LUND UNIVERSITY

School of Economics and Management

LUND UNIVERSITY

Firm Level Factors Affecting Liquidity – The Swedish Stock Market

MASTER THESIS

Authors:
Jose Roberto Pagoada
Kim Jonsson

Supervisor:
Birger Nilsson

Date: 3rd, June 2015

FIRM LEVEL FACTORS AFFECTING
LIQUIDITY- THE SWEDISH STOCK MARKET

By

Jose Roberto Pagoada and Kim Jonsson

A thesis submitted in partial fulfillment of the requirements
for the degree of

Master of Science in Finance

LUND UNIVERSITY

2015

Approved by _____
Chairperson of Supervisory Committee

_____

_____

_____

Program Authorized
to Offer Degree_____

Date _____

Abstract

Title: Firm Level Factors affecting Liquidity-The Swedish Stock Market

Authors: Jose Roberto Pagoada and Kim Jonsson

Advisor: Birger Nilsson

Keywords: Liquidity, Illiquidity, Amihud measure, Bid Ask Spread, Turnover, Liquidity Premium, LCAPM

Purpose: The purpose of this study is to further look at which firm-adjustable factors affect the liquidity of a firm's stock in the Swedish stock market. We also want to determine which out of these suggested factors have a significant effect on liquidity across different proxies of liquidity. Finally we aim to determine whether our findings are consistent with previous research findings.

Methodology: A quantitative approach with the interpretation of the results from panel data regressions.

Theoretical framework: Liquidity Capital Asset Pricing Model (LCAPM)

Empirical foundation: A sample of 433 firms during the time period 2000-2014

Conclusions: We come to the conclusion that the firm's assets liquidity and the ownership structure, more specifically the cash and cash equivalents and the free floating shares, have a positive relationship with liquidity for firms on the Swedish Stock market. These findings are consistent with other studies in other markets. Our data did however not provide significant results to establish a relationship between liquidity and capital structure or dividend payout policies.

Table of Contents

LIST OF TABLES

I . Introduction

Amihud and Mendelson first established a link between expected excess returns and liquidity in 1986. Their study arrived to the conclusion that investors require higher returns on less liquid stock. Studies such as Brennan and Subrahmanyam (1996), Brennan et al (1998) and, Pastor and Stambaugh (2003) have all validated the findings of Amihud and Mendelson (1986), indicating that the level of liquidity indeed has an effect on expected returns and as a result also on asset pricing. They distinguish between the level of liquidity and the liquidity risk where the former is the amount of liquidity measured for example by the bid-ask spread and the latter is the risk that the illiquidity level will deviate from its expected value.

In a later paper Amihud & Mendelson (1991) describe their 1986 results as the liquidity effect. The liquidity effect is compared to the effect of risk on capital assets. Just like risk-averse investors require additional compensation for bearing higher risks, investors will require additional compensation for bearing additional illiquidity on its assets. The liquidity effect shows how the microstructure of security markets is relevant for firms as well as the value of financial policies targeting to increase the liquidity of individual securities and of the market as a whole. Private benefits can thus be created by increasing securities' liquidity since issuers are able to sell more liquid stock at higher prices. Liquidity is therefore essential when developing a company's financial policies regarding financial instruments. Similarly financial analysts must include liquidity in their stock valuations. Financial advisors also should aim to match the investors liquidity needs with the assets included in the portfolio.

This has inspired a vast number of studies to look at variables that affect liquidity and its associated costs. Additional implications have been explored given this liquidity effect including implications for corporate management, for capital structure (O'Connor, Lesmond & Senbet, 2008; Lipson & Mortal, 2009), for security design regarding the number of markets in which a stock is listed (Amihud, Lauterbach and Mendelson, 2003), for payout policies regarding dividends and buybacks (Banerjee, Gatchev, Spindt, 2007; Brockman, Howe and Mortal, 2008) as well as corporate investment decisions, corporate governance and managerial incentives (Amihud and Mendelson, 2012). Variables that affect liquidity can be separated into systematic factors (non-firm-adjustable) and firm-adjustable factors. Systematic factors concern such factors that cannot be affected by an individual firm which are due to macroeconomic factors. Firm-adjustable factors include factors that an individual firm can modify on their own. Extensive literature exists on individual factors in the form of suggestions of liquidity-enhancing policies since there is a connection between these factors, liquidity and returns separately. These include going public, increasing the small investor base, increasing the information disclosure, modifying the dividend payout policy, increasing the firm cash liquidity, avoiding fragmentation when issuing securities. Researchers still have the task to determine which of the policies have a higher impact in increasing the securities' liquidity and to explore additional liquidity-enhancing policies.

The purpose of this study is to further look at which firm-adjustable factors might affect the liquidity of a firm's stock in the Swedish stock market. We also want to determine which out of these suggested factors have a significant effect on liquidity across different proxies of liquidity. Finally we aim to determine whether our findings are consistent with previous research findings. This has a potential to help Swedish firms decide which action the most beneficial in terms of increasing liquidity and as result to their stock price. Our focus is on the Swedish stock market due to the previous lack of studies conducted in this setting. It is worth mentioning that the Swedish stock market differs from for example the US market in the sense that there are no

real market makers for the stocks given that trading is executed primarily electronically. For our study we therefore consider the electronic order book as the market maker.

Our models will be estimated by running panel data regressions using a number of explanatory variables representing four firm-adjustable factors: a) the dividend policy measured by its dividend yield, b) the firm's assets' liquidity measured by cash and cash equivalents and by the quick ratio, c) information disclosure and capital structure both proxied by a single variable debt level, and d) the firm's ownership structure measured by its percentage of free floating shares and by its percentage of institutionally held shares. Three proxies are used for measuring liquidity: the bid-ask spread, the Amihud measure and the turnover.

It is important to have in mind that the costs associated with implementing the suggested financial policies are out of the scope of this study. There is as always a cost versus benefit analysis that needs to be performed by a company in order to determine if said policy effect on liquidity will outweigh the implementation costs. This is a topic that requires further research.

As previous studies have shown, there is an economic and significant relation between the expected return and the liquidity of a firm's stock. This relationship affects the firm's stock price, which then can be lower than what the fundamental value indicates. This result has implications for firms because if they decrease the costs that arise from liquidity they can improve their stock price, everything else being equal. Amihud and Mendelson (2000) showed that this increase in stock price could be achieved without changing other important corporate characteristics such as expected earnings, growth, assets etc. Furthermore, an increase in liquidity would not only benefit the individual company by an increased stock price but also the financial market as a whole. Improved liquidity will result in smaller spreads and a smaller price impact. In the end, this will bring the real market closer to the underlying principle of perfectly liquid markets made in asset pricing theory eliminating liquidity as a friction and resulting in more efficient capital allocation.

Our findings reveal certain similarities with previous studies with some of the firm-adjustable factors although for some firm-adjustable factors the data does not allow to make any significant conclusions. We show how the dividend policies have a significant relationship with liquidity but no conclusion can be determined regarding the sign (positive or negative) of this relationship. The firm's assets' liquidity measured by the cash and cash equivalents has a positive relationship with liquidity and is consistent with previous studies (Gopalan, Kadan and Pevzner, 2012). However when the quick ratio measurement is used we observe a significant negative relationship. A possible explanation for this result could be the fact that this measurement captures a different aspect of the asset's liquidity which causes the negative relationship. Finally, data showed that the ownership structure of a firm is significantly related to the liquidity of a firm. The number of free-floating shares is positively related to liquidity as other studies had found (Amihud et al. 1999). Based on these results firms in Sweden may align their financial policies to increase their firm's assets' liquidity and increase their free floating shares in order to improve their stock's liquidity.

On the other hand we obtained inconclusive results for two variables. Our results did not reveal any significant relationship between our variable (DEBT_LEV) measuring the debt level of a firm, representing both the capital structure and the information disclosure of the firm, and liquidity. Moreover the findings on the institutional shareholding were only significant for one of the proxies of liquidity (ILLIQ), thus not allowing us to make substantial conclusions regarding the relationship with liquidity. Further studies remain to be conducted to determine whether dividend payout policies are positively or negatively related to the liquidity of a stock as well the existence of a significant relationship between capital structure and information disclosure and liquidity in Sweden.

The remaining four chapters of the thesis include in Chapter II a theoretical background, Chapter III a description of the methodology. Chapter IV presents the results of our study and

Chapter V has a summary of the study and concluding remarks. Chapter II's theoretical background discusses the different literature on liquidity, the associated liquidity premium and a review of the literature that establishes a connection of the micro market structure and its implications on corporate finance. It concludes with a review of prior research conducted on the Swedish stock market. Chapter III details the data used and the sources where it was obtained. It follows with a description of the liquidity variables, the independent variables and the control variables. It ends with summary statistics of the variables, the description of the models for the regression and a discussion of validity and reliability of the data. Chapter IV presents the final results of the study as well as a discussion analyzing and interpreting these results. Lastly, Chapter V summarizes all the results and presents our conclusions from the study.

II . Theoretical Background

A. Liquidity

The concept of liquidity is a well-researched topic, many scholars and researchers have investigated the costs that are associated with liquidity and the implications that these have for asset pricing and price efficiency. Costs that are associated with liquidity are primarily related to the notion of information and friction costs, which include adverse selection, opportunity, and direct costs such as commissions & fees. (Amihud & Mendelson, 2000; Agarwal, 2009). These costs will be covered in more detail later on in this chapter.

There are two distinct types of liquidity, the first one called *trading liquidity* indicates how fast something can be transacted and to which roundtrip cost, and the other one called *funding liquidity* indicates the ease with which a firm can obtain funding (Hibbert et al, 2009; Amihud et al, 2005). The two concepts are somewhat interlinked, especially in times of economic crisis. We will however focus on trading liquidity in this paper, and the fact that an illiquid asset will take a longer time to transact than a liquid one, which in turn have implications for asset pricing (Amihud & Mendelson, 2000; Amihud et al, 2005). Much theory of asset pricing is built on some assumptions such as no arbitrage, equilibrium and utility maximization, together with the notion of perfect liquid markets without frictions. These assumptions mean that every asset can be traded at any time with no additional cost (Amihud et al, 2005; Pennacchi, 2008). Acharya and Pedersen (2005) derive a liquidity-adjusted capital asset pricing model (LCAPM) to capture the impact of liquidity risk and commonality on asset pricing. Unlike the traditional CAPM model, which assumes no additional costs when pricing the asset, Acharya and Pedersen (2005), incorporates trading costs or frictions to the model:

$$E_t\left(r_{t+1}^i\right) = (r^f) + E_t\left(c_{t+1}^i\right) + \lambda_t \frac{cov_t\left(r_{t+1}^i - c_{t+1}^i, r_{t+1}^m - c_{t+1}^m\right)}{var_t(r_{t+1}^m - c_{t+1}^m)} \qquad [1]$$

where, $\lambda_t = E_t(r_{t+1}^m - c_{t+1}^m - r^f)$ is the risk premium

In this version, the variables are conditional on the information available up to time t, where r_{t+1}^i is the expected return for the stock, r_{t+1}^m is the market return, r^f is the risk-free rate and c_{t+1}^i is the liquidity level premium for the stock. The *liquidity level* premium represent transactions costs, such as fees and the bid-ask spread, and in a wider setting, they can also represent search and delay costs for the particular asset (Acharya & Pedersen, 2005). This model also captures the *liquidity risk* premium, represented by the second term in the equation; this captures the uncertainty in the liquidity cost itself. The relationship is that total liquidity premium consists of both liquidity level premium and liquidity risk premium as captured by the LCAPM. This means that if illiquidity is zero ($c_{t+1}^m = c_{t+1}^i = 0$), there will be no liquidity frictions and the equation above equals the traditional CAPM model. This makes the liquidity-adjusted capital asset pricing model consistent with earlier research that have shown that an illiquid asset can trade below its fundamental value, which is the present value of its dividends, everything else being equal. This price difference is as discussed above called the liquidity premium (Lester et al. 2012).

A.1. Associated Costs

The total cost associated with the liquidity level premium can be divided into information costs and real friction costs. Information cost relates to the fact that investors hold different information, implying that there is a risk that you are dealing with an informed investor when executing a trade. These costs are often referred to as adverse selection costs (Amihud & Mendelson, 2000). The notion of real friction costs relates to costs associated with the actual trade, such as brokerage fees and search costs. These types of costs are often referred to as opportunity costs and direct costs. In this section we will cover these costs in more detail.

A.1.1 Adverse selection costs

The notion of adverse selection costs can also be referred to as information costs and is an important component of total liquidity costs as captured by the bid-ask spread (Amihud & Mendelson, 2000; Agarwal, 2009). Since the bid-ask spread represent the highest and lowest price at which an investor can buy and sell an asset instantaneously it represent liquidity. The spread difference in itself, which is the actual difference between the bid and ask price in absolute numbers, also indicates the cost of liquidity for limited quantities. When selling a larger quantity the investor can actually move the sell price in a negative way, which in turn also might hurt the investor because he gets a lower price. This sort of transaction usually cause the stock price to decline, but part of the effect is just temporary and part of it is a lasting effect. When talking about market impact costs we talk about the temporary effect that a large transaction have on stock price (Amihud & Mendelson, 2000). These types of costs are called adverse selection costs since the information that make the transaction happen may not be included in the market price of the stock.

Brennan and Subrahmanyam (1996), Brockman et al (2009) and Aslan et al. (2011) all look at these adverse selection cost by differencing between informed and uninformed investors. Informed investors are those who have superior information about a firm and its stock value, while uninformed investors are those who trade based on liquidity. Trading on liquidity means that they buy and sell stocks when they have a shortage or abundance of money. These two groups cannot easily be separated by the market maker and as a result the bid-ask spread will be larger when they think they are dealing with informed investors (Amihud & Mendelson, 2005). Evidence shows that when the identity of a seller of a large quantity of stocks is unknown the market maker will assume that the seller is informed. This will then cause the spread to widen (Amihud & Mendelson, 2000). Other studies have validated this finding by looking at companies with a large number of shareholders and the effect that this have on the bid ask spread. Benston and Hagerman (1974) found a negative correlation between a stocks bid-ask spread and the number of shareholders. Brockman et al. (2009) also found a similar result when

looking at the effect of block ownership on the bid-ask spread. Brockman et al. (2009) define block holders as shareholders that hold more than 5% of a firms total shares, They found that block ownership tend to increase the spread and as a result decrease liquidity, and increase the adverse selection component.

