LUND UNIVERSITY
School of Economics and Management

Department of Business Administration

BUSN79 – Degree Project in Accounting and Finance

Spring semester 2020

Market liquidity and block holdings

Empirical evidence from the Swedish market

Authors:

Mattias Janfjord, 950314-8398

Max Lundblom, 950118-4890

Abstract

Title: Market liquidity and block holdings - Empirical evidence from the Swedish market

Seminar date: 2020-06-03

Course: BUSN79 – Degree Project in Accounting and Finance, 15 ECTS

Authors: Mattias Janfjord and Max Lundblom

Advisor: Håkan Jankensgård

Keywords: Liquidity, trading activity, ownership structure, blockholders, friction

Purpose: Investigate the relation between block ownership and stock liquidity

Methodology: The empirical methods used in this project are of quantitative nature. We use a set of dependent variables representing liquidity measures in order to test how our main explanatory variable, sum of block holdings, affect this. Furthermore, control variables such as market capitalization, share price and volatility are included in the models in order to isolate the effects of our explanatory variables on our dependent variables.

Theoretical perspectives: The active monitoring hypothesis, agency problems, information asymmetry, trading friction, trade-off theory, ownership identity, secondary market liquidity

Empirical foundation: The sample consists of publicly traded Swedish companies listed on Nasdaq OMX Small, Mid and Large cap as well as the First North growth market. Data is gathered through Datastream and Modular Finance's Holdings. The final sample is an unbalanced panel data set, consisting of 7239 observations from 676 companies.

Conclusions: Our findings confirm that also on the Swedish market, blockholders have an adverse effect on liquidity. Blockholders are proven to affect liquidity by both altering trading activity and by increasing information asymmetry, which seems to indicate that the underlying characteristics of a market affect the mechanisms of how blockholdings impact liquidity. These findings are valid irrespective of whether we test the sum of ownership blocks as shareholders owning more than 2.5, 5 or 10% of outstanding shares, regardless of blockholders being classified as owners of cash flow rights or voting rights and whether we perform the regressions cross-sectionally on firm averages rather than with panel data.

Acknowledgements

We would like to thank our supervisor Håkan Jankensgård for his continuous engagement and support along with his useful comments and suggestions for improvement. His knowledge and experience within the topic of ownership structures and corporate finance in general has helped us a lot. We would also like to express our gratitude towards Magnus Rönnlid at Modular Finance for his willingness to provide us with ownership data that we would not have had the possibility to gather ourselves.

Mattias Janfjord Max Lundblom

Table of contents

List of tables

1. Introduction

1.1 Background and problematization

In an ideal financial market, there exists no obstructions for executing trades. Many of the asset pricing models rely upon this assumption of effectiveness, although no such market exists. One effect of these imperfections is reduced liquidity (i.e. wider bid-ask spreads), theoretically explained as a result of informational asymmetries, trading costs and constraints concerning funding (Vayanos and Wang, 2013). The importance of market liquidity has been studied by many researchers and findings imply that there are several favourable attributes assigned to liquid stocks (e.g. Amihud 2002; Fang, Noe and Tice, 2009; Chung, Elder and Kim, 2010).

Previous literature has also shown that the composition of shareholders is a determinant of market liquidity. Ownership distribution in listed Swedish firms is known to be more concentrated than in most other countries (Henrekson and Jakobsson, 2012), meaning that block owners are a widespread phenomenon. Considering the expansive presence of blockholders, it is increasingly important to understand the effect they have in fields such as corporate governance and secondary market efficiency. While there exists a wide range of previous research in the former area (e.g. Agrawal and Knoeber, 1996; Ansell and Gash, 2008; Becht, Bolton and Nöell, 2003; Henrekson and Jakobsson, 2012), the secondary market efficiency and liquidity in blockholder settings, is an area in need of further understanding, not least on the Swedish market.

The purpose of this study will be to deepen the understanding of this area by examining how the presence of blockholders affects the liquidity of stocks, whether it matters if blockholders are insider or outsider investors and whether this effect is due to changes in trading activity or the information environment.

The link between shareholder composition and market liquidity was studied by Demsetz in 1968 and his research showed that there is a positive relation between the number of shareholders and secondary market liquidity. Following that, research has shown a number of positive aspects

attributable to liquid stocks, in addition to that it simplifies the efforts associated with trading of securities (Amihud, Mendelson and Pedersen, 2005). Liquid stocks are subject to price premiums and at the same time, lower risk adjusted returns, resulting in a lower cost of capital for the company (Stoll and Whaley, 1983, Amihud and Mendelson, 1986). This gives management reasons to want a dispersed ownership structure for upholding liquidity of the stock in the secondary market. However, a dispersed ownership structure has other consequences that might be negative, for example decreased monitoring of management (Becht, 1999) and increased volatility (Jankensgård and Vilhelmsson, 2018).

Blockholders are shareholders who are expected to have strong incentives to monitor the firm's operations, but potentially at the cost of optimal dispersion of ownership (Becht, Bolton and Nöell, 2003). A firm's ownership structure is further expected to alter the firm's information environment by increasing the amount of firm-specific information reflected in the stock price. In a scenario where many small investors are present, rather than a few big ones, the amount of information reflected in the share price is expected to be higher (Jankensgård and Vilhemsson, 2018).

In the case of block holdings, Stoll's (2000) theory of friction is trying to explain why this has an adverse effect on liquidity. He explains that this effect has two constituents, real and informational frictions. Real friction is the actual resources used to enable trading in a security, for example the cut that market makers require in order to provide liquidity in a stock (also reflecting the inventory risk of holding the security). Informational friction on the other hand is less straightforward and reflects the costs associated with trading with more informed traders, which is a result of informational asymmetries. This mechanism works as an insurance against losses for the providers of liquidity why this is expected to be reflected in the bid-ask spread (Stoll, 2000).

We find that blockholders are significantly reducing trading activity in stocks and that this is one explanation to the illiquidity imposed by blockholders. Building on the argument of informational asymmetries in blockholder settings, we find evidence that this is a source of illiquidity. In terms of friction, our results suggest that real friction effects are the main reason why block holdings decrease liquidity, but that informational friction also explains some of the reduction. Further, we find no evidence that insider blockholders affect the liquidity of stocks more adversely by

increasing informational asymmetry, compared to outsider blocks. These findings are consistent independent of the threshold level at which block holdings are defined.

1.2 Research Questions

This thesis is concerned with the impact blockholders have on firms' market liquidity. We are aiming to investigate whether block holdings and the characteristics of these are determinants of stock liquidity. In order to do this the following questions will be investigated:

- How does block ownership affect the liquidity of stocks?
- How is stock liquidity affected by changes in the size and characteristics of block ownership?

To enable this analysis, we are also investigating how trading activity is affected by block holdings. In order to answer the second question, different threshold levels of block ownership will be analyzed along with the presence and size of institutional owners and insiders. As this study is focused on the Swedish market, an important part will be to analyze our results in relation to previous studies conducted on other markets. Recent literature has pointed out that different market and governance characteristics can influence the results of these types of studies (Edmans and Holderness, 2017), which makes this even more relevant.

1.3 Purpose and contribution to literature

One contribution of this thesis will be to test whether the prevailing theories and explanations surrounding blockholders and market liquidity are still valid on the financial markets of today. Hendershott, Jones and Menkveld (2011) argue that the way financial assets are traded have been revolutionized by the technological advancements in society and as the existing research is getting old, it is possible that the prevailing theories have become outdated.

Another contribution of this study will be to elaborate the understanding on how blockholders affect liquidity in markets with different settings. We have not identified any similar studies being conducted on the Swedish market and as the characteristics differ in several important aspects

(further discussed in section 2.4.3), we will test whether the prevailing theories can be generalized to an economy that does not fully resemble those previously tested.

Further, no previous study in this field of research has, to our knowledge, defined block ownership as something other than stakeholders owning 5% or more of a firm's outstanding shares, which is likely because of limitations in the available data (Mehran, 1995). Edmans and Holderness (2017) conclude that using a 5% threshold has no theoretical basis and that blocks below 5% should be studied when possible. Along with this, previous researchers have had access to panel data, but have still conducted cross-sectional studies of firm averages (e.g. Heflin and Shaw 2000; Brockman, Chung and Yan, 2009), thus losing some efficiency in their econometric estimates. Through the uniquely detailed data available from the Holdings database regarding firms on the Swedish market, we have the possibility to test both how blockholders of different sizes and characteristics affect market liquidity and also doing this with quarterly data. Through this we will give some theoretical contributions by further elaborating the understanding on how different types and sizes of block ownership affect market liquidity.

2. Theoretical background and empirical research

2.1 Stock market liquidity

Liquidity enables quick trading of large quantities of securities at a low cost, making the time and cost elements of trading essential to uphold liquidity. According to Amihud, Mendelson and Pedersen (2005) the sources of illiquidity on centralised marketplaces can be grouped together as transaction costs, demand pressure and inventory risks, and private information. Transaction costs arise every time a transaction is being conducted on the market. These costs comprise, for example, of brokerage fees, order-processing costs, transaction taxes and the bid-ask spread (Vayanos and Wang, 2013). This dimension of liquidity is hard to observe as the cost of trading depends upon factors that vary across transactions and are not publicly available (except through bid-ask spreads). Some examples that are likely to affect transaction costs are the size of the trade, counterpart, venue of trading and timing of the trade (Amihud, Mendelson and Pedersen, 2005).

Liquidity can also be affected by demand pressure and inventory risk of a certain security. If there are no available buyers at a given price level the seller might still be able to transact, at a higher cost, with a market maker. Market makers are willing to take on risk that other buyers may be unwilling to, thus requiring compensation for it, which relates back to the transaction cost of liquidity and is expressed through wider bid-ask spreads (Amihud, Mendelson and Pedersen, 2005).

Both buyers and sellers of a given transaction might have access to private information. The source of this information can vary and gives rise to a situation where both parties are unwilling to transact given that the seller believes that the buyer has access to positive information and the buyer believes the seller has access to negative information. Providers of liquidity require compensation for the risk of trading with informed investors (Vayanos and Wang, 2013). In this situation of information asymmetry, the establishment of a trade that both parties agree upon is hard to achieve, which is negative in terms of liquidity (Amihud, Mendelson and Pedersen, 2005).

Concluding this, there are both explicit and implicit transaction costs related to trading. The former consists of the visible costs that traders face when transacting in the market and the latter of hidden

costs that are not easily identified, stemming from informational asymmetries and other risk factors that are often reflected in the bid-ask spread.

2.2 Ownership structure and governance

2.2.1 Active monitoring hypothesis

The existence of large shareholders within a firm leads to better monitoring of managers (Agrawal and Mandelker, 1990). Blockholders are expected to monitor a firm's performance (Morck, Shleifer and Vishny, 1988; Ansell and Gash, 2008) as the large stakes invested in firms gives them incentives to do so actively. These incentives motivate the blockholders to bear the costs of monitoring to ensure that managers of the firm act in accordance with the blockholders interests. It is mainly investors that hold significant portions of stock in a firm that have incentives to monitor performance as they receive a larger portion of the potential benefits that this will lead to. Edmans (2014) agree with earlier research stating that large shareholders are more inclined to monitor firm performance and in addition he explains that if the blockholders are not satisfied with the priorities of the firm's managers, there are two main mechanisms through which they can exert governance. The first mechanism is known as voice, which is a direct intervention within the firm. This could for example be exercised by suggesting a strategic change to management or by voting against directors. The second governance mechanism is known as exit and means that the blockholder is selling his shares in the firm. This will likely lead to a decrease in stock price, thus punishing the managers ex ante (Edmans, 2014).

