volume, proxy for stock market concentration. At quarterly time series, all variables are not co-integrated except stock market capitalization, proxy for stock market size. Since not all variables were integrated of the same order, a VECM was rejected.

### 4.3 Granger Causality Test

Granger causality test was performed to test the null hypothesis that a causal relationship existed between two variables. Table 5 shows the results of the Granger causality test.

To establish whether causality existed between stock market size and corporate bond market, the study tested the null hypothesis that stock market capitalization does not Granger cause corporate bond market and vice versa. The magnitude of the t-statistic was higher for the null hypothesis that stock market capitalization does not Granger cause corporate bond market at all observations as compared to the null hypothesis that corporate bond market does not Granger cause stock market capitalization. The p-values at daily, monthly and quarterly observations were not significant at 1%, 5% and 10% level of significance and thus the null hypothesis was accepted in both cases.

To establish whether causality existed between stock market liquidity and corporate bond market, the study tested the null hypothesis that stock market liquidity does not Granger cause corporate bond market and vice versa using turnover and total NSE volume as proxies for stock market liquidity. The null hypothesis that stock market liquidity does not Granger cause corporate bonds was accepted at all observations as the p-values were not significant across all observations. However, there was a unidirectional causality between corporate bonds and stock market liquidity as measured by both turnover and NSE volume using monthly time series. This means that corporate bonds Granger causes stock market liquidity at monthly time series.

]To establish whether causality existed between stock market concentration and corporate bond market,, the study tested the null hypothesis that NSE 20 volume as a proportion of NSE total volume does not Granger cause corporate bond market and vice versa. The p-values at daily, monthly and quarterly observations were not significant at 1%, 5% and 10% level of significance in both cases and thus the null hypotheses that stock market concentration does not Granger cause corporate bonds and corporate bonds does not Granger cause stock market concentration was accepted.

Finally, to establish whether causality existed between stock market volatility and corporate bond market, the study tested the null hypothesis that stock market volatility does not Granger cause corporate bond market and vice versa using NSE 20 share index as a proxy for stock market volatility. As shown in Table 4.5, the p-values at daily, monthly and quarterly observations were

not significant at 1%, 5% and 10% level of significance in both cases. The null hypothesis that stock market volatility does not Granger cause corporate bonds was accepted. Similarly, the null hypothesis that corporate bonds do not Granger cause stock market volatility was also accepted.

**Table 5: Results for Granger Causality Tests**

| **Variables** | **Null Hypothesis** | ***trace*-Statistic** | | | **p-value** | | | **Decision** | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | **Daily** | **Monthly** | **Quarterly** | **Daily** | **Monthly** | **Quarterly** | **Daily** | **Monthly** | **Quarterly** |
| Corporate bond market, Stock Market Size | D(LNMCAP) does not Granger Cause D(LNCBOND) | 0.6998 | 0.20321 | 1.07237 | 0.4968 4 | 0.81662 | 0.36556 | Accept | Accept | Accept |
| | D(LNCBOND) does not Granger Cause D(LNMCAP) | 0.3123 | 0.13820 | 0.13078 | 0.7317 8 | 0.87118 | 0.87833 | Accept | Accept | Accept |
| Corporate bond market, Stock Market Liquidity | LNTURN does not Granger Cause D(LNCBOND) | 0.2340 | 0.13819 | 0.76265 | 0.7913 8 | 0.87120 | 0.48266 | Accept | Accept | Accept |
| | D(LNCBOND | 0.6069 | 3.13599 | 0.80690 | 0.5451 5 | **0.05020 *** | 0.46359 | Accept | Reject | Accept |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ) does not Granger Cause | | | | | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | LNTURN | | | | | | | | | |
| Corporate bond market, Stock Market Liquidity | LNNSEVOL does not Granger Cause D(LNCBOND) | 0.7371 | 2.19296 | 2.06827 | 0.47867 | 0.11990 | 0.15888 | Accept | Accept | Accept |
| | D(LNCBOND) does not Granger Cause LNNSEVOL | 1.2570 | 4.14033 | 0.66148 | 0.28480 | **0.02037 *** | 0.52964 | Accept | Reject | Accept |
| Corporate bond market , Stock Market Concentration | MCONC does not Granger Cause D(LNCBOND) | 1.1431 | 0.45519 | 0.00905 | 0.31909 | 0.63637 | 0.99100 | Accept | Accept | Accept |
| | D(LNCBOND) does not | 0.0077 | 0.83207 | 0.05874 | 0.99227 | 0.43980 | 0.94315 | Accept | Accept | Accept |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Granger Cause MCONC | | | | | | | | | |
| Corporate bond market, Stock Market Volatility | D(LN20INDX) does not Granger Cause D(LNCBOND) | 0.0501 | 0.77631 | 1.94842 | 0.9511 1 | 0.46438 | 0.17486 | Accept | Accept | Accept |
| | D(LNCBOND) does not Granger Cause D(LN20INDX) | 0.5581 | 0.87286 | 0.28363 | 0.5723 9 | 0.42267 | 0.75675 | Accept | Accept | Accept |