A.1.2 Opportunity costs

Opportunity costs relate to the notion of friction costs and captures search frictions and execution delays. The buyer or a seller of a large quantity of stocks faces a choice between immediate transactions or searching for a buyer/seller that is willing to pay a better price. The immediate transaction includes turning to a market maker which buys the security at a discount, this transaction might also include the risk of market impact (Amihud & Mendelson, 2000; Amihud et al. 2005). When choosing to search for a better counterparty there is a delay/opportunity cost related to this action arising from the fact that the market might move, this cost is hard to measure but according to some studies, it can be substantial (Amihud & Mendelson 2000).

A.1.3 Direct costs

Direct costs relate to the notion of exogenous transaction costs, and include the cost that a buyer or seller faces every time a transaction is being carried out. This includes things such as broker fees, transaction fees, taxes etc. (Hibbert et al., 2009). When facing a transaction investors look at the total cost of buying or the net revenue from selling, so they include all types of cost in their assessments (Amihud & Mendelson 2000). Other studies by Chan and Lakonishok (1995) showed that there is a difference between block owners (owners of 5% of companies stocks) and individual investors, and their willingness to pay commission fees in return for less market impact of their trade. However, with the ease and help of the internet commission fees has declined sustainably during the past decade.

A.2 Liquidity Measurements

A.2.1 Bid-Ask Spread

As previously mentioned the bid-ask spread works as a proxy for liquidity because it represents the cost at which an asset can be either sold or bought instantaneously. This means that the spread itself gives an indicator of the liquidity; a wider spread indicates illiquidity. It is also possible to compute the difference between the ask price and the bid price to get an absolute number on liquidity cost for limited quantities (Amihud & Mendelson, 1986) (Amihud et al., 2005). The relative quoted bid-ask spread(QS_{it}) is measured as followed:

$$QS_{it} = \frac{[Ask_{it} - Bid_{it}]}{(Ask_{it} + Bid_{it})/2}, \quad [2]$$

where Ask_{it}, Bid_{it} stands for the ask and bid price for company i, at time t. The spread also depends on adverse selection costs, which arises because the market makers cannot distinguish between informed and uninformed investors (Aslan et al., 2011; Brockman et al, 2009). Furthermore, the spread should also be wide enough to cover the inventory cost (the cost of holding on to the asset before they can sell them) for the market makers (Amihud et al., 2005). These attributes together with the accessibility of the actual spread quotes in the market make it a popular proxy for liquidity in earlier research.

A.2.2 Amihud Measure

The Amihud measure was proposed by Yakov Amihud in 2002 in order to examine the relationship of stock returns and liquidity over time. It is defined as the daily ratio of absolute stock return over its dollar volume averaged over some period of time. It is designed to capture the price impact of trading by measuring the daily price response related to a dollar of trading. Illiquidity ($ILLIQ_{it}$) is measured as follows:

$$ILLIQ_{it} = \frac{|R_{it}*100|}{V_{it}}, \quad [3]$$

where Rit is the price return on asset i, at time t, and Vit is the volume of trading.

This measure has been widely used among researchers given the wide availability and easiness to obtain the data to calculate the illiquidity of an asset. (De Jong and Driessen, 2012; Han and Zhou, 2007; Dick-Nielsen et al. 2012; Acharya and Pedersen, 2005). Goyenko, Holden and Trzcinka (2009) conducted a study to compare the different measures and determine to what extent they captured liquidity. They concluded that the Amihud measure is a good proxy for capturing price impact and they recommend this measure to be used if no high-frequency data are available.

A.2.3 Turnover

Another measurement that is used to represent liquidity is the turnover. Brooke et al. (2000) uses turnover together with the bid-ask spread to measure liquidity. The turnover is simply the total trading volume of an asset over a specified period divided by the number of outstanding assets during the same period. Turnover ($TURN_{it}$) is measured as follows:

$$TURN_{it} = \frac{Number\ of\ assets\ traded}{Number\ of\ outstanding\ assets}. \quad [4]$$

This measurement gives an indication of how transacted a specific asset is and studies such as Amihud and Mendelson (1986) found a negative relation between turnover and illiquidity costs. Indicating that a higher turnover is associated with higher liquidity, which is consistent with earlier findings regarding size determinants of the bid-ask spread. However, researchers such as Agarwal (2009) argue that the turnover measurement is a noisy measure for liquidity since it also captures other effects and as a result, it should be used as a complement.

B. Liquidity Premium

Based on standard asset pricing theory, in a frictionless market, assets with the same cash flows will have the same price (Hibbert et. al., 2009). It has been shown however that market frictions such as transaction costs affect asset pricing. Another aspect of asset pricing has been the assumption that investors are risk averse, which has lead research to identify and measure the different risks associated with each asset (Bossaerts, Plott and Zame, 2000). Empirical research provides strong support to the theory that riskier assets require a higher rate of return from investors. In other words investors need compensation for bearing risks, which is known as equity risk premium.

Liquidity as reviewed in the previous section is a very broad concept that has many aspects and applications in financial economics, asset pricing, and corporate finance. Many studies have researched the link that exists between liquidity and asset prices, hypothesizing and empirically proving that liquidity is also priced in financial assets. The existence of a liquidity premium has implications for asset pricing since it changes the underlying assumptions on which it rests (Amihud et al, 2005). The concept of liquidity premium has had a degree of complexity given that all assets have varying levels of illiquidity (Hibbert et. al., 2009). Nonetheless it has been defined as the difference in excess return, or the difference in stock price between an illiquid asset and its identical liquid asset counterpart. This has caused three main issues when determining the existence of a liquidity premium. First, researchers have had to identify and develop proxies to measure liquidity to allow for comparison. Second, different liquidity premiums exist for different asset classes (Amihud and Mendelson, 2012) such as corporate bonds (De Jong and Driessen, 2012; Han and Zhou, 2007), equity (Acharya and Pedersen, 2005; Bekaert et al., 2007), government bonds (Amihud and Mendelson, 1991; Longstaff et al., 2005), covered bonds (Breger and Stovel, 2004). And lastly there have been many different methods to model and measure liquidity premium, which will be discussed next.

One of the first studies to look at the implications of liquidity on asset pricing was Amihud & Mendelson (1986), which looked at asset pricing in relation to the bid-ask spread. The reason for using the bid-ask spread is that it makes a simple proxy for illiquidity since the ask price includes a premium for immediate buy, and the bid price include a discount for immediate sale. In other words, a larger spread indicates a more illiquid stock and as a result, an investor should demand a higher expected return to compensate for this everything else being equal. Amihud & Mendelson (1986) found that asset returns are indeed an increasing function of the spread suggesting that liquidity affect the asset returns. Several other papers have then validated this relation. Brennan & Subrahmanyam (1996) looked at the relationship between monthly stock returns and measures of illiquidity. By performing a cross-sectional analysis of the stock returns as a function of the cost of liquidity, they found a significant positive relation between the two. Other studies by Brennan et al. (1998) looked at the relationship between return and liquidity, by modeling liquidity as stock trading volume; they found that higher stock trading volumes was correlated with lower expected stock returns. Datar et al. (1998) also took on a similar approach and modeled liquidity with stock turnover, they also found a similar result, and higher stock turnover meant lower returns.

Studies that are more recent have also looked at the relationship between liquidity, liquidity risk and asset returns, Acharya and Pedersen (2005), Pastor and Stambaugh (2003) has all suggested that the level of liquidity and liquidity risk is a priced risk factor. Bradrania & Peat (2014) also look at this topic by using a two-factor asset-pricing framework, and found that liquidity has an impact on expected return and that it is a risk factor to include.

This statistically significant relation between expected return and liquidity would then have an important effect for the value of a firm's stock. If there is a premium for liquid stocks this means that the stock price would be higher compared to an illiquid stock. From the reasoning above, this means that an investor would demand a higher return for an illiquid stock, which is achieved by a lower stock price, everything else being equal (Amihud & Mendelson, 2000). Therefore,

there seems to be incentives for firms to try to enhance the liquidity of their stock and as a result get a higher stock price.

B.1 Estimation methods

A vast literature examines the evidence of liquidity premium across different asset classes using different methods. An overview of the different methods is presented below structured by asset type based on Hibbert et al. (2009) classification.

For corporate bonds there are four approaches used: the microstructure approach, the direct approach, the structural model approach and the regression based approach. The microstructure approach does not provide a model for empirical testing however emphasizes on a framework describing how trading costs and market costs explain the different expected returns and yields. The direct approach involves a more straightforward method wherein two assets or asset portfolios have the same characteristics but with varying levels of liquidity that allows calculating the difference in yields. Brooke et al. (2000) apply this method on the collateral repo rates resulting in an estimate of liquidity premium at 15 bp. The third approach consists on comparing an estimated fair credit spread to actual market spreads to derive the liquidity premium. This method is similar to the direct approach in the sense that it compares an illiquid asset to its liquid counterpart. Webber (2007) provides an example of this approach by proposing a model built on Leland and Toft's (1996) method to derive default and demonstrates a rise in liquidity premium following a recent financial crisis. The regression analysis based approach has been widely used among researchers for two main purposes, one to identify the liquidity proxies that can be linked to higher yields, and second to attempt to quantify the liquidity premium by establishing the relationship between the liquidity proxy and the excess asset returns or yields. Han and Zhou (2007) and De Jong and Driessen (2012) conduct a regression analysis on corporate bonds. As an overview of the empirical evidence on liquidity premium of corporate bonds is that it is existent, substantial, varying over time.

For equity the main method used is regression analysis. Many studies advanced the literature on stock liquidity premium using a regression analysis after Amihud and Mendelson (1986). The main difference consisted on the different liquidity measures used in their research. Brennan and Subrahmanyam (1996) used the daily intraday trade and quote data to estimate liquidity costs.

Loderer and Roth (2005) used relative bid-ask spreads as liquidity measure instead. Brennan et al. (1998) and Pástor and Stambaugh (2003) conducted their studies using stock trading volume as a measure of liquidity. On the other hand Datar et al. (1998) and Nguyen et al. (2007) use stock turnover as proxy for liquidity.

Some studies focus not on proving the existence of a liquidity premium but instead aim to quantify it. Acharya and Pedersen (2005) develop a liquidity adjusted capital asset pricing model using Amihud (2002) measure for liquidity and estimate the return premium associated with liquidity at 3.5%. Bekaert et al. (2007) study the liquidity risk in emerging markets and estimated a local liquidity premium around 85 basis points per month. Lesmond (2005) studied the equity liquidity premium across 23 emerging markets and found differences in liquidity premium based on political and legal systems. Silva and Chávez (2008) analyses the liquidity premium in the Latin American equity markets. His findings showed an average of 8 % in liquidity premium across the four markets in the study.

C. Liquidity premium and the link to corporate finance

Amihud and Mendelson hypothesize in their 1986 paper about a link between corporate finance policies and liquidity. They suggested, based on the evidence that more liquid stock required lower returns, that firms have an incentive to invest in liquidity-increasing financial policies in order to reduce the opportunity cost of capital thereby increasing the overall value of the firm. This implication on capital structure and firm value stems from the violation of one the assumptions in the Miller-Modigliani capital structure (Amihud and Mendelson, 2012). With the presence of high enough liquidity costs, like information and transaction costs, the firm's equity cost of capital will be increased. Furthermore they have suggested (Amihud and Mendelson 1988, 1991) four main firm liquidity-enhancing strategies:

(a) To increase the company's investor base. Empirical evidence from a study of Japanese stock (Amihud et al. 1999) showed that improving the investor base resulted in increased stock liquidity and stock price.

(b) To increase the information disclosure through direct and indirect dissemination. This strategy reduces the information asymmetries about firm value and thus increases stock price.

(c) To avoid stock fragmentation. This strategy's concept arises from the fact that having multiple stock types reduces the stock's liquidity, therefore reducing individual stock price and overall firm value. Amihud et al. (2003) found that when two different set of assets from the same firm were merged, the stock became more liquid and rose in price.

(d) To list on liquid exchange markets. Total liquidity contributes to the liquidity of the individual stock.

Further literature exists on other implications of liquidity on corporate finance. Bharath, Pasquariello and Wu (2009) explore the relationship between capital structure and stock liquidity. Their paper demonstrates that firms that have a higher debt level will have assets with lower liquidity. This illiquidity is explained by the exogenous information asymmetries that arise between the creditors who have more access to inside information and the shareholders. Furthermore they propose an incremental effect between information asymmetries and leverage. The higher the information asymmetries then the higher the likelihood to raise funds through debt, which will in turn cause higher information asymmetries. Additional literature by O'Connor, Lesmond and Senbet (2008) also reinforces and demonstrates that the liquidity of a firm's stock will decrease as the level of debt increases. Their study consists on analyzing firms that had capital structure changes in their sample period in order to examine the impact that it has on stock liquidity measured by the bid ask spread and a model to measure the price impact of liquidity. Lipson and Mortal (2009) also provide evidence and conclude that liquidity has a significant impact on capital structure decisions. Eckbo and Norli (2000) find that in the years subsequent to the IPO, IPO stocks have significantly lower leverage ratios and higher liquidity (turnover) than control firms matched on size. In overall, studies (e.g. O'Connor, Lesmond and Senbet, 2008; Bharath, Pasquariello and Wu, 2009) indicate that firms should take liquidity into account when managing the target level of debt of a firm. There is a tradeoff between the benefits of debt financing such as tax savings and the costs it causes from illiquidity. This effect can be further extended to the increase in the equity cost of capital.