Block investors have incentives to monitor firms' management and these actions work to mitigate the agent problem. However, there is a drawback with this. In order to ensure liquidity in the secondary market some degree of ownership dispersion is essential. This trade-off between optimal monitoring and liquidity is a puzzling phenomenon yet to be solved (Becht, 1999).

2.2.2 Block ownership leading to information asymmetry

The active monitoring conducted by large shareholders leads to a dilemma that affects stock liquidity. The monitoring activities of blockholders can provide them with access to private, value-

relevant information that is not publicly available (Heflin and Shaw, 2000). This creates a scenario where the block owners have an information advantage compared to other market participants.

As a response to an increased risk of informed trading, market makers charge wider spreads and decrease the number of shares they offer (Copeland and Galai, 1983; Glosten and Milgrom, 1985; Heflin and Shaw, 2000; Brockman, Chung and Yan, 2009). The information advantage created by blockholders' monitoring activities, and the potential benefits attributed to this, is partially offset by a reduced liquidity through wider spreads and lower depths. Hence, one component affecting the liquidity of stocks depends on how frequent the blockholders are trading on superior information. The more frequently blockholders do this, the more adversely they will affect the market liquidity (Brockman, Chung and Yan, 2009). However, Brockman, Chung and Yan (2009) also suggest that in settings where legal, regulatory or internal governance concerns limit or completely restrict such informed trading, block ownership will no longer adversely affect market liquidity by information asymmetry. This suggests that the effect of block owners on market liquidity might differ between markets with different underlying conditions. Conducting a study on another market could therefore lead to different conclusions regarding blockholder effects compared to the markets previously studied.

2.2.3 Ownership types

One popular assumption in economics is that owners of a firm want to maximize their economic profits. While this might be a sufficient assumption on many occasions, it is merely an approximation of the general idea that owners may be expected to maximize their utility, which may depend upon other factors (Thomsen and Pedersen, 2000). Further elaborating on this, not all owners can be considered to have maximum shareholder value as their only goal. While the distribution of ownership is one fundamental area when discussing ownership structure, it is also vital to include the identities of the relevant owners. Different types of owners have different goals and preferences which ultimately leads to implications for corporate strategy and performance (Thomsen and Pedersen, 2000).

Institutional investors

Institutional investors are a diverse set of organizations, for example banks, insurance companies, pension funds and investment companies and their performance is normally measured in terms of financial performance. They are assumed to be portfolio investors and normally have low risk aversion and relatively long time horizons. Their main objective can be described as maximizing shareholder value (Thomsen and Pedersen, 2000). David, Kochhar and Levitas (1998) explains that even when institutional investors do not own large blocks of shares within a firm, they are inclined to seek a more active governance role compared to individual stock owners. The reason for this is that institutional investors, unlike other investor types, normally invest other people's money and thus they have a legal fiduciary obligation to take proactive actions to protect their investments from value erosion (David, Kochhar and Levitas, 1998).

Insiders

Finansinspektionen is the Swedish authority responsible for monitoring the financial market and through this also regulating and monitoring insider trading. According to Finansinspektionen, issuers on a regulated market or multilateral trading facility are obligated to continually maintain a list of all the people who have access to insider information on something called an insider list (Finansinspektionen, 2020a). Furthermore, each individual case of insider information is assessed on a case-by-case basis and what is classified as insider information in one case does not necessarily qualify as insider information in another (Finansinspektionen, 2020b). Insider information is defined as *"information of a precise nature, which has not been made public, relating, directly or indirectly, to one or more issuers or to one or more financial instruments, and which, if it were made public, would be likely to have a significant effect on the prices of those financial instruments."* (Finansinspektionen, 2020b). There are strict rules against trading on insider information and it is regulated by law that any individual with access to insider information (defined as described above) is forbidden to exploit this at their own or someone else's behalf, either directly or indirectly (Finansinspektionen 2020c).

Others

In addition to the abovementioned ownership types there are several others that can be bundled together as groups, both as blocks and non-block owners. In this thesis, we are interested in outsider blockholders in addition to institutional and insider owners. Outsiders are the residual of total owners that do not qualify under the definition of insiders in the paragraph above (and will be further defined in section 3.3.2). We acknowledge that multiple other ownership groups exist (e.g. business spheres, families, retail investors (individuals), private equities, venture capital, business angels, foreign investors). Although, we do not investigate these investor types as they fall outside of the scope. Our focus lies on block ownership and therefore no further description of these other types of owners will be given.

2.3 Block ownership and liquidity

According to Stoll (2000) there are two ways in which blockholders can impact market liquidity of a firm in the secondary market. The first being through altering the firm's trading activity and the second by changing the firm's information environment. These ways of altering market liquidity are referred to as friction (Stoll, 2000). The changes in trading activity due to block holdings is called real friction and changes in the information environment is called informational friction.

Real friction is the actual resources used to accomplish trades in the market. Comparing this to the different sources of illiquidity presented in chapter 2.1, the real friction corresponds to parts of the transaction costs, demand pressures and inventory risks. Brockman, Chung and Yan (2009) argue that blockholders cause a reduction in trading activity and that this is why blockholders have a negative effect on liquidity. To contextualize this, previous research has found that trading activity is negatively related to bid-ask spreads (Benston and Hagerman, 1974). Thus, firms with highly concentrated ownership are expected to have lower trading activity and correspondingly larger spreads. In this study the changes in trading activity accounts for the real friction effects, which is in accordance with Brockman, Chung and Yan (2009). This is motivated by a scenario where blockholders trade substantially less than non-blockholders, leading to a reduction in trading

activity that will change the distribution of real friction costs to cover fewer trades and thus increase the fixed real costs in those trades (Brockman, Chung and Yan, 2009).

Informational friction will arise when better informed traders can profit by trading on superior information. This corresponds to what Amihud, Mendelson and Pedersen (2005) discuss as private information. When traders have acquired positive information about a firm, they can buy on the ask price and in case of acquiring negative information, they can sell on the bid price. The occurrence of this type of behaviour lead to market makers increasing bid-ask spreads in order to account for the possibility of informed trading being conducted (Copeland and Galai, 1983). Informational friction is measured as the residual fraction of the bid-ask spread measures that is not explained by the real friction effects (trading activity) in our sample, in accordance with Brockman, Chung and Yan (2009).

It is important to note that while real friction effects are hard to affect through regulation, informational frictions are possible to mitigate through more strict governance and regulations (Brockman, Chung and Yan, 2009).

2.4 Previous literature

Market liquidity has shown to be related to multiple events that are of great importance to multiple stakeholders and this makes it increasingly interesting to further understand the dynamics behind what affects market liquidity. However, while the various effects of market liquidity have been thoroughly researched, there is not as much research and understanding towards what factors affect market liquidity and a particular area where research is limited is how blockholders affect market liquidity.

Heflin and Shaw (2000) and Brockman, Chung and Yan (2009) are two exceptions to this and both papers are empirical studies conducted on the American market. Heflin and Shaw (2000) find a positive relation between liquidity, measured as relative and effective spread, and block holdings, meaning that an increase in block holdings leads to larger relative and effective spreads (which is negative in terms of liquidity). They suggest that one reason for this is because blockholders get

access to private, value-relevant information. In response to this, as expected losses to informed investors increase, market makers increase bid-ask spreads and depths. Brockman, Chung and Yan (2009) also find that blockholders affect market liquidity negatively. However, they suggest that the explanation to this is due to a relative decrease in trading activity rather than because of the dilemma with informed investors and conclude that real friction effects are explaining the adverse relation between block holdings and market liquidity.

2.4.1 Literature on market liquidity

Stock market liquidity has been subject to research in the past and it seems that it is related to a wide range of events. Both Amihud (2002) and Pástor and Stambaugh (2003) find that expected stock returns are related to stock market liquidity. Amihud (2002) explains that expected stock excess returns consist partly of a premium for stock illiquidity and these findings suggest that illiquid stocks would receive higher returns compared to more liquid alternatives, ceteris paribus. Fang, Noe and Tice (2009) study the relation between stock liquidity and firm performance and find that there is a positive relation between these variables, ultimately telling us that firms with liquid stocks are valued higher. Some further conclusions drawn in previous research regarding market liquidity are that firms with liquid common stock are less likely to pay out dividends (Banerjee, Gatchev and Spindt, 2007), stock liquidity affect executive compensation schemes (Jayaraman and Milbourn, 2012) and that firms with better corporate governance practice have better liquidity (narrower bid-ask spreads) (Chung, Elder and Kim, 2010).

The technological advancements in our society during the 2000s has affected the financial markets and the way financial assets are traded have been revolutionized by this (Hendershott, Jones and Menkveld, 2011). This has also had effects on market liquidity and one example of this is algorithmic trading that is one thing that stems from the technological advancements of our society. Algorithmic trading has improved market liquidity by narrowing spreads, reducing adverse selection and reducing trade-related price discovery (Hendershott, Jones and Menkveld, 2011). Since the characteristics and trends of the financial markets change over time, there is a risk that old research gets outdated and thus theories that once were valid in explaining certain relationships are no longer correct. Thus, conducting research with contemporary data could give an indication

whether the same theories are still applicable today, even though the settings of the financial markets have changed since those studies were conducted.

2.4.2 Literature on blockholders

Blockholders is a common subject of research in corporate governance literature. These can generally be defined as large shareholders and are thus distinguished from small investors by the size of their holdings (Edmans and Holderness, 2017). Blockholder theories hold that the benefits of such owners are that they monitor the firm's performance, reduce agency costs and increase firm value (Brockman, Chung and Yan, 2009). However, there are not only benefits related to blockholders. Blockholder ownership can potentially be costly if blockholders have access to private and value-relevant information, which they often do as a result of their monitoring. This in turn can offset reduced liquidity (larger spreads) and depth in the market for the firm's share (Heflin and Shaw, 2000).

The required size of the stake required to be classed as a blockholder is not explicitly expressed to any fraction of the total number of shares, but most of the literature are applying a threshold level of 5% of the total shares outstanding (e.g. Mehran, 1995; Agrawal and Knoeber, 1996; Heflin and Shaw, 2000; Brockman, Chung and Yan, 2009). The main explanation to why 5% is the preferred threshold for block ownership is that this level triggers mandatory public filings under SEC regulation in the USA (Mehran, 1995), enabling data gathering for ownership structures. Hence, the threshold of 5% is a construction made from necessity (data for lower thresholds are difficult or even impossible to retrieve) rather than being the practical best fit for conducting financial studies. Edmans and Holderness (2017) agree on this, saying that there is no theoretical basis for using 5% as the threshold for block ownership and that future research should study blocks smaller than this if possible.

