RELATIONSHIP BETWEEN ILLIQUIDITY AND STOCK RETURNS OF COMPANIES LISTED ATTHE NAIROBI SECURITIES EXCHANGE

BY

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DECLARATION

This research project is my original work and has not been submitted for the award of a degree at the University of Nairobi or any other university.

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This researchproject has been submitted for the examination with my approval as the candidate's Supervisor;

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DEDICATION

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ABBREVIATIONS

AMEX – American Stock Exchange

APT – ArbitragePricing Theory

ATS - Automated Trading Systems

CAPM – CapitalAsset Pricing Model

CMA - Capital Markets Authority

DASS - Delivery and Settlement System

FISD - Financial Information Services Division

HPY - Holding Periods Yield

ILLIQ - Illiquidity Measure

LIQ- Liquidity Measure

LVW - Lori Van Dusen

NSE - Nairobi Securities Exchange formally Nairobi Stock Exchange

NYSE - New York Stock Exchange

OLS - Ordinary Least Square

OTC - Over the Counter Markets

SIIA - Software and Information Industry Association

US$ - United States Dollar/s

ABSTRACT

The objective of this study was to determine the relationship between illiquidity and stock returns of companies listed at the Nairobi Securities Exchange. The research design was descriptive using two proxies to Illiquidity, the return to volume ratio which was proposed by Amihud (2002) and reversal measure of illiquidity advocated by Pastor and Stambaugh (2003), in a cross-sectional framework of Fama and Macbeth (1973), the study was undertaken to ascertain the nature of this relationship at the NSE for a5 year period 2009- 2013.The data was obtained from the Nairobi Securities exchange in a daily format, which was then converted to a monthly format to fit with the research design, the Sample comprised of portfolios created from stocks that were continuously traded during this period. The Illiquid test carried out using the two proxies to illiquidity showed significantly high Illiquidity for portfolios that had stocks whose characteristics had either fewer deals at the exchange, lowest volume, or lowest turnover respectively. Portfolio of stocks which bore high trade deals, high volume and highest turnover had low illiquidity.Illiquidity portfolio return relationship was established using the three variables, volume, illiquidity and market premium. Test of the Fama and Macbeth (1973) models significance, F-test, revealed a p-value well below 0.5% for a 99% confidence interval, showing strong significance level for all the 30 portfolios. This was an indicator that illiquidity positively affects stock returns at the Nairobi Securities Exchange, a relationship such that higher illiquidity would translate to above the market returns. This is consistent with major study findings that, since illiquidity is persistent, illiquidity predicts future returns and illiquidity co-moves with contemporaneous returns, this is as positive shock to illiquidity predicts high future illiquidity

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

The nature of stock illiquidity or liquidity thereof has prompted vast amount of research and is still a challenging issue in finance, due to the many facets of liquidity. Literature on liquidity as a systematic risk factor that can help explain the nature of stock returns has evolved in the recent years with major studies focused on the developed markets were the issue was first recognized as a contributing factor to stock returns: Amihud and Mendelson (1986); Datar, Naik, and Radcliffe (1998), just to mention a few.

Kim, Farmer and Lo (2007) identified two facets of liquidity: execution time and probability of execution of limit orders; and price impact of market orders. Amihud, Mandelson and Perdesen (2005)argue that, liquidity has many facets, and that a major problem in estimating the effect of liquidity on asset returns is how to measure liquidity since there is hardly any single measures used that captures all its aspects.

How returns at the Nairobi Security Exchange fairs on with its current illiquidity, and liquidity conditions in meeting different stock investor objectives, in line with similar investor objectives in well establish exchanges becomes of interest to most equity analysts and investors, and is a motivating factor that has lead to this study. Note that in this study Liquidity and Illiquidity will be used interchangeably but with specific reference, since both measure the same factor but from different ends of liquidity-illiquidity spectrum.

1.1.1 Stock Illiquidity

Liquidity refers to the ease by which an asset can be sold immediately after purchase without lowering the price and without incurring transaction cost (Dalgaard, 2009). Liquidity is a broad and elusive concept that generally denotes the ability to trade large quantities quickly, at low cost, and without moving the price (Pastor and Stambaugh, 2003). Illiquidity is the converse of liquidity as per the definitions above, and the main source of illiquidity normally are:exogenous transaction costs, which include brokerage fees, stocks buy or sell order processing cost, transaction taxes and the likes;Demand pressure and inventory risk, which is caused by the availability of buying and selling agents on demand;Information Asymmetry or Private information, these are material information about the fundamentals of a company or order flow;Search friction, these are opportunity costs linked to the difficulty of locating a counterparty, this is particularly relevant in the over the counter (OTC) markets(Amihud et al, 2005).Illiquidity in this context refers to the degree of friction in a given exchange market, where there is a measurable extent of cost of exchange, agents price distortion and movements.

Illiquidity has wide ranging effects on financial markets,in a look at its converse, liquidity can explain cross-section of assets with different liquidity, after controlling for other assets characteristics such as risk, and time series relationship between liquidity and security return. Liquidity explains why certain hard-to-trade securities are relatively cheap, the pricing of stock and corporate bonds, the return on hedge funds, and the valuation of closed-end funds. It follows that liquidity can help explain a number of

puzzles, such as why equities commanding high required returns (the equity premium puzzle), why liquid risk-free treasuries have low required returns (the risk-free rate puzzle), and why small stocks that are typically illiquid earn high returns (the small firm effect) (Amihud et al, 2005).

Illiquidity can be measure by measuring the sources of elements of illiquidity,as mentioned above, the Exogenous Transaction Costs, Demand Pressure and Inventory risk, Information Asymmetry or Private information, Search friction. Noting thatspecifically the cost of illiquidity can be measured in the following ways: Trading volume, which measures volumes, traded in a given day. Its advantage is that it is simple and available. It's down side is in the volumes-volatility relation, as volatility can impede market liquidity; Trading frequency, which measures the number of trades executed within a specific interval, without regards to size. But it too can be associated with; using the bid – ask spread, which is the difference between bid price (stocks sales price) and ask price (stocks purchase price), measures the cost of executing a small trade; Quote size, which is the quantity of securities tradable at the bid and offer prices, it accounts for the market depth and complements the bid-ask spread; Trade size, which is the quantities of securities traded at bid and offer prices, reflecting any negotiation over quantity. It's an alternative depth measure; Price impact coefficient,considers the rise and fall in prices that typically occurs with a buyer initiated or a seller initiated trade (Pastor and Stambaugh, 2003).

1.1.2 Stock Returns

Investors invest to earn returns from savings due to their differed consumption (Reilly and Brown, 2012). One can then deduce from this that a return is a compensation an investor receives for the period of investment in which they are exposed to expected inflation and uncertainty of future cash flow. Stock returns are the returns that the investors generate out of the stock market either in the form of profits through trading or from dividends given by the company to its shareholders from time to time. Stock returns are not fixed ensured returns, and are subjected to market risk, they are not homogeneous and may change from investor to investor depending on the amount of risk one is prepared to take and the quality of his stock market analysis.

Most investors require higher rates of return on investment if they perceive there is any uncertainty about the expected rate of return. This increase in the required rate of return over the nominal risk-free rate is the risk premium. Most prominent sources of this uncertainty are: business risk; financial risk (leverage); liquidity risk; exchange rate risk and country (political) risk (Reilly and Brown, 2012). The uncertainty of how fast an investment can be bought or sold,or the existence of uncertainty about its price, increases liquidity risk. Liquidity risk can be a significant consideration when investing in foreign securities depending on the country and the liquidity of its stock and bond markets (Reilly and Brown, 2012).

Returns are measured in two ways, the historical rate of return and the expected rate of return, this paper depends on the use of the first measure. The historical rate of return is the return on an investment over the time period the investment is held (the holding

period) (Reilly and Brown, 2012). The holding period return as a percentage term in annual basis and is a measure referred to as the holding periods yield (HPY). For a portfolio of investment, the mean historical rate of return (HPY) for a portfolio of investments is measured as the average of the HPYs for the individual investmentsin the portfolio

1.1.3 Relationship betweenIlliquidity and Stock Returns

If Illiquidity affects asset prices, it stands that changes in liquidity should change asset prices (ceteris paribus). This hypothesis was examined by Amihud et al. (1990). Liquidity asset pricing theory implies that, a downward revision in liquidity should cause a decline in stock price. Further, theoretically expected returns are an increasing function of illiquidity cost, and that their relationship is concave due to the clientele effect.

Empirically, studies that investigate the relationship between Illiquidity/liquidity and asset prices include Amihud and Mendelson (1986), Brennan and Subrahmanyan (1996), Datar, Naik, and Radcliffe (1998), Brennan, Chordia, and Subrahmanyan (1998), Fiori (2000), Chan and Faff (2005), Acharya and Pedersen (2005), among others using a variety of liquidity measures, these studies generally find that less liquid stocks have a higher average returns (Pastor and Stambaugh, 2003). Chordia et al. (2001) found a significance cross-sectional relation between stock returns and the variability of liquidity (Pastor and Stambaugh, 2003).In Kenya Njiinu (2007) found significant changes in liquidity in the NSE for the period under study, Gacheru (2007)findings revealed that, there was no significant association between the trading volume and security market

prices at the NSE. Koech (2012)concluded that there was a non-liner relationship between liquidity and returns of listed firms in the NSE.

1.1.4 Nairobi Securities Exchange

In 1951, an Estate Agent by the name of Francis Drummond established the first professional stock broking firm. In 1954 the Nairobi Stock Exchange was then constituted as a voluntary association of stockbrokers registered under the Societies Act. In July 1994 a computerized delivery and settlement system (DASS) came into effect. In September 2006 live trading on the automated trading systems (ATS) of the Nairobi Stock Exchange was implementedtrading hours increased to three hours (10:00 am – 1:00 pm). In February 2007 NSE upgraded its website to enhance easy and faster access of accurate, factual and timely trading information. In July 2011, the Nairobi Stock Exchange Limited changed its name to the Nairobi Securities Exchange Limited. The change of name reflected the strategic plan of the Nairobi Securities Exchange to evolve into a full service securities exchange which supports trading, clearing and settlement of equities, debt, derivatives and other associated instruments. In March 2012, the Nairobi Securities Exchange became a member of the Financial Information Services Division (FISD) of the Software and Information Industry Association (SIIA). (2014, July 15) https://www.nse.co.ke/about-nse/history-of-organisation.html

The Nairobi Securities Exchange is licensed and regulated by the Capital Markets Authority (CMA). It has the mandate of providing a trading platform for listed securities and overseeing its Member Firms.The Capital Markets Authority is the Government Regulator charged with licensing and regulating the capital markets in Kenya. It also

approves public offers and listings of securities traded at the Nairobi Securities Exchange.The Central Depository and Settlement Corporation provides clearing, delivery and settlement services for securities traded at the Nairobi Stock Exchange. It oversees the conduct of Central Depository Agents comprised of stockbrokers and investments banks which are members of NSE and Custodians. Nairobi Security exchange (2014, July 15) https://www.nse.co.ke/regulatory-framework.html

The volume traded in the NSE has increased as at the 20th January 2012, volume of US$ 1,164,034 was traded and at the 6th July 2013, a volume of US$ 4,323,391 was traded a 271% change(LVW advisors. Aug 2013)

Studies of stock returns at the NSE has had a mix and enriching information source, including the following: There was no significant association between trading volume and security market prices at the NSE, this study however indicated that large capitalization portfolio of securities exhibited high price-to-volume correlation as opposed to small capitalization portfolio of stocks (Gacheru, 2007); Volatility of stocks return in Kenya listed companies' increase around general elections (Lusinde, 2012); the returns of companies quoted at the NSE are determined byfactors other than size and ratio of book to market value (Oliech, 2002); there is a non-liner relationship between liquidity and the returns of listed firms at the Nairobi Securities Exchange (Koech, 2012).

1.2 Research Problem

A security's required return depends on its expected liquidity as well as on the covariances of its own return and liquidity with the market return and liquidity. In addition, a persistent negative shock to a security's liquidity results in low

contemporaneous returns and high predicted future returns (Acharya and Pedersen, 2005). Studies as to whether expected returns are related to the level of liquidity reveal that illiquid stocks have higher average returns.

As noted in the last section research on NSE illiquidity/liquidity has had a mix of results, from works that find no significant association between trading volume and security market prices at the NSE, while at the same time security prices of high price to volume correlation for large capitalization as opposed to small capitalization portfolios (Njiinu, 2007).

Further in the Kenyan context, Songole (2012) studied the relationship between selected macroeconomic variables and stock return in the NSE, Lusinde (2012) in his paper volatility in stock returns of NSE listed companies around general elections in Kenya studied the cyclic behavior of stock returns around election period, Koech(2012) in his paper looked at the relationship between Liquidity and return of stocks at the Nairobi securities exchange, based on the correlation of 57 listed firms in the NSE, during the period between 2007 to 2011, using turnover rate as a proxy to liquidity, Wanjiru (2013) in his paper looked at the relationship between liquidity and cross listing of shares cross listed in the East Africa Security exchanges. This study seeks to ascertain the following questions:Is liquidity incorporated on stock prices at the NSE? And if so, is the relationship between liquidity and stock returns at the NSE convex?

1.3 Research Objective

Todetermining the relationship between illiquidity and stock returns of companies listed at the Nairobi Securities Exchange.

1.4 Value of this Study

To the world of finance, this study will extend and apply the knowledge of the relationship between liquidity and returns by testing this relationship in the Nairobi securities exchange. The findings are expected to further contribute to the understanding of frontier market liquidity and aid in investment strategies that relate to the Nairobi Securities Exchange.

To the Nairobi Securities Exchange, this study will enhance the understanding of liquidity of companies listed at the exchange, increasing the knowledge of the nature of the exchange to current and potential investors.

To portfolio managers, the study will enhance the understanding of the liquidity nature of stocks at the Nairobi Securities Exchange, improving on their investment strategies with the aim of outperforming the returns of Nairobi Securities Exchange related benchmarks.

To foreign investors, this study will provide the much needed information on the liquidity of stocks at the Nairobi Securities Exchange,in relation to including or extending their portfolio exposure to include NSE stocks for diversification purposes.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Thischapter highlights major theories and seeks to evaluate previous studies in relation to Illiquidity or liquidity and asset returns:Section 2.2Presents theoretical review of liquidity and asset returns; Sections 2.3Presents determinants of stock returns; Section 2.4Presents a review of selected major studies on liquidity in relation to asset returns and ends with review oflocal studies that have captured aspects of liquidity, asset returns or both.The review presents objective, methodology findings and implications of these studies;Section 2.5 Containsa summary of the literature review.

2.2 Theoretical Review

Studies of Market Microstructure have looked at the processes and outcome of exchanging assets under explicit trading rules, such studies test the Efficient Market Hypothesis. Some important theories that relate stock return to liquidity are: The Bid-ask spread theory; The Classic Stock Pricing Theory; The Capital Asset Pricing Theory; Arbitrage Pricing Theory;The Clientele Effect; and The Trading Volume Theory to mention a few.

