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An analysis of liquidity in stock markets

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DECLARATION

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

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ABSTRACT

The following is a study on liquidity of the various stocks listed on the NSE. It has defined liquidity as the ability to trade large quantities of a stock without moving the price. The study seeks to determine the most liquid/illiquid stocks listed on the NSE and the possible determinants of a given stock's liquidity/illiquidity. To determine the most liquid/illiquid stocks, the paper employs liquidity ratio as a measure of the stocks liquidity. The paper utilizes panel data regression and multiple regression to answer its research questions. The regressions were run using GRETL. The results suggest that Liquidity Ratio is an appropriate measure of liquidity in the NSE. The results also suggest that companies with high presence on social media as well as a high number of issued stocks tend to be more liquid.

Keywords: Liquidity, Nairobi Securities Exchange

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1 INTRODUCTION

1.1. Background

1.1.1 Definition of Liquidity

Liquidity is an elusive concept. Even (O'Hara, 1995) admitted that it is hard to define, but you know it when you see it. However various authors have tried to define liquidity over the years. (O'Hara, 2004) relates liquidity to the ability to buy and sell assets easily. The study further elaborated that a liquid market is one in which buyers and sellers can trade into and out of positions quickly and without having large price effects. According to (Wuyts, 2007) and (Pastor & Stambaugh, 2003) liquidity generally denotes the ability to trade large quantities of a security quickly, at a low cost and without moving the price. This research will focus on the aspect of liquidity of trading large quantities of a security without moving the price.

1.1.2 Is liquidity desirable?

Though liquidity at first glance may seem desirable, some scholars have raised arguments that liquidity may have negative effects on markets. (O'Hara, Liquidity and Financial Market Stability, 2004) brought out the views of various authors such as (Keynes, 1961), (Tobin, 1978) and (Coffee, 1991). The traditional view on liquidity is best brought out by (Keynes, 1961). He brought out the negative view of liquidity as he implied that the ability to buy and sell assets seamlessly leads to capital markets that are fixated on the short-term, and prone to instability. (Tobin, 1978) also argued that liquidity might undermine the basic functioning of markets. Another way the dark side of liquidity can be brought out is by linking liquidity to corporate governance problems. (Coffee, 1991) argued that liquidity promoted by U.S. policies had obvious benefits such as investors being able to transform their assets into cash quickly and diversify cheaply. He however brought out that the same policies could impair corporate governance by encouraging diffuse

stockholding and discouraging active investing. Diffuse stockholders face more serious collective action problem as they lack the motivation to monitor managers (O'Hara, 2004).

The alternative view of liquidity is that it enhances market stability because investors are willing to hold securities that they can buy and sell easily. (Wuyts, 2007) concluded that liquidity is important for the stability of the financial system analyzing the forces that drive liquidity in stock markets, as well as of the implications of liquidity for different agents in the market such traders, investors, stock exchanges and listed firms. Some other positive effects of liquidity that were brought out by other authors would be:

- Stock market liquidity lowers the cost of raising external capital. (Butler, Grullon, & Weston, 2005) concluded that firms could reduce the cost of raising capital by improving the market liquidity of their stock.
- (Abdul-Khaliq, 2013) concluded from his study that stock market liquidity may have an effect on economic growth.
- Liquidity also plays a positive role in resolving the manager/shareholder agency problem (Fang, Noe, & Sheri, 2009)

The positive effects that come about due to stock market liquidity supports the desirability of liquidity. Recent light has been put on liquidity even by the on liquidity risk management for collective investment schemes. Their report aimed to make sure that open ended funds where people can sell their units back into the funds when they want their money back can meet their obligations (International Organization of Securities Commission , 2013). Liquidity is therefore not only desirable but also very important.

1.1.3 Conditions for liquidity

(Black, 1971) outlined certain conditions that a market for a stock needs to satisfy for it to be classified as liquid. The conditions are:

- There are always bid ask prices for the investor who wants to buy and sell small amounts of stock immediately

- The difference between the bid and asked prices (also referred to as the spread) is always small.
- An investor who is buying or selling a large amount of stock in the absence of special information can expect to do so over a long period of time at a price not very different, on average, from the current market price
- An investor can buy or sell a large block of stock immediately but at a premium or discount that depends on the size of the block. The larger the block, the larger the premium or discount.