2.4.3 Research and characteristics of the Swedish market

Compared to the American market (where most earlier research is conducted) there are multiple differences in the characteristics of the Swedish market. Henrekson and Jakobsson (2012) highlights some of these differences and one thing they mention is that Sweden has greater ownership concentration (measured by control rights) than most other countries. While this has

become less evident since the beginning of the 1990s there are still dissimilarities between the Swedish and American market in this regard.

Henrekson and Jakobsson (2012) also mention that a big difference between the Swedish and American market is corporate laws and the effect of these. In contrast to the USA, Swedish laws state that the entire board is up for re-election each year and therefore anyone who can muster a majority of the votes can elect a new board, that in turn can replace current management. Thus, managers in Swedish companies have a weak position relative to shareholders, in comparison to managers of American companies. Having controlling rights in Swedish companies can hence be more powerful. Ohlsson (2006) further explains that it is both difficult and costly to implement powerful incentive systems for managers in Swedish firms as there is a high tax rate on both labor income and stock options tied to employment, making it more difficult to align the interests of managers with the interests of stockholders.

The current research regarding block holders and market liquidity in Sweden is scarce and we have not identified any previous studies conducted on this topic. Rather, the previous research that has been done on the Swedish market has examined other relations and effects connected to liquidity or ownership. For example, Butt and Virk (2015) conducted a study on the Nordic markets where they analyzed the effect of market liquidity on asset prices and Dahlquist and Robertsson (2001) examined what firm characteristics foreign investors show preference towards in the Swedish market.

Another field that has been researched is how the composition of shareholders is affecting the stock return volatility (Jankensgård and Vilhelmsson, 2018). They find that, in the Swedish setting (using similar ownership data as in this study), a more dispersed ownership (i.e more owners) increases the volatility of stocks. Surprisingly, as their predictions were that with a wider base of shareholders, the information reflected in the share price should be more accurate and thus stocks should have less variability in returns (Jankensgård and Vilhelmsson, 2018).

Hence, while both market liquidity and different types of ownership have been researched and analyzed separately in previous studies on the Swedish market, this study focuses on an area where research as of today is insufficient.

2.5 Hypotheses

Previous research on the effect of block holdings on market liquidity suggests that block holdings are positively related to bid-ask spreads (Heflin and Shaw, 2000; Brockman, Chung and Yan, 2009) and this means that higher block ownership is expected to lead to wider spreads (lower liquidity). Thus our first hypothesis is formulated as follows:

Hypothesis 1: Liquidity is adversely affected by block holdings

Brockman, Chung and Yan (2009) conclude that increased block ownership is associated with a decrease in trading activity and that this is the sole mechanism explaining the adverse effects on liquidity in their study. The same relationship is expected to be present also on the Swedish market and thus our second hypothesis is formulated as follows:

Hypothesis 2: Block holdings affect market liquidity adversely through real friction effects

Previous research suggests that the type of block ownership is potentially affecting the spread (Brockman, Chung and Yan, 2009). This is connected to what Stoll (2000) explains as informational friction and originates from the presence of investors with superior information. Insiders are expected to have an informational advantage and access to private information which leads us to our third hypothesis:

Hypothesis 3: Insider blocks affect liquidity more adversely than outsider blocks

3. Methodology

This study follows a quantitative methodology investigating the hypotheses formulated in the previous section. The first step of this is to gather the appropriate data from various databases. After all data has been collected, we run regressions to obtain statistical relationships for our examined variables. The results from these regressions will be the foundation of our analysis which is what will ultimately help us determine what kind of conclusions can be drawn on the relation between block ownership and market liquidity.

3.1 Data and sample description

Two different databases are used in order to gather all the sufficient data for this study. The financial data is obtained from Datastream while the ownership data is obtained from Modular Finance's Holdings database. Holdings contains ownership data for all Swedish listed companies and from this database we collect data regarding ownership and block holdings. Through the Holdings database we are able to get quarterly data of the ownership distribution enabling our study to have four data points per year rather than only one as in previous studies (e.g. Heflin and Shaw, 2000; Brockman, Chung and Yan, 2009). In addition to ownership distribution, both in terms of voting and cash flow rights, we are also able to retrieve data on the identity of the owners, for example the total percentage of shares owned by institutional investors and the share of blockholders that are insiders.

Our sample covers the main exchange in Sweden, Nasdaq OMX Stockholm (large, mid and small cap), and the First North growth market. From the Holdings database we find that firms on these exchanges comprised about 99.5% of the total market capitalization on the Swedish markets by the end of 2019. Data from the two risk capital markets Spotlight and NGM are not included in the sample. According to Modular Finance, the data available on the companies on these lists are of worse quality than for the other markets and it is difficult to ensure that the data is correct. Along with this, the size of these markets are small and through the sample in this study we already cover 99.5% of the total market capitalization on the Swedish markets. Thus, our reasoning behind leaving this out of our sample is that the disadvantages of including faulty and potentially flawed data are outweighing the benefits of a slight increase in our sample size.

The sample covers the 12 quarters of the years 2017-2019. According to Chordia, Roll, and Subrahmanyam (2001) it is important to include multiple periods in an analysis of market activity and liquidity and bearing this in mind we decided to use a span of three years for the data in our sample. The reason for choosing the particular years 2017-2019 was that we wanted data that rightfully represents the contemporary market conditions. Previous studies have used data that can be argued to be outdated and thus it was important for us to conduct this study on more recent data.

As mentioned earlier, a limitation to previous studies is that the data they used on ownership distribution was based on how it looked at one certain day each year. This means that the data is not necessarily representative of how it actually looked throughout the year. The same problem will to some extent be applicable to this study. However, to try and mitigate some of the risk associated with this we are using quarterly data (which is the highest resolution available from Holdings) instead of yearly data, thus getting four data points per year. While this still means that one data point will be used to represent each quarter, having four data points per year instead of one ensures a bit more certainty to the produced results. To summarize, our dataset consists of 7239 observations from 676 companies.

3.2 Empirical approach and model specification

The empirical approach of this study is a linear model estimation of the determinants of stock liquidity with an unbalanced panel data set. To further analyze what relations could explain the effect of blockholders on stock liquidity we also estimate a model for trading activity. The main empirical model is shown in equation 1:

$$Liquidity_{i,t} = \beta_0 + \beta_1 \log(Market\ cap_{i,t}) + \beta_2 \log(Shareprice_{i,t}) + \beta_3 \log(Volatility_{i,t}) + \beta_4 Institutional_{i,t-1} + \beta_5 Blocks_{i,t-1} + \beta_6 \log(Turnover_{i,t}) + f_1 + \alpha_k + p_t + \varepsilon_{i,t} \quad (1)$$

where f_1 is listing fixed effects, α_k is industry fixed effects, p_t is period fixed effects and $\varepsilon_{i,t}$ is the error term. The various subscripts have different meanings where i is firm, t is time, l is stock exchange listing and k is industry. In order to test whether changes in liquidity are due to

informational or real friction effects, trading activity will be included in the regressions with liquidity measures (spreads). Testing the liquidity models with and without trading activity enables distinguishing between the two types of friction.

The model for testing whether trading activity is affected by block ownership is presented in equation 2:

$$Trading\ activity_{i,t} = \beta_0 + \beta_1 \log(Market\ cap_{i,t}) + \beta_2 \log(Shareprice_{i,t}) + \beta_3 \log(Volatility_{i,t}) + \beta_4 Institutional_{i,t-1} + \beta_5 Blocks_{i,t-1} + f_1 + \alpha_k + p_t + \varepsilon_{i,t} \quad (2)$$

where all abbreviations and subscripts have the same meaning as in equation 1 presented above.

We conduct Hausman tests in order to determine whether fixed effects or random effects is the appropriate model in each of our regressions. The results from this can be seen in appendix A (table 8) and shows that the null can be rejected in all instances, meaning that fixed effects is the appropriate model for all our tests[1].

Further, it is likely that the four dimensions firm, time (quarter), industry and listing have fixed effects that cause the residuals to be correlated across observations, which we have to account for in order to avoid having biased results. When dealing with multiple dimensions of fixed effects, standard errors are biased when using many of the popular estimation methods (e.g OLS, Fama-Macbeth, White, Newey-West modified for panel data sets) (Petersen, 2009). In order to make sure that our estimations produce unbiased standard errors we cluster these by firm, as well as parametrically including (as dummies) period, industry and listing. We decide to parametrically include time, industry and listing into the model rather than clustering on multiple dimensions as Petersen (2009) concludes that when there are too few clusters, the standard errors will be biased even when they are clustered on the correct dimension(s). As time (11 clusters), industry (12 clusters) and listing (4 clusters) are all relatively small, including them into the model as dummy variables seems to be the best way to account for the fixed effects. The inclusion of fixed effects

[1] The regression results for the random effects models are reported in appendix A (table 9), but as the Hausman tests indicated that fixed effects were the more appropriate model, these results will not be further discussed.

in the model also comes with another benefit as Roberts and Whited (2013) conclude that this is a possible remedy for helping with endogeneity concerns. Thus, these precautions should ensure that our model is not biased by endogeneity problems, while also being robust to heteroscedasticity. In addition to this, it should also ensure that our estimates produce unbiased standard errors.

3.3 Variable description

3.3.1 Dependent variables

There are several ways of defining and calculating stock liquidity and in this study we are using two different measures. We follow the techniques used in previous literature on how the effects of block ownership is related to market liquidity (e.g. Brockman, Chung and Yan, 2009; Heflin and Shaw, 2000). In addition to the liquidity variables we also want to measure trading activity, which is also done according to previous research (Brockman, Chung and Yan, 2009). This results in three dependent variables; relative quoted bid-ask spread, relative effective bid-ask spread and turnover.

Our first measure of liquidity, relative quoted spread, is a simple measure of liquidity, but has been criticized as it excludes information about trades executed within the bid-ask range (Bessembinder, 1999). This measure is defined as the difference between the quoted bid and ask prices, divided by the midpoint (average) of the bid and ask prices. The relative quoted spread is included as a dependent variable in our regressions in its natural logarithm form, with the name *Log(Quoted).* Where the midpoint is the average of the bid and ask prices. We scale by the midpoint to receive a percentage measure, thus not being affected by the price of the share.

$$Relative\ quoted\ spread = \frac{(Ask - bid)}{Midpoint}$$

In order to mitigate the problem with the quoted spread we also test our hypotheses with a measure of the effective spread, i.e. at the level where transactions are conducted in relation to the bid-ask. The definition of relative effective spread used in this study is twice the absolute value of the difference between the transaction price of the stock and the midpoint, divided by the midpoint.

This variable is included in our liquidity regressions in natural logarithm form, named *Log(Effective)*. We multiply the absolute difference with two in order to account for implied roundtrip costs associated with trading (buying at ask, selling at bid) (Bessembinder, 1999).

$$Relative\ effective\ spread = \frac{2 \cdot |Shareprice - Midpoint|}{Midpoint}$$

For the analysis of trading activity, we base our measure on the practice of earlier research. Brockman, Chung and Yun (2009) conclude that regardless whether they use the logarithm of turnover or the number of trades and trade size as the trading activity variable, all yield similar results. We chose to use *Log(Turnover)* as our trading activity variable as this provided us with the most complete data when extracted from Datastream. The measure for turnover is simply the number of shares traded for a specific firm, divided by the total shares outstanding. This variable is used to examine whether any real friction effects from block holdings can be found within our sample. While the logarithm of turnover is used as a dependent variable when testing trading activity, it is also included as an independent variable in the regressions of the liquidity variables.

$$Turnover = \frac{Number\ of\ shares\ traded}{Total\ shares\ outstanding}$$

3.3.2 Independent variables

In order to test the hypotheses of this study, multiple independent variables are used. We divide these variables into two subcategories: block ownership and trading activity. The block ownership variables are further divided into cash flow rights and voting rights. Variable names as included in all tables are presented in italics in the sections below.