Another study by Banerjee, Gatchev and Spindt (2007) explores the liquidity hypothesis of dividends. The hypothesis of dividends states that in a market with trading frictions, other things equal, firms with less liquid stock are more likely to pay out dividends. They do indeed find proof backing up their hypothesis. Brockman, Howe and Mortal (2008) conducted similar research on liquidity and dividend policy. However in their study they set out to prove the liquidity hypothesis of repurchases which claims that stock liquidity influences the decisions on corporate payout policy primarily through repurchases instead of dividends. The results

showed that firms who initiated repurchases are generally more liquid than firms who did not, comparably firms who initiated dividend payouts were less liquid than those who did not. Their study therefore reinforces the idea that dividend payouts are a form of compensation for less liquid stock. Griffin (2010) adds to the literature on dividend policy and stock liquidity. Their study supports the relationship previously found by Banerjee, Gatchev and Spindt (2007).
Moreover, Sarin, Shastri and Shastri (1999) show that liquidity decreases as the level of inside ownership increases. They empirically prove as well that the stock liquidity is inversely related to institutional ownership. This entails that firms have the ability to improve their stock liquidity by targeting an appropriate level of inside ownership and institutional ownership. Note that firms may only aim for this appropriate level of inside ownership and/or institutional ownership since they cannot directly control whether institutions purchase their shares or not. As explanation for this inverse relationship they suggest that the information asymmetries are an increasing function of insider holdings. In contrast to their study, a study by Glosten and Harris (1988) found an inconclusive and insignificant relation between stock liquidity and insider holdings using a sample of NYSE stocks from 1981 to 1983. Researchers have opposing results in regards to the relationship between stock liquidity and the percentage of insider holding. More recently Agarwal (2009) explores the relationship between liquidity and institutional ownership. He finds that an increase in institutional ownership may result in opposing effects on liquidity. On one hand it may decrease liquidity by increasing information asymmetry which he describes as an adverse selection effect. And on the other hand it may increase liquidity by increasing price discovery due to competition among institutions' information efficiency effect. The relationship is described as non-monotonic (increasing liquidity at first until reaching optimality and then decreasing as institutional ownership increases).

The liquidity of the stock also affects certain aspects related to corporate governance. Maug (1998) shows how liquid stock markets allow large investors to benefit from monitoring and it also helps to reduce the free-rider problem, thus improving corporate governance. Bolton and Von Thadden (1998) explore the costs and benefits of liquidity reflected by the firm's

ownership structure. They compare the benefits of liquidity obtained from a dispersed ownership to the benefits of efficient management stemmed from a degree of ownership concentration, thus lower liquidity.

D. Firm Liquidity

After exploring the literature of liquidity in general first, followed by liquidity in asset pricing and its link to corporate financial policies, we proceed with another aspect of liquidity in order to get the broad picture of all the different liquidity terms that will be dealt with throughout this thesis. Firm liquidity can be defined as the availability of internal funds (Hoshi, Kashyap, Scharfstein, 1991). In other words it can be described as the firm's ability to convert assets into cash in order to meet its financial obligations. The most liquid form of an asset is namely cash. Emery and Cogger (1982) state that firms maintain liquidity in order to meet near short term and long term expected and unexpected outflows. Among the widely used spread measures of firm liquidity are the current ratio which is current assets over current liabilities, the quick ratio which is the cash and cash equivalents over current liabilities, and net working capital which is current assets minus current liabilities (Bierman, 1960). Certain financial policies affect directly or indirectly the firm's liquidity. Increasing the dividend payout for example will decrease the firm's cash holdings thus the firm liquidity. Similarly, the corporate decision of setting a low cash holding target will have an impact of the firm's liquidity. Gopalan, Kadan and Pevzner (2012) found a positive relationship between stock liquidity and the liquidity of the assets of a company (what we described as firm liquidity). Their study showed how asset liquidity improved stock liquidity more for firms which are less likely to reinvest their liquid assets. Their findings also revealed that an increase in corporate cash holdings has higher benefits for firms with more illiquid stock.

E. Earlier research in Sweden

The relationship between stock returns and liquidity is not a well-researched topic when it comes to the Swedish stock market. There have just been a few previous studies investigating the concept of liquidity and the existence of a liquidity premium in Sweden. The findings of these studies are somewhat ambiguous in the support of the existence of a liquidity premium. Both Pavlica and Persson (2012), Svartholm and Uhrberg (2012), and Gerwin (2005) tried to validate the findings of Amihud and Mendelson (1986) by looking at the relationship between stock return and liquidity on the Swedish stock market. All of the studies took on a similar approach to try to investigate the relationship; they did portfolio analysis and cross-sectional regressions based on time series data. The data consisted of time series data of a variety of companies together with other variables such as the bid-ask spread as a proxy for measuring liquidity. Gerwin found only weak evidence regarding the relationship between liquidity and stock returns. Pavlica and Persson (2012) also did not find clear evidence for the existence of a liquidity premium. However, the studies argues that their sample periods can help to explain the ambiguous results they got with the later having a time period that is very volatile. Other studies such as Personne (2013) also investigates the same relationship to see if liquidity is a factor influencing returns on the Swedish stock market for the period 2001-2010. The author fits a Sharpe-Lintner CAPM model with an illiquidity factor to series of excess return. He finds that illiquidity has an impact on returns.

III. Methodology

A. Sample and Data

Our data sample consist of Swedish companies listed on both OMX and Aktietorget, we first collected the available data for all Swedish companies from Reuters DataStream. This gave us a sample size of approximately 900 companies. For each of these companies our desired explanatory variables where retrieved on a monthly basis for the time period 2000-01-01 to 2014-12-31. The data needed to calculate our liquidity proxies where retrieved on a daily basis for the same time period to then calculate monthly averages to make the data consistent. The time period were selected based on two main reasons, first one being that we wanted as long of a period as possible to even out the volatility associated with the financial crisis of 2008. Second reason for not having a longer period of time is that there were limited data available before 2000-01-01. We then started to reduce companies in a systematic way based on our liquidity variables. Our criterion was that companies that had no available information on our selected independent variables were to be deleted. This left us with a sample size of 433 companies, with 180 monthly observations each giving us a total of 77,940 observations. The data was structured as panel data, with companies as the cross sectional dimension.

Several limitations were faced when conducting this research study. One limitation was the fact that the data was unbalanced. On a multivariate regression Eviews removes every period point that does not have a value for all the variables, thus reducing furthermore the sample size. In our sample we had a large number of observations as previously mentioned, nevertheless when running the regressions the sample size is reduced to approximately 27,000. Furthermore Eviews has certain limited functions regarding panel data validity tests, driving us to conduct manual tests to control for aspects such as heterogeneity for example.

B. Liquidity Variables

We will use the aforementioned measurements: Bid-ask spread, Amihud-measure and the Turnover to proxy liquidity. The reason for using three measurements is to investigate if our firm level variables are significant across the suggested liquidity measurements. We have described the main logic behind these proxies and their formulas in the previous chapter. In this section, we will go further into why the particular measurements have been chosen and how we will calculate them based on our data sample. In order to see how the liquidity variables have evolved through our sampled time period we graphed the yearly average of ten randomly selected companies for each measurement as can be seen in Appendix A.

The *Bid-ask spread* (BA_S) is used because of its characteristics but also because it is easily accessible in Thomson Reuter's DataStream. Furthermore, we use the bid-ask spread because of previous studies showing that it is a valid proxy for liquidity. Amihud and Mendelson (1986), Brennan and Subrahmanyam (1996), Amihud and Mendelson (2005) and Dimson and Henke (2002) all use the bid-ask spread in their studies to model liquidity. We will use the quoted bid and ask prices of the companies in our data sample on a daily basis. In DataStream these daily quotes is defined as the latest bid and ask price. The spread itself is then calculated as the Ask price minus the Bid price divided by its midpoint, we will then take the average of these daily bid-ask spreads to obtain it on a monthly basis. In the graph depicting the evolution of the bid-ask spread in Appendix A we observe two spikes in the spread indicating a decrease in liquidity. These events correspond to the internet bubble in early 2000 and the financial crisis of 2008.

The *Amihud-measure* is as previously mentioned another popular proxy for liquidity because it captures the illiquidity of an asset. This measurement has also been used by a variety of previous studies such as Goyenko, Holden and Trzcinka (2009), Acharya and Pedersen (2005) and Dick-Nielsen et al (2012) to proxy liquidity. The Amihud-measure is also popular because of the

accessibility of the data on which it is calculated. We will use the quoted daily stock prices to calculate the daily stock returns on the companies in our data sample. To get the Amihud-measure on a daily basis we will then divide the daily stock returns by the daily SEK volume traded. We will then take the average on these daily Amihud-measures to get a monthly Amihud measurement: ILLIQ. The graph of the Amihud measure evolution over our sample period (Appendix A) shows two main decreases in liquidity (increases in the Amihud measure) corresponding to 2008 and 2013. These observations may be the result of the 2008 financial crisis as well as the euro crisis of 2013. This measurement does not seem to capture any effect from the internet bubble in 2000 as does the bid-ask spread.

Finally, we use the *Turnover* as our third proxy for liquidity. A number of studies has suggested that the turnover can be used to proxy liquidity sense it indicates how transacted a specific asset is. The turnover (TURN_VAL) is defined as the total trading volume of an asset over the number of outstanding assets. This measurement has also been used in previous studies such as Brooke et al. (2000) to model liquidity. We have obtained the turnover for the companies in our data sample from Thomson Reuter's DataStream on a daily basis; this is defined as the number of shares traded on a particular day. To get the turnover ratio we will divide this number by the number of outstanding shares. We will then use the average of these to get it on a monthly basis. In appendix A the time trend of turnover is also graphed. We observe two increases in liquidity in the years 2001 and 2007. These years correspond to periods under stress nevertheless there seems to be an increase in liquidity based on this measurement. The reason for this could be due to the noisiness included in the measurement, turnover basically captures different aspects of trading and not just liquidity.

C. Explanatory Variables and Control Variables

The aim of our study is to identify financial policies, which have a significant relation with the firm's stock liquidity given the positive relation between stock liquidity and firm value. Based on previous literature discussed in chapter II we have selected a set of firm adjustable factors, (referred to as explanatory variables) as well as several control variables (which will be denoted as non-firm adjustable) to run a regression analysis. By firm adjustable factors we imply a set of internal factors that a firm is able to actively modify through different financial policies. On the other hand, the non-firm adjustable ones are external factors which, even though they are individually related to the firm, are difficult to change by management. Each factor will be measured using one or more variables. The intuition and measures used will be detailed next.

C.1 Explanatory Variables

Dividend Policy:

The dividend policy has been shown to affect the liquidity of the stock (Banerjee, Gatchev and Spindt, 2007; and Griffin, 2010). Additionally firms are able to actively increment, maintain, lower or even cancel the dividend payouts in a firm. For the purpose of this study the fact that managers are normally reluctant to cut down dividends or initiate a dividend payment is ignored. This normally occurs since this cutting down dividends may suggest to investors that they feel the company's prospects are not good enough to support a dividend payment any longer (Black, 1976). Similarly, initiating a dividend payment will require them to maintain it for a period of time. The variable used to measure dividend policy is the firm's dividend yield (DIV_Y) calculated as the dividend per share as a percentage of the share price per month.

Firm Liquidity:

Based on the study by Gopalan, Kadan and Pevzner (2012) in which they find a positive relation between firm assets' liquidity and stock liquidity, a variable representing the firm's cash holdings is included in the study. Two variables are used to measure this factor: Cash and cash equivalents, and Quick Ratio. Two measures are used because they capture different aspects of the firm liquidity. This can be observed by the fact that the correlation between them is low as seen in table 4. Cash and cash equivalents gives us an insight of the total liquid assets of the firm whereas quick ratio measures the ability of a firm to repay its liabilities. The variables are calculated as follows:

CASH_EQ = (Cash & Equivalents / Total Current Assets)*100 [5]

QUICK_R = ((Cash & Equivalents + Net receivables) / Total Current Liabilities) [6]

Information Disclosure and Capital Structure:

One of the main difficulties that researchers have faced is selecting a right proxy for information disclosure. Chen et al. (2007) have used for example the Transparency and Disclosure rankings provided by S&P when exploring the relationship between corporate governance and equity liquidity. However, the rankings data for the Swedish companies selected in our sample and for our time span is unavailable. Our approach follows Agarwal's (2009) model to proxy information disclosure as debt level of a firm. The capital structure of a firm can affect information disclosure as suggested in security design literature. In other words higher leverage is related to a lower level of public information disclosure since the debtholders become the firm's main source of finance. Moreover, information disclosure literature has shown that an increase in disclosure causes a reduction in information asymmetry, which results in an increase in liquidity (Diamond and Verrecchia, 1991). The bid-ask spread increases with higher information asymmetry reducing the liquidity of the stock. Therefore, a financial policy targeting the reduction of information asymmetries has a probable effect on increasing the liquidity of the stock. (Amihud and Mendelson, 1988). Based on this logic, our study uses DEBT_LEV as proxy for information disclosure which is:

DEBT_LEV = (Long T. Debt +Short T. Debt & Current Long T. debt)/Total capital + Short T. Debt & Current Long T. Debt) *100 [7]

This variable has a double function that will shed light indirectly on the information disclosure and directly about the capital structure effect on liquidity.

Stock ownership structure:

The stock ownership structure of a firm has been linked to liquidity in previous studies (Agarwal, 2009; Glosten and Harris, 1988; Sarin, Shastri and Shastri, 1999). Additionally firms potentially have the ability to influence their stock ownership which is the reason why this factor is included as an explanatory factor. There are two variables used to capture and describe the ownership structure: Number of free-floating shares (F_FLOAT) and Number of Shares held by institutions (INST_SHARES). These variables will capture the number of shares available to the public and the number of shares held by institutional investors. They will be calculated monthly as a percentage of total shares outstanding to allow for comparison.

C.2 Control Variables

As control variables, we have selected variables that also have an effect on liquidity but are not directly firm adjustable. These are: profitability measured by Return on Equity (ROE) and Return on Invested Capital (ROIC), Firm Size measured by the log of the Market Cap (M_CAP) these are calculated as followed:

ROIC = (Net Income – Bottom Line + ((Interest Expense on Debt - Interest Capitalized) * (1-Tax Rate))) / Average of Last Year's and Current Year's (Total Capital + Short Term Debt & Current Portion of Long Term Debt) * 100 [8]

ROE = (Net Income – Bottom Line - Preferred Dividend Requirement / Average of Last Year's and Current Years Common Equity * 100 [9]

M_CAP = LOG (Market Price-Year End * Common Shares Outstanding) [10]

Besides these measurements we will add a dummy variable for those firms who pay or do not pay dividends (DIV_DUMMY), finally we will include monthly stock return volatility (R_VOL)

D. Summary Statistics

Table 1 present the summary statics for our chosen liquidity measures over the sample period. These liquidity measures are consistent with the once used in earlier studies such as Agarwal (2009), Amihud and Mendelson (1988). The number of observations available for each of these variables is approximately around the range of 50.000 – 53.000.