(Kyle, 1985) used the above conditions of liquid stock market and pointed out the following elements of market liquidity: tightness, depth and resiliency. Tightness refers to the cost of turning over a position in a short period of time. Depth refers to the ability of the market to absorb quantities without having a large effect on price. Market resiliency refers to the speed with which prices tend to the underlying liquidation value of the commodity. Resiliency also measures the rate at which prices bounce back from an uninformative shock.

1.1.4 Brief history of the Nairobi Securities Exchange

The Nairobi Securities Exchange (NSE) was constituted as Nairobi Stock Exchange in 1954 as a voluntary association of stockbrokers in the European community registered under the Societies Act. Before its constitution firms traded in shares and stocks through a 'gentleman's agreement.' Later around 1954 before the attainment of Kenya's independence before Africans and Asians were permitted to trade in securities the business of dealing in shares was confined only to Europeans. After a while the uncertainty in the future of Kenya was clear and the economy started to grow leading to a boom in stock market activity. Until December 17, 2007 trading on the NSE was done in a central location, the trading floor. However, on December 17, 2007 they implemented its Wide Area Network (WAN) platform. With the onset of remote trading, brokers and investment banks no longer required a physical presence on the trading floor since they would be able to trade through

terminals in their offices linked to the NSE trading engine. On December 7, 2009 they marked the first day of automated trading in government bonds through the Automated Trading System (ATS) and uploaded all government bonds on the System. In July 2011, the Nairobi Stock Exchange Limited changed its name to the Nairobi Securities Exchange Limited. They are now in the process of expanding their capacity and launching the derivatives market (Nairobi Securities Exchange Limited, 2015).

1.2. Problem statement

According to previous studies such as (Wuyts, 2007) liquidity in stock markets is important to stock markets as they enhance market stability. Other scholars such as (Butler, Grullon, & Weston, 2005) and (Abdul-Khaliq, 2013) support the desirability of liquidity in a stock market by bringing out the positive effects that are associated with stock market liquidity such as increased economic growth and lower costs of raising economic capital. Liquidity is therefore a very important concept in stock markets. This study seeks to establish liquidity in the Nairobi Securities Exchange stock market by determining liquidity of individual stocks in the market. The study will go further and establish some reasons that can be attributed to making a stock liquid or illiquid.

1.3. Research Objectives

The objectives of this research is to:

- Identify liquidity of stocks in the Nairobi Securities Exchange
- Evaluate why the stocks exhibit their liquidity characteristics.

1.4. Research Questions

Research questions guiding my study are:

- Which stocks are most liquid/illiquid in the Nairobi Securities Exchange?
- What makes the stocks liquid/illiquid?

1.5. Significance of Research

The study shall provide insight on which are the liquid/illiquid stocks in the Nairobi Securities Exchange and evaluate why stocks exhibit liquid/illiquid characteristics. This information shall be useful to investors, as it will provide insight on which stocks are liquid and illiquid. The study will also be useful to listed firms as it provides information on some of the characteristics that make a firm's stocks liquid/illiquid.

2 LITERATURE REVIEW

1.6. Introduction

There has been a lot of literature in the field of knowledge of liquidity in stock markets, its determinants and its effect. In this respect, this chapter shall analyze work done by a number of different authors on liquidity in stock markets, its determinants and its effects

1.1. Factors affecting stock market liquidity

2.1.1 Firm earning's

One of the factors that affect stock market liquidity is the firm's earnings. (Lakhal, 2008) examined stock market liquidity around voluntary earnings disclosures using effective spreads. The results of the study indicate that quarterly earnings enhance stock market liquidity by shrinking bid-ask spreads. However, earnings forecasts exacerbate information asymmetry before and after the announcement date confirming the existence of information leakage. The paper focuses more on information leakage than the effects of voluntary earnings disclosure on stock market liquidity.

(Banerjee, Gatchev, & Spindt, 2007) also found a strong empirical relation between the dividend policy of the firm and the liquidity of its common stock. They documented declining propensity of firms to pay dividends in the later years of our sample is largely explained by the significant changes in the liquidity of U.S. security markets. According to the study, a period of fewer dividend payers is characterized by lower trading costs and increased market activity. The study also presents evidence that its conclusions are more relevant for firms that have the ability to pay cash dividends to their shareholders. It also finds that firms with less liquid stocks are more likely to initiate dividend payments.