Block ownership

The main variable of interest, block ownership, is defined in accordance with previous literature (e.g. Mehran, 1995; Agrawal and Knoeber, 1996; Heflin and Shaw, 2000; Brockman, Chung and Yan, 2009) as any shareholder owning at least 5% of the total cash flow rights. The variable used for block ownership (*Sum blocks (≥5%)*) is calculated as the sum of fractions held by block owners

(above the applied threshold level) of the total outstanding shares[2]. However, to examine whether the results are robust across different definitions of the size of blockholders, we also test the sum of fractions of the total shares outstanding for block owners defined as shareholders owning more than 2.5% and 10% of the total capital. The threshold level of 2.5% (*Sum blocks (≥2.5%)*) is chosen based on Edmans and Holderness (2017) conclusion that blocks should be tested at lower threshold levels when possible (e.g. 2.5%), while the threshold level of 10% (*Sum blocks (≥10%)*) is based on the Nasdaq rulebooks (Nasdaq, 2019a; Nasdaq, 2019b). Nasdaq do not explicitly refer to these as blockholders, but state that ownings of 10% or more are not defined as being in public hands. In addition to this, a further test of the robustness of the main results will be made by testing for blockholders defined as owning more than 5% of the total voting rights (*Sum Blocks (≥5%) votes*) rather than the cash flow rights.

In accordance with Brockman, Chung and Yan (2009) all ownership variables will be lagged by one period in all regressions. The reasoning behind this is that both the liquidity measures and the measure for trading activity are calculated based on daily returns during each quarter, while the ownership data is measured at the end of each quarter.

Insiders and outsiders

In order to analyse the characteristics of blockholders, they are divided into two categories, namely insiders (*Insider (≤5%)*) and outsiders (*Outsider (≤5%)*). In accordance with the classification from Finansinspektionen (2020a), the group of insiders in this study consists of the investors reported in each firm's insider list. However only the insiders that are also classified as blockholders, i.e. owning more than 5% of a firm's outstanding shares, will be studied.

Outsiders are defined as the fraction of block holdings minus the fraction of insider block ownership. Thus, this category includes all block owners that are not qualified through the definition of insiders as described in the paragraph above. Through this, all blockholders are either classified as insiders or outsiders, where sufficient data was possible to gather.

[2] Example: A company has 2 blockholders with more than 5% of the outstanding shares each and in total their holdings comprise 20% of the total capital. The figures included in the descriptive statistics in this case would be the number of blockholders (2) and fraction of total share capital held by these (20%).

3.3.3 Control variables

We include a number of control variables following previous literature in the area (e.g. Heflin and Shaw, 2000; Brockman, Chung and Yan, 2009). These are included in order to isolate the effects of our explanatory variables on our dependent variables. Variable names are presented in italics.

Market capitalization (MSEK)

We measure the size of the companies by its market capitalization (*Log(Market cap)*), which is likely to have an impact on both liquidity and trading activity. The variable is in logarithmic form as is common practice in previous studies on liquidity. Previous literature suggests that bid-ask spreads are negatively correlated to market capitalization (see e.g. Stoll and Whaley, 1983).

Share price

Prior research suggests share price (*Log(Share price)*) as a control variable for studies on bid-ask spreads (see e.g. Hanley, Kumar and Seguin, 1993; Heflin and Shaw, 2000). This variable is expected to have a negative relation to relative quoted and effective spreads (Brockman, Chung and Yan, 2009). We measure share price as the quarterly average price per share.

Volatility

Volatility is measured as the quarterly variance in stock price and is a frequent measure in earlier literature on the subject of bid-ask spreads. Copeland and Galai (1983) showed that the width of the bid-ask spread is at least partially determined by the stock volatility, which makes it a useful variable to include in our model. This variable is included our regressions as an explanatory variable in its natural logarithm form, *Log(volatility)*.

Period

We have a sample consisting of 12 different periods, and in our model, these are included as dummy variables. As discussed earlier (section 3.2) parametrically including the time dimension in this manner ensures that we account for fixed time effects.

Listing

We include dummy variables for listing in our model to account for fixed listing effects, ensuring that they do not cause a bias in our estimates. There are several differences between the stock exchanges included in the sample and these differences are most prominent when comparing the differences between First North and the others (large, mid and small cap). For example, First North companies vary a lot in terms of size (market capitalization), while the other lists are more homogenous in this regard. Furthermore, liquidity requirements on the main exchange (large, mid and small cap) are more conservative compared to those on First North. Main market companies are obliged to have a distribution of ownership so that 25% of the outstanding shares are in hands of the public (Nasdaq, 2019a), while the corresponding level for First North is only at 10% (Nasdaq, 2019b). These are not strict requirements and can be exceeded on special occasions, as can be seen in the summary statistics (section 4.1).

Industry

Industry dummies are included for the same reasons as period and listing, namely to account for fixed effects. The inclusion of industry fixed effects is motivated by the differences in nature between sectors concerning future earnings that potentially have an impact on the trading and spreads in stocks.

Institutional ownership

Institutional ownership (*Institutional*) is measured as the percentage of institutional ownership in relation to the total amount of share capital. Through this, all institutional owners are recognized in this measure and not only the institutional owners who are blockholders. This variable is constructed this way because even when institutional investors do not own large blocks of shares within a firm, they are inclined to seek a more active governing role than individual stock owners (David, Kochhar and Levitas, 1998). As discussed in chapter 2.3, increased monitoring is expected to increase information asymmetry, which in turn leads to market makers increasing bid-ask spreads. Through this, institutional owners, regardless if they are block owners or not, should affect stock liquidity and thus they should be a part of our model.

3.4 Validity, reliability and limitations

The validity of a study is determined by whether the results are actually a measure of the intended purpose, i.e. whether you actually studied what you were supposed to study (Bryman and Bell, 2017). For this study, the variables used are based on the inclusion of them in the most prominent studies previously conducted within this area of research, which strengthens validity. Further, while there is always a risk that the data retrieved from Datastream and Holdings could include some random errors, it is unlikely that they would include systematic errors as both are recognized databases working hard to ensure the reliability of their data.

The trustworthiness of these databases also strengthens the reliability of this study. The reliability of a study is determined by the replicability of it. If someone else were to conduct the same study the same results would be obtained, if reliable (Bryman and Bell, 2017). While the databases are reliable, there is a risk of human errors as all data have been processed manually by the authors of this study. While we have been both cautious and deliberate to minimize the likelihood of this happening, these risks can never be fully mitigated. Furthermore Stata, a recognized program for conducting statistical calculations, have been used for producing the various summary statistics and regressions presented in this study, which should ensure the reliability of those.

While we tried to make this study as comprehensive as possible there are some limitations that we were not able to account for. The period studied is relatively short which is due to the lack of reliable data on insider holdings prior to 2018. While we still get a fair amount of observations, a longer timeframe would perhaps have further improved the certainty of some findings. In addition to this, our liquidity measures are suffering a bit from only being based on the closing value of each day. Harris (1989) states that closing bid, ask and share prices are on average higher than daily averages.. In the various databases we had access to we could not find any source that offered any more detailed data on bid and ask prices, which lead us to only using the closing prices of each day.

4. Empirical results and analysis

4.1 Summary statistics and univariate analysis

Table 1 presents summary statistics of our full sample. On average each firm has 3.355 blockholders (≥5%) that control 45.1% of the cash flow rights. We also find that the numbers are very similar when looking at blockholders in terms of voting rights where 3.267 blockholders control 43.9% of the votes. This tells us that the results will likely be very similar irrespective of whether you classify blockholders as owning 5% or more of the cash flow rights or the votes. Further, dividing the blockholders into outsider and insider blocks shows that there are fewer observations for this compared to the other variables, and this has two explanations. Firstly, Modular Finance (the company that administers the Holdings database) informed us that the data on the distribution of insiders was not reliable before 2018 and thus we only have data from this point on. Secondly, the data retrieved on insiders and outsiders only consist of the occasions where blockholders of both classes exist, which means companies where all blockholders are either insiders or outsiders is not covered by our sample. From these variables we find that insider blockholders hold, on average, about 1.3 percentage points more of the cash flow rights compared to outsiders.

Another interesting finding is that block holdings are higher in our sample compared to studies conducted on the American market (e.g. Heflin and Shaw, 2000; Brockman, Chung and Yan, 2009) confirming that ownership concentration is higher in Sweden as expressed by Henrekson and Jakobsson (2012). We find that on average 45% of the cash flow rights are held by block owners, while Brockman, Chung and Yan (2009) and Heflin and Shaw (2000) found 23.07% and 12.3%, respectively. The liquidity measures are showing that stocks in our sample have wider bid-ask spreads compared to the previous studies, as well.

Table 1. Descriptive statistics

This table presents the summary statistics of the variables used in this study. For variable definition, see chapter 3.3. All block ownership variables are measured in cash flow rights, except the two that are explicitly marked "votes" and refers to voting rights.

Variable	Obs.	Mean	Median	Std. Dev.	Min	Max
Liquidity and trading activity variables						
Relative quoted spread	7239	0.015	0.010	0.020	0.000	0.336
Relative effective spread	7239	0.006	0.003	0.013	0.000	0.333
Turnover	7239	0.150	0.080	0.364	0.000	13.285
Block ownership variables						
Number of blockholders (≥2.5%)	7239	6.177	6.000	2.367	1.000	17.000
Sum blocks (≥2.5%)	7239	0.551	0.564	0.187	0.026	0.998
Number of blockholders (≥5%)	7239	3.355	3.000	1.493	0.000	9.000
Sum blocks (≥5%)	7239	0.451	0.450	0.201	0.000	0.998
Number of blockholders (≥10%)	7239	1.446	1.000	0.976	0.000	5.000
Sum blocks (≥10%)	7239	0.315	0.300	0.222	0.000	0.998
Number of blockholders (≥5%) votes	7239	3.267	3.000	1.510	0.000	9.000
Sum blocks (≥5%) votes	7239	0.439	0.433	0.199	0.000	0.998
Insider (≥5%)	2902	0.262	0.233	0.171	0.050	0.795
Outsider (≥5%)	2902	0.249	0.230	0.142	0.050	0.730
Control variables						
Institutional	7166	0.272	0.182	0.260	0.000	0.995
Market cap (MSEK)	7239	14059.120	762.690	56664.892	2.688	1,233,672.000
Share price (SEK)	7239	69.563	33.320	100.460	0.010	1072.450
Volatility	7014	0.430	0.361	0.254	0.000	1.980

The industry distribution of all observations in our sample is as follows: discretionaries 4.96%, energy and environment 2.96%, finance 6.24%, health care 19.28%, industrial 16.29%, information technology 12.81%, materials 3.29%, raw materials 4.41%, real estate 9.28%, services 9.9%, telecom and media 1.73% and trading and goods 8.85%.