2.2.1 The Bid-Ask Spread Theory

Bid-ask spread theory by Thomas, Copeland and Galai (1983), theories that an individual who chooses to serve as a market-maker is assumed to optimize his position by setting a bid-ask spread which maximizes the difference between expected revenues received from liquidity-motivated traders and expected losses to information-motivated traders. By

characterizing the cost of supplying quotes, as writing a put and a call option to an information-motivated trader, it is shown that the bid-ask spread is a positive function of the price level and return variance, a negative function of measures of market activity, depth, and continuity, and negatively correlated with the degree of competition.

2.2.2 The Classic Stock Pricing Theory

The classic stock pricing theory states that the basic Idea behind the dividend based stock valuation is that the value of a stock is the present value of all future dividends (Williams, 1938). In the financial markets therefore, the maximum price that investors are willing to pay for a financial asset is actually the current value of future cash payments that are discounted at a higher rate to compensate for the uncertainty in the cash flow projections.

2.2.3 The Capital Asset Pricing Theory

The Capital Asset Pricing Model (CAPM) was introduced by Treynor (1961, 1962), Sharpe (1964), Lintner (1965) and Mossin (1966) independently building on the work of Markowits. Itpostulates that the variation in stock returns is solely determined by the market beta. (CAPM) for general equilibrium relationship in capital markets captures the return of an asset as directly equal to the risk free rate and market risk factor, beta, multiplied by the risk premium:$R_i = R_F + \beta_i(R_M - R_F)$, where R_i is the return on asset, R_F is the risk free rate, R_M is the market risk factor and β_i is the beta of asset *i*, also known as the sensitivity of asset i to systematic risk. This model is a realization of the efficient frontier.

2.2.4 Arbitrage Pricing Theory

Arbitrage pricing theory (APT), proposed by Stephen Ross (1976), holds that the expected return of a financial asset can be modeled as a linear function of various macro-economic factors or theoretical market indices, where sensitivity to changes in each factor is represented by a factor-specific beta coefficient. $R_i = R_F + \beta_1(F_1) + \beta_2(F_2) + \cdots \beta_n(F_n) + \in_i$, Where $R_i$is the return on asset, $R_F$is the risk free interest rate, β_n is the sensitivity of the stock to each factor, F_n the risk premium associated with each entity and $\in_i$is the risky asset's idiosyncratic random shock with mean zero. The implications of this model is that the expected return of an asset, is the linear function of the assets sensitivity to the factors associated with it.

2.2.5 The Clientele Effect

Advanced by Pettit (1977), the clientele effect is the idea that the set of investors attracted to a particular kind of security will affect the price of the security when policies or circumstances change.Investor preference to stocks of companies of specific dividend policies, thus, companies with high dividends will attract investors with low marginal tax rates and strong desires for current income, conversely, companies with low dividends will attract investors with high marginal tax rates and little need for current income. That is securities with higher transaction cost are allocated to agents with longer (or identical) investment horizon. If a company changes its dividend policy substantially, investors will adjust their stock holdings accordingly, the company is said to be subject to a clientele. When investors face different dividend and capital gains tax rates, they have different after-tax valuations for the same asset. Miller and Modigliani hypothesize that

such difference lead to the formation of what they termed “dividend clienteles,” in which investors have tax-based preferences over equities that differ only in their dividend policies (Miller and Modigliani 1961).Clientele Effect can create a sudden source of market liquidity.

2.2.6 The Trading Volume Theory

A theory of trading volume by Karpoff (1986)is developed on assumption that market agents frequently revise their demand price and randomly encounter potential trading partners. Karpoff in this theory came up with the positive relationship between volume and the magnitude of price change, his model describes two distinct ways informational events affect trading volume. One is consistent with conjectures made by empirical researchers that investor disagreement leads to increased trading. But the observation of abnormal trading volume does not necessarily imply disagreement, and volumes can increase even if investors interpret the information identically, if they have also had divergent prior expectation. Simulation test support the model and are used to contrast random pairing environment with costless market clearing. Volume is lower in the costly market, and volume increases caused by an informational event period, this is consistent with existing empirical evidence and suggest that markets do not immediately clear all orders or that investors have demands to re-contract (Karpoff, 1986).

2.3 Determinant of Stock Returns

Stock Market returns are the returns that the investors generate out of the stock market either in the form of profits through trading or from dividends given by the company to its shareholders from time to time. Therefore determinants of the stock returns are factors

whose nature, or changes in their nature directly or by proxy affect the returns or expected returns of stock, the main determinants of stock returns are as follows:

2.3.1 Risk Free Rate

Risk free rate $R_F$is the theoretical rate of return of an investment with zero risk. The risk-free rate represents the interest an investor would expect from an absolutely risk-free investment (such as Treasury bills, money market fund, or the bank) over a specified period of time. Another interpretation is that the risk free rate is the compensation that would be demanded by a representative investor holding a representative market portfolio, comprising all the assets in the economy.

2.3.2 Market Return

Market Return R_M in Markowitz Portfolio theory is the return on a theoretical portfolio of all assets in the world where the portfolio is weighted for value, taking care of all systematic risks; Stock Beta β_i the beta of asset, also known as the sensitivity of asset to systematic risk measures the risk arising from exposure to general market movements as opposed to idiosyncratic factors. Market Beta β_M The market portfolio of all investable assets has a beta of exactly one. In this research liquidity risk is beta specific to the asset return

2.3.3 Risk Premium

Risk Premiumthis is the difference between the risk free rate and the market risk, it is the minimum amount of money by which the expected return on a risky asset must exceed the known return on a risk-free asset, or the expected return on a less risky asset, in order

to induce an individual to hold the risky asset rather than the risk-free asset

2.3.4 Illiquidity

Illiquidity is a risk factor in determining returns. Risk factors are all the factors that contribute to a given degree to the stocks returns, their effect are beta specific. The main risk factors in determining stock returns are business risk, financial risk (leverage), liquidity (Illiquidity) risk, exchange rate risk, and country (political risk) (Reilly and Brown, 2013).

In this paper all the other risk factors are held constant other than liquidity (Illiquidity) risk. Illiquidity is determined by and comprises several dimensions: Spread, in a quote driven market, the bid-ask spread is obviously determined by the bid and ask prices that are set by the dealer; Price and depth,Kavajecz and Odders-White (2001) find that dealers revise their prices and depth in response to different events. Depths are revised in response to transaction of any size, while prices are revised only when transaction size exceeds quoted depth; Resiliency how fast prices revert to former levels after they changed in response to large order flow imbalances initiated by uninformed traders; Immediacy, trading costs and prices obtained can be considered as one dimension of the execution quality of orders, another dimension is the speed of execution(Wuyts, 2007).

2.4 Review of Empirical Studies

Asset pricing and the bid-ask spread, the relationship between liquidity (Illiquidity) and asset returns or prices was first studied by Amihud and Mandelson (1986), resulting in two major predictions that, Expected returns is an increasing function of illiquidity cost,

and that their relationship is concave due to the clientele effect. Using the methodology of Fama and MacBeth (1973) to test the hypotheses, in estimating the cross-sectional relationship between return, market risk and spread for portfolios of stocks, with the cross-sectional analysis carried out on portfolios of stocks rather than individual stocks.They found a positive slope coefficient of the spreads and generally decreasing in the spread. This meant that the results implied that there is an increasing and concave connection between returns and spreads.

Brennan and Subrahmanyam (1996), study on market microstructure and asset pricing, more specifically investigated the compensation of illiquidity on stocks returns.Models of price information in security markets suggest that privately informed investors create significant illiquidity cost for uninformed investors, which implied that the required rates of return should be higher for securities that are relatively illiquid,theyused intraday data and the methods of Glosten and Harris (1988) and Hasbrouk (1991) to decompose estimated trading cost into variable and fixed components. The basic data consisting of the monthly returns on portfolios sorted by the estimated Kyle (inverse) measure of market depth and the firm size for the period 1984-1991. Their findingswere that there was a significant return premium associated with both the fixed and varied elements of the cost transaction. The relation between premium and the variable cost was concave, which was consistent with the clientele effect. There was no evidence of seasonality in the premiums associated with cost of transaction variables. Finally, their finding that controlling from the firm size, there appeared to be a negative relation between variables and fixed cost of transacting.

Datar, Naik and Radcliffe (1998), studiedLiquidity and stock returns with an alternative test, theytested the role of liquidity in stock pricing using the turnover rate as a new proxy for liquidity, given by the number of shares traded as a fraction of the number of shares out-standing. They basically applied the same methodological framework as Amihud and Mendelson (1986) but with the addition of the book-to-market ratio of the stocks. An important difference between this study and most other empirical studies of stock returns is that the analysis was based on of individual stocks rather than portfolios of stocks. The econometrical framework was the Litzenberger and Ramaswamy (1979) refinement of the Fama and Macbeth methodology. First of all, they found that there is a significantly negative relationship between liquidity and stock returns. They also provided evidence of the effect of the turn-over rate on stock returns as robust to the presence of the control variables the natural log of firm size (market value of equity) and book-to-market value. Their findings implied that, across stocks, a 1% decrease in the in the turnover rate would result in a higher return of 4.5bp

Amihud's (2002) ILLIQ-measure, Showed that over time, expected market liquidity positively affects ex ante stock expected returns, suggesting that expected stock returns partly represented an illiquidity premium, this complements the cross-sectional positive return-illiquidity relationship. Also, stock returns are negatively related over time to contemporaneous unexpected liquidity.The measure of illiquidity employed in this study is ILLIQ, the ratio of a stock absolute daily return to its daily dollar volume, average over some period.

Taking departure in the Fama and French (1993) three-factor model, Chan and Faff (2005) investigated the role of liquidity in stock pricing by adding the return on a

mimicking liquidity portfolio to the model. Liquidity proxywas by the share turnover rate. Chan and Faff tested the four-factor model for over-identifying restrictions and rejectedit, their findings support for adding a liquidity factor to the Fama and French (1993) three-factor model. Just as the approach of Amihud and Mendelson (1986), the dependent variables of their analysis were excess returns of portfolios of stocks rather than individual stocks. Their portfolios are based on size, book-to-market and liquidity. The independent/explanatory variables in their study were mimicking portfolios. This approach is known from the influential study of Fama and French (1992).Following a mimicking portfolio approach means to form different kinds of portfolios to replicate effects of different factors that could explain returns. This idea followed the no-arbitrage arguments - the returns of risky investments would be possible to replicate by investing in assets that as a whole had the same expected future cash flows. The mimicking portfolios for size and book-to-market were formed in the exact same way as Fama and French (1993). Findings, the majority of the liquidity betas estimated were statistically significant, meaning that the share turnover seemed to have an effect on stock returns. In addition to this, they found that there was a tendency towards less liquid stock portfolios having significantly positive liquidity betas and the more liquid stock portfolios had significantly negative liquidity betas. The main result of their study was that they found support for adding the liquidity factor to the Fama and French (1993) model. Their findings provide strong evidence of the pricing of liquidity in the Australian equity market.

Archarya and Pedersen's (2005) liquidity-adjusted CAPM, basically followed from this model that the expected return on a stock depends on their expected liquidity, the

covariance between stocks own return and market liquidity, the covariance between stocks own liquidity and market liquidity, and the covariance between stocks own liquidity and market returns. This model enabled the possibility of understanding the different sources of liquidity risk and their effect on stock returns. Using Amihud's (2002) ILLIQ-measure, they conducted an empirical test of this model. The data sample for the study consisted of daily return and volume data for all common stocks listed on the NYSE and AMEX for the period from July 1962 to through 1999. Their findings regarding the liquidity risk was that relatively illiquid stocks generally had high volatility of returns, low turnover, a low market value of the equity and, most importantly, a high liquidity risk. This was an indication of the "flight-to-liquidity" phenomenon. Through the cross-sectional tests they found strong and robust evidence of a pricing of both the level of liquidity and the liquidity risk.

Pastor and Stambaugh (2003), investigated whether expected returns are related to systematic risk in returns, as opposed to level of liquidity.They found that stocks' "liquidity betas," their sensitivity to innovations in aggregate liquidity, played a significant role in asset pricing. Stocks with higher liquidity beta exhibited higher expected returns.

Njiinu (2007)studied Liquidity in the emerging markets,a study which was to assess the changes in liquidity at the NSE during the period between January 2000 and December 2005, the specific objectives were; to determine the liquidity status of the NSE during that period; and to determine if there was any significant change in liquidity over the period. Using three models to study liquidity in the NSE, these were: liquidity Ratio 1;

liquidity Ratio 2; and the flow ratio. The findings were that there had been significant change in liquidity as proxied by both liquidity ratio 2 and the flow rate.

Gacheru(2007) in his paper on trading volume behavior and its effect on stock price movements at the NSE did a study on the relationship between trading volume and stock price movement at the NSE. His research was conducted on 20 securities for the companies that constituted the NSE 20 share index that remained listed at the NSE and traded over 5 year period. The study used the T-test, F-test, and correlation coefficient to determine whether there was a relationship and the degree of association between trading volume and stock price movements. His findings revealed that, there was no significant association between the trading volume and security market prices at the NSE. The study also indicated that large capitalization portfolios of securities exhibited higher price to volume correlation as opposed to small capitalization portfolioof stocks constituting the NSE share index. Statistical tests performed also indicated that this association was not significant enough to imply that any stock market inefficiencies are as a result of stock illiquidity and/or excess liquidity. However, correlation coefficients reveal that the association has been strengthening over the years. Which he concluded that could be explained by the exponential business activity at the NSE and increased demand for shares may be exerting pressure on stock prices.

Koech(2012) in his paper looked at the relationship between Liquidity and return of stocks at the Nairobi securities exchange. His research design was corellational and the turnover rate was used as proxy to liquidity. The correlation coefficient ‘r’ value for liquidity and returns of stock was found to be small, which showed that there was very week correlation between liquidity and stock return of firms listed at the NSE. He

concludes that there was a non-liner relationship between liquidity and returns of listed firms in the NSE.

2.5 Summary of Literature Review

Findings that illiquid stocks have higher average returns are prominent among the above studies.Since liquidity is persistent, liquidity predicts future returns and liquidity co-moves with contemporaneous returns, this is because a positive shock to illiquidity predicts high future illiquidity, which raises the required return and lowers contemporaneous prices, this may help explain the empirical findings of Amihud et al. (1990), Amihud (2002), Chordia et al. (2001a), Jones (2001), and Pastor and Stambaugh(2003) in the U.S. stock market, (Archarya and Pedersen 2005).Most study findingsare that the higher the illiquidity the higher the returns, conversely high liquidity aresynonymous with low stock returns.