### 4.4 Multivariate Regression Analysis

Multivariate regression model revealed that Stock Market Size, Stock Market Liquidity, Stock Market Volatility and Stock Market Concentration were found to be satisfactory variables in explaining growth in corporate bonds. This is supported by coefficient of determination also known as the R square of 62.35%.

The results indicated that the overall model was statistically significant. Further, the results imply that the independent variables are good predictors of performance. This was supported by an F statistic of 7.867 and the reported p value (0.0006) which was less than the conventional probability of 0.05 significance level.

Regression of coefficients results in table 6 shows that stock market size and corporate bonds are positively and significant related (r=0.015, p=0.0409). The table further indicated that stock market

liquidity and corporate bonds are positively and insignificant related (r=1.665, p=0.551). It was further established that stock market concentration and corporate bond were positively and significantly related (r=0.0067, p=0.0162) while Stock Market Volatility and corporate bond were positively and insignificantly related (r=0.0000269, p=0.06)

**Table 6: Coefficients of Regression**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| Stock Market Size | 0.015532 | 0.018431 | 2.842705 | 0.0409 |
| Stock Market Liquidity | 1.664747 | 2.745084 | 0.606446 | 0.5514 |
| Stock Market Conc | 0.006672 | 0.004587 | 2.454440 | 0.0162 |
| Stock Market Volatility | 2.69E-05 | 1.35E-05 | 1.989372 | 0.0613 |
| C | -0.054541 | 0.024879 | -2.192280 | 0.0410 |

| | | | |
|---|---|---|---|
| R-squared | 0.623536 | Mean dependent var | 0.061967 |
| Adjusted R-squared | 0.544280 | S.D. dependent var | 0.022763 |
| S.E. of regression | 0.015367 | Akaike info criterion | -5.330195 |
| Sum squared resid | 0.004486 | Schwarz criterion | -5.084768 |
| Log likelihood | 68.96235 | Hannan-Quinn criter. | -5.265083 |
| F-statistic | 7.867392 | Durbin-Watson stat | 0.488000 |
| Prob(F-statistic) | 0.000645 | | |

The optimal model is:

Growth in corporate bond market=-0.0545 + 0 .0155$X_1$ + 1.664$X_2$ + 0.0066 $X_3$+ 0.0000269$X_4$ Where;

$X_1$= Stock Market Size

$X_2$= Stock Market Liquidity

$X_3$= Stock Market Concentration

$X_4$= Stock Market Volatility

## 5.0 CONCLUSIONS AND RECOMMENDATIONS 5.1 Conclusions

Stock market size as measured by stock market capitalization has a positive relationship with corporate bonds outstanding but does not Granger cause corporate bond market in Kenya. Regression of coefficients results shows that Stock market size and corporate bonds are positively and significant related (r=0.029, p=0.002). This means that one unit increase in Stock market size leads to a growth in corporate bond market by 0.029 units. The null hypothesis was rejected since p<0.05 and thus Stock Market size have a significant effect on corporate bonds.

Raghavan and Sarwono found out that stock market size (measured by stock market capitalization) did not have a significant influence on the corporate bonds market (measured by corporate bonds outstanding). This finding is also consistent with Jiang, Tang and Law (2002) who analyzed the costs and benefits of developing debt markets in Hong Kong and found the relationship between equity issuance and debt market development is positive although not significant. Patoda and Jain (2012) examined the relationship between bond market and stock market in India and found a positive correlation between stock and bond market of India.

According to Bondt (2002), the development of a corporate debt securities market is closely linked, and often follows, the development of an equity market. As most of the costs of going public in bond and equity markets in terms of accounting requirements, legal and other fixed costs, are similar, the development of each of these markets encourages the development of the other markets

This section presents the conclusions based on the findings from the analysis. Stock market liquidity as measured by turnover and total volume has a positive relationship with corporate bonds outstanding but does not Granger cause corporate bond market in Kenya. However, there is a unidirectional causal relationship between corporate bond market and stock market liquidity using monthly time series data. Regression of coefficients results shows that stock market liquidity and corporate bonds are positively and significant related (r=8.291, p=0.0008). This means that one unit increase in Stock market liquidity leads to a growth in corporate bond market by 8.291 units. The null hypothesis was rejected since p<0.05 and thus Stock Market liquidity have a significant effect on corporate bonds.