In table 2 the summary statistics divided by listing are presented. Overall these figures are showing values as expected, where the large cap companies have narrower spreads compared to the other lists, with First North companies on average having the widest spreads. The same distribution is observed regarding market capitalization and share price. Large cap companies have higher market cap and higher share price compared to the other lists, where First North is smallest.

Table 2. Descriptives by listing

This table presents the averages of our variables sorted by exchange. See chapter 3.3 for variable definitions.

Variable	Large	Mid	Small	First North	Total
Relative quoted spread	0.002	0.006	0.012	0.026	0.015
Relative effective spread	0.001	0.002	0.004	0.011	0.006
Turnover	0.151	0.140	0.129	0.162	0.150
Number of blockholders (≥2.5%)	5.778	6.844	6.239	5.977	6.177
Sum blocks (≥2.5%)	0.455	0.570	0.570	0.569	0.551
Number of blockholders (≥5%)	2.658	3.715	3.466	3.393	3.355
Sum blocks (≥5%)	0.347	0.457	0.470	0.478	0.451
Number of blockholders (≥10%)	1.061	1.340	1.532	1.605	1.446
Sum blocks (≥10%)	0.237	0.289	0.330	0.350	0.315
Number of blockholders(≥5%) votes	2.568	3.579	3.325	3.350	3.267
Sum blocks (≥5%) votes	0.329	0.439	0.453	0.473	0.439
Insider (≥5%)	0.228	0.229	0.260	0.282	0.262
Outsider (≥5%)	0.186	0.273	0.248	0.250	0.249
Institutional	0.578	0.439	0.199	0.105	0.272
Market cap (MSEK)	77538.526	4637.121	730.359	556.294	14059.120
Share price (SEK)	180.254	90.942	36.154	31.693	69.563
Volatility	0.245	0.328	0.419	0.556	0.430
Number of firms	105	141	111	319	676
Number of observations	1184	1564	1250	3241	7239
Share of total sample (obs.)	0.164	0.216	0.173	0.448	1

Block holdings and volatility are on average higher the smaller the list, where First North has the highest values and large cap the smallest. Institutional ownership has the reverse distribution where the Large cap companies have the largest share of institutional owners and First North companies the smallest.

Table 3 presents the correlation matrix of the variables included in this study. The liquidity measures are highly correlated with each other and the same goes for some of the block holding variables. This is expected however and will not be a problem since none of these variables are included in the same regressions. Several of the independent variables are correlated to each other, but not to the degree that there is a risk of multicollinearity, why we do not proceed with further diagnostic testing of this.

Table 3. Correlation matrix

In this table average pearson correlation coefficients for our main variables are presented. All estimates are based on our quarterly sample data ranging from 2017-2019. Descriptions of all variables are found in chapter 3.3.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Relative Quoted Spread	1.0000												
2. Relative Effective Spread	0.6540	1.0000											
3. Market Cap	-0.1716	-0.0966	1.0000										
4. Shareprice	-0.2898	-0.1873	0.4134	1.0000									
5. Volatility	0.2994	0.2158	-0.1742	-0.3129	1.0000								
6. Turnover	-0.0735	0.0447	-0.0136	-0.0570	0.1226	1.0000							
7. Institutional	-0.4075	-0.2438	0.3203	0.3890	-0.3619	-0.0256	1.0000						
8. Sum blocks (≥2.5%)	0.1599	0.0160	-0.1939	0.0176	-0.0813	-0.1940	-0.0589	1.0000					
9. Sum blocks (≥5%)	0.1775	0.0344	-0.1943	0.0115	-0.0509	-0.1800	-0.1264	0.9425	1.0000				
10. Sum blocks (≥10%)	0.1786	0.0562	-0.1368	0.0071	-0.0271	-0.1536	-0.2052	0.7969	0.8746	1.0000			
11. Sum blocks ≥5% (votes)	0.1910	0.0477	-0.1927	-0.0114	-0.0288	-0.1749	-0.1545	0.9195	0.9726	0.8696	1.0000		
12. Insider (≥5%)	0.0897	0.0396	-0.0645	-0.0744	0.0088	-0.0154	-0.0888	0.0686	0.0612	0.0730	0.0561	1.0000	
13. Outsider (≥5%)	-0.0306	-0.0320	-0.0306	0.0075	-0.0002	-0.0511	0.0247	0.0827	0.0823	0.0406	0.0927	-0.4103	1.0000

All block holding variables are positively correlated to relative quoted and effective spreads (except outsider blockholders) and this goes in line with previous literature on block holdings' effect on liquidity. Further, the block ownership variables are negatively correlated to turnover, which implies that increased block ownership correlates to decreased trading activity, independent of the threshold level set.

4.2 Multivariate analysis

In this section we display and discuss the results from our regressions. Firstly, we present the regression results from testing our base model (1), measuring liquidity as the relative quoted and effective spread. Secondly, we start to investigate how trading activity is affecting liquidity by presenting the regression results for testing model (2). Thirdly, we include turnover as a variable in our original model and compare these results to the ones where turnover is excluded. Fourthly, we investigate the effects of insider and outsider block holdings on liquidity. Lastly, we present additional regression results conducted in order to test the robustness of our main results.

4.2.1 Block ownership and liquidity

Table 4 presents the results from our regression of relative quoted and effective spread. The coefficient for block ownership is statistically significant and positive for both measures and this indicates that block holdings lead to wider bid-ask spreads, which is negative in terms of liquidity. A one standard deviation increase in block ownership is associated with a 20.17% increase in relative quoted spread and a 7.07% increase in effective quoted spread. The magnitude of these

coefficients are larger compared to the previous studies conducted on the American market (Heflin and Shaw, 2000; Brockman, Chung and Yan, 2009), but the overall conclusion is the same, block holdings have an adverse effect on market liquidity. As discussed earlier, the average spread (both quoted and effective) is larger on the Swedish market compared to the American and thus it makes sense that the coefficient for block ownership is also of greater magnitude when comparing in absolute terms.

Table 4. Regression of quoted and effective spread

Table 4 presents the results from model (1) as presented in 3.2. Block and institutional ownership variables are lagged by one period. Sum Blocks (>5%) is the sum of the fractions held by owners of 5 or more percent of total shares outstanding. All dependent variables, market cap, share price and volatility are in natural logarithm form. The models all include firm, period, listing and industry fixed effects. Standard errors clustered by firm are presented in parentheses. ***, ** and * represents significance at the 1, 5 and 10% level, respectively.

	(1)	(2)
VARIABLES	Log(Quoted)	Log(Effective)
Constant	-2.470***	-3.715***
	(0.128)	(0.154)
Log(Market cap)	-0.342***	-0.182***
	(0.022)	(0.027)
Log(Share price)	-0.054**	-0.236***
	(0.022)	(0.027)
Log(Volatility)	0.053	0.166***
	(0.041)	(0.051)
Institutional	-0.162*	-0.028
	(0.092)	(0.106)
Sum blocks (≥5%)	0.914***	0.340***
	(0.087)	(0.102)
Firm fixed	YES	YES
Period fixed	YES	YES
Listing fixed	YES	YES
Industry fixed	YES	YES
Observations	6,343	5,965
R-squared	0.855	0.497

The coefficients for the other variables seem to be in line with previous research in regards of the coefficients being positive or negative. The magnitudes differ in absolute terms, but overall the results are similar. Larger firms (measured through market capitalization) and firms with higher price per share have narrower relative spreads, both quoted and effective, while firms with higher volatility in their returns have larger spreads. An indication of this could be seen already in the correlation matrix (table 3) where both market capitalization and share price are negatively correlated to both types of spreads, while also having a positive correlation in between each other.

4.2.2 Block ownership and share turnover

The results from the regressions of model (2) (as presented in section 3.2) are presented in table 5. Volatility shows high economical and statistical significance in all regressions, indicating that this variable is a determinant for trading activity. The same can be found for institutional ownership and the effects of this, in contrast to the blockholder variables, are positive in all regressions. This is consistent with the findings of Brockman, Chung and Yan (2009), indicating that institutional ownership increases trading activity.

Table 5. Regressions of trading activity at different threshold levels for block ownership

Table 5 presents the results from the trading activity model as presented in 3.2. Block and institutional ownership variables are lagged by one period. Sum Blocks are the sum of fractions held by owners at the specified threshold levels of total shares outstanding. The dependent variables, market cap, share price and volatility are in natural logarithm form. All models include firm, period, listing and industry fixed effects. Standard errors clustered by firm are presented in parentheses. ***, ** and * represents significance at the 1, 5 and 10% level, respectively.

	(1)	(2)	(3)	(4)
VARIABLES	Log(Turnover)	Log(Turnover)	Log(Turnover)	Log(Turnover)
Constant	-0.728***	-1.123***	-1.183***	-1.675***
	(0.261)	(0.252)	(0.245)	(0.253)
Log(Market cap)	-0.043	-0.023	-0.006	0.014
	(0.044)	(0.044)	(0.039)	(0.044)
Log(Share price)	-0.018	-0.033	-0.031	-0.068*
	(0.038)	(0.038)	(0.039)	(0.038)
Log(Volatility)	0.434***	0.439***	0.407***	0.418***
	(0.081)	(0.082)	(0.097)	(0.085)
Institutional	1.033***	0.866***	0.775***	0.589***
	(0.185)	(0.184)	(0.232)	(0.186)
Sum blocks (≥2.5%)	-2.506***			
	(0.182)			
Sum blocks (≥5%)		-2.287***		
		(0.166)		
Insider (≥5%)			-2.281***	
			(0.237)	
Outsider (≥5%)			-2.612***	
			(0.326)	
Sum blocks (≥10%)				-1.801***
				(0.147)
Firm fixed	YES	YES	YES	YES
Period fixed	YES	YES	YES	YES
Listing fixed	YES	YES	YES	YES
Industry fixed	YES	YES	YES	YES
Observations	6,394	6,394	2,500	6,394
R-squared	0.346	0.344	0.340	0.315

The variables of most interest are the various block ownership measures and they all have negative coefficients that are statistically significant. This is found at all threshold levels and for both insider and outsider blocks. The interpretation of these results tells us that a one standard deviation increase in the sum of blocks (≥5%) is associated with a decrease in turnover by 36.85%. Arguably, this is of high economic significance as the capital held by blockholders is decreasing the trading activity irrespective of which threshold level we test for block holdings (columns 1-2 and 4) and at the same time with a high magnitude. Furthermore, the effect on trading activity from the block ownership type (column 3) shows small differences between insider and outsider blocks. Outsider blocks have a slightly more detrimental impact on trading activity compared to insider ones.