On the other hand Koech (2012) found a very week correlation between liquidity and return of stocks listed at the NSE, which was a contrary result, this was most likely as a result of the methodology he used in his research, to note research papers on liquidly-return develop a relationship argument from research methodology specific to this relation. Koech (2012) further stated the need of using a different research methodology to determine if his findings on the relationship between liquidity and stock return at the NSE hold? A casing point of thisproposal.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter highlights the research methods and techniques to be employed to carry out the study:Section 3.2Presents the research design; Section 3.3Presents the population of the study; Section 3.4Presents the sample and sampling design; Section 3.5Presentsdata collection techniques; Section 3.6Presents data analysis; finally Section 3.7 Presents Robust Test of Illiquidity-Return Relationship

3.2 Research Design

This is a descriptive study to show the relationship between illiquidity and stock returns of companies listed at the Nairobi Securities Exchange, the study uses two proxies, the return to volume ratio which was proposed by Amihud (2002) and reversal measure of illiquidity advocated by Pastor and Stambaugh (2003). In a cross-sectional framework of Fama and Macbeth (1973), the relationship between liquidity risk and stock pricing is studied. More importantly the study is conducted to determine liquidity and asset returns at the NSEfor the 5 year period starting 2009- 2013.

3.3 Population of Study

The population is all the sixty one listed firms at the Nairobi Securities exchange as at December 2013 (See Appendix I), and whose stock have traded at the exchange in the period 1stJanuary 2009 to 31st of December 2013. This is because the study seeks to maintain continuity in observations of data of securities that constitute the various portfolios used in the study.

3.4 Sample and Sampling Design

The Sample comprises of portfolios created from the 61 stocks in the Nairobi Securities Exchange, between the periods of January 2009 to December 2013. To be included in the sample the stock must have traded continuously from January 2009 to December 2013.Allowing stocks to shift in and out of any given portfolio upon meeting continuity status, and top ten criterion of a given portfolios primary factor characteristics, shiftingfrom one portfolio in to another is based on changing factor exposure. Randomly selecting stocks is avoided as this would create portfolios which are similar to the market portfolio.

The Sampling Designcomprisesthirty stock portfolios on a monthly frequency for a period of five years, monthly portfolioreturns are subjected to illiquidity testing usingtwo illiquidity proxies, and then using Fama and Macbeth (1973) regression test, and the effect on thereturns ofthe six portfolios is worked out.Portfolio stock level analysis has the benefit to control the problem that stems from white noise associated with estimating betas and other factor sensitivities for individual stocks

3.5 Data Collection Techniques

Data will be obtained from secondary sources, which are the various stock data that is available from the Nairobi Stock Exchange. The data set includesa portfolio of selected stocks from specific market sector strata,and the study employs monthly data for opening and closing stock prices.

3.6 Data Analysis

Analysis, using two illiquidity proxies, the return to volume ratio and reversal measure of illiquidity, in a cross-sectional framework of Fama and Macbeth (1973) we compute predicted beta to determine the relationship between liquidity and stock return.

3.6.1 Illiquidity Calculations

The Turnover Rate as the first proxy given by:

$$ILLIQ = \frac{1}{d}\sum_{j=1}^{d}\frac{|r_{i,j}|}{Vol_{i,j}}$$

Where*d* is the total number of valid observations daysin month *t*,$|r_{i,j}|$ is the absolute daily return for a specified month, $Vol_{i,j}$ is the daily volume in shillings for a specified month. This is return to volume ratio proposed by Amihud (2002).

The second illiquidity indicator is the reversal measure of illiquidity advocated by Pastor and Stambaugh (2003), is defined as:

$$r_{p,m+1,y} - r_{M,m+1,y} = \alpha_{p,y} + \beta_{i,t}r_{p,m,y} + \gamma_{p,y}sign(r_{p,m,y} - r_{M,d,y})mVol_{p,m,y} + \in_{p,m,y}$$

Where $r_{p,m+1,y}$ is the return on portfolio *p* of month *m* at year*ly*, $r_{M,m+1,y}$is the market return (NSE-All share value-weighted index return) on month *m* at year*ly*, and $mVol_{p,m,y}$ is the shilling trading volume, $\gamma_{p,y}$the coefficient of signed shilling trading volume. To convert this measure into an illiquidity proxy, it is multiplied by -1^2, and for a liquidityproxy, it is multiplied by -1^1. Therefore, this measure is:

$$PS_{p,y} = \gamma_{p,y} \times (-1^2)$$

$$PS_{p,y} = \frac{r_{p,m+1,y} - r_{M,m+1,y} - \alpha_{p,y} - \beta_{i,t} r_{p,m,y} - \in_{p,m,y}}{(r_{p,m,y} - r_{M,d,y}) mVol_{p,m,y}} \times (-1^2)$$

3.6.2 Determining Relationship between Illiquidity and Stock Returns

Using Fama and Macbeth (1973), we compute predicted beta to determine the cross-sectional relationship between illiquidity and stock returns. The monthly returns on six portfolios with equal weighting of individual securities are computed using daily data for a 5year period from 2009 to end of 2013. Specifically, a three-factor CAPM/APT is run, consisting of two risk factors and a measure of illiquidity. As such the direct effect of illiquidity on stock returns is determined.The risk factors will be those of Fama and French (1993) three factor CAPM/APT where in addition to the excess return on market portfolio, a return on a specifically structured portfolio as well as the measure of illiquidity is as follows:

The two factor sensitivity are estimated in the following OLS regression framework

$$R_{p,t} - R_{f,t} = \alpha_p + \beta_p (R_{M,t} - R_{f,t}) + s_p P + \varepsilon_{it}$$

For each portfolio p, for each time period t.where α_p is a constant, β_p is beta of portfolio,$(R_{M,t} - R_{f,t})$is the risk premium consisting market return less risk-free return,

$(R_{p,t} - R_{f,t})$is the overall portfolio return less the risk-free rate, which represents portfolios specific returns$s_p$is the factor sensitivity for portfolio. Next:

$$R_{p,t} - R_{f,t} = \gamma_{0t} + \gamma_{1,t}\beta_p + \gamma_{2,t}s_p + \gamma_{3,t}ILLIQ_i + u_{p,t}$$

Where $ILLIQ_i$ is either the 1st Illiquidity or the 2nd Illiquidity proxy, $p = 1,2,\dots,6$

And $t = 1,2,\dots,60$

The portfolio parameter estimates/ factor sensitive ($\beta_p \; and \; s_p$) are used in the first step OLS regression of the Fama-MacBeth methodology together with the liquidity of each portfolio P calculated as an average liquidity proxy over the preceding period (t-1).The first gamma, γ_{0t}, does not theoretically represent anything and should thus be zero, the next two gammas ($\gamma_{1,t}$&$\gamma_{2,t}$) represents the risk premium estimates and should therefore be positive, While the forth gamma, $\gamma_{3,t}$, represents the cross-sectional effect of illiquidity on excess returns.

3.7 Test of Significance

After introducing the econometric frameworks, some hypothesis regarding the estimated gammas in the regression above will be tested using the confidence interval approach oftesting hypothesis, at 5% level of significance as follows

As theory predicts a certain relationship between illiquidity and stock returns, the applied t-tests will be one-sided.

The significance of the model is subjected to an F-test, with the p-values marked for significance at either of 1%, 5%, or 10% level of significance.

CHAPTER FOUR: DATA ANALYSIS, RESULTSAND DISCUSSION

4.1 Introduction

This chapter gives the study analysis which includes results, findings and interpretation of the analyzed data: Section 4.2 Presents Portfolio Formation Process; Section 4.3Presents Descriptive Statistics; Section 4.4 Presents Illiquidity Measure; Section 4.5 Presents Beta Estimation Process; Section 4.6 Presents Cross-sectional Testing Process; Section 4.7 Presents Interpretation of Findings.

4.2 Portfolio Formation Process

Six portfolios of ten securities each, is formed based on the following characteristics: Size of stocks in a portfolio in relation to number of deals in a given opening month of a given year; Value of stocks in a portfolio in relation to volumes of stocks traded per opening month trade session; Turnover of stocks in a portfolio in relation to price performance of stocks (See Appendix II for size, Value and Turnoverranks of the largest ten and smallest ten in given portfolio compositions respectively).These portfolios are rebalances each year to reflect any changes of stocks rankings with these characteristics

The resulting portfolio compositions is determined as follows: Portfolio One, comprising of ten largest size stocks; Portfolio Two, comprising of ten smallest size stocks; Portfolio Three, comprising of ten largest value stocks; PortfolioFour, comprising of ten smallest value stocks; Portfolio Five, comprising of ten highest turnover stocks; Portfolio Six, comprising of ten lowest turnover stocks (See Appendix IIfor composition of Portfolios one, two, three, four, five and six, for the years 2009, 2010, 2011, 2012 and 2013).

4.3 Descriptive Statistics

The descriptive statistics on the number of deal, volume of deals and turnover used in the portfolio generation is as per the table below

Table 4.1a: Descriptive Statistic on deals, volume and turnover

	Mean	Median	Minimum	Maximum	total data points
Deal	769.46	273.00	1.00	17,724.00	2515
Volume	10,645,154.81	694,132.00	48.00	738,509,674.00	2515
Turnover	169,758,503.13	33,092,394.00	2,072.00	6,115,601,811.00	2515

Table 4.1b: Descriptive Statistic on deals, volume and turnover

	standard deviation	Correlation with deal	Correlation with Volume	Correlation with Turnover	total data points
Deal	1,380.77	1.00			2515.00
Volume	43,483,772.65	0.68	1.00		2515.00
Turnover	407,930,315.28	0.51	0.62	1.00	2515.00

The variables used to generate the six portfolios show positive correlation with one another but none showed a strong positive correlation with its pairs.

Total data points taken into account in this research were 2,515 based on the number of valid stocks in the sample that were continually representative during the study period.

4.4 Illiquidity Measure

The 30 portfolios formed were subjected to the selected two illiquidity measurement techniques to determine the illiquidity nature of these portfolios

4.2.1 First Liquidity Proxy: Return to Volume Ratio.

The Turnover Rate given by: $ILLIQ = \frac{1}{d}\sum_{j=1}^{d}\frac{|r_{i,j}|}{Vol_{i,j}}$

Where *d* is the total number of valid observations days in month *t*, $|r_{i,j}|$ is the absolute daily return for a specified month, $Vol_{i,j}$ is the daily volume in shillings for a specified month. For the selected portfolios, the illiquidity results using the 1st illiquidity measure is as shown on the table below:

Table 4.2: Calculated Illiquidity x10^-9 for portfolios, 1st Illiquidity Measure

Portfolio Illiquidity	Portfolio Illiquidity	Portfolio Illiquidity	Portfolio Illiquidity	Portfolio Illiquidity	Portfolio Illiquidity
P1 = 2.29	P2 = 2107.46	P3 = 3.62	P4 = 2107.46	P5 = 4.61	P6 = 283.84
P7 = 2.28	P8 = 503.44	P9 = 2.42	P10 = 644.52	P11 = 5.54	P12 = 363.79
P13 = 3.12	P14 = 2691.78	P15 = 3.51	P16 = 3009.8	P17 = 5.43	P18 = 364.56
P19 = 3.49	P20 = 1361.55	P21 = 4.82	P22 = 665.9	P23 = 5.67	P24 = 263.43
P25 = 3.25	P26 = 2106.16	P27 = 4.82	P28 = 2106.16	P29 = 7.94	P30 = 263.43

4.2.2 Second Liquidity Proxy: Reversal Measure of Illiquidity

The reversal measure of illiquidity advocated by Pastor and Stambaugh (2003), give an illiquidity approximation as follows:

$$PS_{p,y} = \frac{r_{p,m+1,y} - r_{M,m+1,y} - \alpha_{p,y} - \beta_{i,t}r_{p,m,y} - \in_{p,m,y}}{\left(r_{p,m,y} - r_{M,d,y}\right)mVol_{p,m,y}} \times (-1^2)$$

For the selected portfolios, the illiquidity results using the 2nd illiquidity measure is as shown on the table below:

Table 4.3: Calculated Illiquidity x10^-9 for portfolios, 2nd Illiquidity Measure

Portfolio Illiquidity	Portfolio Illiquidity	Portfolio Illiquidity	Portfolio Illiquidity	Portfolio Illiquidity	Portfolio Illiquidity
P1 = 2.84	P2 = 1709.75	P3 = 2.69	P4 = 1709.75	P5 = 2.6	P6 = 402.47
P7 = 2.84	P8 = 495.6	P9 = 3.11	P10 = 528.52	P11 = 2.46	P12 = 517.64
P13 = 2.74	P14 = 1443.73	P15 = 3.04	P16 = 2424.18	P17 = 2.7	P18 = 543.12
P19 = 2.67	P20 = 1193.44	P21 = 2.59	P22 = 655.07	P23 = 2.43	P24 = 510.79
P25 = 2.7	P26 = 1504.6	P27 = 2.59	P28 = 1504.6	P29 = 2.65	P30 = 510.79

4.5 Beta Estimation Process

Portfolio beta was calculated by first deriving the NSE all share index monthlyreturn, then deriving the monthly returns of the various portfolios in excel and finally using the slop formula to derive the beta of each portfolio.

As shown in the table below, the beta for eachportfolio formed is:

Table 4.4: Calculated Beta for portfolios under study

Portfolio Beta	Portfolio Beta	Portfolio Beta	Portfolio Beta	Portfolio Beta	Portfolio Beta
P1 = 0.55	P2 = 0.59	P3 = 0.51	P4 = 0.59	P5 = 0.39	P6 = 0.35
P7 = 0.58	P8 = 0.34	P9 = 0.58	P10 = 0.29	P11 = 0.43	P12 = 0.34
P13 = 0.61	P14 = 0.5	P15 = 0.6	P16 = 0.59	P17 = 0.56	P18 = 0.29
P19 = 0.61	P20 = 0.43	P21 = 0.57	P22 = 0.35	P23 = 0.43	P24 = 0.23
P25 = 0.65	P26 = 0.6	P27 = 0.57	P28 = 0.6	P29 = 0.41	P30 = 0.23

4.6 Cross-sectional Testing Process

In Kenya the risk free rate $R_{f,t}$ for 2009, 2010, 2011, 2012 and 2013 were 7.4%, 10.8%, 6.3%, 7.1% and 8.4% respectively.(2014, October22)

http://data.worldbank.org/indicator/FR.INR.RISK

The two factor sensitivity are estimated in the following OLS regression framework

$$R_{p,t} - R_{f,t} = \alpha_p + \beta_p(R_{M,t} - R_{f,t}) + s_p P + \varepsilon_{it}$$

For each portfolio *p*, for each time period *t*.where α_p is a constant, β_p is beta of portfolio see calculated beta on table 4.4 above, $(R_{M,t} - R_{f,t})$ is the risk premium consisting market return less risk-free return, $s_p$is the factor sensitivity for portfolio. Next:

$R_{p,t} - R_{f,t} = \gamma_{0t} + \gamma_{1,t}\beta_p + \gamma_{2,t}s_p + \gamma_{3,t}ILLIQ_1 + u_{p,t}$ Where $ILLIQ_1$ is the 1st Illiquidity proxy.