2.1.2 Business cycles

Stock market liquidity can also be affected by business cycles. (Naes, Skjeltorp, & Odegaard, 2011) studied the relationship between stock market liquidity and the business cycle. They provided two empirical observations. First, they showed that stock market liquidity contains useful information for estimating the current and future state of the economy. These results were shown to be remarkably robust to the choice of liquidity proxy and sample period. The relationship was also seen to be very similar for two different markets, the US and Norway. The study found evidence that time variation in equity market liquidity is related to changes in participation in the stock market, especially for the smallest firms. Participation in small firms decreased when the economy worsens. Their finding was consistent with a “flight-to-quality” effect and with the finding that the liquidity of the smallest firms contains most information about future economic conditions. In addition to suggesting a new financial market-based predictor, the results of the study provided a new explanation for the observed commonality in liquidity.

2.1.3 Asset Liquidity

Another factor that affects stock market liquidity would be asset liquidity in a firm. (Gopalan, Kadan, & Pevzner, 2012) studied the relation between asset liquidity and stock liquidity. The model used predicted that the relation might be either positive or negative depending on parameter values. This is because a higher proportion of liquid assets on the balance sheet reduces the uncertainty regarding assets-in-place and it also facilitates more future investment, thereby increasing the level of uncertainty. These 2 effects of a higher proportion of liquid assets influence stock liquidity in opposite directions. In their empirical analysis, they tested to find out which effect dominated and found that more cash lowers valuation uncertainty associated with assets-in-place, and it improves stock liquidity. The model

used by (Gopalan, Kadan, & Pevzner, 2012) also showed that asset liquidity improves stock liquidity more for firms that are less likely to reinvest their liquid assets (i.e., firms with less growth opportunities and financially constrained firms). Empirically, they found a positive and economically large relation between asset liquidity and stock liquidity. They discovered that the relation is more positive for firms that are less likely to reinvest their liquid assets. Their study shows that the relation between asset liquidity and stock liquidity also has some value implications. The effect of a high cash balance in improving stock liquidity is a hitherto unknown benefit of cash. They find that an increase in corporate cash holding is significantly more valuable for firms with less liquid stock.

(Charoenwong, Chong, & Yang, 2014) also examined the relationship between asset liquidity and stock liquidity but under different accounting information environments. In support of the valuation uncertainty hypothesis, they find that firms with greater asset liquidity on average have higher stock liquidity just like (Gopalan, Kadan, & Pevzner, 2012). However, (Charoenwong, Chong, & Yang, 2014) went further and showed that asset liquidity plays a more significant role in resolving valuation uncertainty in countries with poor information environment. For example, they found that the asset-stock liquidity relationship is stronger in countries with poor accounting standards. They found evidence that after the adoption of IFRS, the improved accounting information environment resulted in a weaker asset-stock liquidity relation, but only in countries with a strong legal regime. Finally, the study shows that the positive asset-stock liquidity relationship may be attributed to other elements in market design such as transparency and liquidity effects.

1.2. Effects of stock market liquidity

2.1.4 Cost of raising external capital

Stock market liquidity has various implications to a firm. For example (Butler, Grullon, & Weston, 2005) examined the effect stock market liquidity has on the cost of raising external capital. Their paper took a different approach to test whether liquidity matters to the firm by examining an event that links liquidity to the direct cost of raising external capital unlike previous studies that relate liquidity to a firm's cost of capital. The study showed that stock market liquidity is an important determinant of the cost of raising external capital. They used a large sample of seasoned equity offerings to measure both the direct cost of raising capital (the investment banking fees) as well as the market liquidity of the underlying stock prior to the offering and found that, *ceteris paribus*, investment banks' fees are significantly lower for firms with more liquid stock. They estimated that the difference in the investment banking fee for firms in the most liquid and the least liquid quintile was about 101 basis points or 21% of the average investment banking fee in our sample. The study's findings suggested that firms could reduce the cost of raising capital by improving the market liquidity of their stock. Though the paper shines a light on the importance of liquidity of a firm's securities as it suggests that the effects of liquidity on the value of a firm go beyond what was suggested by other studies, liquidity of a firm's stock affects more than the cost of raising capital that the paper failed to discuss.

(Wuyts, 2007) analyzed the forces that drive liquidity in stock markets, as well as of the implications of liquidity for different agents in the market such as traders, investors, stock exchanges and listed firms. In his study, Wuyts provided a clear definition of liquidity that included the price effect. According to Wuyts a market is liquid if traders can quickly buy or sell large numbers of shares without large price effects. He also investigated whether liquidity in stock markets is a desirable feature and discussed the different

dimensions of liquidity in quote driven and order driven markets. He also investigated the impact of other elements in market design on liquidity. He concluded that liquidity is important for stock exchanges and trading systems in general. In competition with each other and with alternative trading systems, liquidity tends to be an important argument to attract order flow and listings. Moreover, liquidity exhibits an externality: liquid markets tend to attract even more liquidity. He concluded that liquidity is important for the stability of the financial system.