4.2.3 Block ownership and liquidity with trading activity effects

Table 6 presents the regression results from our main model (same as table 4) along with the results when including turnover as an explanatory variable. The relative quoted bid-ask spread is presented in columns 1 and 2 and the relative effective bid-ask spread in columns 3 and 4. As discussed before, the coefficient for block ownership is statistically significant and positive for both relative quoted spread and effective relative spread when the variable for turnover is left out (columns 1 and 3). However, when we control for the effect of trading activity (columns 2 and 4) the results are different. For the quoted spread we find that the block holdings coefficient is still positive and significant, but the magnitude is reduced by more than two thirds. For the effective spread the coefficient turns negative but is no longer statistically significant, thus we can't draw any certain conclusions regarding this. These results suggest that the adverse effects of block holdings are decreasing when controlling for trading activity (turnover), which implies that the blockholder effect on liquidity is at least partially explained by the decrease in trading activity. The effect of institutional investors changes from negative to positive when including trading activity to the model, but since it is not statistically significant, we cannot draw any certain conclusions based on this.

Table 6. Regression of quoted and effective spread with trading activity

Table 6 presents the results from the base model as presented in 3.2. Block and institutional ownership variables are lagged by one period. Sum Blocks (≥5%) is the sum of the fractions held by owners of 5 or more percent of total shares outstanding. All dependent variables, market cap, share price and volatility are in natural logarithm form. The models all include firm, period, listing and industry fixed effects. Standard errors clustered by firm are presented in parentheses. ***, ** and * represents significance at the 1, 5 and 10% level, respectively.

	(1)	(2)	(3)	(4)
VARIABLES	Log(Quoted)	Log(Quoted)	Log(Effective)	Log(Effective)
Constant	-2.470***	-2.790***	-3.715***	-3.920***
	(0.128)	(0.128)	(0.154)	(0.159)
Log(Market cap)	-0.342***	-0.347***	-0.182***	-0.182***
	(0.022)	(0.017)	(0.027)	(0.024)
Log(Share price)	-0.054**	-0.064***	-0.236***	-0.243***
	(0.022)	(0.014)	(0.027)	(0.023)
Log(Volatility)	0.053	0.171***	0.166***	0.229***
	(0.041)	(0.029)	(0.051)	(0.047)
Institutional	-0.162*	0.042	-0.028	0.076
	(0.092)	(0.069)	(0.106)	(0.105)
Sum blocks (≥5%)	0.914***	0.289***	0.340***	-0.027
	(0.087)	(0.068)	(0.102)	(0.105)
Log(Turnover)		-0.273***		-0.159***
		(0.018)		(0.023)
Firm fixed	YES	YES	YES	YES
Period fixed	YES	YES	YES	YES
Listing fixed	YES	YES	YES	YES
Industry fixed	YES	YES	YES	YES
Observations	6,343	6,338	5,965	5,960
R-squared	0.855	0.901	0.497	0.508

These results are similar, but not identical to Brockman, Chung and Yun (2009). Their findings suggest that the reduction in trading activity explained the entire effect on liquidity and they did not find any evidence of informational friction in their study. Our results are similar in the regard that we also find support for real friction effects, where the decline in trading activity affects market liquidity. However, we do not find that real friction effects are the sole explanation for this. As the coefficient still remains significant and positive (for the relative quoted spread) when including trading activity to the model, it seems as the informational friction effects must also impact the liquidity, and thus also partially explain the reduced liquidity. This contrasts earlier research as we cannot show that real friction is the sole cause of the adverse blockholder effects on liquidity (as argued by Brockman, Chung and Yun, 2009) and seemingly this finding shows

how the characteristics of the Swedish market actually causes the market to function differently than the American.

There could be multiple reasons as to why our results show that both real and informational friction are affecting secondary market liquidity in Sweden. The Swedish market characteristics, having relatively high ownership concentration and corporate laws that place firm managers in a weak position relative to shareholders, are two examples that could affect informational frictions. As the average ownership concentration is high there are likely multiple stakeholders in most firms having incentives to monitor their investments, which is one way that informational asymmetry on the market should increase. Further, shareholders having a strong position relative to managers further increase the incentives for monitoring as shareholders in comparison have more authority in Sweden compared to the USA (at least in this regard). These two characteristics of the market are likely to correlate with shareholders having stronger incentives to monitor firms and also having a relatively larger number of shareholders actually monitoring. Summarizing, this should lead to a larger likelihood of finding informational friction on the Swedish market than the American one and perhaps this is the reason why we find that the real friction effects are not the sole explanation to how blockholders reduce the stock liquidity.

4.2.4 Regressions by ownership type

Table 7 shows the regression results from dividing block ownership into the two groups insiders and outsiders. The data is not as complete as for the other variables, which leads to a lot fewer observations. However, looking at the effects of insiders versus outsiders we find that outsiders seem to have a more adverse effect on liquidity than insiders. The results show the same relation as the ones in table 6, where the impact of both insider and outsider blocks decrease significantly when controlling for trading activity. Further, we find that all regressions show that outsiders are having a more adverse effect on liquidity than insiders, and this is most evident when testing the effective spread. This might seem surprising as the group insiders are the block owners that are put on an insider list by Finansinspektionen, the Swedish authority responsible for monitoring the financial market, because they have access to inside information. Hence, by default, we know that these owners have access to inside information and previous literature have concluded that this should lead to an adverse effect on liquidity (Copeland and Galai, 1983; Glosten and Milgrom,

1985). Outsiders are not expected to have access to private information and thus the expected results would have been that this group had less impact on market liquidity compared to the insiders.

Table 7. Regression of quoted and effective spreads by ownership type

Table 7 presents the results from the base model as presented in 3.2. Block and institutional ownership variables are lagged by one period. Insider and outsider (≥5%) is the sum of the fractions held by insiders or outsider owners of 5 or more percent of total shares outstanding. All dependent variables, market cap, share price and volatility are in natural logarithm form. The models all include firm, period, listing and industry fixed effects. Standard errors clustered by firm are presented in parentheses. ***, ** and * represents significance at the 1, 5 and 10% level, respectively.

	(1)	(2)	(3)	(4)
VARIABLES	Log(Quoted)	Log(Quoted)	Log(Effective)	Log(Effective)
Constant	-2.675***	-3.022***	-3.920***	-4.088***
	(0.142)	(0.108)	(0.204)	(0.203)
Log(Market cap)	-0.340***	-0.339***	-0.178***	-0.174***
	(0.024)	(0.019)	(0.033)	(0.032)
Log(Share price)	-0.037*	-0.044***	-0.190***	-0.193***
	(0.022)	(0.017)	(0.031)	(0.030)
Log(Volatility)	-0.001	0.111***	0.105	0.148*
	(0.050)	(0.038)	(0.075)	(0.076)
Institutional	-0.139	0.060	-0.234	-0.191
	(0.145)	(0.117)	(0.203)	(0.205)
Insider (≥5%)	1.138***	0.490***	0.338*	0.033
	(0.139)	(0.113)	(0.193)	(0.197)
Outsider (≥5%)	1.250***	0.529***	0.751***	0.433*
	(0.173)	(0.125)	(0.225)	(0.225)
Log(Turnover)		-0.278***		-0.122***
		(0.015)		(0.027)
Observations	2,484	2,481	2,348	2,345
R-squared	0.826	0.881	0.445	0.450

However, while this might seem surprising, it could have a logical explanation. While they might have access to private and value relevant information, insiders do not necessarily trade on this information. There are strict rules prohibiting the use of inside information for personal gain, and perhaps the regulatory limitations are effective in minimizing this behaviour.

Brockman, Chung and Yan (2009) suggests that in settings where legal, regulatory or internal governance concerns limit or completely restrict informed trading, insider information will have no adverse effect on liquidity. Our findings imply that this could be valid on the Swedish market as both relative quoted and effective spreads show smaller magnitudes for insiders as compared to

outsiders. Although both insiders and outsiders have an impact on market liquidity, it cannot be concluded that market makers charge wider spreads based on the risk of trading with insider investors explicitly, as outsider blocks have higher coefficients in all four regressions.

Further elaborating on this, the way the two different groups are classified could perhaps also be an explanation. As insiders (in this study) are defined as the group of blockholders that are on the insider list we know that they are heavily monitored by authorities (i.e. Finansinspektionen) and might not have the possibility to trade on insider information without facing severe consequences. However, the group of outsiders are still blockholders, and according to previous literature this increases the likelihood of them having access to inside information. While this group is also strictly prohibited from trading on this kind of information, they are not as closely monitored as the insider group, which might lead to it happening more often. If this is the case it could be one reason why the outsider group is found to have a more detrimental effect on liquidity compared to insiders.

4.2.5 Additional regressions and robustness testing

In order to compare our results with previous studies (e.g. Heflin and Shaw, 2000; Brockman, Chung and Yan, 2009) we also conduct a cross-sectional regression. Previous studies use company averages of all variables included, compressing information from multiple points in time into one data point, thus disregarding possibly valuable information regarding time and company fixed effects. We provide outputs based on the same technique in appendix B (table 10) and find that the results are very similar to those presented in table 6. There are small differences to the magnitude and significance of some variables, but all significant coefficients still have the same sign, regardless of which regression method we use. Thus, irrespective of which statistical approach we opt for (cross-sectional time series averages or panel data) the results are very similar. As discussed above, these findings are mostly in line with the previous studies conducted within this area, where the main difference is the extent to which informational or real friction is what explains the effect of block ownership on liquidity.

Tables 11 and 12 in appendix C show regression results where blockholders are defined as shareholders owning more than 2.5% and 10%. When comparing the results of the different

threshold levels we find that the results presented in sections 4.2.1 and 4.2.3 are robust regardless of what definition of blockholders is chosen. The results are similar to those presented in table 6 in terms of what variables are significant, in what way each variable affects the spreads (being positive or negative) and the R^2-values. The magnitudes differ a bit however, and the results suggest that the higher the threshold is for blockholders, the smaller magnitude this variable has. As this is the case when going from the 10% to the 5% level, and also when going from the 5% to the 2.5% level, we find that each span of blockholders are having an adverse effect on liquidity. If this would not be the case, the coefficient would either be staying the same or decreasing when going from one threshold level to the next. Now instead, when going from the 5% threshold (on the quoted spread) to the 2.5% threshold we find that the coefficient is increasing from 0.914 to 1.054, which shows that the group of blockholders between 2.5% and 5% are having a detrimental effect on liquidity.

Further, when testing blockholders in terms of voting rights, we see results almost identical as when testing in terms of cash flow rights. The regression results for voting rights are presented in appendix D (table 13) and when comparing this with table 6 we find that the magnitudes are similar for all variables irrespective of which spread is tested and whether turnover is included or excluded. Along with this, the same variables are significant (or non-significant) on the exact same levels and we can conclude that within our sample we cannot find any important differences whether we categorize blockholders in terms of voting rights or cash flow rights.

There are many aspects that need to be considered when running the type of regressions that have conducted in this study and some of these have already been discussed (e.g. heteroscedasticity, fixed effects and multicollinearity). Reverse causality is another aspect that needs to be considered. However, as pointed out by Brockman, Chung and Yan (2009), while reverse causality is a general concern with block ownership data, it is not likely to be a problem in this kind of analysis, as it is unlikely that investors would prefer to invest blocks in companies whose stocks have larger spreads or lower trading activity.

5. Conclusions

The purpose of this thesis was to deepen the understanding about blockholders' effect on market liquidity. In order to evaluate this, we conduct empirical tests to determine whether there is an association between liquidity and the proportion of the firm that is held by blockholders.