The finding that stock market liquidity as measured by turnover and NSE total volume does not granger cause corporate bond market is consistent with Raghavan and Sarwono (2012) who found out that stock market liquidity (measured by total value of stocks traded) did not have a significant influence on the corporate bonds market (measured by corporate bonds outstanding). However, this finding disagrees with the findings of Mu, et al. (2013) and Eichengreen, et al. (2008) who established that the development of financial system is critical in the development of corporate bond markets.

De Jong and Driessen (2006) show that equity market liquidity risk is priced in a cross-section of corporate bond portfolios, while Acharya, Amihud and Bharath (2010) show that corporate bonds

are exposed to liquidity shocks in equity and treasury markets. Franzoni, Novak, and Phalippou (2011) have found that equity market liquidity risk is priced outside the cross-section of equities.

This section presents the conclusions based on the findings from the analysis. Regression of coefficients results shows that Stock Market Concentration and corporate bonds are positively and significant related (r=0.014, p=0.017). This means that one unit increase in Stock market concentration leads to a growth in corporate bond market by 0.014 units. The null hypothesis was rejected since p<0.05 and thus Stock Markets concentration have a significant effect on corporate bonds.

This finding is inconsistent with that of El-Wassal (2013) who argued that Stock Market Concentration adversely affects stock market development as it hampers stock market breadth by the concentration of capitalization within a handful of large companies, limiting the range of attractive investment opportunities and thus adversely affecting liquidity in the stock market in question. Having a stock market which is driven by only few companies could weaken the link between stock prices for non-leading companies and/or their performance and growth prospects. This distorts the signaling function of stock markets. Stock market concentration might also encourage speculative activities as investment alternatives are limited and diversification possibilities are limited as well. According to the concentration-stability view, higher market concentration enhances the stability of the financial system. One line of argument suggests that, due to higher market concentration, firms have more market power and may therefore generate higher profits.

Stock market concentration adversely affects market development as it hampers market breadth by the concentration of capitalization within a handful of large companies, limiting the range of attractive investment opportunities and thus adversely affecting liquidity in the stock market in question (El. Wassal, 2013). Having a stock market which is driven by only few companies could weaken the link between stock prices for non-leading companies and/or their performance and growth prospects. This distorts the signaling function of stock markets. Stock market concentration might also encourage speculative activities as investment alternatives are limited and diversification possibilities are limited as well.

Mu, et al. (2013) analyzed bond markets in Africa and found that corporate bond market capitalization is directly linked to economic size, the level of development of the economy and financial markets and better institutions. Chen and Runquan (2009) using Johansen Cointegration test, VECM-X and GARCH model finds a linkage between stock and bond market through studies and observe the existence of long-term relation and volatility. He also finds co-movement of stock and bond indices where he suggests an equilibrium correlation with short-term inaccuracy or error correction.

Chordia, et al. (2003) explored liquidity movements in stock and Treasury bond markets over a period of more than 1800 trading days and found that a shock to quoted spreads in one market affects the spreads in both markets, and that return volatility is an important driver of liquidity. Innovations to stock and bond market liquidity and volatility proved to be significantly correlated, suggesting that common factors drive liquidity and volatility in both markets.

**5.2 Recommendations**

The study concluded that stock market size has a positive relationship with corporate bond markets. Therefore, this study recommends for Policy makers in Kenya to find ways and means of increasing the size of the stock market to reap the aforementioned benefits. A large size of the stock market will cause the benefits to flow to the corporate bond market too.

Based on the conclusions of the study, stock market liquidity was found to have a positive relationship with corporate bond market. Therefore, this study recommends for Policy makers to come up with measures to enhance the liquidity of the stock market which will in turn encourage investment in corporate bonds.

The study concluded that stock market concentration had a positive relationship. Therefore, the study recommends that concerted efforts should be made to improve market concentration in the corporate bonds market so that it can operate optimally. The existing concentration affected the stock and corporate bond markets positively. However, policy makers should be careful not to allow a higher stock market concentration as this will adversely affect the financial markets (El-Wassal, 2013).

The positive relationship between stock market volatility and corporate bonds market suggest that the corporate bond market as an investment is affected by developments in the stock market. Policy makers should be aware of and monitor the level of stock market volatility that is appropriate for promoting the growth of the corporate bond markets and indeed other financial markets.

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