2.1.5 Effects on Bond market liquidity

Stock market liquidity is also seen to have a spillover effect on liquidity in the bond market as studied in (Goyenko & Ukhov, 2009). This paper established liquidity linkage between stock and Treasury bond markets. It analyzes the joint dynamics of stock and Treasury bond market illiquidity over a long time span (July 1962 to December 2003) and finds that stock and Treasury bond markets are linked not only via volatility but via illiquidity as well. The study concludes that there is a lead-lag relationship between illiquidity of the two markets and bidirectional Granger causality. The effect of stock illiquidity on bond illiquidity is consistent with flight-to-quality or flight-to-liquidity episodes. According to the study positive shock to stock illiquidity decreases bond illiquidity, which is consistent with flight-to-quality or flight-to-liquidity episodes. In contrast, positive shock to bond illiquidity increases stock illiquidity. Illiquidity conditions in the two major markets affect each other. They measure liquidity in the stock market using (Amihud, 2002) illiquidity measure and in the Treasury market with relative quoted spreads. The paper concludes that though the stock and bond market illiquidity share many similarities, they have different economic natures. Bond illiquidity is quick to capture the effect of monetary policy variables, while this effect may take longer for stock illiquidity. This is because that monetary policy shocks are reflected in bond illiquidity and then channeled into the equity market via the effect of bond illiquidity on stock illiquidity. The study also concludes that illiquidity of short-term bonds is more

sensitive to monetary policy shocks and has a stronger effect on stock market illiquidity compared to medium- and long-term bonds. Therefore, in an informational sense, the illiquidity of short-term bonds plays a significant role in cross-market dynamics.

2.1.6 Economic growth

(Abdul-Khaliq, 2013) studied the impact of stock market liquidity on economic growth in Jordan. He identified the position of stock market liquidity at Amman Stock Exchange (ASE) during the period from 1991 to 2011. For measurements of liquidity at ASE he used measuring tools such as; market capitalization to GDP and the turnover ratio. Also, in the paper he tested the relationship between market capitalization to GDP and the turnover ratio and the economic growth represented by the growth rate of GDP. The model adopted for testing the relationship is the simple linear regression model. He found that market capitalization to GDP doesn't exert significant effect upon the economic growth but the turnover ratio has significant effect upon the economic growth. He suggests that the government should promote stock market liquidity to help increase economic growth. The paper doesn't mention factors that affect liquidity or why some stocks are liquid and others are not. The paper only provides on recommendation on improving liquidity in the stock market. The paper used a simplistic model of linear regression, which has various limitations that make it an ineffective model.

1.3. Measures of liquidity

Across the years different methods have been used to measure liquidity of securities. Some papers used a variety of methods to measure liquidity. (Gopalan, Kadan, & Pevzner, 2012) In their tests, their theoretical measure of stock liquidity is Kyle's (1985) lambda. However, they employed four other alternative measures of stock liquidity due to the unanimity of Kyle's literature on how to empirically measure liquidity. These four alternative

measures include use of the implicit bid ask spreads proposed by Roll (1984), effective bid ask spreads calculated from intraday data, the Pastor-Stambaugh (2003) measure and the illiquidity measure proposed by Amihud (2002).

A few examples of the measures of stock market liquidity that have been utilized through out the years are:

2.1.7 Bid Ask Spreads

The natural measure of liquidity has been the bid ask spread. Various authors have studied the bid ask spreads in various markets. In their model (Ho & Stoll, 1981) assumed a market with one monopolistic, passive specialist who sets bid and ask prices as a markup on true price; random arrival of buy and sell orders which is modeled by a Poisson process with arrival rates λ_a and λ_b ; number of orders is declining in markup; and that the specialist maximizes expected utility of final wealth. The markups on true price set to achieve the bid and ask prices depended on monopoly power of specialist, volatility of stock price, risk aversion, time horizon and inventory levels. The bid ask spread, which was calculated as by summing the mark up on both the bid and the ask prices, was found to be independent of the inventory level however the location of the midpoint of bid and ask quotes does depend on inventory level. In the Ho and Stoll model they concluded that trading affects future prices and change in inventory is negative of trade size. They showed no informational effects as buyer initiated transaction pushed price up and this effect was proportional to trade size. Trading did not affect true price hence no informational effects.