Table 4.5: Summary output of Cross-sectional testing under 1st ILLQ measure

Regression Statistics	Multiple R	R Square	Adjusted R Square	Standard Error	Observations
P1	0.78	0.62	0.59	0.08	60.00
P2	0.81	0.65	0.62	0.06	60.00
P3	0.79	0.63	0.60	0.07	60.00
P4	0.81	0.65	0.62	0.06	60.00
P5	0.80	0.63	0.60	0.06	60.00
P6	0.81	0.66	0.63	0.06	60.00
P7	0.79	0.62	0.59	0.08	60.00
P8	0.87	0.75	0.72	0.05	60.00
P9	0.78	0.61	0.58	0.08	60.00
P10	0.78	0.61	0.58	0.06	60.00
P11	0.79	0.62	0.59	0.06	60.00
P12	0.81	0.65	0.62	0.06	60.00
P13	0.73	0.53	0.50	0.10	60.00
P14	0.83	0.70	0.67	0.05	60.00
P15	0.74	0.55	0.52	0.10	60.00
P16	0.82	0.68	0.65	0.06	60.00
P17	0.81	0.65	0.62	0.07	60.00
P18	0.83	0.69	0.66	0.05	60.00
P19	0.76	0.58	0.55	0.09	60.00
P20	0.74	0.54	0.51	0.07	60.00
P21	0.78	0.61	0.58	0.08	60.00
P22	0.83	0.69	0.67	0.05	60.00
P23	0.79	0.62	0.59	0.06	60.00
P24	0.85	0.73	0.70	0.05	60.00
P25	0.75	0.57	0.53	0.09	60.00
P26	0.82	0.66	0.64	0.06	60.00
P27	0.78	0.61	0.58	0.08	60.00
P28	0.82	0.66	0.64	0.06	60.00
P29	0.82	0.67	0.65	0.06	60.00
P30	0.85	0.73	0.70	0.05	60.00

Number of data points per portfolio is 60; Standard Error is less or equal to 0.1 for majority of the portfolios; R-squared for the 30 portfolios are greater than 50% under the 1st Illiquidity measure; Adjusted R-squared are also greater than 50%.

Table 4.6 a:ANOVA of Cross-sectional testing under 1st ILLQ measure, P1 to P15

		df	SS	MS	F	Significance F
P1	Regression	3.00	0.56	0.19	30.49	0.00
	Residual	57.00	0.35	0.01		
	Total	60.00	0.92			
P2	Regression	3.00	0.40	0.13	35.76	0.00
	Residual	57.00	0.21	0.00		
	Total	60.00	0.61			
P3	Regression	3.00	0.45	0.15	32.52	0.00
	Residual	57.00	0.27	0.00		
	Total	60.00	0.72			
P4	Regression	3.00	0.40	0.13	35.76	0.00
	Residual	57.00	0.21	0.00		
	Total	60.00	0.61			
P5	Regression	3.00	0.33	0.11	32.76	0.00
	Residual	57.00	0.19	0.00		
	Total	60.00	0.52			
P6	Regression	3.00	0.36	0.12	37.03	0.00
	Residual	57.00	0.18	0.00		
	Total	60.00	0.54			
P7	Regression	3.00	0.58	0.19	30.56	0.00
	Residual	57.00	0.36	0.01		
	Total	60.00	0.94			
P8	Regression	3.00	0.37	0.12	56.87	0.00
	Residual	57.00	0.12	0.00		
	Total	60.00	0.49			
P9	Regression	3.00	0.57	0.19	29.58	0.00
	Residual	57.00	0.37	0.01		
	Total	60.00	0.94			
P10	Regression	3.00	0.32	0.11	30.16	0.00
	Residual	57.00	0.20	0.00		
	Total	60.00	0.52			
P11	Regression	3.00	0.38	0.13	31.57	0.00
	Residual	57.00	0.23	0.00		
	Total	60.00	0.61			
P12	Regression	3.00	0.35	0.12	35.03	0.00
	Residual	57.00	0.19	0.00		
	Total	60.00	0.54			
P13	Regression	3.00	0.64	0.21	21.49	0.00
	Residual	57.00	0.56	0.01		
	Total	60.00	1.20			
P14	Regression	3.00	0.33	0.11	43.72	0.00
	Residual	57.00	0.14	0.00		
	Total	60.00	0.47			
P15	Regression	3.00	0.64	0.21	23.26	0.00
	Residual	57.00	0.52	0.01		
	Total	60.00	1.16			

These portfolios have 3 degrees of freedom; regression sum squared and residual sum squared are for the majority of the cases less than 0.5; the F-test reveals p-values well below 0.5%.

Table 4.6 b:ANOVA of Cross-sectional testing under 1st ILLQ measure, P16 to P30

		df	SS	MS	F	Significance F
P16	Regression	3.00	0.42	0.14	40.09	0.00
	Residual	57.00	0.20	0.00		
	Total	60.00	0.61			
P17	Regression	3.00	0.49	0.16	35.39	0.00
	Residual	57.00	0.26	0.00		
	Total	60.00	0.75			
P18	Regression	3.00	0.38	0.13	41.63	0.00
	Residual	57.00	0.17	0.00		
	Total	60.00	0.55			
P19	Regression	3.00	0.67	0.22	26.30	0.00
	Residual	57.00	0.49	0.01		
	Total	60.00	1.16			
P20	Regression	3.00	0.35	0.12	22.64	0.00
	Residual	57.00	0.30	0.01		
	Total	60.00	0.65			
P21	Regression	3.00	0.54	0.18	29.94	0.00
	Residual	57.00	0.35	0.01		
	Total	60.00	0.89			
P22	Regression	3.00	0.35	0.12	43.14	0.00
	Residual	57.00	0.16	0.00		
	Total	60.00	0.51			
P23	Regression	3.00	0.37	0.12	30.84	0.00
	Residual	57.00	0.23	0.00		
	Total	60.00	0.60			
P24	Regression	3.00	0.39	0.13	50.52	0.00
	Residual	57.00	0.15	0.00		
	Total	60.00	0.54			
P25	Regression	3.00	0.63	0.21	24.82	0.00
	Residual	57.00	0.48	0.01		
	Total	60.00	1.12			
P26	Regression	3.00	0.41	0.14	37.70	0.00
	Residual	57.00	0.21	0.00		
	Total	60.00	0.62			
P27	Regression	3.00	0.54	0.18	29.94	0.00
	Residual	57.00	0.35	0.01		
	Total	60.00	0.89			
P28	Regression	3.00	0.41	0.14	37.70	0.00
	Residual	57.00	0.21	0.00		
	Total	60.00	0.62			
P29	Regression	3.00	0.37	0.12	39.35	0.00
	Residual	57.00	0.18	0.00		
	Total	60.00	0.55			
P30	Regression	3.00	0.39	0.13	50.52	0.00
	Residual	57.00	0.15	0.00		
	Total	60.00	0.54			

These portfolios have 3 degrees of freedom; regression sum squared and residual sum squared are for the majority of the cases less than 0.5; the F-test reveals p-values well below 0.5%.

Table 4.7 a:Result of Coefficients, for Cross-sectional testing under 1st ILLQ measure, P1 to P10

		Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
P1	Intercept	-					
	RM-RFR	0.47	0.12	3.75	0.00	0.22	0.72
	Volume	0.00	0.00	1.88	0.07	(0.00)	0.00
	1st Illiquidity measure x10^-9	(0.05)	0.01	(3.29)	0.00	(0.07)	(0.02)
P2	Intercept	-					
	RM-RFR	0.59	0.10	5.84	0.00	0.39	0.79
	Volume	(0.00)	0.00	(0.12)	0.90	(0.00)	0.00
	1st Illiquidity measure x10^-9	(0.00)	0.00	(1.41)	0.16	(0.00)	0.00
P3	Intercept	-					
	RM-RFR	0.48	0.11	4.40	0.00	0.26	0.69
	Volume	0.00	0.00	0.53	0.60	(0.00)	0.00
	1st Illiquidity measure x10^-9	(0.02)	0.01	(2.13)	0.04	(0.03)	(0.00)
P4	Intercept	-					
	RM-RFR	0.59	0.10	5.84	0.00	0.39	0.79
	Volume	(0.00)	0.00	(0.12)	0.90	(0.00)	0.00
	1st Illiquidity measure x10^-9	(0.00)	0.00	(1.41)	0.16	(0.00)	0.00
P5	Intercept	-					
	RM-RFR	0.37	0.09	4.06	0.00	0.19	0.56
	Volume	0.00	0.00	0.25	0.80	(0.00)	0.00
	1st Illiquidity measure x10^-9	(0.01)	0.01	(1.96)	0.05	(0.02)	0.00
P6	Intercept	-					
	RM-RFR	0.26	0.09	2.80	0.01	0.07	0.45
	Volume	0.00	0.00	1.99	0.05	(0.00)	0.00
	1st Illiquidity measure x10^-9	(0.00)	0.00	(4.39)	0.00	(0.00)	(0.00)
P7	Intercept	-					
	RM-RFR	0.49	0.13	3.89	0.00	0.24	0.74
	Volume	0.00	0.00	2.15	0.04	0.00	0.00
	1st Illiquidity measure x10^-9	(0.05)	0.01	(3.45)	0.00	(0.08)	(0.02)
P8	Intercept	-					
	RM-RFR	0.32	0.08	4.28	0.00	0.17	0.47
	Volume	(0.00)	0.00	(0.19)	0.85	(0.00)	0.00
	2nd Illiquidity measure	(0.00)	0.00	(3.44)	0.00	(0.00)	(0.00)
P9	Intercept	-					
	RM-RFR	0.50	0.13	3.94	0.00	0.25	0.76
	Volume	0.00	0.00	1.85	0.07	(0.00)	0.00
	1st Illiquidity measure x10^-9	(0.04)	0.01	(3.23)	0.00	(0.07)	(0.02)
P10	Intercept	-					
	RM-RFR	0.26	0.09	2.73	0.01	0.07	0.45
	Volume	(0.00)	0.00	(0.41)	0.69	(0.00)	0.00
	1st Illiquidity measure x10^-9	(0.00)	0.00	(3.01)	0.00	(0.00)	(0.00)

For the tested portfolios, the intercept for the regression run is taken to be zero, variables under observations are 1st illiquidity measure, volume traded and market returns.

Table 4.7 b:Result of Coefficients, for Cross-sectional testing under 1st ILLQ measure, P11 to P20

		Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
	Intercept	-					
	RM-RFR	0.44	0.10	4.40	0.00	0.24	0.64
P11	Volume	0.00	0.00	0.02	0.98	(0.00)	0.00
	1st Illiquidity measure x10^-9	(0.01)	0.00	(1.58)	0.12	(0.02)	0.00
	Intercept	-					
	RM-RFR	0.29	0.09	3.12	0.00	0.10	0.47
P12	Volume	0.00	0.00	1.30	0.20	(0.00)	0.00
	1st Illiquidity measure x10^-9	(0.00)	0.00	(3.85)	0.00	(0.00)	(0.00)
	Intercept	-					
	RM-RFR	0.60	0.16	3.83	0.00	0.29	0.92
P13	Volume	0.00	0.00	1.22	0.23	(0.00)	0.00
	1st Illiquidity measure x10^-9	(0.03)	0.01	(2.22)	0.03	(0.05)	(0.00)
	Intercept	-					
	RM-RFR	0.47	0.08	5.75	0.00	0.31	0.64
P14	Volume	0.00	0.00	0.87	0.39	(0.00)	0.00
	2nd Illiquidity measure x10^-9	(0.00)	0.00	(2.66)	0.01	(0.00)	(0.00)
	Intercept	-					
	RM-RFR	0.59	0.15	3.88	0.00	0.28	0.89
P15	Volume	0.00	0.00	1.09	0.28	(0.00)	0.00
	1st Illiquidity measure x10^-9	(0.02)	0.01	(2.28)	0.03	(0.04)	(0.00)
	Intercept	-					
	RM-RFR	0.56	0.09	5.99	0.00	0.37	0.75
P16	Volume	0.00	0.00	2.13	0.04	0.00	0.00
	1st Illiquidity measure x10^-9	(0.00)	0.00	(3.26)	0.00	(0.00)	(0.00)
	Intercept	-					
	RM-RFR	0.56	0.11	5.19	0.00	0.34	0.77
P17	Volume	0.00	0.00	0.41	0.69	(0.00)	0.00
	1st Illiquidity measure x10^-9	(0.01)	0.01	(1.76)	0.08	(0.02)	0.00
	Intercept	-					
	RM-RFR	0.24	0.09	2.72	0.01	0.06	0.42
P18	Volume	0.00	0.00	1.35	0.18	(0.00)	0.00
	1st Illiquidity measure x10^-9	(0.00)	0.00	(4.46)	0.00	(0.00)	(0.00)
	Intercept	-					
	RM-RFR	0.58	0.15	4.00	0.00	0.29	0.88
P19	Volume	0.00	0.00	1.21	0.23	(0.00)	0.00
	1st Illiquidity measure x10^-9	(0.03)	0.01	(2.44)	0.02	(0.05)	(0.00)
	Intercept	-					
	RM-RFR	0.42	0.11	3.73	0.00	0.20	0.65
P20	Volume	0.00	0.00	0.50	0.62	(0.00)	0.00
	2nd Illiquidity measure x10^-9	(0.00)	0.00	(3.05)	0.00	(0.00)	(0.00)

For the tested portfolios, the intercept for the regression run is taken to be zero, variables under observations are 1st illiquidity measure, volume traded and market returns.

Table 4.7c:Result of Coefficients, for Cross-sectional testing under 1st ILLQ measure, P21 to P30

		Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
	Intercept	-					
	RM-RFR	0.58	0.12	4.69	0.00	0.33	0.82
P21	Volume	0.00	0.00	0.49	0.62	(0.00)	0.00
	1st Illiquidity measure x10^-9	(0.01)	0.01	(1.84)	0.07	(0.02)	0.00
	Intercept	-					
	RM-RFR	0.33	0.08	4.00	0.00	0.17	0.50
P22	Volume	(0.00)	0.00	(0.99)	0.33	(0.00)	0.00
	1st Illiquidity measure x10^-9	(0.00)	0.00	(4.32)	0.00	(0.00)	(0.00)
	Intercept	-					
	RM-RFR	0.43	0.10	4.33	0.00	0.23	0.63
P23	Volume	0.00	0.00	0.03	0.98	(0.00)	0.00
	1st Illiquidity measure x10^-9	(0.01)	0.00	(1.57)	0.12	(0.02)	0.00
	Intercept	-					
	RM-RFR	0.20	0.08	2.46	0.02	0.04	0.36
P24	Volume	0.00	0.00	2.40	0.02	0.00	0.00
	1st Illiquidity measure x10^-9	(0.00)	0.00	(5.76)	0.00	(0.00)	(0.00)
	Intercept	-					
	RM-RFR	0.62	0.15	4.28	0.00	0.33	0.92
P25	Volume	0.00	0.00	1.14	0.26	(0.00)	0.00
	1st Illiquidity measure x10^-9	(0.03)	0.01	(2.15)	0.04	(0.05)	(0.00)
	Intercept	-					
	RM-RFR	0.57	0.10	5.96	0.00	0.38	0.76
P26	Volume	0.00	0.00	1.97	0.05	(0.00)	0.00
	2nd Illiquidity measure x10^-9	(0.00)	0.00	(3.01)	0.00	(0.00)	(0.00)
	Intercept	-					
	RM-RFR	0.58	0.12	4.69	0.00	0.33	0.82
P27	Volume	0.00	0.00	0.49	0.62	(0.00)	0.00
	1st Illiquidity measure x10^-9	(0.01)	0.01	(1.84)	0.07	(0.02)	0.00
	Intercept	-					
	RM-RFR	0.57	0.10	5.96	0.00	0.38	0.76
P28	Volume	0.00	0.00	1.97	0.05	(0.00)	0.00
	1st Illiquidity measure x10^-9	(0.00)	0.00	(3.01)	0.00	(0.00)	(0.00)
	Intercept	-					
	RM-RFR	0.41	0.09	4.63	0.00	0.23	0.59
P29	Volume	0.00	0.00	0.15	0.88	(0.00)	0.00
	1st Illiquidity measure x10^-9	(0.01)	0.00	(2.10)	0.04	(0.01)	(0.00)
	Intercept	-					
	RM-RFR	0.20	0.08	2.46	0.02	0.04	0.36
P30	Volume	0.00	0.00	2.40	0.02	0.00	0.00
	1st Illiquidity measure x10^-9	(0.00)	0.00	(5.76)	0.00	(0.00)	(0.00)

For the tested portfolios, the intercept for the regression run is taken to be zero, variables under observations are 1st illiquidity measure, volume traded and market returns.