We find that blockholders have an adverse effect on market liquidity on the Swedish market and these results are robust irrespective of whether we test the sum of ownership blocks as shareholders owning more than 2.5, 5 or 10% of outstanding shares, regardless of blockholders being classified as owners of cash flow rights or voting rights and whether we perform the regressions cross-sectionally on firm averages rather than with panel data. Thus, our findings support hypothesis 1 and we conclude that blockholders do have an adverse effect on market liquidity.

Further, we find that block ownership significantly reduces trading activity irrespective of whether we test blockholders as shareholders owning more than 2.5, 5 or 10% of cash flow rights. Irrespective of what threshold level is used, we also find that real friction effects are a large explanation to the adverse effects on liquidity. However, in contrast to earlier research, we do not find that real friction effects are the sole explanation to the adverse effects on liquidity. Rather, we find that informational friction also has an impact, indicating that the block ownership effects are caused by different underlying mechanisms on the Swedish market compared to the American. Further elaborating on this, our results could be argued to indicate that dissimilar market characteristics affect how block holdings impact market liquidity. Summarizing this, we find support for hypothesis 2, where real friction effects partly explain the adverse impact of block holdings on liquidity, however we conclude that it does not explain all of it.

Regarding different groups of blockholders we find that outsiders are having a more adverse effect on liquidity than insiders, which contrasts hypothesis 3. Possibly this can be explained by the regulatory conditions on the Swedish market regarding insider trading, where strict rules along with heavy monitoring of owners with access to insider information decrease the risk of informed trading by insiders. As long as the insiders do not trade on their superior information, the spreads

should not be affected by the existing information asymmetry, and perhaps this is the explanation to why the outsiders are having a more adverse effect on liquidity.

5.1 Theoretical and practical implications

From a theoretical perspective the contributions of this study are mainly twofold. Firstly, through showing that the block holding effect on liquidity stems from different causes depending on the characteristics of the market, the understanding of this subject deepens. As seen in our study, block holdings on the Swedish market seem to affect liquidity through a mix of real and informational friction, while previous research on the American market showed that only real frictions were present. Seemingly, the characteristics of different markets is affecting how block holdings affect liquidity, which is something that has not, to our knowledge, been previously concluded in this type of research. Secondly, we contribute to the theoretical understanding on the subject of ownership structures and liquidity by finding that irrespective of whether you classify blockholders as shareowners owning more than 2.5, 5 or 10% of the total shares outstanding, they have an adverse effect on liquidity. Especially the finding that blockholders smaller than 5% are also having an adverse effect on liquidity is something that broadens the previous understanding within the subject as, to the extent of our knowledge, this has not been tested or found before.

Since this study finds that block holdings affect market liquidity, a practical contribution is that firms should aim for a more dispersed ownership structure if they strive to increase its stock liquidity. On a similar note, as the block owners classified as insiders are having a less adverse effect on liquidity than outsiders, firms should not be particularly worried about having a large group of insiders as it is not detrimental to the market liquidity. However, a more dispersed ownership structure also has other consequences. More dispersed ownership means that less owners will be having large enough incentives to conduct appropriate monitoring. In addition to this, while more dispersed ownership leads to better liquidity, it also leads to more volatility and it is important to understand that while improved liquidity might be something to strive for, this has other consequences that might not be as desirable.

5.2 Future research

While our analysis does provide several interesting findings, there are areas that would benefit from being furtherly examined. First, one certain area is further determining at what level large shareholders start becoming detrimental to the liquidity of the stock. As previously discussed, we found that shareholders larger than 2.5% are having an adverse effect on liquidity, but it would be interesting to test the same on 1% and even on smaller thresholds than this. Further it would be interesting to investigate the effect of having one very large blockholder compared to a number of smaller blockholders to test whether it is simply the total size of block holdings or also the number of block owners that determines how adversely it will affect market liquidity.

Secondly, another aspect that would be interesting to investigate further is the differences in block holding effects between different markets, further focusing on the implications that different regulatory settings cause on block holdings and the effect this has on secondary market liquidity. Although we partially look into this, finding some evidence that the Swedish market regulations are constraining insiders from executing insider trades and thus limiting the effects of informational asymmetry in bid-ask spreads, this is an area that could be deeper understood by further analysis and research.

Lastly, delving deeper into the different classes of blockholders (and others ownership classes) would also further increase the understanding of the subject. In this thesis we studied block ownership and further divided this into insider and outsider blocks, but by increasing the number of different classes of blockholders it would be possible to further analyze what particular characteristics of stockholders are especially detrimental to market liquidity. However, this might be difficult to practically accomplish as it would require very detailed data on the identities of all blockholders, which is likely difficult to acquire. Besides this, further elaborating on the composition of shareholder types rather than the size of the investment would be interesting to investigate in regard to market liquidity as well.

Reference list

Agrawal, A. and Knoeber, C. R. (1996). "Firm Performance and Mechanisms to Control Agency Problems between Managers and Shareholders", *Journal of Financial & Quantitative Analysis,* 31(3), pp. 377–397.

Agrawal, A. and Mandelker, G. (1990). "Large Shareholders and the Monitoring of Managers: The Case of Antitakeover Charter Amendments", *Journal of Financial and Quantitative Analysis,* 25(2), pp. 143-161.

Amihud, Y. (2002). "Illiquidity and Stock Returns: Cross-Section and Time-Series Effects", *Journal of Financial Markets,* 5(1), pp. 31-56.

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

Amihud, Y., Mendelson, H. and Pedersen, L. (2005). "Liquidity and Asset Prices", *Foundations and Trends in Finance,* 1(4), pp. 269-364.

Ansell, C. and Gash, A. (2008). "Collaborative Governance in Theory and Practice", *Journal of Public Administration Research and Theory,* 18(4), pp. 543-571.

Banerjee, S., Gatchev, V. A. and Spindt, P. A. (2007). "Stock Market Liquidity and Firm Dividend Policy", *Journal of Financial & Quantitative Analysis,* 42(2), pp. 369–398.

Becht, M. (1999), "European Corporate Governance: Trading off liquidity against control", *European Economic Review,* 43(4-6), pp. 1071−1083.

Becht, M., Bolton, P., and Röell, A. (2003). "Corporate governance and control", In Constantinides, G., Stulz, R. and Harris, M. (eds*), Handbook of the Economics of Finance,* 1A edn, North Holland, pp. 1-109.

Benston, G. and Hagerman, R. (1974). "Determinants of Bid-Asked Spreads in the Over-The-Counter Market", *Journal of Financial Economics,* 1(4), pp. 353–364.

Bessembinder, H. (1999). "Trade Execution Costs on Nasdaq and the NYSE: A Post-Reform Comparison", *Journal of Financial and Quantitative Analysis,* 34(3), pp. 387-407.

Brockman, P., Chung, D. and Yan, X. (2009). "Block Ownership, Trading Activity, and Market Liquidity", *Journal of Financial and Quantitative Analysis,* 44(6), pp. 1403-1426.

Bryman, A. and Bell, E. (2017). “Företagsekonomiska forskningsmetoder”, 3 edn, Translated by Björn Nilsson, Stockholm: Liber.

Butt, H. and Virk, N. (2015). “Liquidity and Asset Prices: An Empirical Investigation of the Nordic Stock Markets”, *European Financial Management,* 21(4), pp. 672-705.

Chordia, T., Roll, R. and Subrahmanyam, A. (2001). “Market Liquidity and Trading Activity”, *The Journal of Finance*, 56(2), pp. 501-530.

Chung, K. H., Elder, J. and Kim, J.-C. (2010). “Corporate Governance and Liquidity”, *Journal of Financial & Quantitative Analysis*, 45(2), pp. 265–291.

Copeland, T. E., and D. Galai. (1983). "Information Effects of the Bid-Ask Spread", *Journal of Finance*, 38(5), pp. 1457-1469.

Dahlquist, M. and Robertsson, G. (2001). “Direct Foreign Ownership, Institutional Investors, and Firm Characteristics”, *Journal of Financial Economics,* 59(3), pp. 413-440.

David, P., Kochhar, R. and Levitas, E. (1998). “The Effect of Institutional Investors on the Level and Mix of CEO Compensation”, *Academy of Management Journal*, 41(2), pp. 200-208.

Demsetz, H. (1968). “The cost of transacting”, *Quarterly Journal of Economics*, 82(1), pp. 33-53.

Edmans, A. (2014) “Blockholders and Corporate Governance”, *Annual Review of Financial Economics*, 6, pp. 23-50.

Edmans, A. and Holderness, C. (2017). “Blockholders: A Survey of Theory and Evidence”, in Hermalin, B. and Weisbach, M., *The Handbook of the Economics of Corporate Governance*, 1st Edition, North Holland Publishing, pp. 541-636.

Fang, V., Noe, T. and Tice, S. (2009). “Stock Market Liquidity and Firm Value”, *Journal of Financial Economics*, 94(1), pp. 150–169.

Finansinspektionen. (2020a). “Insider Lists”, Available online: https://www.fi.se/en/markets/issuers/insider-information/insider-lists/ [Accessed 27April 2020]

Finansinspektionen. (2020b). “Insider Information”, Available online: https://www.fi.se/en/markets/issuers/insider-information/ [Accessed 22 April 2020]

Finansinspektionen. (2020c). “Marknadsmissbruk”, Available online: https://www.fi.se/sv/marknad/om-marknadsmissbruk/ [Accessed 14 May 2020]

Glosten, L. R. and Milgrom, P. R. (1985). “Bid, Ask and Transaction Prices in a Specialist Market with Heterogeneously Informed Traders”, *Journal of Financial Economics*, 14(1), pp. 71–100.

Hanley, K.W., Kumar, A.A. and Seguin, P.J. (1993). “Price Stabilization in the Market for New Issues”, *Journal of Financial Economics*, 34(2), pp. 177-197.

Harris, L. (1989). ”A Day-End Transaction Price Anomaly”, *Journal of Financial & Quantitative Analysis*, 24(1), pp. 29–45.

Heflin, F. and Shaw, K. (2000). “Blockholder Ownership and Market Liquidity”, *The Journal of Financial and Quantitative Analysis*, 35(4), pp. 621-633.

Hendershott, T., Jones, C. and Menkveld, A. J. (2011) “Does Algorithmic Trading Improve Liquidity?”, *Journal of Finance*, 66(1), pp. 1–33.

Henrekson, M. and Jakobsson, U. (2012) “The Swedish Corporate Control Model: Convergence, Persistence or Decline?”, *Corporate Governance: An International Review*, 20(2), pp. 212-227.

Jankensgård, H. and Vilhelmsson, A. (2018). “The Shareholder Base Hypothesis of Stock Return Volatility: Empirical Evidence”, *Financial Management*, *47*(1), pp. 55-79.

Jayaraman, S. and Milbourn, T. (2012). “The Role of Stock Liquidity in Executive Compensation”, *Accounting Review*, 87(2), pp. 537–563.

Mehran, H. (1995). “Executive compensation structure, ownership, and firm performance”, *Journal of Financial Economics*, 38(2), pp. 163–184.

Morck, R., A. Shleifer; and R. Vishny. (1988). "Management Ownership and Market Valuation: An Empirical Analysis", *Journal of Financial Economics*, 20(1-2), pp. 293-315.