Another example of a study on bid ask spreads is (Roll, 1984). His paper presented a method for inferring the effective bid-ask spread directly from a time series of market prices. The method was cheap, as it required no data other than the prices themselves. It did, however, require two major assumptions: The asset was traded in an information efficient market and the

probability distribution of observed price changes was stationary (at least for short intervals of, say, two months). He found that first-order serial covariance in price changes is inversely related to the effective bid-ask spread. This implied that the spread could be inferred from the sequence of price changes simply by computing and transforming the serial covariance. After conducting a year-by-year cross-sectional regression of serial covariance on the log of size and the predicted strong negative relation was confirmed. The significance levels are high except for daily returns in one aberrant year. However, a sizeable difference was detected between spreads estimated from daily and weekly data. This implied informational inefficiency or else very short-term non-stationarity in expected returns thus undermining his two assumptions. Bid ask spreads however are only available for developed stock markets. It is not an effective measure for underdeveloped stock markets.

2.1.8 Kyle's lambda

(Kyle, 1985) took a different approach in calculating bid ask spreads from (Roll, 1984) and dropped the assumption of information efficiency. The model he used was a dynamic model of insider trading with sequential auctions structured to resemble a sequential equilibrium, which he used to examine the characteristics of a speculative market and the value of private information to an insider. He calculated the bid and ask prices by adding a mark up which was a function of trade size, information differences between traders and speculation among traders. His model demonstrated how the liquidity characteristics of an efficient, frictionless market can be derived from underlying information asymmetries in a dynamic trading environment which captures some relevant features of trading in organized exchanges. Kyle's lambda uses bid ask spreads which is only available in developed stock markets.

2.1.9 Pastor-Stambaugh measure

(Pastor & Stambaugh, 2003) investigated whether market liquidity is a state

variable important for asset pricing. He found that greater exposure to liquidity risk lead higher expected return for a security. The liquidity measure he employed was an estimate for each month using the daily model. The measure relied on the principle that order flow induces greater return reversals when liquidity is lower. The liquidity measure reflects return reversal after trading, the liquidity “cost” in terms of return reversal: The larger the volume, the larger the return reversal, and the larger the cost. The model is estimated each month for each stock (daily data). Market liquidity was measured by the average across stocks in each month. They found that their measure of liquidity was more negative for more illiquid stocks.

2.1.10 Amihud’s measure

One of the most common methods used to measure liquidity by recent scholars such as of a security is Amihud’s measure of liquidity. (Amihud, 2002) used a measure of illiquidity based on the idea that illiquidity is the relationship between the price change and the associated order flow or trading volume. The illiquidity measure he used was the average daily ratio of absolute stock returns to dollar volume. This ratio gives the absolute (percentage) price change per dollar of daily trading volume, or the daily price impact of the order flow. For each year y , the illiquidity measure of stock i is calculated as the average. His measure of illiquidity is easily obtained from daily stock data for long time series in most stock markets making it a comparable measure to be used across countries.

Another study that utilized Amihud’s measure of illiquidity was (Goyenko & Ukhov, 2009) while trying to find a link between the stock market and the bond market.

2.1.11 Latent liquidity measure

Another measure that was developed over the years is latent liquidity. (Mahanti, Nashikkar, Subrahmanyam, Chacko, & Mallik, 2008) used an

alternative measure of liquidity that focused on the accessibility of a security. This measure makes it possible to characterize liquidity of securities that rarely traded, as even if a security does not trade, it will be accessible to the market if investors who frequently trade hold it. However, the security will be less accessible if investors who trade less often hold it. The authors used the characteristic of the investors holding the security and defined a new measure of liquidity, latent liquidity. It is calculated as the weighted average of the turnover ratios of the investors holding the security (weighted by the value of their holdings). The strength of this new measure of liquidity was supported by the strong relationships that were found to exist in the relationships between latent liquidity and transaction costs as well as price effects of trades. In both relationships, latent liquidity exhibited strong predictive ability. They further investigated the relationships between latent liquidity measures for traded and non-traded bonds and found that latent liquidity is a measure suitable for both liquid as well as illiquid securities.

2.1.12 Other measures of stock market liquidity

Some papers have utilized simple measures of liquidity such as market capitalization and turnover ratio (Abdul-Khaliq, 2013)

3 METHODOLOGY

This chapter presents the methodology for this study. The focus of this study is to find out: (1) liquidity of stocks in the Nairobi Securities Exchange (2) the determinants of liquidity of the stocks.