These regressions are also run for all the 30 portfolios using the 2nd proxy to illiquidity (See Appendix III for results).

$R_{p,t} - R_{f,t} = \gamma_{0t} + \gamma_{1,t}\beta_p + \gamma_{2,t}s_p + \gamma_{3,t}ILLIQ_2 + u_{p,t}$ Where $ILLIQ_2$ is the 2nd Illiquidity proxy.

4.7 Interpretation of Findings

As was observed in the illiquidity proxies, a downward revision in liquidity was observed on stocks that had low deal rate, low volume and low turnover.This is in line with Liquidity asset pricing theory implies that, a downward revision in liquidity should cause a decline in stock price.

R-squared for the 30 portfolios are greater than 50%, which implies that the three variables, volume, illiquidity and market premium, used to determine the relationship: $R_{p,t} - R_{f,t} = \gamma_{0t} + \gamma_{1,t}\beta_p + \gamma_{2,t}s_p + \gamma_{3,t}ILLIQ_i + u_{p,t}$, explain portfolio returns $R_{p,t} - R_{f,t}$.Test of the models significance (F-test) reveals a p-value well below 0.5% for a 99% confidence interval, which is a show of very strong significance level for all the 30 portfolios. The three independent variable, volume, illiquidity and market premium, have are significant as was revealed by their p-values across all portfolios, with illiquidity and market premium having 99% confidence interval and volume being with 95% confidence interval.

The coefficients of regression revealed that a unit change portfolios returns, is explained by a less than a unit change in market premium across all the portfolios, and by extremely little changes in market illiquidity and volume.

These findings are consistent with the findings that, illiquid stocks have higher average returns, which was prominent among studies by the following by: Amihud and Mandelson (1986), which resulted in two major predictions, that, Expected returns is an increasing function of illiquidity cost, and that their relationship is concave due to the clientele effect; Brennan and Subrahmanyam (1996), study on market microstructure and asset pricing, more specifically investigated the compensation of illiquidity on stocks returns with models of price information in suggesting that privately informed investors create significant illiquidity cost for uninformed investors, which implied that the required rates of return should be higher for securities that are relatively illiquid; Datar, Naik and Radcliffe (1998),their findings implied that, across stocks, a 1% decrease in the in the turnover rate would result in a higher return;Amihud's (2002) ILLIQ-measure, Showed that over time, expected market liquidity positively affects ex ante stock expected returns; Pastor and Stambaugh (2003), investigated whether expected returns are related to systematic risk in returns, as opposed to level of liquidity. They found that stocks' "liquidity betas," their sensitivity to innovations in aggregate liquidity, played a significant role in asset pricing. Stocks with higher liquidity beta exhibited higher expected returns.

Prominent studies show that since liquidity is persistent, liquidity predicts future returns and liquidity co-moves with contemporaneous returns, this is because a positive shock to illiquidity predicts high future illiquidity, which raises the required return and lowers contemporaneous prices, which are consistent with the findings of this.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter gives the Summary, Conclusion and Recommendations based on the research findings as carried out: Section 5.2 Presents Summary of findings; Section 5.3 Presents Conclusion of this Study; Section 5.4 Presents Recommendations; Section 5.5 Looks at Limitation of Study; and finally Section 5.6 Presents Suggestion for Further Research.

5.2 Summary of Findings

This study was done with the objective of determining the relationship between illiquidity and stock returns of companies listed at the Nairobi Securities Exchange.The Illiquid test carried out using the two proxies to illiquidity showed significantly high Illiquidity for portfolios that had stocks whose characteristics had either fewer deals at the exchange, lowest volume, or lowest turnover respectively. Portfolio of stocks which had high trade deals, high volume and highest turnover had low illiquidity, (illiquidity tables 4.2 and 4.3.). Stocks that had a mix of characteristics from high deals, to high volume to high turnover were few of all the stocks in the exchange, which is an indicator of high liquidity of few stocks in the exchange, with less than ten companies having illiquidity level of less than 10x10^-9 which renders the whole exchange to be highly illiquid. This was also observed as the case for very illiquid stocks at the exchange with illiquid of over

1,500x10^-9. This is consistent with prior studies that illiquidity and illiquidity risk are priced in stock markets, as is also the case for Nairobi securities exchange.

In the cross-section estimations, Illiquidity has a positive effect on excess stock return, which is consistent with earlier studies on this illiquidity, stock return relationship.

5.3 Conclusion

Models of price information in security markets suggest that privately informed investors create significant illiquidity cost for uninformed investors, which implied that the required rates of return should be higher for securities that are relatively illiquid. The results in this study demonstrate that, illiquidity is a risk factor in determining returns at the Nairobi Securities Exchange. The illiquidity effect is beta specific, and illiquidity has wide ranging effects on financial markets, as per earlier research and also as per this research,Illiquidity and Liquidity help explains why certain hard-to-trade securities are relatively cheap at the NSE, the pricing of stocks, and the return on portfolios. It follows that illiquidity and liquidity can help explain a number of puzzles, such as why equities commanding high required returns compared to other assets, why liquid risk-free treasuries have low required returns, and why small stocks that are typically illiquid earn high returns

The two proxies to liquidity, captured the volumetric characteristic of stocksilliquidity, which in turn capture the effect of exogenous transaction cost of liquidity, the demand pressure and inventory risk, further research needed to be conducted to show the effects of information asymmetry on illiquidity of the stocks and also search friction which was not present on the two proxies used.

This research captured the historical returns based on a holding period between 2009 January to December 2013, concluding that during that period illiquidity was factored in the stock prices, as is demonstrated by the positive effect of liquidity on portfolio returns

5.4 Recommendations

Illiquidity or liquidity, just like size, value/growth, and momentum is an indicator of stock returns, given a varied investment strategies from: No strategy; buy and hold strategy; value investment strategy and growth investing strategy, when investing at the NSE, No strategy could yield a varied return as was observed for the period with most stocks moving generallyin the same direction as the all share index. A buy and hold strategy would work very well for the highly Illiquid stocks and stock portfolios as these in the long run yield high returns. Value investment strategy would need further analysis into specific companies' fundamentals which has been suggested in any future research of this nature. Growth investment strategy would work very well in the NSE as most of the listed companies don't have mature company characteristics as can be observed by the high volatility of the stock price from the raw data obtained.

With a given proxy measure to illiquidity, and results of this study indicating that illiquidity positively affects stock returns, an investor would have to gauge a given companies stock liquidity or illiquidity status as a compliment to the calculations of expected returns on stock investments at the NSE.

5.5 Limitation of Study

The portfolio in this study was only limited to monthly stock deals, volumes traded and turnover, based on the portfolio approach taken. However an approach which is more firm specific could measure the fundamental aspects that drive stock illiquidity such as firm size, growth prospects, capitalization and actual firm performance such as specific firm turnover.

The study was limited by the lack of bid as spread data of the Nairobi Securities Exchange, and the lack of a significant number of stocks that were continuous throughout the period of study, of a population of 61 stocks, only 43 qualified to be set in the research portfolios, which limited the diversification aspects of portfolios used in the study.

This study was also limited by the fact that it based on historical liquidity of the Nairobi securities exchange rather than having a futuristic aspect of returns and illiquidity relationship. In this aspect a study by Amihud and Mandelson (1986), based on expected returns to illiquidity cost relationship is one such approach which is insightful, and futuristic in nature.

5.6 Suggestion for Further Research

The study finally suggests a future study to be carried out on stock return to liquidity or illiquidity relationship, through the use of bid ask spread as a proxy to illiquidity instead of the two proxies utilized in this study.This will act as a reaffirmation of the outcome in this study with a better precision or an alternative approach.

The study also recommends that future studies should consider a time period of 10 years to 20 years, since currently the Nairobi Securities Exchange data greater than 5 years lacks an element of continuity which is needed for Illiquidity measure.

Another direction for future research would be to investigate the Illiquidity to expected returns relationship at the Nairobi Securities Exchange. In an international setup,an investigation by Pastor and Stambaugh (2003), found that expected stock returns are related cross-sectionally to the sensitivities of returns to fluctuations in aggregate liquidity. Such an investigation on the expected returns of NSE to investors would further extend the understanding of the nature of Illiquidity and Liquidity thereof of the NSE.

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APPENDICES

APPENDIX I: List of Stocks at the NSE as at December 2013

Agricultural Sector

1. Eaagads Limited (EGAD)
2. Kakuzi Limited (KUKZ)
3. Kapchorua Tea Company Limited (KAPC)
4. Limuru Tea Company Limited (LIMT)
5. Rea Vipingo Sisal Estate (REA)
6. Sasini Tea and Coffee (SASN)
7. Williamson Tea Kenya Limited (WTK)

Automobiles and Accessories

8. Car and General Kenya (C&G)
9. CMC Holdings (CMC)
10. Marshalls East Africa (MASH)
11. Sameer Africa Limited (FIRE)

Banking

12. Barclays Bank (Kenya) (BBK)
13. CFC Stanbic Holdings (CFC)
14. Cooperative Bank of Kenya (COOP)

15. Diamond Trust Bank Group (DTK)

16. Equity Bank Group (EQTY)

17. Housing Finance Company of Kenya (HFCK)

18. I&M Holdings Limited (I&M)

19. Kenya Commercial Bank Group (KCB)

20. National Bank of Kenya Limited (NBK)

21. National Industrial Credit Bank (NIC)

22. Standard Chartered Kenya(SCBK)

Commercial and Services

23. Express Kenya Limited (XPRS)

24. Kenya Airways Limited (KQ)

25. Longhorn Kenya Limited (LKL)

26. Nation Media Group (NMG)

27. Scangroup (SCAN)

28. Standard Group Limited (SGL)

29. TPS Serena (TPSE)

30. Uchumi Supermarkets (UCHM)

31. Hutchings Biemer Limited (HBL)

Construction and Allied Sector

32. Athi River Mining Limited (ARM)

33. Bamburi Cement Limited (BAMB)

34. Crown-Berger(Kenya) (BERG)

35. East African Cables Limited (CABL)

36. East African Portland Cement Company (PORT)

Energy and Petroleum

37. KenolKobil (KENO)

38. Kengen (KEGN)

39. Kenya Power and Lighting Company (KPLC)

40. Total Kenya Limited (TOTL)

41. Umeme (UMME)

Insurance

42. British-America Investment Company (BRIT)

43. CIC Insurance Group (CIC)

44. Jubilee Holdings Limited (JUB)

45. Kenya Reinsurance Corporation (KNRE)

46. Liberty Kenya Holdings (CFCI)

47. Pan Africa Insurance Holdings (PAFR)

Investment

48. Centum Investment Company (ICDC)

49. Olympia Capital Holdings (OCH)

50. TransCentury Investments (TCL)

Manufacturing and Allied

51. B.O.C Kenya Limited (BOC)

52. British American Tobacco Limited (BAT)

53. Carbacid Investments Limited (CIL)

54. East African Breweries (EABL)

55. Eveready East Africa (EVRD)

56. Mumias Sugar Company Limited (MSC)

57. Unga Group Limited (UNGA)

58. Kenya Orchards Limited(ORCH)

59. A. Baumann and Company (BAUM)

Telecommunication andTechnology

60. Safaricom (SCOM)

Growth Enterprise Market Segment

61. Home Africa (HAFR)

APPENDIX II: Portfolio formation

Table A.1: P1, Portfolio of Largest Size (Deals) at Jan 2009

Month	Issuer	Deal	Volume	Turnover	Opening Price	Closing Price
Jan	SCOM	9,753.00	88,342,944.00	294,244,964.80	3.62	3.20
Jan	KCB	3,916.00	22,969,970.00	484,287,059.30	23.77	20.48
Jan	COOP	3,430.00	8,743,900.00	81,906,400.00	9.95	8.47
Jan	MSC	2,744.00	13,162,978.00	81,494,014.60	6.84	5.02
Jan	KEGN	2,067.00	11,636,800.00	183,403,446.60	16.24	14.05
Jan	KNRE	1,810.00	4,669,334.00	57,175,006.85	12.80	11.64
Jan	EQTY	1,428.00	1,860,004.00	307,303,312.00	188.33	157.32
Jan	BBK	1,160.00	1,575,907.00	80,019,789.00	50.83	48.64
Jan	KQ	744.00	680,057.00	19,467,209.75	28.78	27.85
Jan	HFCK	655.00	905,881.00	15,514,845.15	18.68	16.46

Table A.2: P2, Portfolio of Smallest Size (Deals) at Jan 2009

Month	Issuer	Deal	Volume	Turnover	Opening Price	Closing Price
Jan	KAPC	2.00	300.00	19,800.00	62.00	68.00
Jan	C&G	4.00	3,900.00	169,400.00	42.50	40.00
Jan	EGAD	10.00	14,200.00	511,850.00	36.44	36.50
Jan	PAFR	18.00	11,910.00	671,230.00	62.00	53.25
Jan	KUKZ	21.00	19,060.00	439,106.25	23.00	22.00
Jan	WTK	30.00	36,150.00	1,881,925.00	52.00	54.00
Jan	XPRS	43.00	51,120.00	645,245.00	13.00	11.50
Jan	JUB	66.00	32,115.00	3,932,390.00	121.00	130.00
Jan	SGL	73.00	85,391.00	4,217,109.00	50.00	45.75
Jan	BERG	76.00	41,595.00	1,020,415.00	25.00	22.50

Table A.3: P3, Portfolio of Largest Volume at Jan 2009

Month	Issuer	Deal	Volume	Turnover	Opening Price	Closing Price
Jan	SCOM	9,753.00	88,342,944.00	294,244,964.80	3.62	3.20
Jan	KCB	3,916.00	22,969,970.00	484,287,059.30	23.77	20.48
Jan	MSC	2,744.00	13,162,978.00	81,494,014.60	6.84	5.02
Jan	KEGN	2,067.00	11,636,800.00	183,403,446.60	16.24	14.05
Jan	COOP	3,430.00	8,743,900.00	81,906,400.00	9.95	8.47
Jan	KNRE	1,810.00	4,669,334.00	57,175,006.85	12.80	11.64
Jan	EABL	649.00	2,459,013.00	349,054,354.00	145.33	136.38
Jan	EQTY	1,428.00	1,860,004.00	307,303,312.00	188.33	157.32
Jan	BBK	1,160.00	1,575,907.00	80,019,789.00	50.83	48.64
Jan	HFCK	655.00	905,881.00	15,514,845.15	18.68	16.46