TABLE 1 Liquidity variables: Summary Statistics

	BA_S	ILLIQ	TURN_VAL
Mean	4.664902	12.72853	86.29900
Median	1.732731	0.140701	3.000335
Maximum	143.9488	23493.07	516182.0
Minimum	0.000000	0.000000	0.000000
Std. Dev.	8.965367	242.9950	3572.977
Skewness	5.060912	51.15808	105.9208
Kurtosis	39.61693	3388.278	12712.95
Jarque-Bera	3064022.	2.52E+10	3.55E+11
Probability	0.000000	0.000000	0.000000
Sum	237686.1	672130.0	4543988.
Sum Sq. Dev.	4095330.	3.12E+09	6.72E+11
Observations	50952	52805	52654

Table 1.This table present summary statics for liquidity variables pooled over the entire sample period 2000-2014. BA_S is the Bid-Ask Spread, ILLIQ is the Amihud measure and TURN_VAL is the turnover, these measurements are calculated using monthly averages of daily data for the entire sample period.

Table 2 presents the summary statistics for our chosen variables, including both our independent variables and the control variables for our pooled sample data. All of which have been included in previous studies that investigates what effects liquidity. Most of our variables have approximately 53.000 -55.000 observations. However shares available to the public, F_FLOAT, and institutional held shares, INST_SHARES, have 41.000 available observations. All the variables have been normalized or expressed in percentage to be comparable as stated in the previous section.

TABLE 2 Independent and control variables: Summary Statistics

	CASH_EQ	DEBT_LEV	DIV_Y	F_FLOAT	INST_SHARES	M_CAP	QUICK_R	R_VOL	ROE	ROIC	DIVDUMMY
Mean	32.78847	27.03451	2.107913	68.85491	8.275860	13.60439	2.589197	35.65150	-10.55388	-5.813408	0.494870
Median	23.78000	21.02000	0.000000	71.00000	0.000000	13.33092	1.080000	32.77000	8.250000	5.960000	0.000000
Maximum	99.74000	544.3400	450.0000	100.0000	100.0000	20.56094	1135.810	87.62000	1959.060	340.1300	1.000000
Minimum	0.010000	-277.5100	0.000000	1.000000	0.000000	6.514713	0.020000	10.09000	-4385.560	-1712.850	0.000000
Std. Dev.	27.52337	29.01300	7.306290	25.29324	14.09409	2.571297	19.29881	13.02448	115.4093	59.17737	0.499978
Skewness	0.892972	1.954233	30.34503	-0.491400	2.720399	0.269705	48.44369	0.738823	-15.17976	-11.66229	0.020523
Kurtosis	2.674082	32.62814	1226.399	2.381350	12.60477	2.429369	2744.211	2.895525	541.4456	264.1026	1.000421
Jarque-Bera	7279.085	2187023.	3.44E+09	2305.587	208365.0	1398.255	1.65E+10	3777.944	6.66E+08	1.57E+08	9177.167
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	1737985.	1588845.	116068.0	2825117.	339633.0	740432.5	136067.5	1473120.	-580157.4	-318975.9	27249.00
Sum Sq. Dev.	40153183	49469908	2939312.	26248219	8151926.	359834.6	19572302	7009237.	7.32E+08	1.92E+08	13764.30
Observations	53006	58771	55063	41030	41039	54426	52552	41320	54971	54869	55063

Table 2.This table present summary statics for liquidity variables pooled over the entire sample period 2000-2014. CASH_EQ is the cash & equivalents as a percentage out of total current assets, DEBT_LEV is the Total debt as a percentage of total capital. DIV_Y is dividend yield calculated as the dividend per share as a percentage of the share price per month**.** F_FLOAT is the free-floating stocks available to the public calculated as percentage of total shares outstanding, INST_SHARES are institutional held shares calculated as percentage of total shares outstanding. M_CAP is market cap calculated as the log of the share market price at year end times number of common outstanding shares, QUICK_R is the quick ratio calculated as Cash & Equivalents + Net receivables over total current asset, R_VOL is the return volatility, ROE is the return on equity, ROIC is the return on invested capital, and DIVDUMMY is a dummy variable capturing if a company pays dividends or not, all of these measurements are calculated using monthly data.

E. Regression

We want to see if our independent variables and control variables are related to liquidity in a consistent matter across our three proxies for liquidity. This will be done by running multivariate regressions using our liquidity proxies as the dependent variable. However to check that our results are robust we will run several regressions by adding the control variables one by one.

Model 1:

$$Y_t = \alpha + \beta_1 CASH\_EQ_t + \beta_2 \text{DEBT\_LEV}_t + \beta_3 \text{DIV\_Y}_t + \beta_4 \text{F\_FLOAT}_t + \beta_5 \text{INST\_SHARES}_t + \beta_6 \text{QUICK\_R}_t \quad [11]$$

This model was run without the control variables for all three liquidity proxies, meaning that we change Y to stand for bid-ask spread(BA_S), Amihud measure (ILLIQ), and turnover (TURN_VAL). This will be done for all the following regressions as well.

Model 2:

$$Y_t = \alpha + \beta_1 CASH\_EQ_t + \beta_2 \text{DEBT\_LEV}_t + \beta_3 \text{DIV\_Y}_t + \beta_4 \text{F\_FLOAT}_t + \beta_5 \text{INST\_SHARES}_t + \beta_6 \text{QUICK\_R}_t + \beta_7 DIVDUMMY_t + \varepsilon_t \quad [12]$$

Model 3:

$$Y_t = \alpha + \beta_1 CASH\_EQ_t + \beta_2 \text{DEBT\_LEV}_t + \beta_3 \text{DIV\_Y}_t + \beta_4 \text{F\_FLOAT}_t + \beta_5 \text{INST\_SHARES}_t + \beta_6 \text{QUICK\_R}_t + \beta_7 DIVDUMMY_t + \beta_8 M\_CAP_t + \varepsilon_t \quad [13]$$

Model 4:

$$Y_t = \alpha + \beta_1 CASH\_EQ_t + \beta_2 \text{DEBT\_LEV}_t + \beta_3 \text{DIV\_Y}_t + \beta_4 \text{F\_FLOAT}_t + \beta_5 \text{INST\_SHARES}_t + \beta_6 \text{QUICK\_R}_t + \beta_7 DIVDUMMY_t + \beta_8 M\_CAP_t + \beta_9 ROE_t + \varepsilon_t \quad [14]$$

Model 5:

$$Y_t = \alpha + \beta_1 CASH\_EQ_t + \beta_2 \text{DEBT\_LEV}_t + \beta_3 \text{DIV\_Y}_t + \beta_4 \text{F\_FLOAT}_t + \beta_5 \text{INST\_SHARES}_t + \beta_6 \text{QUICK\_R}_t + \beta_7 DIVDUMMY_t + \beta_8 M\_CAP_t + \beta_9 ROE_t + \beta_{10} ROIC_t + \varepsilon_t \quad [15]$$

Model 6 is the final model including all the control variables:

Model 6: $Y_t = \alpha + \beta_1 CASH\_EQ_t + \beta_2 \text{DEBT\_LEV}_t + \beta_3 \text{DIV\_Y}_t + \beta_4 \text{F\_FLOAT}_t + \beta_5 \text{INST\_SHARES}_t + \beta_6 \text{QUICK\_R}_t + \beta_7 DIVDUMMY_t + \beta_8 M\_CAP_t + \beta_9 ROE_t + \beta_{10} ROIC_t + \beta_{11} R\_VOL_t + \varepsilon_t$ [16]

F. Reliability and validity

The concept of reliability and validity is of importance when doing studies such as this one. As previously mentioned all of our data has been collected using DataStream and therefore should be considered reliable. Furthermore we have included variables that previous studies on the subject of liquidity have found significant and as a result we feel comfortable using these in our study as well.

When conducting regressions using OLS it is important to check that the data is robust and we will conduct several tests on our data to verify that it meets the requirements for performing OLS regressions (Brooks, 2008).

F.1 Data testing

Heteroscedasticity:

One assumption being used in OLS estimations is that the residuals have constant variance. If there is any kind of correlation between its residuals this assumption is violated and heteroscedasticity occurs. Since Eviews do not offer built in options for testing panel data for heteroscedasticity we perform a manual Breusch-Pagan test for the explanatory variables (Brooks, 2008). The test is done by estimating the regression of model 6 and to save the squared residuals from this. We then use the squared residuals as the dependent variable and run the test again with our explanatory variables. Looking at the p-value associated with the F-test (0.000) tells us that the null hypothesis of homoscedasticity is rejected indicating that we have a problem with heteroscedasticity in our data. This was the case across all of our liquidity

measures (See Appendix B). To account for this we will run our regressions using White´s robust standard errors.

Heterogeneity:

Using a standard pooled regression assumes that there is no heterogeneity, meaning that there is no dependence between observations on a variable within different cross sectional units, and no time specificity. In other words it assumes that there is no correlation between the residuals within a cross sectional unit or in the time period dimension. This could be a problem when dealing with a large panel data set (Brooks, 2008).

A simple way to deal with this problem is to use either fixed effects in either the time dimension or the cross sectional dimension, or both. Using fixed effects allows the intercept to differ across cross section and time. An alternative to fixed effects is the random effects which assume that the intercept for each cross sectional unit arises from a common intercept, and a random term which varies cross sectionally but is constant over time (Brooks, 2008).

To test for the poolability of the data we ran a redundant fixed effects test in both cross section and period fixed effects for each of our liquidity variables. The associated p-values of the F-statistics were 0 to four decimal figures, indicating that a pooled regression was not suitable for the data (See Appendix C) .We then proceeded to test whether random effects should be used by conducting a Hausmann test, which p-value was zero for the bid-ask spread and the Amihud measure indicating that fixed effects should be used. However the p-value for turnover was insignificant (>5%) suggesting that the random effects model is more suitable for the data. For comparison we included the tables in the Appendix C showing the regression coefficients for all three models. As a general observation the coefficients are consistent throughout the different models for each of our liquidity variables, with minor deviations.

Multicollinearity:

According to Brooks (2008) multicollinearity arises when the independent variables in a multiple regression are correlated. Correlation between independent variables will exist however it becomes a statistical issue when this correlation becomes very high.
In order to detect for issues of multicollinearity we looked at the Table 4 of correlations of the independent variables and the control variables. According to Gujarati (2002) correlation coefficients higher than 0.8 or lower than -0.8 indicates a problem of multicollinearity. The correlation coefficients range from -0.5390 to 0.3507 therefore not exceeding the lower or upper limits. There is thus no problem of multicollinearity in our data.

Normality:

Normality refers to the assumption that the error terms are normally distributed. Non-normality is caused by extreme values referred to as outliers (Brooks, 2008). To test for non-normality we conducted the Jarque-Bera tests. Results are shown in Appendix D for all the three final models. The results show very high values for Jarque-Bera for all three liquidity variables rejecting the null hypothesis of normality. For a large sample size however, Brooks (2008) states that a violation of normality has no significant effects on the validity of the model.

IV . Results and Analysis

In this section we will present the correlations between our liquidity proxies as well as for our independent and control variables. Furthermore, we will present our results from our regressions and analyze them accordingly.

A. Correlations

Table 3 present the correlation between our liquidity variables. The correlations coefficient ranges from -0,006 to 0,086 between our variables. However the signs of the correlations is more interesting since it indicates what sort of relationship that exist between our proxies for liquidity. Our liquidity measures were chosen to capture different aspects of liquidity. As previously mentioned a wider bid ask spread (BA_S) indicates a more illiquid stock, while a higher Amihud measure (ILLIQ) also indicates illiquidity. This means that there should be a positive relationship between the two, which our data suggest that there is, however the relationship is weaker than expected. Our third proxy for liquidity is the turnover measure (TURN_VAL), which measures how transacted a specific asset is, a higher turnover should relate to a smaller bid ask spread and a lower Amihud measure. This means that there should be a negative relation between turnover, bid ask spread and Amihud measure, according to our data this is the case even if the relationship is rather weak.

TABLE 3.Correlation liquidity variables

	BA_S	ILLIQ	TURN_VAL
BA_S	1.000000		
ILLIQ	0.085775	1.000000	
TURN_VAL	-0.005765	-0.001157	1.000000

Table 3.This table presents the Pearson correlations for our liquidity variables over the pooled sample period 2000-2014

Table 4 present the correlation between our independent variables and our control variables. As we can see by the Pearson correlation matrix there are some significant relationships between our independent variables. However these are according to theory for instance we can see a negative correlation (-0,41) between CASH_EQ and DEBT_LEV. This is consistent with theory since when cash and cash equivalents increase this increase total capital which decreases the debt level percentage. Another negative correlation (-0,38) can be found between F_FLOT and INST_SHARES, which also is consistent with theory since the more intuitional held shares the less publicly available once. There is also a positive correlation (0.35) between F_FLOAT and R_VOL.

TABLE 4.Correlation independent and control variables

	CASH_EQ	DEBT_LEV	DIV_Y	F_FLOAT	INST_SHARES	M_CAP	QUICK_R	R_VOL	ROE	ROIC
CASH_EQ	1.000000									
DEBT_LEV	-0.411799	1.000000								
DIV_Y	-0.110921	0.042017	1.000000							
F_FLOAT	0.151275	-0.051865	-0.116010	1.000000						
INST_SHARES	-0.100003	0.067423	0.122398	-0.387490	1.000000					
M_CAP	-0.191421	0.194579	0.145951	-0.244325	0.266299	1.000000				
QUICK_R	0.158932	-0.076342	-0.022381	0.008541	-0.018678	-0.033481	1.000000			
R_VOL	0.322768	-0.186434	-0.268750	0.350746	-0.204414	-0.539022	0.047162	1.000000		
ROE	-0.034846	-0.140137	0.081901	-0.074909	0.059126	0.187444	0.010378	-0.212585	1.000000	
ROIC	-0.159174	0.002247	0.133280	-0.157506	0.097170	0.294525	0.017814	-0.372667	0.479069	1.000000

Table 4.This table presents the Pearson correlations for our independent variables and our control variables over the pooled sample period 2000-2014

B. Regression Results and Analysis

Bid-Ask Spread:

Table 5 presents our results for the final regression with the bid-ask spread as the dependent variable. As previously mentioned, this regression is conducted by using fixed effects as our earlier redundant fixed effect test suggested. We used Eviews to run these regressions and as can be seen the number of observation used in the regression (27.886) was almost a quarter of our total observations. The reason for this is that Eviews only use the observations that have available data points for all cross-sectional units. Turning to our results, we find some interesting discoveries regarding the relationship between our independent variables and our first measure for liquidity (bid-ask spread). Starting with the insignificant variables, we have some results that was in contrast to what we first anticipated. Both the number of shares available for trade by the public, measured by free-floating shares (F_FLOAT), and the number of shares held by institutional investors (INST_SHARES) showed not to be significant for the bid-ask spread. This was not what we expected since earlier studies such as Amihud and Mendelson (2000) suggested that increasing the free-floating stock would decrease the bid-ask spread, however we cannot find such a relationship in our data. Gopalan, Kadan and Pevzner (2012) found a positive relationship between a firm's assets liquidity and its stock liquidity, and to capture this we included two measurements, cash and cash equivalents (CASH_EQ) and quick ratio (QUICK_R). As can be seen in the results we find that cash and cash equivalents are strongly insignificant for the bid-ask spread but the quick ratio where just barely insignificant on a 5% significant level.