3.1 Research Design

The research employs both a quantitative approach to answer the research questions.

3.2 Model Specification and Estimation

There are many indicators that measure different aspects of liquidity. One of the most comprehensive ways of measuring liquidity is the use of bid ask spreads. Liquidity in the Nairobi Securities Exchange cannot be measured by bid-ask spreads because there are no designated market makers or specialists who post bid ask quotes. Therefore, the paper shall make use of the other common measures of liquidity such as:

- Liquidity ratio: captures the notion that large amounts can be traded in a liquid stock without any significant changes in the stock price
- Trading Volume: Daily number of shares traded of a stock
- Turnover Ratio: The volume of stocks traded as a fraction of number of outstanding stocks.
- Market Capitalization: It is the market value of a company's outstanding shares.

The dependent variable chosen for the purpose of research is the liquidity ratio (LR), which captures the notion, that a large amount can be traded in a liquid stock without any significant changes in the stock price. The liquidity ratio calculates the average amount of capital that causes a movement in stock prices by 1%. Higher liquidity ratio implies greater market liquidity or depth (Amihud, Mendelson, & Lauterbach, 1997).

3.3 Definition and Measurement of Variables

The aim was to show whether there is influence of other liquidity variables in the LR and quantify the power of influence. The following study is using the method of multiple regression. For the dependent variable Y is used indicator of liquidity LR.

The measure of liquidity for this study shall be the liquidity ratio. It is calculated as:

$$LR_I = \frac{\sum_y V_{id}}{\sum_y |R_{id}|} = \frac{\sum_{n=1}^{N_t} p_n \cdot v_n}{\sum_y \left| \left(\frac{p_{id}}{p_{i(d-1)}} - 1 \right) \cdot 100 \right|}$$

For each stock it is calculated average daily price, p_{id} , which is compared with the price of the previous day, $p_{i(d-1)}$, in order to obtain the natural logarithm for each day. The sum of the total volume traded per day, V_{id} , is divided by the sum of the absolute daily price changes based on a period of one year to get the average amount of capital that is needed to cause increase or decrease price for 1%. Higher liquidity ratio implies greater market liquidity or depth. It is consistent with the definition of liquidity that this study adopted which was stated earlier as the ability to trade large quantities of a security at a low cost and without moving the price.

The aim was to show whether there is influence of other liquidity variables in the LR and quantify the power of influence. The study shall use panel data regression to do this. For the dependent variable Y is used indicator of liquidity LR. For independent liquidity variables are used: market capitalization (MCap) and volume of stocks traded (Vol).

- Market capitalization (MCap): Market capitalization is measured as the number of issued stocks, I_i multiplied by closing price, CP_i .

$$= I_i \times CP_i$$

- Volume traded:

$$= Vol_i$$

- Where Vol_i is the volume of stocks traded in stock i per given day

The regression equation shall be:

$$LR_{it} = \alpha + \beta_1 \sum_0^T MCap_{it} + \beta_2 \sum_0^T Vol_{it}$$

In determining the factors that cause a stock to be liquid, the study shall also run a multiple regression with the dependent variable being the liquidity ratio. The independent variables used shall be:

- Issued stocks (I_i): The total number of stocks that a company issued.
- Firm's performance which shall be measured using reported profits of a given firm
- Presence in Social Media: This shall be measured by activity in the social media platforms such as Facebook and Twitter.

The regression equation shall be:

$$Annual LR_i = \alpha + \beta_3 I_i + \beta_4 Performance + \beta_5 Socialmediapresence$$

3.4 Data Collection and Data Sample

The data will be collected from Nairobi Securities Exchange. It shall use data covering the period between 01/01/2014 and 31/12/2014. The research shall use daily data from all the listed stocks in Nairobi Securities Exchange. Firm's profits shall be collected from the financial statements of a firm.

4 DATA ANALYSIS AND FINDINGS

This chapter presents the results of the methodology described above as well as an analysis of the generated results.

4.1 Most liquid and least liquid stocks listed on the NSE

According to the liquidity measure used the top ten most liquid stocks were found to be (in descending order): Safaricom Ltd, Kenya Commercial Bank Ltd, East Africa Breweries Ltd, Equity Bank Ltd, The Cooperative Bank of Kenya Ltd, Diamond Trust Bank Kenya Ltd, Athi River Mining Cement Ltd, Centum Investment Co Ltd, Barclays Bank of Kenya Ltd, British American Tobacco Kenya Ltd and Nation Media group Ltd. The stocks of the mentioned companies all had a liquidity ratio above 15,000,000. This meant that all the above stocks would require capital amounting to over 15,000,000 KES to cause a 1% increase or decrease in price. Safaricom was found to be the most liquid of the listed stocks. It exhibited a liquidity ratio of 237,622,767. This can be interpreted as needing capital amounting to about 240,000,000 KES to cause 1% change in the price of its stocks. It was followed by KCB with a liquidity ratio of 149,071,667. The most liquid sectors were found to be the Banking and Telecommunication & Technology sector.