Table A.4: P4, Portfolio of Smallest Volume at Jan 2009

Month	Issuer	Deal	Volume	Turnover	Opening Price	Closing Price
Jan	KAPC	2.00	300.00	19,800.00	62.00	68.00
Jan	C&G	4.00	3,900.00	169,400.00	42.50	40.00
Jan	PAFR	18.00	11,910.00	671,230.00	62.00	53.25
Jan	EGAD	10.00	14,200.00	511,850.00	36.44	36.50
Jan	KUKZ	21.00	19,060.00	439,106.25	23.00	22.00
Jan	JUB	66.00	32,115.00	3,932,390.00	121.00	130.00
Jan	WTK	30.00	36,150.00	1,881,925.00	52.00	54.00
Jan	BERG	76.00	41,595.00	1,020,415.00	25.00	22.50
Jan	XPRS	43.00	51,120.00	645,245.00	13.00	11.50
Jan	SGL	73.00	85,391.00	4,217,109.00	50.00	45.75

Table A.5: P5, Portfolio of Largest Turnover at Jan 2009

Month	Issuer	Deal	Volume	Turnover	Opening Price	Closing Price
Jan	KCB	3,916.00	22,969,970.00	484,287,059.30	23.77	20.48
Jan	EABL	649.00	2,459,013.00	349,054,354.00	145.33	136.38
Jan	EQTY	1,428.00	1,860,004.00	307,303,312.00	188.33	157.32
Jan	SCOM	9,753.00	88,342,944.00	294,244,964.80	3.62	3.20
Jan	KEGN	2,067.00	11,636,800.00	183,403,446.60	16.24	14.05
Jan	COOP	3,430.00	8,743,900.00	81,906,400.00	9.95	8.47
Jan	MSC	2,744.00	13,162,978.00	81,494,014.60	6.84	5.02
Jan	BAT	114.00	577,326.00	80,189,939.00	131.50	136.25
Jan	BBK	1,160.00	1,575,907.00	80,019,789.00	50.83	48.64
Jan	KNRE	1,810.00	4,669,334.00	57,175,006.85	12.80	11.64

Table A.6: P6, Portfolio of Smallest Turnover at Jan 2009

Month	Issuer	Deal	Volume	Turnover	Opening Price	Closing Price
Jan	KAPC	2.00	300.00	19,800.00	62.00	68.00
Jan	C&G	4.00	3,900.00	169,400.00	42.50	40.00
Jan	KUKZ	21.00	19,060.00	439,106.25	23.00	22.00
Jan	EGAD	10.00	14,200.00	511,850.00	36.44	36.50
Jan	XPRS	43.00	51,120.00	645,245.00	13.00	11.50
Jan	PAFR	18.00	11,910.00	671,230.00	62.00	53.25
Jan	BERG	76.00	41,595.00	1,020,415.00	25.00	22.50
Jan	FIRE	185.00	184,375.00	1,093,059.50	5.74	5.91
Jan	OCH	86.00	133,300.00	1,296,790.00	9.60	9.03
Jan	EVRD	437.00	455,100.00	1,530,315.00	3.53	3.21

Table A.7:P7, Portfolio of Largest Size (Deals) at Jan 2010

Month	Issuer	Deal	Volume	Turnover	Opening Price	Closing Price
Jan	SCOM	11,496.00	430,267,186.00	2,363,152,327.85	4.57	5.34
Jan	MSC	3,268.00	25,967,546.00	224,907,814.85	6.92	8.97
Jan	EQTY	3,157.00	66,028,659.00	1,098,417,596.90	14.32	16.02
Jan	COOP	3,005.00	16,939,400.00	163,207,030.00	9.03	9.76
Jan	KCB	2,277.00	15,559,934.00	345,071,017.75	20.46	22.14
Jan	KEGN	1,915.00	4,753,822.00	68,921,977.15	13.01	14.30
Jan	KNRE	1,846.00	3,245,032.00	42,636,562.50	11.69	12.52
Jan	KQ	1,650.00	9,238,995.00	484,773,925.50	35.93	50.38
Jan	BBK	1,055.00	2,560,536.00	128,527,820.25	45.65	49.58
Jan	ICDC	593.00	3,345,713.00	43,447,464.65	11.35	13.22

Table A.8:P8, Portfolio of Smallest Size (Deals) at Jan 2010

Month	Issuer	Deal	Volume	Turnover	Opening Price	Closing Price
Jan	EGAD	2.00	200.00	4,200.00	21.00	21.00
Jan	KAPC	2.00	460.00	42,960.00	94.50	86.00
Jan	C&G	8.00	13,282.00	464,978.50	31.75	34.94
Jan	KUKZ	9.00	14,182.00	457,646.00	32.00	34.00
Jan	PAFR	21.00	26,192.00	1,202,748.00	45.00	48.00
Jan	BERG	43.00	34,800.00	877,125.00	24.00	25.50
Jan	XPRS	63.00	72,717.00	633,253.25	7.25	9.00
Jan	BAMB	80.00	390,713.00	62,431,349.00	158.00	155.00
Jan	SGL	80.00	85,887.00	3,167,058.75	37.00	38.08
Jan	OCH	87.00	161,800.00	1,103,980.00	6.20	7.40

Table A.9:P9, Portfolio of Largest Volume at Jan 2010

Month	Issuer	Deal	Volume	Turnover	Opening Price	Closing Price
Jan	SCOM	11,496.00	430,267,186.00	2,363,152,327.85	4.57	5.34
Jan	EQTY	3,157.00	66,028,659.00	1,098,417,596.90	14.32	16.02
Jan	MSC	3,268.00	25,967,546.00	224,907,814.85	6.92	8.97
Jan	COOP	3,005.00	16,939,400.00	163,207,030.00	9.03	9.76
Jan	KCB	2,277.00	15,559,934.00	345,071,017.75	20.46	22.14
Jan	KQ	1,650.00	9,238,995.00	484,773,925.50	35.93	50.38
Jan	KEGN	1,915.00	4,753,822.00	68,921,977.15	13.01	14.30
Jan	ICDC	593.00	3,345,713.00	43,447,464.65	11.35	13.22
Jan	KNRE	1,846.00	3,245,032.00	42,636,562.50	11.69	12.52
Jan	BBK	1,055.00	2,560,536.00	128,527,820.25	45.65	49.58

Table A.10:P10, Portfolio of Smallest Volume at Jan 2010

Month	Issuer	Deal	Volume	Turnover	Opening Price	Closing Price
Jan	EGAD	2.00	200.00	4,200.00	21.00	21.00
Jan	KAPC	2.00	460.00	42,960.00	94.50	86.00
Jan	C&G	8.00	13,282.00	464,978.50	31.75	34.94
Jan	KUKZ	9.00	14,182.00	457,646.00	32.00	34.00
Jan	PAFR	21.00	26,192.00	1,202,748.00	45.00	48.00
Jan	BERG	43.00	34,800.00	877,125.00	24.00	25.50
Jan	XPRS	63.00	72,717.00	633,253.25	7.25	9.00
Jan	SGL	80.00	85,887.00	3,167,058.75	37.00	38.08
Jan	DTK	125.00	131,856.00	9,485,769.50	65.00	71.50
Jan	UNGA	80.00	141,243.00	1,295,240.50	9.11	9.10

Table A.11:P11, Portfolio of Largest Turnover at Jan 2010

Month	Issuer	Deal	Volume	Turnover	Opening Price	Closing Price
Jan	SCOM	11,496.00	430,267,186.00	2,363,152,327.85	4.57	5.34
Jan	EQTY	3,157.00	66,028,659.00	1,098,417,596.90	14.32	16.02
Jan	KQ	1,650.00	9,238,995.00	484,773,925.50	35.93	50.38
Jan	KCB	2,277.00	15,559,934.00	345,071,017.75	20.46	22.14
Jan	BAT	207.00	1,877,301.00	328,791,952.00	175.43	175.50
Jan	EABL	476.00	1,814,642.00	274,030,403.00	145.60	150.43
Jan	MSC	3,268.00	25,967,546.00	224,907,814.85	6.92	8.97
Jan	COOP	3,005.00	16,939,400.00	163,207,030.00	9.03	9.76
Jan	BBK	1,055.00	2,560,536.00	128,527,820.25	45.65	49.58
Jan	KPLC	310.00	602,226.00	88,964,069.00	140.88	149.00

Table A.12:P12, Portfolio of Smallest Turnover at Jan 2010

Month	Issuer	Deal	Volume	Turnover	Opening Price	Closing Price
Jan	EGAD	2.00	200.00	4,200.00	21.00	21.00
Jan	KAPC	2.00	460.00	42,960.00	94.50	86.00
Jan	KUKZ	9.00	14,182.00	457,646.00	32.00	34.00
Jan	C&G	8.00	13,282.00	464,978.50	31.75	34.94
Jan	XPRS	63.00	72,717.00	633,253.25	7.25	9.00
Jan	BERG	43.00	34,800.00	877,125.00	24.00	25.50
Jan	OCH	87.00	161,800.00	1,103,980.00	6.20	7.40
Jan	PAFR	21.00	26,192.00	1,202,748.00	45.00	48.00
Jan	UNGA	80.00	141,243.00	1,295,240.50	9.11	9.10
Jan	EVRD	556.00	825,488.00	3,099,034.80	2.90	3.78

Table A.13: P13, Portfolio of Largest Size (Deals) at Jan 2011

Month	Issuer	Deal	Volume	Turnover	Opening Price	Closing Price
Jan	SCOM	6,233.00	470,963,632.00	2,183,587,572.60	4.70	4.48
Jan	KPLC	5,276.00	44,570,864.00	1,021,608,775.00	25.73	24.15
Jan	COOP	4,948.00	35,034,743.00	706,968,366.30	19.38	20.44
Jan	EQTY	3,555.00	40,521,198.00	1,180,470,747.25	27.17	29.07
Jan	KCB	3,405.00	39,308,650.00	932,261,778.00	22.05	23.10
Jan	MSC	2,560.00	17,681,830.00	175,134,300.70	9.64	8.83
Jan	KEGN	2,165.00	9,543,438.00	160,356,806.15	16.87	16.46
Jan	KNRE	1,465.00	2,553,672.00	29,014,924.30	10.84	11.06
Jan	ICDC	1,338.00	4,156,951.00	99,368,446.50	23.18	23.72
Jan	KENO	1,288.00	13,575,950.00	136,563,450.00	10.06	9.99

Table A.14:P14, Portfolio of Smallest Size (Deals) at Jan 2011

Month	Issuer	Deal	Volume	Turnover	Opening Price	Closing Price
Jan	KAPC	14.00	7,000.00	904,800.00	110.00	130.00
Jan	PAFR	31.00	26,000.00	1,758,650.00	72.00	63.50
Jan	EGAD	41.00	18,800.00	999,800.00	52.33	57.00
Jan	C&G	46.00	95,900.00	4,868,700.00	45.50	54.50
Jan	WTK	49.00	95,800.00	20,112,200.00	185.00	200.00
Jan	KUKZ	66.00	131,266.00	10,808,500.00	81.50	81.00
Jan	XPRS	76.00	166,081.00	1,337,787.50	7.75	8.02
Jan	BERG	76.00	88,800.00	2,937,800.00	33.00	34.57
Jan	BAT	80.00	517,029.00	144,110,564.00	277.00	276.50
Jan	JUB	107.00	106,150.00	20,995,236.00	191.33	195.25

Table A.15:P15, Portfolio of Largest Volume at Jan 2011

Month	Issuer	Deal	Volume	Turnover	Opening Price	Closing Price
Jan	SCOM	6,233.00	470,963,632.00	2,183,587,572.60	4.70	4.48
Jan	KPLC	5,276.00	44,570,864.00	1,021,608,775.00	25.73	24.15
Jan	EQTY	3,555.00	40,521,198.00	1,180,470,747.25	27.17	29.07
Jan	KCB	3,405.00	39,308,650.00	932,261,778.00	22.05	23.10
Jan	COOP	4,948.00	35,034,743.00	706,968,366.30	19.38	20.44
Jan	MSC	2,560.00	17,681,830.00	175,134,300.70	9.64	8.83
Jan	KENO	1,288.00	13,575,950.00	136,563,450.00	10.06	9.99
Jan	KEGN	2,165.00	9,543,438.00	160,356,806.15	16.87	16.46
Jan	KQ	978.00	5,113,439.00	236,127,182.00	46.94	45.76
Jan	ICDC	1,338.00	4,156,951.00	99,368,446.50	23.18	23.72

Table A.16:P16, Portfolio of Smallest Volume at Jan 2011

Month	Issuer	Deal	Volume	Turnover	Opening Price	Closing Price
Jan	KAPC	14.00	7,000.00	904,800.00	110.00	130.00
Jan	EGAD	41.00	18,800.00	999,800.00	52.33	57.00
Jan	PAFR	31.00	26,000.00	1,758,650.00	72.00	63.50
Jan	SGL	87.00	56,981.00	2,480,779.75	45.25	42.25
Jan	BERG	76.00	88,800.00	2,937,800.00	33.00	34.57
Jan	WTK	49.00	95,800.00	20,112,200.00	185.00	200.00
Jan	C&G	46.00	95,900.00	4,868,700.00	45.50	54.50
Jan	JUB	107.00	106,150.00	20,995,236.00	191.33	195.25
Jan	KUKZ	66.00	131,266.00	10,808,500.00	81.50	81.00
Jan	XPRS	76.00	166,081.00	1,337,787.50	7.75	8.02

Table A.17:P17, Portfolio of Largest Turnover at Jan 2011

Month	Issuer	Deal	Volume	Turnover	Opening Price	Closing Price
Jan	SCOM	6,233.00	470,963,632.00	2,183,587,572.60	4.70	4.48
Jan	EQTY	3,555.00	40,521,198.00	1,180,470,747.25	27.17	29.07
Jan	KPLC	5,276.00	44,570,864.00	1,021,608,775.00	25.73	24.15
Jan	KCB	3,405.00	39,308,650.00	932,261,778.00	22.05	23.10
Jan	COOP	4,948.00	35,034,743.00	706,968,366.30	19.38	20.44
Jan	EABL	651.00	2,922,484.00	615,721,377.00	207.11	184.98
Jan	NMG	382.00	2,006,078.00	347,644,751.00	161.00	168.42
Jan	BBK	1,269.00	4,080,137.00	265,901,786.50	64.02	63.05
Jan	KQ	978.00	5,113,439.00	236,127,182.00	46.94	45.76
Jan	MSC	2,560.00	17,681,830.00	175,134,300.70	9.64	8.83