Turning to the variables that showed to be significant we find results that are in alignment with earlier studies, for instance we use market cap (M_CAP) as a measurement of size, and return on invested capital (ROIC) as a profitability measurement. Both of these variables where significant on a 0,1% significance level, and showed a negative relationship with the bid-ask

spread suggesting liquidity increase with size and profitability. This result is consistent with studies such as Amihud (2002) that shows that company size is positively correlated with liquidity. Turning to the capital structure, Bharath, Pasquariello and Wu (2009) showed that firms that have a higher debt level would have assets with lower liquidity. In our result we see that the debt level (DEBT_LEV) is significant and have a positive relation to the bid-ask spread, supporting the result that higher debt levels leads to less liquid shares. This is mainly explained by the information asymmetry that arises when creditors gets more information than the public.

We have also included dividend policies in our model, which is measured by a dividend dummy to capture the difference between firms that pays dividends and the ones that do not. Second, we also want to capture if the size of the dividends matter for the firms that do pay dividends by measuring the dividend yield (DIV_Y). We realize that the dividend policies captures two different effects. First one being that investors might be drawn to companies paying dividends, which would then have a positive effect on liquidity due to a higher trading frequency. The other effect is that suggested by Banerjee, Gatchev and Spindt (2007) which explores the liquidity hypothesis of dividends. The hypothesis of dividends states that in a market with trading frictions, other things equal, firms with less liquid stock are more likely to pay out dividends. This means that in that case there would be a positive relation between dividends and illiquidity. In our results we see that the dividend dummy is highly significant and show a positive relationship with the bid-ask spread, indicating that the second effect dominates the first one. In other words, companies paying dividends have a wider bid-ask spread than those who do not, indicating less liquid stocks.

However, turning to the actual size of the dividends (DIV_Y) of the companies that do pay dividends it seems to have a positive effect on liquidity. This is represented by the fact that the dividend yield is significant and has a negative relation to the bid-ask spread in our results. These findings can be summarized as the following: firms that do pay dividends tend to have less liquid stocks, but the liquidity can be increased by a higher dividend yield. Finally looking

at the adjusted R-squared value it has a value of 59% indicating that the overall fit of our model is better using the fixed effects than a pooled regression.

Table 5. Final Regression, Bid-Ask spread

Variable	BA_S	Probability
Sample Period:	2002M05 2014M12	
Total Panel Observations:	27886	
C	20.29975***	0.0000
CASH_EQ	-0.002243	0.4682
DEBT_LEV	0.010484**	0.0021
DIV_Y	-0.014414**	0.0031
F_FLOAT	-0.002962	0.3301
INST_SHARES	-0.002099	0.4272
M_CAP	-1.305318***	0.0000
QUICK_R	0.002356	0.0648
R_VOL	0.028810***	0.0000
ROE	1.01E-06	0.9932
ROIC	-0.011539***	0.0000
DIVDUMMY	0.356727***	0.0000
R-Squared	0.599386	
Adjusted R-squared	0.592859	
F-Statistic	91.83860***	*

Note: *** indicates significance at 0.1% level, ** indicates significance at 1% level and *indicates significance at 5% level.

Table 6 shows the results for the six models used to check for robustness of the coefficients of the firm-adjustable variables by adding each of the control variables one by one. We observe consistent coefficients through all the models for all the variables except for the ones that became insignificant on the last model (CASH_EQ, F_FLOAT, INST_SHARES, ROE, DIVDUMMY).

Table 6. Robustness Check on the Bid-Ask spread

Dependent Variable: BA_S						
Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
C	3.716799***	3.994457***	25.57823***	24.92745***	22.93968***	20.29975***
CASH_EQ	-0.007460**	-0.007274**	0.000560	0.000709	8.41E-05	-0.002243
DEBT_LEV	0.008414***	0.008086***	0.002671	0.004165	0.007061*	0.010484**
DIV_Y	-0.014848**	-0.000511	-0.011527*	-0.011123*	-0.011576*	-0.014414**
F_FLOAT	-0.005001*	-0.005424*	0.002790	-0.001212	-0.002228	-0.002962
INST_SHARES	-0.001093	-0.001195	0.002248	-0.001172	-0.001195	-0.002099
QUICK_R	0.002593*	0.002541*	0.000823	0.001437	0.002439	0.002356***
DIVDUMMY		-0.510748***	0.202369**	0.243430**	0.205553**	0.356727
M_CAP			-1.634329***	-1.571521***	-1.425052***	-1.305318***
ROE				-0.001866***	3.51E-05	1.01E-06
ROIC					-0.010757***	-0.011539***
R_VOL						0.028810***
Total panel (unbalanced) observations:	33637	33637	33481	32366	32061	27886

Note: *** indicates significance at 0.1% level, ** indicates significance at 1% level and *indicates significance at 5% level.

Amihud Measure:

The results for the final regression on the Amihud measure of liquidity (ILLIQ) are presented in Table 7. In order to analyze these results we will first briefly review what the Amihud measure actually measures and what are the expected relationships between the dependent variable and each of the independent variables. The Amihud is a measure for illiquidity measured by a ratio of return over the value of the volume traded. An increase in ILLIQ implies a decrease in the liquidity of the stock whereas a decrease implies an increase in the level of liquidity. Based on previous research discussed in Chapter II theoretical background it is expected to observe the following relationships: a positive relationship between dividend payout (DIV_Y and DIVDUMMY) and ILLIQ (e.g. Griffin 2010); a negative relationship between firm liquidity (liquidity of the assets measured by CASH_EQ and QUICK_R) and ILLIQ (Gopalan, Kadan and Pevzner, 2012); a positive relationship between capital structure (DEBT_LEV) and ILLIQ; and a negative relationship between the number of free floating shares (F_FLOAT) and ILLIQ. There is however no expected relationship between institutional shares and ILLIQ given that previous studies (Agarwal, 2009) have shown how institutional shares can have opposite effects on liquidity. With regards to the control variables it is expected that size (M_CAP) and profitability (ROE and ROIC) have a negative relationship. Return volatility is expected to have a positive relationship with ILLIQ.

The total number of observations in the regression was of 27714. Given the unbalanced nature of the data and the relevant tests conducted to account for heterogeneity and heteroscedasticity a fixed effects panel regression with White's robust error was conducted. Both cross sectional fixed effects and period fixed effects were used to allow for variety across companies and across time. The fit of this model is nonetheless considerably low (R^2=10.6%) and it indicates that the variables do not explain a large majority of the Amihud variable. A potential concern raised is whether the Amihud measure does indeed measure the liquidity of a stock.

Some interesting observations can be made from the results. First we observe that the dividend yield variable (DIV_Y) is negative and highly significant. This result is inconsistent with previous studies and indicates that the dividend payout is positively related to liquidity, in other words high dividend payouts are related to (low ILLIQ) more liquid stock.

CASH_EQ is negative and significant. On the other hand QUICK_R is significant but positive. Despite both being significant, these results are contradicting each other. The quick ratio and the cash and cash equivalents of a firm measure the firm's assets' liquidity which according to Gopalan, Kadan and Pevzner (2012) should be positively related to the stock liquidity thus negatively related to the Amihud measure. In our results only the coefficient for CASH_EQ is consistent with their study. The coefficient for QUICK_R is however of a small magnitude (<1%) indicating a very small effect on the Amihud measure.

The debt level of the firm is positively related to the liquidity of the firm's stock (positively to the ILLIQ measure) but our results are insignificant. Finally the results of the variables related to firm's ownership structure indicate at a significant level that a high percentage of free floating shares is negatively related to ILLIQ thus positively related to the liquidity of a stock. This is consistent with the expected coefficient. It also reveals that the institutional shares are negatively related to ILLIQ and positively related to liquidity. This indicates that a higher percentage of institutional shares would be a characteristic of a firm with liquid stock.

DEBT_LEV, M_CAP, ROIC and DIVDUMMY are insignificant (Note that M_CAP would be significant at a 10% level but the positive sign would suggest an inconsistency with the literature [Amihud, 2002]). When analyzing our control variables we observe that the return volatility is negative and highly significant and the remaining profitability measure ROE is positive and significant. These findings do not support the literature (e.g. Correia and Amarral, 2014) and suggest that a higher volatility is related to a higher level of liquidity while a high growth (ROE) is related to a lower level in a stock's liquidity.

Table 7. Final Regression, Amihud Measure

Variable	ILLIQ	Probability
Sample Period:	2002M05 2014M12	
Total Panel Observations:	27714	
C	50.55432***	0.0000
CASH_EQ	-0.085622*	0.0223
DEBT_LEV	0.030065	0.5564
DIV_Y	-0.151207***	0.0004
F_FLOAT	-0.558739***	0.0000
INST_SHARES	-0.178866***	0.0006
M_CAP	1.583185	0.0590
QUICK_R	0.008764**	0.0047
R_VOL	-0.705600***	0.0001
ROE	0.020105***	0.0008
ROIC	-0.002320	0.9445
DIVDUMMY	-0.101844	0.9420
R-Squared	0.108650	
Adjusted R-squared	0.094004	
F-Statistic	7.418411***	*

Note: *** indicates significance at 0.1% level, ** indicates significance at 1% level and *indicates significance at 5% level.

Table 8 shows the results for the six models used to check for robustness of the coefficients of the firm-adjustable variables by adding each of the control variables one by one. We observe consistent coefficients through all the models for all the variables except for the ones that became insignificant on the last model (DEBT_LEV, DIV_DUMMY, M_CAP and ROIC).

Table 8. Robustness Check on the Amihud Measure

Dependent Variable: ILLIQ						
Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
C	70.80738***	67.26910***	-32.46094	-4.894997	-13.10178	50.55432***
CASH_EQ	-0.222956**	-0.225166**	-0.271165**	-0.308419**	-0.309533**	-0.085622*
DEBT_LEV	-0.521280*	-0.517147*	-0.500937*	-0.580878*	-0.570974*	0.030065
DIV_Y	0.030289	-0.134475*	-0.083050	-0.118331*	-0.121852*	-0.151207***
F_FLOAT	-0.619624***	-0.613963***	-0.652897***	-0.786190***	-0.794158***	-0.558739***
INST_SHARES	-0.056283	-0.054594	-0.071832	-0.122274*	-0.116711*	-0.178866***
QUICK_R	0.014165**	0.014815**	0.022322***	0.019089***	0.023794***	0.008764**
DIVDUMMY		6.322207***	3.049818*	2.888691	2.835028	-0.101844
M_CAP			7.566842**	6.515444**	7.135340**	1.583185
ROE				0.028268**	0.037035**	0.020105***
ROIC					-0.052373*	-0.002320
R_VOL						-0.705600***
Total panel (unbalanced) observations:	33380	33380	33235	32146	31838	27714

Note: *** indicates significance at 0.1% level, ** indicates significance at 1% level and *indicates significance at 5% level.

Turnover:

Table 9 presents the coefficients of the panel regression conducted on the turnover (TURN_VAL) as our third measure of liquidity. In this case the turnover is assumed to be positively related with liquidity, thus as the turnover of a firm increases so does the liquidity of its stock. The variables that are expected to have a positive relationship with TURN_VAL are CASH_EQ, QUICK_R, F_FLOAT as well the control variables ROE, ROIC and M_CAP. On the other hand the variables with a negative expected relationship are DEBT_LEV, DIV_Y, DIVDUMMY, and R_VOL. Institutional share holding has been shown to be positive and negative due to its non-monotonic relationship with liquidity (Agarwal, 2009). The total number of observations in the regression was of 27675. Given the unbalanced nature of the data and the relevant tests conducted to account for heterogeneity and heteroscedasticity a random effects panel regression with White's robust errors was realized on the final model. It is important to note that we obtain an extremely low fit for the model (R^2 <1%). A possible explanation for this is the fact that this measure captures many factors at the same time, making it a very noisy measure as previously stated.

In this model we observe a negative and highly significant coefficient for the dividend yield (DIV_Y: -0.4481). This indicates that an increase in dividend yield results in a decrease in the liquidity of the stock. This finding is consistent with the liquidity hypothesis of dividends (Banerjee, Gatchev and Spindt, 2007). The coefficients of the variables measuring the firm's assets' liquidity (CASH_EQ, QUICK_R) show once more an opposite relationship to liquidity. The coefficient for CASH_EQ is highly significant and positive whereas the coefficient for QUICK_R is significant but negative. The findings on QUICK_R are inconsistent with the expected relationship to liquidity and indicate that firms with higher quick ratio have lower liquidity.

The debt level of the firm (DEBT_LEV) is positively related to liquidity suggesting that an increase in the debt leverage would improve liquidity. However these results are insignificant. Lastly we analyze our fourth aspect of a firm: its ownership structure. In this model only the free-

floating shares' F_FLOAT coefficient is significant and positive. It indicates, consistently with expectations that increasing the percentage of free-floating shares would result in an increase in liquidity. Out of the control variables only M_CAP and ROIC are significant and both are positively related to liquidity as previous studies suggest (Amihud, 2002).