The least liquid stocks were found to be Rea Vipingo Plantations Ltd, CMC Holdings Ltd, Hutchings Biemer Ltd, A. Baumann & Co Ltd and Kenya Orchards Ltd. All the stocks mentioned had a liquidity ratio of zero, as their shares were not traded all year. Hutchings Biemer shares have not been traded since Feb 5, 2001 when CMA (The Capital Markets Authority) stopped the shares of the furniture firm from being traded due to non-compliance with continuing disclosure obligations. CMC Holdings was eventually delisted on Feb 11, 2015. The motor dealer's stock had been suspended since September 2011 when claims of fraud and bad governance erupted in the wake of a boardroom battle. The delisting followed the takeover of the company by a subsidiary of the United Arab Emirates' largest operating conglomerate, the Al Futtaim Group. Rea Vipingo is also set to

delist from the Nairobi Securities Exchange after REA Trading Ltd acquired a 94.6 per cent stake. Rea Trading had indicated that it wants to delist from the stock market to allow it to invest more in the sisal processor during the takeover bid. Other illiquid shares included: Marshalls (East Africa) Ltd, Express Kenya Ltd, Eveready East Africa Ltd, Olympia Capital Holdings Ltd and Eaagads Ltd Ord. The stocks of the mentioned companies all had liquidity ratios below 105,000. This implies that the stocks would require capital amounting to less than 105,000 KES to cause a 1% increase or decrease in the price of the particular stock. The most illiquid sector in the stock market was found to be the Agricultural sector.

4.2 Influence of other liquidity measures on liquidity ratio

The regression models were carried out using GRETL software. Only 60 of the companies were used as the rest were not listed through out the sample period. The results for the first regression model were as follows:

Model 1: Random-effects (GLS), using 720 observations

Included 60 cross-sectional units

Time-series length = 12

Dependent variable: liquidityratio

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	-1.6386e+06	1.83797e+06	-0.8915	0.3729	
marketcap	0.000334191	2.44447e-05	13.6713	<0.0001	***
monthlytradedv	0.52819	0.0360545	14.6498	<0.0001	***
olume					

Mean dependent var	14844171	S.D. dependent var	45519457
Sum squared resid	4.15e+17	S.E. of regression	24046061
Log-likelihood	-13257.38	Akaike criterion	26520.76
Schwarz criterion	26534.50	Hannan-Quinn	26526.07

'Within' variance = 4.27326e+14

'Between' variance = 1.58512e+14

theta used for quasi-demeaning = 0.526022

Breusch-Pagan test -

Null hypothesis: Variance of the unit-specific error = 0

Asymptotic test statistic: Chi-square(1) = 175.887

with p-value = 3.83355e-40

Hausman test -

Null hypothesis: GLS estimates are consistent

Asymptotic test statistic: Chi-square(2) = 39.9419

with p-value = 2.1219e-09

The hausman test is used to identify whether the fixed effects model or the random effects model is more the appropriate model to be used. The results suggest that a fixed effects model would be more appropriate as the p value is less than 0.05 thus we reject the null hypothesis

Model 1: Fixed-effects, using 720 observations

Included 60 cross-sectional units

Time-series length = 12

Dependent variable: liquidityratio

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	-2.72454e+0	4.51243e+06	-6.0379	<0.0001	***
	7				
marketcap	0.00103692	0.000123705	8.3822	<0.0001	***
monthlytradedv	0.62813	0.0389175	16.1400	<0.0001	***
olume					

Mean dependent var	14844171	S.D. dependent var	45519457
Sum squared resid	2.81e+17	S.E. of regression	20671860
LSDV R-squared	0.811261	Within R-squared	0.300209
LSDV F(61, 658)	46.36546	P-value(F)	1.7e-198
Log-likelihood	-13117.10	Akaike criterion	26358.21
Schwarz criterion	26642.12	Hannan-Quinn	26467.81
rho	0.039626	Durbin-Watson	1.767520