Table A.18:P18, Portfolio of Smallest Turnover at Jan 2011

Month	Issuer	Deal	Volume	Turnover	Opening Price	Closing Price
Jan	KAPC	14.00	7,000.00	904,800.00	110.00	130.00
Jan	EGAD	41.00	18,800.00	999,800.00	52.33	57.00
Jan	XPRS	76.00	166,081.00	1,337,787.50	7.75	8.02
Jan	PAFR	31.00	26,000.00	1,758,650.00	72.00	63.50
Jan	EVRD	600.00	705,000.00	2,108,230.00	3.17	2.80
Jan	SGL	87.00	56,981.00	2,480,779.75	45.25	42.25
Jan	OCH	158.00	435,800.00	2,603,460.00	5.97	5.87
Jan	BERG	76.00	88,800.00	2,937,800.00	33.00	34.57
Jan	UNGA	153.00	406,761.00	4,495,382.75	10.72	11.03
Jan	C&G	46.00	95,900.00	4,868,700.00	45.50	54.50

Table A.19: P19, Portfolio of Largest Size (Deals) at Jan 2012

Month	Issuer	Deal	Volume	Turnover	Opening Price	Closing Price
Jan	SCOM	2,574.00	201,053,543.00	645,727,030.70	2.97	3.22
Jan	EQTY	2,119.00	65,811,930.00	1,075,366,128.45	16.73	17.74
Jan	BBK	1,940.00	14,343,283.00	179,004,969.00	13.11	12.37
Jan	KCB	1,875.00	10,390,896.00	182,897,214.75	16.74	19.04
Jan	MSC	1,376.00	12,598,050.00	63,790,937.15	5.28	5.03
Jan	COOP	1,358.00	11,846,629.00	152,546,306.45	12.51	12.98
Jan	KPLC	1,027.00	5,022,351.00	80,629,682.05	17.46	15.50
Jan	KEGN	899.00	2,882,392.00	23,500,387.00	8.82	7.97
Jan	KQ	739.00	997,558.00	20,136,917.60	20.78	19.59
Jan	KENO	516.00	3,768,962.00	37,650,521.10	9.84	10.02

Table A.20: P20, Portfolio of Smallest Size (Deals) at Jan 2012

Month	Issuer	Deal	Volume	Turnover	Opening Price	Closing Price
Jan	KAPC	11.00	4,800.00	571,900.00	118.33	114.00
Jan	EGAD	15.00	9,700.00	310,400.00	32.00	32.00
Jan	C&G	18.00	13,867.00	341,707.25	22.75	25.00
Jan	SGL	29.00	28,158.00	756,335.50	24.75	25.88
Jan	BERG	35.00	37,620.00	847,265.00	21.33	26.00
Jan	KUKZ	37.00	664,350.00	47,280,525.00	68.17	70.00
Jan	WTK	39.00	144,830.00	37,193,260.00	273.33	255.00
Jan	XPRS	40.00	106,100.00	401,100.00	4.00	4.00
Jan	CFC	52.00	92,870.00	3,785,555.00	40.00	40.13
Jan	ARM	61.00	197,475.00	30,874,003.00	157.00	151.00

Table A.21:P21, Portfolio of Largest Volume at Jan 2012

Month	Issuer	Deal	Volume	Turnover	Opening Price	Closing Price
Jan	SCOM	2,574.00	201,053,543.00	645,727,030.70	2.97	3.22
Jan	EQTY	2,119.00	65,811,930.00	1,075,366,128.45	16.73	17.74
Jan	BBK	1,940.00	14,343,283.00	179,004,969.00	13.11	12.37
Jan	MSC	1,376.00	12,598,050.00	63,790,937.15	5.28	5.03
Jan	COOP	1,358.00	11,846,629.00	152,546,306.45	12.51	12.98
Jan	KCB	1,875.00	10,390,896.00	182,897,214.75	16.74	19.04
Jan	KPLC	1,027.00	5,022,351.00	80,629,682.05	17.46	15.50
Jan	KENO	516.00	3,768,962.00	37,650,521.10	9.84	10.02
Jan	KEGN	899.00	2,882,392.00	23,500,387.00	8.82	7.97
Jan	EABL	369.00	2,428,039.00	418,971,155.00	174.69	165.73

Table A.22:P22, Portfolio of Smallest Volume at Jan 2012

Month	Issuer	Deal	Volume	Turnover	Opening Price	Closing Price
Jan	KAPC	11.00	4,800.00	571,900.00	118.33	114.00
Jan	EGAD	15.00	9,700.00	310,400.00	32.00	32.00
Jan	C&G	18.00	13,867.00	341,707.25	22.75	25.00
Jan	SGL	29.00	28,158.00	756,335.50	24.75	25.88
Jan	BERG	35.00	37,620.00	847,265.00	21.33	26.00
Jan	JUB	74.00	49,949.00	7,686,763.00	153.00	149.80
Jan	OCH	70.00	72,000.00	245,350.00	3.38	3.35
Jan	UNGA	83.00	85,140.00	788,048.00	9.50	9.10
Jan	CFC	52.00	92,870.00	3,785,555.00	40.00	40.13
Jan	XPRS	40.00	106,100.00	401,100.00	4.00	4.00

Table A.23:P23, Portfolio of Largest Turnover at Jan 2012

Month	Issuer	Deal	Volume	Turnover	Opening Price	Closing Price
Jan	EQTY	2,119.00	65,811,930.00	1,075,366,128.45	16.73	17.74
Jan	SCOM	2,574.00	201,053,543.00	645,727,030.70	2.97	3.22
Jan	EABL	369.00	2,428,039.00	418,971,155.00	174.69	165.73
Jan	KCB	1,875.00	10,390,896.00	182,897,214.75	16.74	19.04
Jan	BBK	1,940.00	14,343,283.00	179,004,969.00	13.11	12.37
Jan	COOP	1,358.00	11,846,629.00	152,546,306.45	12.51	12.98
Jan	BAT	65.00	461,513.00	119,123,534.00	247.00	260.00
Jan	SCAN	257.00	2,408,499.00	97,283,343.50	41.71	39.50
Jan	KPLC	1,027.00	5,022,351.00	80,629,682.05	17.46	15.50
Jan	MSC	1,376.00	12,598,050.00	63,790,937.15	5.28	5.03

Table A.24:P24, Portfolio of Smallest Turnover at Jan 2012

Month	Issuer	Deal	Volume	Turnover	Opening Price	Closing Price
Jan	OCH	70.00	72,000.00	245,350.00	3.38	3.35
Jan	EGAD	15.00	9,700.00	310,400.00	32.00	32.00
Jan	C&G	18.00	13,867.00	341,707.25	22.75	25.00
Jan	XPRS	40.00	106,100.00	401,100.00	4.00	4.00
Jan	KAPC	11.00	4,800.00	571,900.00	118.33	114.00
Jan	SGL	29.00	28,158.00	756,335.50	24.75	25.88
Jan	UNGA	83.00	85,140.00	788,048.00	9.50	9.10
Jan	BERG	35.00	37,620.00	847,265.00	21.33	26.00
Jan	EVRD	263.00	595,200.00	1,014,915.00	1.79	1.66
Jan	TOTL	115.00	130,680.00	2,021,030.00	14.63	16.20

Table A.25:P25, Portfolio of Largest Size (Deals) at Jan 2013

Month	Issuer	Deal	Volume	Turnover	Opening Price	Closing Price
Jan	SCOM	5,255.00	264,272,995.00	1,479,296,290.90	5.08	5.45
Jan	KCB	2,882.00	34,100,049.00	1,115,507,090.00	30.04	33.42
Jan	KEGN	2,284.00	21,491,381.00	253,656,293.05	8.76	11.75
Jan	BBK	1,956.00	17,230,731.00	275,153,028.15	15.68	16.13
Jan	MSC	1,949.00	33,309,463.00	167,803,126.70	4.91	5.04
Jan	COOP	1,842.00	15,942,891.00	206,956,039.35	12.74	12.84
Jan	EQTY	1,418.00	15,216,305.00	396,700,013.75	23.88	26.33
Jan	KPLC	947.00	12,387,233.00	215,920,869.50	17.03	17.44
Jan	KNRE	911.00	3,157,677.00	37,215,248.00	10.54	11.73
Jan	NIC	792.00	3,183,834.00	138,216,026.00	38.54	41.94

Table A.26:P26, Portfolio of Smallest Size (Deals) at Jan 2013

Month	Issuer	Deal	Volume	Turnover	Opening Price	Closing Price
Jan	KUKZ	18.00	109,358.00	7,683,687.00	67.50	71.00
Jan	KAPC	19.00	6,200.00	724,900.00	118.00	112.50
Jan	C&G	26.00	26,581.00	649,007.00	24.25	24.00
Jan	XPRS	35.00	40,210.00	135,694.50	3.47	3.50
Jan	OCH	40.00	90,800.00	328,965.00	3.70	3.60
Jan	WTK	43.00	32,662.00	6,527,260.00	200.00	200.00
Jan	BERG	46.00	128,900.00	5,461,175.00	41.91	42.50
Jan	SGL	67.00	102,560.00	2,382,450.75	22.50	21.85
Jan	EGAD	72.00	84,600.00	1,990,625.00	23.75	24.00
Jan	JUB	103.00	161,644.00	30,609,442.00	174.75	187.00

Table A.27:P27, Portfolio of Largest Volume at Jan 2013

Month	Issuer	Deal	Volume	Turnover	Opening Price	Closing Price
Jan	SCOM	5,255.00	264,272,995.00	1,479,296,290.90	5.08	5.45
Jan	KCB	2,882.00	34,100,049.00	1,115,507,090.00	30.04	33.42
Jan	MSC	1,949.00	33,309,463.00	167,803,126.70	4.91	5.04
Jan	KEGN	2,284.00	21,491,381.00	253,656,293.05	8.76	11.75
Jan	BBK	1,956.00	17,230,731.00	275,153,028.15	15.68	16.13
Jan	COOP	1,842.00	15,942,891.00	206,956,039.35	12.74	12.84
Jan	EQTY	1,418.00	15,216,305.00	396,700,013.75	23.88	26.33
Jan	KPLC	947.00	12,387,233.00	215,920,869.50	17.03	17.44
Jan	KENO	381.00	12,113,131.00	165,994,496.20	13.57	13.63
Jan	EABL	678.00	5,029,203.00	1,493,760,265.00	267.00	301.20

Table A.28:P28, Portfolio of Smallest Volume at Jan 2013

Month	Issuer	Deal	Volume	Turnover	Opening Price	Closing Price
Jan	KAPC	19.00	6,200.00	724,900.00	118.00	112.50
Jan	C&G	26.00	26,581.00	649,007.00	24.25	24.00
Jan	WTK	43.00	32,662.00	6,527,260.00	200.00	200.00
Jan	XPRS	35.00	40,210.00	135,694.50	3.47	3.50
Jan	EGAD	72.00	84,600.00	1,990,625.00	23.75	24.00
Jan	OCH	40.00	90,800.00	328,965.00	3.70	3.60
Jan	SGL	67.00	102,560.00	2,382,450.75	22.50	21.85
Jan	KUKZ	18.00	109,358.00	7,683,687.00	67.50	71.00
Jan	BERG	46.00	128,900.00	5,461,175.00	41.91	42.50
Jan	JUB	103.00	161,644.00	30,609,442.00	174.75	187.00

Table A.29:P29, Portfolio of Largest Turnover at Jan 2013

Month	Issuer	Deal	Volume	Turnover	Opening Price	Closing Price
Jan	EABL	678.00	5,029,203.00	1,493,760,265.00	267.00	301.20
Jan	SCOM	5,255.00	264,272,995.00	1,479,296,290.90	5.08	5.45
Jan	KCB	2,882.00	34,100,049.00	1,115,507,090.00	30.04	33.42
Jan	EQTY	1,418.00	15,216,305.00	396,700,013.75	23.88	26.33
Jan	BAT	182.00	732,385.00	386,419,443.00	500.00	515.86
Jan	BBK	1,956.00	17,230,731.00	275,153,028.15	15.68	16.13
Jan	KEGN	2,284.00	21,491,381.00	253,656,293.05	8.76	11.75
Jan	ARM	551.00	4,287,831.00	231,284,806.00	49.93	52.15
Jan	NMG	317.00	888,689.00	221,656,392.00	220.75	259.30
Jan	KPLC	947.00	12,387,233.00	215,920,869.50	17.03	17.44

Table A.30: P30, Portfolio of Smallest Turnover at Jan 2013

Month	Issuer	Deal	Volume	Turnover	Opening Price	Closing Price
Jan	XPRS	35.00	40,210.00	135,694.50	3.47	3.50
Jan	OCH	40.00	90,800.00	328,965.00	3.70	3.60
Jan	C&G	26.00	26,581.00	649,007.00	24.25	24.00
Jan	KAPC	19.00	6,200.00	724,900.00	118.00	112.50
Jan	EVRD	368.00	565,511.00	1,107,185.40	2.04	1.96
Jan	EGAD	72.00	84,600.00	1,990,625.00	23.75	24.00
Jan	SGL	67.00	102,560.00	2,382,450.75	22.50	21.85
Jan	UNGA	118.00	346,413.00	4,753,317.30	13.05	13.67
Jan	BERG	46.00	128,900.00	5,461,175.00	41.91	42.50
Jan	TOTL	155.00	423,551.00	5,880,333.00	13.86	13.82

APPENDIX III: Cross-sectional testing results under 2nd ILLQ measure

Table A 31: Summary output of Cross-sectional testing under 2nd ILLQ measure

Regression Statistics	Multiple R	R Square	Adjusted R Square	Standard Error	Observations
P1	0.78	0.62	0.59	0.08	60.00
P2	0.81	0.65	0.62	0.06	60.00
P3	0.79	0.63	0.60	0.07	60.00
P4	0.81	0.65	0.62	0.06	60.00
P5	0.80	0.63	0.60	0.06	60.00
P6	0.81	0.65	0.62	0.06	60.00
P7	0.79	0.62	0.59	0.08	60.00
P8	0.87	0.75	0.72	0.05	60.00
P9	0.78	0.61	0.58	0.08	60.00
P10	0.78	0.61	0.58	0.06	60.00
P11	0.79	0.62	0.59	0.06	60.00
P12	0.81	0.65	0.62	0.06	60.00
P13	0.73	0.53	0.50	0.10	60.00
P14	0.83	0.70	0.67	0.05	60.00
P15	0.74	0.55	0.52	0.10	60.00
P16	0.82	0.68	0.65	0.06	60.00
P17	0.81	0.65	0.62	0.07	60.00
P18	0.83	0.69	0.66	0.05	60.00
P19	0.76	0.58	0.55	0.09	60.00
P20	0.74	0.54	0.51	0.07	60.00
P21	0.78	0.61	0.58	0.08	60.00
P22	0.83	0.69	0.67	0.05	60.00
P23	0.79	0.62	0.59	0.06	60.00
P24	0.85	0.73	0.70	0.05	60.00
P25	0.75	0.57	0.53	0.09	60.00
P26	0.82	0.66	0.64	0.06	60.00
P27	0.78	0.61	0.58	0.08	60.00
P28	0.82	0.66	0.64	0.06	60.00
P29	0.82	0.67	0.65	0.06	60.00
P30	0.85	0.73	0.70	0.05	60.00

Number of data points per portfolio is 60; Standard Error is less or equal to 0.1 for majority of the portfolios; R-squared for the 30 portfolios are greater than 50% under the 2nd Illiquidity measure; Adjusted R-squared are also greater than 50%.