Table 9. Final Regression, Turnover

Variable	TURN_VAL	Probability
Sample Period:	2002M05 2014M12	
Total Panel Observations:	27675	
C	-412.3470**	0.0072
CASH_EQ	1.603080**	0.0018
DEBT_LEV	0.112253	0.6569
DIV_Y	-0.448176**	0.0057
F_FLOAT	1.131424**	0.0022
INST_SHARES	0.021124	0.7734
M_CAP	21.82988**	0.0050
QUICK_R	-0.075088*	0.0134
R_VOL	0.588355	0.2609
ROE	-0.002056	0.7489
ROIC	0.208110**	0.0016
DIVDUMMY	6.634536	0.3346
R-Squared	0.004078	
Adjusted R-squared	0.003682	
F-Statistic	10.29709***	*

Note: *** indicates significance at 0.1% level, ** indicates significance at 1% level and *indicates significance at 5% level.

In table 10 we present the results of the different models to check for robustness of the coefficients by running regressions of the firm-adjustable variables and then subsequently adding each of the non-firm-adjustable control variables. We observe a consistency of the coefficients throughout all the models for all the variables even the ones that are not significant.

Table 10. Robustness Check on Turnover

Dependent Variable: TURN_VAL						
Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
C	-67.71544**	-81.18677**	-334.4201**	-341.6786**	-336.2579**	-412.3470**
CASH_EQ	1.302514**	1.333979**	1.314928**	1.335330**	1.338924**	1.603080**
DEBT_LEV	0.041396	0.052949	0.056736	0.080468	0.073753	0.112253
DIV_Y	-0.103300	-0.770039***	-0.391888*	-0.369169*	-0.362860*	-0.448176**
F_FLOAT	0.862408**	0.893987**	0.890783**	0.915589**	0.921435**	1.131424**
INST_SHARES	0.306138**	0.281895**	0.060449	0.065313	0.055179	0.021124
QUICK_R	-0.065908*	-0.066288*	-0.055121*	-0.057450*	-0.062475*	-0.075088*
DIVDUMMY		23.14759***	5.690429	5.416515	5.350962	6.634536
M_CAP			19.41343**	19.73600**	19.33723**	21.82988**
ROE				0.010163	-0.000877	-0.002056
ROIC					0.063040*	0.208110**
R_VOL						0.588355
Total panel (unbalanced) observations:	33330	33330	33185	32098	31790	27675

Note: *** indicates significance at 0.1% level, ** indicates significance at 1% level and *indicates significance at 5% level.

Comparative analysis:

Table 11 presents the regression results for our variables across all three measurements of liquidity. By doing, this we can see which variables that are significant across either two or all three of our liquidity measurements and the degree of significance associated with each variable. A conclusion could be reached about the relationship of our independent variables if the coefficients are consistent and significant across at least two of our liquidity measurements.

Our results show that just one variable is significant across all three measurements on a significance level of 5% or less. The variable that is significant across all three measurements is DIV_Y, suggesting it has an overall relationship with liquidity. The relationship seems to be negative for all three measurements, suggesting that it lowers the bid-ask spread, the Amihud measure and the turnover. This seems inconclusive since this means that a higher dividend yield means a more liquid stock when measuring liquidity with the bid-ask spread and the Amihud measure. However, when looking at turnover as a proxy for liquidity the relationship seems to be the opposite, a higher dividend yield means less trade and thereby a more illiquid stock. This result might partly be explained by the findings of Banerjee, Gatchev and Spindt (2007) that showed that less liquid companies tend to pay dividends in the first place. A definitive relationship between the dividend yield and liquidity cannot be established from our data.

Turning to the variables that show significance over two of our liquidity measurements, we find CASH_EQ, F_FLOAT, M_CAP, QUICK_R, R_VOL and ROIC. This result seems to verify the findings of previous studies that found these variables significant in explaining liquidity. Gopalan, Kadan and Pevzner (2012) found a positive relationship between a firm's assets liquidity and its stock liquidity, this result partially consistent with our findings. CASH_EQ has a negative relationship with the Amihud measure and a positive relationship with turnover, indicating a positive overall relationship with liquidity. QUICK_R on the other hand seem to have a negative overall relationship with liquidity since it has a positive relationship with the

Amihud measure, and a negative relationship with turnover. These opposite results from the two variables measuring the same firm's assets' liquidity can be attributed to the fact that they capture different aspects of the firm's liquidity.

Our variable for debt level is only significant for the bid-ask spread and we cannot make any conclusions about its relationship with liquidity from these findings.

Amihud and Mendelson (2000) suggested that increasing the free-floating shares would decrease the bid-ask spread and as a result increase the stock liquidity. Free-floating shares are not significant for explaining the bid-ask spread in our data, but it is significant for explaining the Amihud measure and the turnover. As we can see, free-floating shares have a negative relationship with the Amihud measure and a positive relationship with turnover, again indicating a positive overall relationship with liquidity. However our variable for institutional shares is only significant for the Amihud measurement and thus we cannot make any conclusions about its relationship with liquidity from these findings.

Amihud (2002) shows a positive relationship between firm size and liquidity, which are consistent with our findings. M_CAP have a positive relationship with turnover and a negative relationship with bid-ask spread, indicating a positive overall relationship with liquidity. Turning to one of our measurements for profitability, ROIC, we find that it has a negative relationship with the bid-ask spread and a positive relationship with turnover, indicating a positive overall relationship with liquidity.

As a final note the adjusted R-squared values associated with the different measurements is somewhat different. With a rather good fit for the bid-ask spread at 59% and quite a low fit for both Amihud measure, 10% and turnover at just 0,4 %. Suggesting that our data explains the bid-ask spread the best.

Table 11. Final Regressions, Comparison table

Variable	BA_S	ILLIQ	TURN_VAL
Sample Period:	2002M05 2014M12	2002M05 2014M12	2002M05 2014M12
Total Panel Observations:	27886	27714	27675
C	20.29975***	50.55432***	-412.3470**
CASH_EQ	-0.002243	-0.085622*	1.603080**
DEBT_LEV	0.010484**	0.030065	0.112253
DIV_Y	-0.014414**	-0.151207***	-0.448176**
F_FLOAT	-0.002962	-0.558739***	1.131424**
INST_SHARES	-0.002099	-0.178866***	0.021124
M_CAP	-1.305318***	1.583185	21.82988**
QUICK_R	0.002356	0.008764**	-0.075088*
R_VOL	0.028810***	-0.705600***	0.588355
ROE	1.01E-06	0.020105***	-0.002056
ROIC	-0.011539***	-0.002320	0.208110**
DIVDUMMY	0.356727***	-0.101844	6.634536
R-Squared	0.599386	0.108650	0.004078
Adjusted R-squared	0.592859	0.094004	0.003682
F-Statistic	91.83860***	7.418411***	10.29709***

Note: *** indicates significance at 0.1% level, ** indicates significance at 1% level and *indicates significance at 5% level.

V. Summary and Conclusion

With the technology advancements of the new century, investors are able to monitor a firm's stock price continuously as well as execute trade orders instantaneously. This has many implications for the managers which need to carefully tailor financial and non-financial policies that may or may not affect stock prices. Amihud (1986) showed the relationship between the stock returns and liquidity, measured by the bid-ask spread. The study showed that a liquidity premium was included in the expected stock returns. Later studies have also verified this relationship between stock returns and liquidity by looking at liquidity associated costs. Acharya and Pedersen (2005) derived a liquidity-adjusted capital asset pricing model (LCAPM) to capture the impact of liquidity risk and commonality on asset pricing. This model shows that the stock price can be modified by improving the liquidity, everything else held constant. Given this relationship many studies have explored different factors that have a relationship with stock liquidity.

Bharath, Pasquariello and Wu (2009) explored the relationship between a firm's capital structure and its associated stock liquidity. Their paper demonstrates that firms that have a higher debt level will have assets with lower liquidity due to information asymmetric. Turning to dividend policies Banerjee, Gatchev and Spindt (2007) as well as Brockman, Howe and Mortal (2008) found support that dividend payouts are a form of compensation for less liquid stocks, indicating that firms with less liquid stocks are more likely to payout dividends.

Regarding ownership structure, Sarin, Shastri and Shastri (1999) showed that liquidity decreases as the level of inside ownership increases. Amihud and Mendelson (2000) also argued that increasing the shareholder base as measured by free-floating shares, would increase liquidity.

Gopalan, Kadan and Pevzner (2012) found a positive relationship between stock liquidity and the liquidity of the assets of a company, where cash is the most liquid asset. Besides these factors, other firm characteristics such as firm size and firm profitability have also been proven to have a relationship with liquidity.

Based on these previous studies we included the same set of independent and control variables to see if these where significant in explaining liquidity for firms on the Swedish stock market. The findings allow for some interesting conclusions for the different factors researched.

Regarding firm liquidity as measured by cash and cash equivalents, as well as the quick ratio we find that these are consistent but shows opposite relationships with liquidity. Cash and cash equivalents have a positive relationship with liquidity and the quick ratio has a negative relationship. Looking at dividend policies we find that the results are inconsistent preventing us from making a conclusion regarding the relationship between dividend policies and liquidity.

Looking at the capital structure as measured by the debt level we find that it is inconsistent and that we cannot draw any conclusion regarding its relationship with liquidity. Turning to the ownership structure, measured by the number of free-floating shares as well as the institutional held shares we find free-floating shares to be consistent. Free-floating shares show a positive relationship with liquidity.

We also included control variables in our study which are not firm adjustable in the same sense that our independent variables. These were included to capture firm size and firm profitability. Market cap was used to measure firm size, and we find that it is consistent and have a positive relationship with liquidity. To measure profitability we used both return on equity and return on invested capital. The results were inconsistent for return on equity meaning we could not make any conclusion about its relationship with liquidity. However return on invested capital was consistent and showed a positive relationship with liquidity.

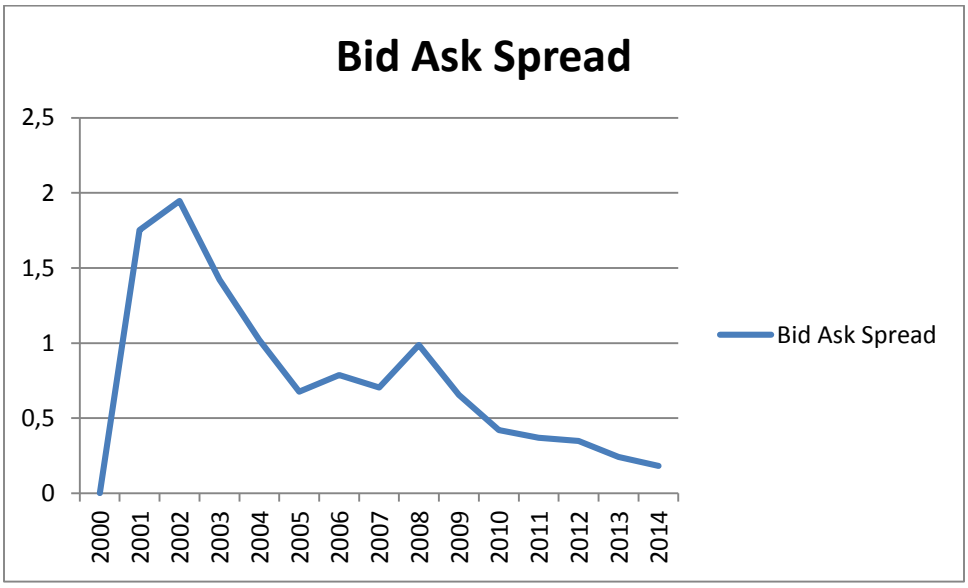
These findings suggest that there are some factors that companies can improve to affect its stock liquidity and as a result increase its share price, everything else being equal. Our study found that out of our independent variables both cash and cash equivalents and the number of free-floating shares had a consistent and significant positive relationship with liquidity. This means that an increase in these variables would increase stock liquidity and thereby affect the stock price in a positive way. Furthermore we verified previous studies showing that the control variables, firm size and firm profitability, have a positive relationship with liquidity.

However with each implementation there are associated costs which might outweigh the benefits. The associated costs need to be further investigated by future studies to conclude whether or not firms should implement the suggested findings. At the same time they should look at which variables are the most cost-effective to increase when improving liquidity. Another suggestion based on our study is that future research could look if the Amihud measure and the turnover are appropriate measurements for liquidity on the Swedish stock market using the variables suggested in previous studies. As a final idea, future research should explore the magnitude of the effects of each of these policies by conducting a study with a narrow approach on a single explanatory variable.