Joint test on named regressors -

Test statistic: $F(2, 658) = 141.14$

with p-value = $P(F(2, 658) > 141.14) = 9.87685e-52$

Test for differing group intercepts -

Null hypothesis: The groups have a common intercept

Test statistic: $F(59, 658) = 5.20559$

with p-value = $P(F(59, 658) > 5.20559) = 1.77644e-27$

The effects of both volume traded and market capitalization were found to be positive and significant under the 95% confidence interval. The volume traded was however found to have more influence on the study's measure of liquidity than market capitalization. Liquidity ratio can therefore be used as an appropriate measure of liquidity for the stocks listed in the NSE as it moves in the same direction as simpler liquidity measures as well as measuring the amount of capital needed to cause a 1% change in the price of a given stock.

4.3 Factors affecting liquidity of a stock

In the second regression, only 56 of the stocks were used in the regression due to unavailability of data. The results of the second model were as below:

Model 1: OLS, using observations 1-56

Dependent variable: AnnualLR

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	-1.73947e+0	4.52804e+06	-0.3842	0.7024	
	6				
socialmediaprese nce	1.55047e+07	6.34063e+06	2.4453	0.0179	**
Numberofissued Stocks	0.00545455	0.000613399	8.8923	<0.0001	***
Performance	0.000446733	0.000291249	1.5339	0.1311	
Mean dependent var	15902563	S.D. dependent var	40389867		
Sum squared resid	2.78e+16	S.E. of regression	23133755		
R-squared	0.689838	Adjusted R-squared	0.671944		
F(3, 52)	38.55151	P-value(F)	2.95e-13		
Log-likelihood	-1026.967	Akaike criterion	2061.933		
Schwarz criterion	2070.034	Hannan-Quinn	2065.074		

Test for omission of variables -

Null hypothesis: parameters are zero for the variables

Performance

Test statistic: $F(1, 52) = 2.35271$

with p-value = $P(F(1, 52) > 2.35271) = 0.131128$

Number of issued stocks and social media presence were found to have a positive and significant impact on liquidity under the 95% confidence interval. However, performance as found to have a positive yet insignificant

effect on liquidity. This differs with (Fang, Noe, & Sheri, 2009) findings. Number of issued stocks was found to have the highest effect on liquidity as it had the highest beta coefficient. A unit increase in the number of issued shares could lead to a 0.00545 increase in the liquidity of a share.

5 CONCLUSION AND RECOMMENDATION

5.1 RECOMMENDATIONS

From the findings of this study, I would recommend that the firm's with the most illiquid stocks consider issuing more stocks through a rights issue or awarding bonus stocks to current shareholder's in order to increase the stocks liquidity. The firm's should also consider improving their presence on social media either by starting a blog for the firm, setting up social media accounts on platforms such as Facebook, Twitter or Instagram.

5.2 CONCLUSION

The study found that the most liquid stocks listed on the NSE were Safaricom Ltd, Kenya Commercial Bank and East Africa Brewewries Ltd. The least liquid of the listed stocks in 2014 were Rea Vipingo Plantations Ltd, CMC Holdings Ltd, Hutchings Biemer Ltd, A. Baumann & Co Ltd and Kenya Orchards Ltd

According to the results of the study large companies as measured by market capitalization are more liquid than companies with lower market capitalization; the statement is confirmed by the panel data regression between the independent variable (market capitalization) and the dependent variable (LR).It was also found that the more a stock was traded the more liquid the stock was.

The study also found that liquid stocks tend to have a high number of issued stocks and high presence in the social media scene. Illiquid stocks on the other hand were found to have a low number of issued stocks and low presence or no presence at all in the social media scene. The effect of performance, number of material announcements and investor holding on liquidity of a stock were however found to be insignificant.

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APPENDIX

Appendix 1: Liquidity Ratios of the most liquid listed firm's

Company	Annual LR
Safaricom	237622767.9
KCB	149071667.8
EABL	103287064
Coop Bank	96341749.18
Equity	31976672.55
ARM	29159073.21
Centum	22780954.32
Barclays	22753011.89
BAT	21506322.3
Nation Media	18866457.92

Appendix 2: Liquidity Ratios of the least liquid firms listed on the NSE

Company	Annual LR
Rea vipingo	0
CMC	0
Hutchings Biemer	0
A.Baumann	0
Kenya Orchads	4480.7995
Marshalls	17597.68331
Express Ltd	24861.28003
Eveready	76760.32542
Olympia	81755.37199
Eaagad	101992.2552