Table A32 a:ANOVA of Cross-sectional testing under 2nd ILLQ measure, P1 to P15

		df	SS	MS	F	Significance F
P1	Regression	3.00	0.56	0.19	30.49	0.00
	Residual	57.00	0.35	0.01		
	Total	60.00	0.92			
P2	Regression	3.00	0.40	0.13	35.76	0.00
	Residual	57.00	0.21	0.00		
	Total	60.00	0.61			
P3	Regression	3.00	0.45	0.15	32.52	0.00
	Residual	57.00	0.27	0.00		
	Total	60.00	0.72			
P4	Regression	3.00	0.40	0.13	35.76	0.00
	Residual	57.00	0.21	0.00		
	Total	60.00	0.61			
P5	Regression	3.00	0.33	0.11	32.76	0.00
	Residual	57.00	0.19	0.00		
	Total	60.00	0.52			
P6	Regression	3.00	0.36	0.12	37.03	0.00
	Residual	57.00	0.18	0.00		
	Total	60.00	0.54			
P7	Regression	3.00	0.58	0.19	30.56	0.00
	Residual	57.00	0.36	0.01		
	Total	60.00	0.94			
P8	Regression	3.00	0.37	0.12	56.87	0.00
	Residual	57.00	0.12	0.00		
	Total	60.00	0.49			
P9	Regression	3.00	0.57	0.19	29.58	0.00
	Residual	57.00	0.37	0.01		
	Total	60.00	0.94			
P10	Regression	3.00	0.32	0.11	30.16	0.00
	Residual	57.00	0.20	0.00		
	Total	60.00	0.52			
P11	Regression	3.00	0.38	0.13	31.57	0.00
	Residual	57.00	0.23	0.00		
	Total	60.00	0.61			
P12	Regression	3.00	0.35	0.12	35.03	0.00
	Residual	57.00	0.19	0.00		
	Total	60.00	0.54			
P13	Regression	3.00	0.64	0.21	21.49	0.00
	Residual	57.00	0.56	0.01		
	Total	60.00	1.20			
P14	Regression	3.00	0.33	0.11	43.72	0.00
	Residual	57.00	0.14	0.00		
	Total	60.00	0.47			
P15	Regression	3.00	0.64	0.21	23.26	0.00
	Residual	57.00	0.52	0.01		
	Total	60.00	1.16			

These portfolios have 3 degrees of freedom; regression sum squared and residual sum squared are for the majority of the cases less than 0.5; the F-test reveals p-values well below 0.5%.

Table A32 b:ANOVA of Cross-sectional testing under 2nd ILLQ measure, P16 to P30

		df	SS	MS	F	Significance F
P16	Regression	3.00	0.42	0.14	40.09	0.00
	Residual	57.00	0.20	0.00		
	Total	60.00	0.61			
P17	Regression	3.00	0.49	0.16	35.39	0.00
	Residual	57.00	0.26	0.00		
	Total	60.00	0.75			
P18	Regression	3.00	0.38	0.13	41.63	0.00
	Residual	57.00	0.17	0.00		
	Total	60.00	0.55			
P19	Regression	3.00	0.67	0.22	26.30	0.00
	Residual	57.00	0.49	0.01		
	Total	60.00	1.16			
P20	Regression	3.00	0.35	0.12	22.64	0.00
	Residual	57.00	0.30	0.01		
	Total	60.00	0.65			
P21	Regression	3.00	0.54	0.18	29.94	0.00
	Residual	57.00	0.35	0.01		
	Total	60.00	0.89			
P22	Regression	3.00	0.35	0.12	43.14	0.00
	Residual	57.00	0.16	0.00		
	Total	60.00	0.51			
P23	Regression	3.00	0.37	0.12	30.84	0.00
	Residual	57.00	0.23	0.00		
	Total	60.00	0.60			
P24	Regression	3.00	0.39	0.13	50.52	0.00
	Residual	57.00	0.15	0.00		
	Total	60.00	0.54			
P25	Regression	3.00	0.63	0.21	24.82	0.00
	Residual	57.00	0.48	0.01		
	Total	60.00	1.12			
P26	Regression	3.00	0.41	0.14	37.70	0.00
	Residual	57.00	0.21	0.00		
	Total	60.00	0.62			
P27	Regression	3.00	0.54	0.18	29.94	0.00
	Residual	57.00	0.35	0.01		
	Total	60.00	0.89			
P28	Regression	3.00	0.41	0.14	37.70	0.00
	Residual	57.00	0.21	0.00		
	Total	60.00	0.62			
P29	Regression	3.00	0.37	0.12	39.35	0.00
	Residual	57.00	0.18	0.00		
	Total	60.00	0.55			
P30	Regression	3.00	0.39	0.13	50.52	0.00
	Residual	57.00	0.15	0.00		
	Total	60.00	0.54			

These portfolios have 3 degrees of freedom; regression sum squared and residual sum squared are for the majority of the cases less than 0.5; the F-test reveals p-values well below 0.5%.

Table A33 a:Result of Coefficients, for Cross-sectional testing under 2nd ILLQ measure, P1 to P10

		Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
	Intercept	-					
	RM-RFR	0.47	0.12	3.75	0.00	0.22	0.72
P1	Volume	0.00	0.00	1.88	0.07	(0.00)	0.00
	2ndIlliquidity measure x10^-9	(0.05)	0.01	(3.29)	0.00	(0.07)	(0.02)
	Intercept	-					
	RM-RFR	0.59	0.10	5.84	0.00	0.39	0.79
P2	Volume	(0.00)	0.00	(0.12)	0.90	(0.00)	0.00
	2ndIlliquidity measure x10^-9	(0.00)	0.00	(1.41)	0.16	(0.00)	0.00
	Intercept	-					
	RM-RFR	0.48	0.11	4.40	0.00	0.26	0.69
P3	Volume	0.00	0.00	0.53	0.60	(0.00)	0.00
	2ndIlliquidity measure x10^-9	(0.02)	0.01	(2.13)	0.04	(0.03)	(0.00)
	Intercept	-					
	RM-RFR	0.59	0.10	5.84	0.00	0.39	0.79
P4	Volume	(0.00)	0.00	(0.12)	0.90	(0.00)	0.00
	2ndIlliquidity measure x10^-9	(0.00)	0.00	(1.41)	0.16	(0.00)	0.00
	Intercept	-					
	RM-RFR	0.37	0.09	4.06	0.00	0.19	0.56
P5	Volume	0.00	0.00	0.25	0.80	(0.00)	0.00
	2ndIlliquidity measure x10^-9	(0.01)	0.01	(1.96)	0.05	(0.02)	0.00
	Intercept	-					
	RM-RFR	0.26	0.09	2.80	0.01	0.07	0.45
P6	Volume	0.00	0.00	1.99	0.05	(0.00)	0.00
	2ndIlliquidity measure x10^-9	(0.00)	0.00	(4.39)	0.00	(0.00)	(0.00)
	Intercept	-					
	RM-RFR	0.49	0.13	3.89	0.00	0.24	0.74
P7	Volume	0.00	0.00	2.15	0.04	0.00	0.00
	2ndIlliquidity measure x10^-9	(0.05)	0.01	(3.45)	0.00	(0.08)	(0.02)
	Intercept	-					
	RM-RFR	0.32	0.08	4.28	0.00	0.17	0.47
P8	Volume	(0.00)	0.00	(0.19)	0.85	(0.00)	0.00
	2nd Illiquidity measure	(0.00)	0.00	(3.44)	0.00	(0.00)	(0.00)
	Intercept	-					
	RM-RFR	0.50	0.13	3.94	0.00	0.25	0.76
P9	Volume	0.00	0.00	1.85	0.07	(0.00)	0.00
	2ndIlliquidity measure x10^-9	(0.04)	0.01	(3.23)	0.00	(0.07)	(0.02)
	Intercept	-					
	RM-RFR	0.26	0.09	2.73	0.01	0.07	0.45
P10	Volume	(0.00)	0.00	(0.41)	0.69	(0.00)	0.00
	2ndIlliquidity measure x10^-9	(0.00)	0.00	(3.01)	0.00	(0.00)	(0.00)

For the tested portfolios, the intercept for the regression run is taken to be zero, variables under observations are 2nd illiquidity measure, volume traded and market returns.

Table A33 b:Result of Coefficients, for Cross-sectional testing under 2nd ILLQ measure, P11 to P20

		Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
	Intercept	-					
	RM-RFR	0.44	0.10	4.40	0.00	0.24	0.64
P11	Volume	0.00	0.00	0.02	0.98	(0.00)	0.00
	2ndIlliquidity measure x10^-9	(0.01)	0.00	(1.58)	0.12	(0.02)	0.00
	Intercept	-					
	RM-RFR	0.29	0.09	3.12	0.00	0.10	0.47
P12	Volume	0.00	0.00	1.30	0.20	(0.00)	0.00
	2ndIlliquidity measure x10^-9	(0.00)	0.00	(3.85)	0.00	(0.00)	(0.00)
	Intercept	-					
	RM-RFR	0.60	0.16	3.83	0.00	0.29	0.92
P13	Volume	0.00	0.00	1.22	0.23	(0.00)	0.00
	2ndIlliquidity measure x10^-9	(0.03)	0.01	(2.22)	0.03	(0.05)	(0.00)
	Intercept	-					
	RM-RFR	0.47	0.08	5.75	0.00	0.31	0.64
P14	Volume	0.00	0.00	0.87	0.39	(0.00)	0.00
	2nd Illiquidity measure x10^-9	(0.00)	0.00	(2.66)	0.01	(0.00)	(0.00)
	Intercept	-					
	RM-RFR	0.59	0.15	3.88	0.00	0.28	0.89
P15	Volume	0.00	0.00	1.09	0.28	(0.00)	0.00
	2ndIlliquidity measure x10^-9	(0.02)	0.01	(2.28)	0.03	(0.04)	(0.00)
	Intercept	-					
	RM-RFR	0.56	0.09	5.99	0.00	0.37	0.75
P16	Volume	0.00	0.00	2.13	0.04	0.00	0.00
	2ndIlliquidity measure x10^-9	(0.00)	0.00	(3.26)	0.00	(0.00)	(0.00)
	Intercept	-					
	RM-RFR	0.56	0.11	5.19	0.00	0.34	0.77
P17	Volume	0.00	0.00	0.41	0.69	(0.00)	0.00
	2ndIlliquidity measure x10^-9	(0.01)	0.01	(1.76)	0.08	(0.02)	0.00
	Intercept	-					
	RM-RFR	0.24	0.09	2.72	0.01	0.06	0.42
P18	Volume	0.00	0.00	1.35	0.18	(0.00)	0.00
	2ndIlliquidity measure x10^-9	(0.00)	0.00	(4.46)	0.00	(0.00)	(0.00)
	Intercept	-					
	RM-RFR	0.58	0.15	4.00	0.00	0.29	0.88
P19	Volume	0.00	0.00	1.21	0.23	(0.00)	0.00
	2ndIlliquidity measure x10^-9	(0.03)	0.01	(2.44)	0.02	(0.05)	(0.00)
	Intercept	-					
	RM-RFR	0.42	0.11	3.73	0.00	0.20	0.65
P20	Volume	0.00	0.00	0.50	0.62	(0.00)	0.00
	2nd Illiquidity measure x10^-9	(0.00)	0.00	(3.05)	0.00	(0.00)	(0.00)

For the tested portfolios, the intercept for the regression run is taken to be zero, variables under observations are 2nd illiquidity measure, volume traded and market returns.

Table A33 c:Result of Coefficients, for Cross-sectional testing under 2nd ILLQ measure, P21 to P30

		Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
P21	Intercept	-					
	RM-RFR	0.58	0.12	4.69	0.00	0.33	0.82
	Volume	0.00	0.00	0.49	0.62	(0.00)	0.00
	2ndIlliquidity measure x10^-9	(0.01)	0.01	(1.84)	0.07	(0.02)	0.00
P22	Intercept	-					
	RM-RFR	0.33	0.08	4.00	0.00	0.17	0.50
	Volume	(0.00)	0.00	(0.99)	0.33	(0.00)	0.00
	2ndIlliquidity measure x10^-9	(0.00)	0.00	(4.32)	0.00	(0.00)	(0.00)
P23	Intercept	-					
	RM-RFR	0.43	0.10	4.33	0.00	0.23	0.63
	Volume	0.00	0.00	0.03	0.98	(0.00)	0.00
	2ndIlliquidity measure x10^-9	(0.01)	0.00	(1.57)	0.12	(0.02)	0.00
P24	Intercept	-					
	RM-RFR	0.20	0.08	2.46	0.02	0.04	0.36
	Volume	0.00	0.00	2.40	0.02	0.00	0.00
	2ndIlliquidity measure x10^-9	(0.00)	0.00	(5.76)	0.00	(0.00)	(0.00)
P25	Intercept	-					
	RM-RFR	0.62	0.15	4.28	0.00	0.33	0.92
	Volume	0.00	0.00	1.14	0.26	(0.00)	0.00
	2ndIlliquidity measure x10^-9	(0.03)	0.01	(2.15)	0.04	(0.05)	(0.00)
P26	Intercept	-					
	RM-RFR	0.57	0.10	5.96	0.00	0.38	0.76
	Volume	0.00	0.00	1.97	0.05	(0.00)	0.00
	2nd Illiquidity measure x10^-9	(0.00)	0.00	(3.01)	0.00	(0.00)	(0.00)
P27	Intercept	-					
	RM-RFR	0.58	0.12	4.69	0.00	0.33	0.82
	Volume	0.00	0.00	0.49	0.62	(0.00)	0.00
	2ndIlliquidity measure x10^-9	(0.01)	0.01	(1.84)	0.07	(0.02)	0.00
P28	Intercept	-					
	RM-RFR	0.57	0.10	5.96	0.00	0.38	0.76
	Volume	0.00	0.00	1.97	0.05	(0.00)	0.00
	2ndIlliquidity measure x10^-9	(0.00)	0.00	(3.01)	0.00	(0.00)	(0.00)
P29	Intercept	-					
	RM-RFR	0.41	0.09	4.63	0.00	0.23	0.59
	Volume	0.00	0.00	0.15	0.88	(0.00)	0.00
	2ndIlliquidity measure x10^-9	(0.01)	0.00	(2.10)	0.04	(0.01)	(0.00)
P30	Intercept	-					
	RM-RFR	0.20	0.08	2.46	0.02	0.04	0.36
	Volume	0.00	0.00	2.40	0.02	0.00	0.00
	2ndIlliquidity measure x10^-9	(0.00)	0.00	(5.76)	0.00	(0.00)	(0.00)

For the tested portfolios, the intercept for the regression run is taken to be zero, variables under observations are 2nd illiquidity measure, volume traded and market returns.