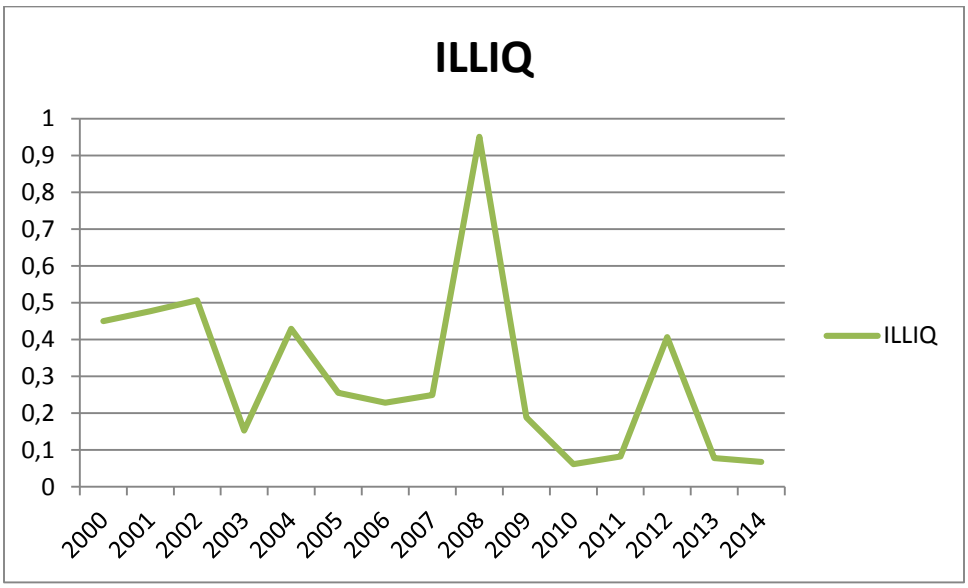
Appendix

APPENDIX A

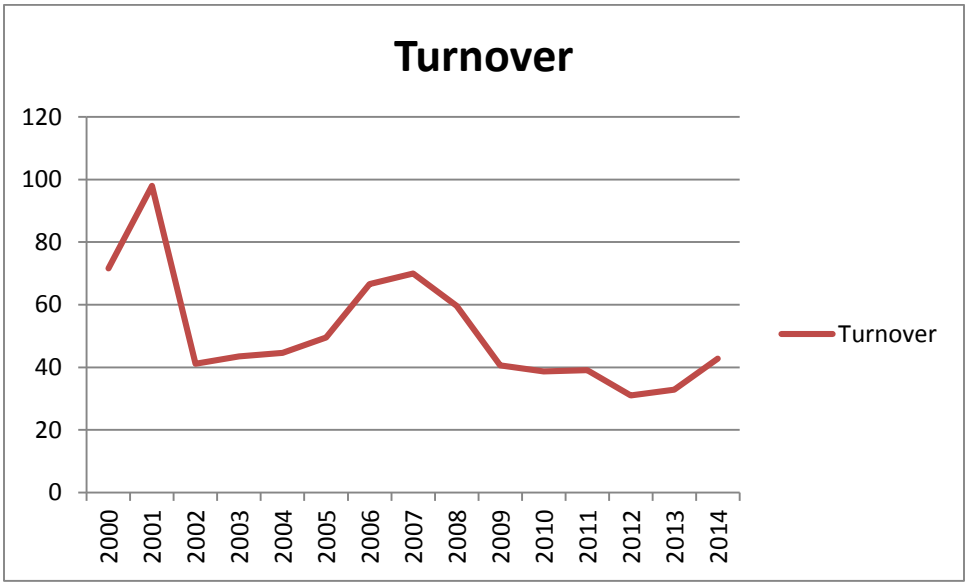
A.1 Graph: Bid Ask Spread evolution through time



A.2 Graph: Amihud measure evolution through time



A.3 Graph: Turnover evolution through time



APPENDIX B

B.1 Heteroscedasticity, Breusch-Pagan test: Bid-Ask Spread

Dependent Variable: RESIDUALBAS^2
Method: Panel Least Squares
Sample (adjusted): 2002M05 2014M12
Periods included: 151
Cross-sections included: 287
Total panel (unbalanced) observations: 27886

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	53.61488	7.128720	7.520968	0.0000
CASH_EQ	0.120186	0.033639	3.572774	0.0004
DEBT_LEV	0.112793	0.037180	3.033705	0.0024
DIV_Y	-0.198609	0.190167	-1.044390	0.2963
F_FLOAT	-0.240130	0.033103	-7.254003	0.0000
INST_SHARES	-0.193746	0.055130	-3.514330	0.0004
M_CAP	-5.240215	0.379750	-13.79911	0.0000
QUICK_R	0.046366	0.028133	1.648115	0.0993
R_VOL	1.152206	0.086674	13.29349	0.0000
ROE	0.009597	0.006628	1.447935	0.1476
ROIC	-0.077164	0.019356	-3.986520	0.0001
DIVDUMMY	10.41384	2.219833	4.691274	0.0000

R-squared	0.031738	Mean dependent var	15.50865
Adjusted R-squared	0.031355	S.D. dependent var	122.0256
S.E. of regression	120.0973	Akaike info criterion	12.41491
Sum squared resid	4.02E+08	Schwarz criterion	12.41846
Log likelihood	-173089.1	Hannan-Quinn criter.	12.41605
F-statistic	83.05895	Durbin-Watson stat	1.023768
Prob(F-statistic)	0.000000		

B.2 Heteroscedasticity, Breusch-Pagan test: Amihud Measure

Dependent Variable: ILLIQRESIDUAL^2
Method: Panel Least Squares
Sample (adjusted): 2002M05 2014M12
Periods included: 152
Cross-sections included: 287
Total panel (unbalanced) observations: 27714

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	47950.25	30782.33	1.557720	0.1193
CASH_EQ	-305.5185	145.9655	-2.093087	0.0364
DEBT_LEV	512.4951	161.0774	3.181670	0.0015
DIV_Y	-109.0242	780.3830	-0.139706	0.8889
F_FLOAT	-973.1509	142.7427	-6.817518	0.0000
INST_SHARES	-712.6467	237.8464	-2.996248	0.0027
M_CAP	13.89711	121.2257	0.114638	0.9087
QUICK_R	-1974.740	1641.924	-1.202699	0.2291
R_VOL	1586.786	376.4644	4.214971	0.0000
ROE	18.63057	28.57966	0.651882	0.5145
ROIC	-129.6303	85.89149	-1.509234	0.1313
DIVDUMMY	3268.985	9573.871	0.341449	0.7328

R-squared	0.003137	Mean dependent var	10137.29
Adjusted R-squared	0.002741	S.D. dependent var	518135.4
S.E. of regression	517424.7	Akaike info criterion	29.15155
Sum squared resid	7.42E+15	Schwarz criterion	29.15511
Log likelihood	-403941.0	Hannan-Quinn criter.	29.15270
F-statistic	7.925800	Durbin-Watson stat	0.739904
Prob(F-statistic)	0.000000		

B.3 Heteroscedasticity, Breusch-Pagan test: Turnover

Dependent Variable: TURNRESIDUAL^2
Method: Panel Least Squares
Sample (adjusted): 2002M05 2014M12
Periods included: 152
Cross-sections included: 286
Total panel (unbalanced) observations: 27675

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5607470.	1020960.	-5.492353	0.0000
CASH_EQ	14505.59	4845.711	2.993491	0.0028
DEBT_LEV	17692.66	5346.786	3.309027	0.0009
DIV_Y	6175.425	25867.39	0.238734	0.8113
F_FLOAT	8805.915	4732.027	1.860918	0.0628
INST_SHARES	-6593.247	7888.533	-0.835801	0.4033
M_CAP	215944.9	54469.75	3.964493	0.0001
QUICK_R	-2529.496	4018.097	-0.629526	0.5290
R_VOL	44384.59	12494.74	3.552261	0.0004
ROE	514.0072	947.5117	0.542481	0.5875
ROIC	5730.886	2868.687	1.997739	0.0458
DIVDUMMY	-231159.7	317728.5	-0.727539	0.4669

R-squared	0.002129	Mean dependent var	275582.8
Adjusted R-squared	0.001732	S.D. dependent var	17164524
S.E. of regression	17149654	Akaike info criterion	36.15329
Sum squared resid	8.14E+18	Schwarz criterion	36.15686
Log likelihood	-500259.1	Hannan-Quinn criter.	36.15444
F-statistic	5.364776	Durbin-Watson stat	0.396811
Prob(F-statistic)	0.000000		

APPENDIX C

C.1 Redundant fixed effects test: Bid-Ask Spread

Redundant Fixed Effects Tests
Equation: BASREG
Test cross-section and period fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	89.491279	(286,27438)	0.0000
Cross-section Chi-square	18376.208280	286	0.0000
Period F	9.286526	(150,27438)	0.0000
Period Chi-square	1380.957972	150	0.0000
Cross-Section/Period F	62.448997	(436,27438)	0.0000
Cross-Section/Period Chi-square	19222.062037	436	0.0000

C.2 Redundant fixed effects test: Amihud Measure

Redundant Fixed Effects Tests
Equation: ILLIQREG
Test cross-section and period fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	9.857326	(286,27265)	0.0000
Cross-section Chi-square	2726.950237	286	0.0000
Period F	1.473520	(151,27265)	0.0001
Period Chi-square	225.247892	151	0.0001
Cross-Section/Period F	6.894233	(437,27265)	0.0000
Cross-Section/Period Chi-square	2904.711798	437	0.0000

C.3 Redundant fixed effects test: Turnover

Redundant Fixed Effects Tests
Equation: TURNREG
Test cross-section and period fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	11.813077	(285,27227)	0.0000
Cross-section Chi-square	3226.513646	285	0.0000
Period F	1.355032	(151,27227)	0.0025
Period Chi-square	207.198973	151	0.0016
Cross-Section/Period F	8.234279	(436,27227)	0.0000
Cross-Section/Period Chi-square	3427.883163	436	0.0000

C.4 Coefficient comparison tables

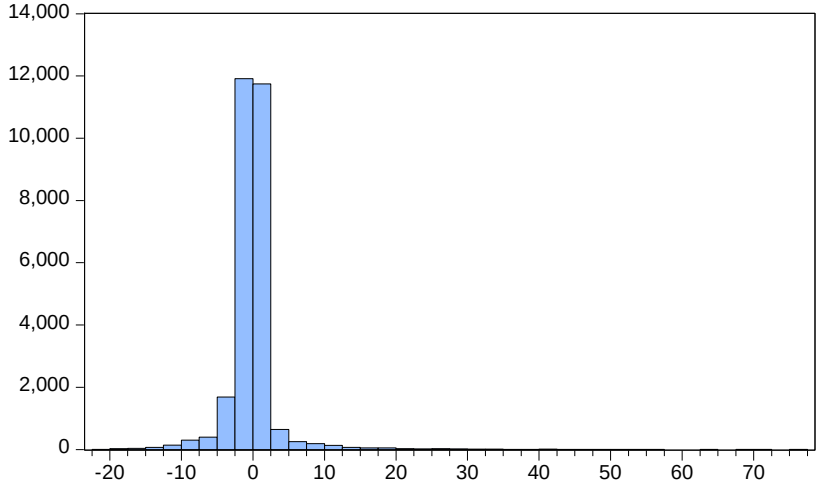
BA_S			
Total panel (unbalanced) observations: 27886			
Variable\ Method	*Panel Least Squares (PLS)*	*PLS- CS and P Fixed Effects*	*PLS- Random Effects*
C	15.50730***	20.29975***	24.12123***
CASH_EQ	0.003567**	-0.002243	-0.003028
DEBT_LEV	0.003043	0.010484**	0.011190***
DIV_Y	-0.030900**	-0.014414**	0.007386
F_FLOAT	-0.027356***	-0.002962	-0.011600***
INST_SHARES	-0.007693**	-0.002099	-0.017458***
M_CAP	-0.968291***	-1.305318***	-1.540373***
QUICK_R	0.004894**	0.002356	0.002657**
R_VOL	0.057783***	0.028810***	0.033860***
ROE	0.000600*	1.01E-06	0.000209
ROIC	-0.009276***	-0.011539***	-0.013484***
DIVDUMMY	0.458529***	0.356727***	0.292795**
R-squared	0.214112	0.599386	0.579047
Adjusted R-squared	0.213463	0.592859	0.574516
F-statistic	330.0391	91.83860	127.7747
Prob(F-statistic)	0.000000	0.000000	0.000000

ILLIQ			
Total panel (unbalanced) observations: 27714			
Variable\ Method	*Panel Least Squares (PLS)*	*PLS- CS and P Fixed Effects*	*PLS- Random Effects*
C	31.02011***	50.55432***	88.29091***
CASH_EQ	-0.080274**	-0.085622*	-0.042662
DEBT_LEV	0.136843***	0.030065	0.042137
DIV_Y	-0.080617	-0.151207**	-0.022184
F_FLOAT	-0.363695***	-0.558739***	-0.500500***
INST_SHARES	-0.208969***	-0.178866**	-0.294966**
M_CAP	-1.148229**	1.583185	-2.518481***
QUICK_R	0.003888	0.008764**	0.003718
R_VOL	0.419464***	-0.705600***	-0.260725**
ROE	-0.001880	0.020105**	0.019799**
ROIC	-0.030887	-0.002320	-0.027041**
DIVDUMMY	1.591619	-0.101844	-0.923350
R-squared	0.012493	0.108650	0.005336
Adjusted R-squared	0.011673	0.094004	0.004941
F-statistic	15.23093	7.418411	13.51021
Prob(F-statistic)	0.000000	0.000000	0.000000

TURN_VAL			
Total panel (unbalanced) observations: 27714			
Variable\ Method	*Panel Least Squares (PLS)*	*PLS- CS and P Fixed Effects*	*PLS- Random Effects*
C	-257.2529***	-294.3808***	-412.3470**
CASH_EQ	0.470345**	0.485004**	1.603080**
DEBT_LEV	0.481655**	0.429538**	0.112253
DIV_Y	-0.054796	-0.507828	-0.448176**
F_FLOAT	0.703592***	0.711469***	1.131424**
INST_SHARES	-0.031326	-0.014693	0.021124
M_CAP	12.24055***	13.27250***	21.82988**
QUICK_R	-0.059294	-0.075963	-0.075088*
R_VOL	1.820604***	1.777050***	0.588355
ROE	0.016262	0.014048	-0.002056
ROIC	0.243854**	0.261485**	0.208110**
DIVDUMMY	10.77278	10.79342	6.634536
R-squared	0.007989	0.005087	0.004078
Adjusted R-squared	0.007164	0.004691	0.003682
F-statistic	9.681975	12.85756	10.29709
Prob(F-statistic)	0.000000	0.000000	0.000000

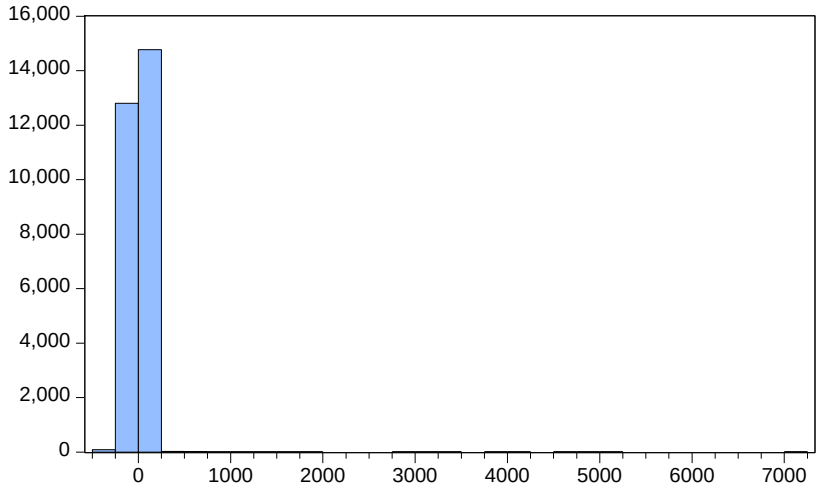
APPENDIX D

D.1 Jarque-Bera Test of Normality : Bid-Ask Spread Regression



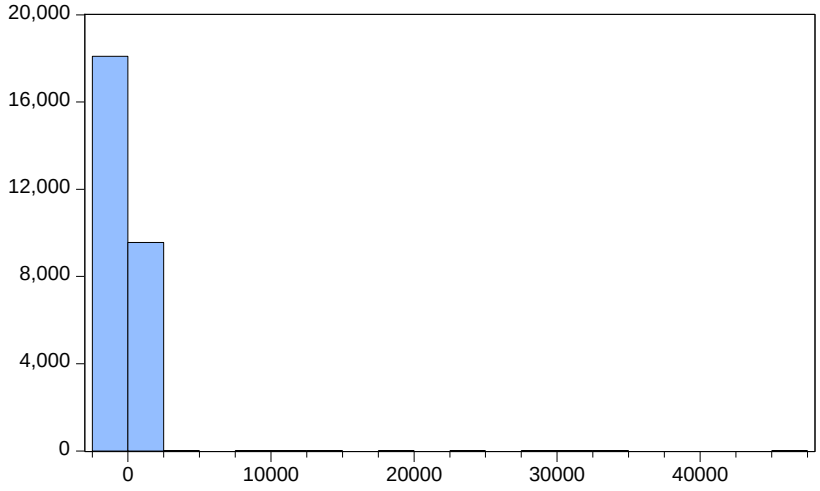
Series: Standardized Residuals	
Sample 2002M05 2014M12	
Observations 27886	
Mean	-4.50e-17
Median	-0.067766
Maximum	77.37773
Minimum	-21.15492
Std. Dev.	3.938173
Skewness	4.941051
Kurtosis	62.90681
Jarque-Bera	4283385.
Probability	0.000000

D.2 Jarque-Bera Test of Normality : Amihud Measure Regression



Series: Standardized Residuals	
Sample 2002M05 2014M12	
Observations 27714	
Mean	-4.28e-16
Median	0.690616
Maximum	7105.079
Minimum	-437.8653
Std. Dev.	95.13239
Skewness	43.13378
Kurtosis	2393.320
Jarque-Bera	6.61e+09
Probability	0.000000

D.3 Jarque-Bera Test of Normality : Turnover Regression



Series: Standardized Residuals	
Sample 2002M05 2014M12	
Observations 27675	
Mean	-10.20714
Median	-20.32754
Maximum	45044.43
Minimum	-252.4267
Std. Dev.	524.8700
Skewness	58.60647
Kurtosis	3887.706
Jarque-Bera	1.74e+10
Probability	0.000000

References

Acharya, V. V. & Pedersen, L.H. (2005). Asset pricing with liquidity risk. *Journal of Financial Economics.* Vol 77, 375–410.

Agarwal, P. (2009). Institutional ownership, liquidity and liquidity risk. Ph.D. Thesis Graduate School of Cornell University.

Amihud, Y. (2002). Illiquidity and stock returns: cross-section and time-series effects. *Journal of Financial Markets*, Vol. 5, No. 1, pp. 31-56.

Amihud, Y., Lauterbach, B., & Mendelson, H. (2003). The value of trading consolidation: evidence from the exercise of warrants. *Journal of Financial and Quantitative Analysis*, Vol. 38, No.04, pp. 829-846.

Amihud, Y. & Mendelson, H. (1986). Asset Pricing and the Bid-Ask Spread. *Journal of Financial Economics*, Vol. 17, pp 223-249.

Amihud, Y., & Mendelson, H. (1988). Liquidity and asset prices: Financial management implications. *Financial Management*, pp. 5-15.

Amihud, Y., & Mendelson, H. (1991). Liquidity, maturity, and the yields on US Treasury securities. *The Journal of Finance*, Vol. 46, No. 4, pp. 1411-1425.

Amihud, Y. & Mendelson, H. (2000). The Liquidity Route To a Lower Cost of Capital. *Journal of Applied Corporate Finance.* Vol. 12, no 4, pp. 8-25.

Amihud, Y., & Mendelson, H. (2012). Liquidity, the Value of the Firm, and Corporate Finance. *Journal of Applied Corporate Finance*, Vol. 24, No. 1, pp. 17-32.

Amihud, Y., Mendelson, H., & Lauterbach, B. (1997). Market microstructure and securities values: Evidence from the Tel Aviv Stock Exchange. *Journal of Financial Economics*, Vol. 45, No. 3, pp. 365-390.

Amihud, Y. Mendelson, H. and Pedersen, L.H. (2005). Liquidity and Asset Prices. *Foundations and Trends in Finance.* Vol. 1, no 4, pp. 269-364.

Amihud, Y., Mendelson, H., & Uno, J. (1999). Number of shareholders and stock prices: Evidence from Japan. *The Journal of finance*, Vol. 54, No.3, pp. 1169-1184.

Aslan, H. Easley, D. Hvidkjaer, S. and O´Hara, M. (2011). The Characteristics of Informed Trading: Implications for Asset Pricing. *Journal of Empirical Finance,* Vol. 18, pp. 782–801.

Banerjee, S., Gatchev, V. A., & Spindt, P. A. (2007). Stock market liquidity and firm dividend policy. *Journal of Financial and Quantitative Analysis*, Vol. 42, No. 02, pp. 369-397.

Bekaert, G., Harvey, C. R., & Lundblad, C. (2007). Liquidity and expected returns: Lessons from emerging markets. *Review of Financial Studies*, Vol. 20 No, 6, pp. 1783-1831.

Benston, G.J & Hagerman, R.L (1974). Determinants of Bid-Asked Spreads in the Over-the-Counter Market. *Journal of Financial Economics*, Vol. 1, pp. 353-364.

Bharath, S. T., Pasquariello, P., & Wu, G. (2009). Does asymmetric information drive capital structure decisions?. *Review of Financial Studies*, Vol. 22 No.8, pp. 3211-3243.

Bierman, H. (1960). Measuring financial liquidity. *Accounting Review*, pp. 628-632.

Black, F. (1976). The dividend puzzle. *The Journal of Portfolio Management*, Vol.2, No.2, pp. 5-8.

Bolton, P., & Thadden, V. (1998). Blocks, liquidity, and corporate control. *The Journal of Finance*, Vol. 53, No.1, pp. 1-25.

Bossaerts, P., Plott, C., & Zame, W. (2000). Prices and allocations in financial markets: Theory and evidence. *Cal Tech Working Paper*.

Bradrania, M.R & Peat. M. (2014). Characteristics Liquidity, Systematic Liquidity and Expected Returns. *Journal of International Financial Markets, Institutions & Money*. Vol. 33, pp. 78–98.

Breger, L., & Stovel, D. (2004). Agency ratings in the Pfandbrief market. *The Journal of Portfolio Management*, Vol.*30* No.4, pp. 239-243.

Brennan, M.J. Cordia, T. and Subrahmanyam, A. (1998). Alternative Factor Specifications, Security Characteristics, and the Cross-Section of Expected Stock Returns. *Journal of Financial Economics,* Vol. 49, pp. 345- 373.

Brennan, M.J. & Subrahmanyam, A. (1996). Market Microstructure and Asset Pricing: On the Compensation for Illiquidity in Stock Returns. *Journal of Financial Economics*, Vol. 41, pp. 441-464.

Brockman, P. Chung, D.Y. and Yan, X. (2009). Block Ownership, Trading Activity, and Market Liquidity. *Journal of Financial and Quantitative Analysis,* Vol. 44, No. 6, Dec. 2009, pp. 1403–1426.

Brockman, P., Howe, J. S., & Mortal, S. (2008). Stock market liquidity and the decision to repurchase. *Journal of Corporate Finance,* Vol. 14, No.4, pp. 446-459.

Brooke, M., Cooper, N., and Scholtes, C. (2000). Inferring market interest rate expectations from money market rates. *Bank of England Quarterly Bulletin*: November 2000.

Brooks, C 2008, Introductory Econometrics For Finance, Cambridge: Cambridge University Press

Chan, L.K.C. & Lakonishok, L. (1995). The Behavior of Stock Prices Around Institutional Trades. *Journal of Finance.* Vol 50, pp. 1147-1174.

Chen, W. P., Chung, H., Lee, C., & Liao, W. L. (2007). Corporate governance and equity liquidity: Analysis of S&P transparency and disclosure rankings. *Corporate Governance: An International Review,* Vol. 15 No. 4, pp. 644-660.

Correia, L. F., & Amaral, H. F. (2014). Determinants of Market Liquidity of Shares Traded on the BM&FBOVESPA. *BBR-Brazilian Business Review,* Vol. 11 No.6, pp. 75-97.

Datar, V.T. Naik, N.Y, and Radcliffe, R. (1998). Liquidity and Stock Returns: An Alternative Test. *Journal of Financial Markets*, Vol. 1, pp. 205-219.

De Jong, F., & Driessen, J. (2012). Liquidity risk premia in corporate bond markets. *The Quarterly Journal of Finance*, Vol. 2 No.02

Diamond, D. W., & Verrecchia, R. E. (1991). Disclosure, liquidity, and the cost of capital. *The Journal of Finance,* Vol. 46, No.4, pp. 1325-1359.

Dick-Nielsen, J., Feldhütter, P., & Lando, D. (2012). Corporate bond liquidity before and after the onset of the subprime crisis. *Journal of Financial Economics*, Vol.103, No.3, pp. 471-492.

Dimson, E. and Hanke, B. (2002). The expected illiquidity premium: Evidence from equity-index linked bonds. Working paper.

Eckbo, B. E., & Norli, Ø. (2000). Leverage, liquidity and long-run IPO returns.

Emery, G. W., & Cogger, K. O. (1982). The measurement of liquidity. *Journal of Accounting Research*, Vol.20, No.2, pp. 290-303.

Gerwin, P. (2005) An illiquidity premium in stock returns? - Evidence from the Stockholm Stock Exchange. Master thesis in Industrial and Financial Economics, Gothenburg University

Glosten, L. R., & Harris, L. E. (1988). Estimating the components of the bid/ask spread. *Journal of financial Economics*, Vol. 21, No.1, pp. 123-142.

Gopalan, R., Kadan, O., & Pevzner, M. (2012). Asset liquidity and stock liquidity. *Journal of Financial and Quantitative Analysis*, Vol. *47* No. 02, pp. 333-364.

Goyenko, R. Y., Holden, C. W., & Trzcinka, C. A. (2009). Do liquidity measures measure liquidity?. *Journal of Financial Economics*, Vol.92, No.2, pp. 153-181.

Gujarati, D., (2002). Basic Econometrics, 4th Ed., *McGraw Hill.*

Griffin, C. H. (2010). Liquidity and dividend policy: international evidence. *International Business Research*, Vol. 3, No.3, p3.

Han, S., & Zhou, H. (2007). Non default bond spread and market trading liquidity. Technical report.

Hibbert, J. Kircher, A. Kretzchmar, G. Li, R. and McNeil, A. (2009). Liquidity Premium Literature Review of Theoretical and Empirical Evidence. Research Report

Hoshi, T., Kashyap, A., & Scharfstein, D. (1991). Corporate structure, liquidity, and investment: Evidence from Japanese industrial groups. *The Quarterly Journal of Economics*, Vol. 106, pp. 33-60.

Korajczyk, R. A. & Sadka, R. (2008). Pricing the commonality across alternative measures of liquidity. *Journal of Financial Economics*, Vol. 87, pp. 45–72.

Leland, H. E., & Toft, K. B. (1996). Optimal capital structure, endogenous bankruptcy, and the term structure of credit spreads. *The Journal of Finance*, Vol.51, No.3, pp. 987-1019.

Lesmond, D. A. (2005). Liquidity of emerging markets. *Journal of Financial Economics*, Vol. 77, No.2, pp. 411-452.

Lester, B. Postlewaite, A. and Wright, A. (2012). Information, Liquidity, Asset Prices, and Monetary Policy. *Review of Economic Studies,* Vol. 79, pp. 1209-1238.

Lipson, M. L., & Mortal, S. (2009). Liquidity and capital structure. *Journal of Financial Markets*, Vol. 12, No. 4, pp. 611-644.

Loderer, C., & Roth, L. (2005). The pricing discount for limited liquidity: Evidence from SWX Swiss Exchange and the Nasdaq. *Journal of Empirical Finance*, Vol. 12, No.2, pp. 239-268.

Longstaff, F. A., Mithal, S., & Neis, E. (2005). Corporate yield spreads: Default risk or liquidity? New evidence from the credit default swap market. *The Journal of Finance*, Vol. 60, No.5, pp. 2213-2253.

Maug, E. (1998). Large shareholders as monitors: is there a trade-off between liquidity and control?. *The Journal of Finance*, Vol. 53, No.1, pp. 65-98.

Nguyen, D., Mishra, S., Prakash, A., & Ghosh, D. K. (2007). Liquidity and asset pricing under the three-moment CAPM paradigm. *Journal of Financial Research*, Vol. 30, No.3, pp. 379-398.

O'Connor, P. F., Lesmond, D., & Senbet, L. W. (2008). Leverage Recapitalizations and Liquidity. *New Zealand Finance Colloquium*.

Pastor, L. & Stambaugh, R. (2003). Liquidity risk and expected stock returns. *Journal of Political* Economy. Vol. 111, pp. 642–685.

Pavlica, S & Persson, P. (2012). Does more trade equal less return -Applied on the Swedish stock market. Master thesis in Finance, Lund University.

Pennacchi, G. (2008). Theory of Asset Pricing. Pearson Education, Boston.

Personne, G. (2013). Liquidity and return in the Swedish stock market. Master thesis in finance, Lund University.

Roll, R. (1984). A simple implicit measure of the effective bid-ask spread in an efficient market. *The Journal of Finance*, Vol. 39, No. 4, pp. 1127-1139.

Sadka, R. (2006). Momentum and post-earnings-announcement drift anomalies: The role of liquidity risk. *Journal of Financial Economics*. Vol 80, pp. 309–349.

Sarin, A., Shastri, K. A., & Shastri, K. (2000). Ownership structure and stock market liquidity. *International Journal of Accounting*, Vol. 38, pp. 465-491.

Silva, A. C., & Chávez, G. A. (2008). Cross-listing and liquidity in emerging market stocks. *Journal of Banking & Finance*, Vol. 32, No.3, pp. 420-433.

Svartholm, P., Uhrberg, M. (2012). Likviditetsstrategi på Stockholmsbörsen –En studie om likviditetspremiens existens och dess eventuella överavkastning. Linköping University.

Webber, L. (2007). Decomposing corporate bond spreads. *Bank of England Quarterly Bulletin*.