Nasdaq (2019a), “Rule Book for Issuers”, Available online: https://www.nasdaq.com/docs/Nasdaq%20Stockholm's%20Rule%20book%20for%20Issuers%20-%201%20January%202019.pdf [Accessed 3 May 2020]

Nasdaq (2019b), “Nasdaq First North Growth Market – Rulebook”, Available online: https://www.nasdaq.com/solutions/rules-regulations-first-north-mtf-rules [Accessed 1 May 2020]

Ohlsson, L. (2006). “Best Practice Venture Capital: Principles, Tools and Approaches for Investment, Strategy and Policy”, Stockholm: Ibis

Pástor, L. and Stambaugh, R. (2003). “Liquidity Risk and Expected Stock Returns”, *Journal of Political Economy*, 111(3), pp. 642-685.

Petersen, M. (2009). “Estimating Standard Errors in Finance Panel Data Sets: Comparing Approaches”, *Review of Financial Studies*, 22(1), pp. 435-480.

Roberts, M. and Whited, T. (2013). “Endogeneity in Corporate Finance.” In Constantinides, G., Stulz, R. and Harris, M. (eds), Handbook of the Economics of Finance, 2A edn, North Holland, pp. 493-572.

Stoll, H.R. (2000). “Friction” *Journal of Finance*, 55 (4), pp. 1479-1514.

Stoll, H.R. and Whaley, R. (1983). “Transaction costs and the small firm effect”. *Journal of Financial Economics*, 12, pp. 57-79.

Thomsen, S. and Pedersen, T. (2000). “Ownership structure and economic performance in the largest European companies”, *Strategic Management Journal (John Wiley & Sons, Inc.)*, 21(6), pp. 689-705.

Vayanos, D. and Wang, J. (2013). “Market Liquidity - Theory and Empirical Evidence”, In Constantinides, G., Stulz, R. and Harris, M. (eds), *Handbook of the Economics of Finance*, 2A edn, North Holland, pp. 1289-1361.

Appendices

Appendix A. Hausman test

Table 8. Hausman tests

This table presents the test statistics for the main models in this thesis. The null hypothesis is that the random effects model is the preferred model. This is rejected for all models as presented below.

Panel A. Turnover models (presented in table 5)		
1	chi2 =	229.97
	Prob>chi2 =	0.0000
2	chi2 =	234.59
	Prob>chi2 =	0.0000
3	chi2 =	197.93
	Prob>chi2 =	0.0000
4	chi2 =	149.05
	Prob>chi2 =	0.0000
Panel B. Relative quoted and effective spreads (presented in table 6)		
1	Chi2 =	144.78
	Prob>chi2 =	0.0000
2	chi2(6) =	464.73
	Prob>chi2 =	0.0000
3	chi2 =	53.59
	Prob>chi2 =	0.0000
4	chi2 =	21.29
	Prob>chi2 =	0.0007

Table 9. Random effects models

This table presents the regression results from the regressions with random effects. All variables included are the same as in table 5 (panel A below) and table 6 (panel B below). For variable descriptions see chapter 3.3. Standard errors are presented in parentheses. ***, ** and * represents significance at the 1, 5 and 10% level, respectively.

Panel A. Turnover models

	(1)	(2)	(3)	(4)
VARIABLES	Log(Turnover)	Log(Turnover)	Log(Turnover)	Log(Turnover)
Constant	-2.098***	-2.337***	-2.211***	-2.796***
	(0.121)	(0.111)	(0.171)	(0.103)
Log(Market cap)	0.163***	0.175***	0.171***	0.208***
	(0.020)	(0.019)	(0.029)	(0.019)
Log(Share price)	-0.156***	-0.167***	-0.172***	-0.190***
	(0.021)	(0.021)	(0.031)	(0.021)
Log(Volatility)	0.196***	0.201***	0.239***	0.176***
	(0.035)	(0.035)	(0.058)	(0.035)
Institutional	0.346***	0.210*	0.123	-0.058
	(0.123)	(0.122)	(0.218)	(0.123)
Sum blocks (≥2.5%)	-1.911***			
	(0.114)			
Sum blocks (≥5%)		-1.826***		
		(0.103)		
Insider (≥5%)			-2.167***	
			(0.218)	
Outsider (≥5%)			-1.499***	
			(0.220)	
Sum blocks (≥10%)				-1.511***
				(0.094)
Observations	6,394	6,394	2,500	6,394

Panel B. Relative quoted and effective spread models

	(1)	(2)	(3)	(4)
VARIABLES	Log(Quoted)	Log(Quoted)	Log(Effective)	Log(Effective)
Constant	-2.267***	-2.532***	-3.442***	-3.626***
	(0.053)	(0.047)	(0.093)	(0.093)
Log(Market cap)	-0.333***	-0.329***	-0.214***	-0.210***
	(0.009)	(0.008)	(0.016)	(0.015)
Log(Share price)	-0.117***	-0.118***	-0.258***	-0.260***
	(0.010)	(0.009)	(0.019)	(0.018)
Log(Volatility)	-0.024	0.016	0.153***	0.211***
	(0.015)	(0.014)	(0.038)	(0.038)
Institutional	-0.411***	-0.362***	-0.090	0.009
	(0.057)	(0.050)	(0.104)	(0.102)
Sum blocks (≥5%)	0.775***	0.562***	0.410***	0.134
	(0.047)	(0.043)	(0.098)	(0.102)
Log(Turnover)		-0.139***		-0.122***
		(0.005)		(0.016)
Observations	6,343	6,338	5,965	5,960

Appendix B. Cross-sectional regression of time series averages by firm

Table 10. Cross-sectional regressions of relative quoted and effective spreads

This table presents the results of cross-sectional regressions on the time-series averages by firm of all variables included in our sample. Block and institutional ownership are lagged by one period. All dependent variables, market cap, share price and volatility are included in natural logarithm form. All models include listing and industry dummies. Robust standard errors are presented in parentheses. ***, ** and * represents significance at the 1, 5 and 10% level, respectively.

	(1)	(2)	(3)	(4)
VARIABLES	Log(Quoted)	Log(Quoted)	Log(Effective)	Log(Effective)
Constant	-2.264***	-2.489***	-3.444***	-3.571***
	(0.148)	(0.130)	(0.188)	(0.194)
Log(Market cap)	-0.342***	-0.372***	-0.213***	-0.230***
	(0.024)	(0.019)	(0.033)	(0.030)
Log(Share price)	-0.029	-0.028	-0.096***	-0.095***
	(0.022)	(0.017)	(0.027)	(0.025)
Log(Volatility)	0.101**	0.220***	0.152**	0.219***
	(0.048)	(0.044)	(0.071)	(0.073)
Institutional	-0.121	0.140	0.043	0.189
	(0.100)	(0.087)	(0.134)	(0.138)
Sum blocks (≥5%)	0.969***	0.377***	0.359***	0.026
	(0.095)	(0.088)	(0.120)	(0.135)
Log(Turnover)		-0.262***		-0.147***
		(0.025)		(0.035)
Observations	661	661	661	661
R-squared	0.875	0.910	0.698	0.714

Appendix C. Regression results from liquidity regressions with different threshold levels of block ownership

Table 11. Regression of quoted and effective spread at ≥2.5% threshold level

Table 11 presents the results from the base model as presented in 3.2. The model includes both liquidity and trading activity regressions. Block and institutional ownership variables are lagged by one period. Sum Blocks (≥2.5%) is the sum of the fractions of total shares outstanding held by owners of 2.5 or more percent of total shares outstanding. All dependent variables and market cap, share price and volatility are in natural logarithm form. The models all include firm, period, listing and industry fixed effects. Standard errors clustered by firm are presented in parentheses. ***, **, * represents significance at the 1, 5, 10% level, respectively.

	(1)	(2)	(3)	(4)
VARIABLES	Log(Quoted)	Log(Quoted)	Log(Effective)	Log(Effective)
Constant	-2.658***	-2.868***	-3.808***	-3.948***
	(0.135)	(0.133)	(0.160)	(0.163)
Log(Market cap)	-0.333***	-0.342***	-0.178***	-0.180***
	(0.023)	(0.017)	(0.027)	(0.024)
Log(Share price)	-0.062***	-0.067***	-0.241***	-0.245***
	(0.022)	(0.014)	(0.027)	(0.023)
Log(Volatility)	0.056	0.170***	0.167***	0.228***
	(0.041)	(0.029)	(0.050)	(0.048)
Institutional	-0.249***	0.024	-0.069	0.079
	(0.093)	(0.069)	(0.104)	(0.102)
Sum blocks (≥2.5%)	1.054***	0.381***	0.430***	0.042
	(0.094)	(0.073)	(0.110)	(0.112)
Log(Turnover)		-0.268***		-0.154***
		(0.018)		(0.023)
Firm fixed	YES	YES	YES	YES
Period fixed	YES	YES	YES	YES
Listing fixed	YES	YES	YES	YES
Industry fixed	YES	YES	YES	YES
Observations	6,343	6,338	5,965	5,960
R-squared	0.858	0.902	0.498	0.508

Table 12. Regression of quoted and effective spread at ≥10% threshold level

Table 12 presents the results from the base model as presented in 3.2. The model includes both liquidity and trading activity regressions. Block and institutional ownership variables are lagged by one period. Sum Blocks (≥10%) is the sum of the fractions of total shares outstanding held by owners of 10 or more percent of total shares outstanding. All dependent variables and market cap, share price and volatility are in natural logarithm form. The models all include firm, period, listing and industry fixed effects. Standard errors clustered by firm are presented in parentheses. ***, **, * represents significance at the 1, 5, 10% level, respectively.

	(1)	(2)	(3)	(4)
VARIABLES	Log(Quoted)	Log(Quoted)	Log(Effective)	Log(Effective)
Constant	-2.230***	-2.719***	-3.628***	-3.922***
	(0.123)	(0.124)	(0.150)	(0.158)
Log(Market cap)	-0.357***	-0.351***	-0.188***	-0.182***
	(0.022)	(0.017)	(0.027)	(0.024)
Log(Share price)	-0.040*	-0.059***	-0.231***	-0.243***
	(0.022)	(0.014)	(0.027)	(0.023)
Log(Volatility)	0.061	0.177***	0.169***	0.229***
	(0.042)	(0.029)	(0.051)	(0.047)
Institutional	-0.079	0.084	-0.002	0.079
	(0.094)	(0.067)	(0.104)	(0.102)
Sum blocks (≥10%)	0.663***	0.150**	0.249***	-0.046
	(0.079)	(0.060)	(0.096)	(0.097)
Log(Turnover)		-0.283***		-0.160***
		(0.017)		(0.022)
Firm fixed	YES	YES	YES	YES
Period fixed	YES	YES	YES	YES
Listing fixed	YES	YES	YES	YES
Industry fixed	YES	YES	YES	YES
Observations	6,343	6,338	5,965	5,960
R-squared	0.849	0.900	0.496	0.508

Appendix D. Voting rights regressions

Table 13. Regression of quoted and effective spread with blocks (≥5%) as voting rights

This table presents the results from the base model as presented in 3.2. Block and institutional ownership variables are lagged by one period. Sum Blocks (voting rights ≥5%) is the sum of the fractions of voting rights held by owners of 5 or more percent of total voting rights. All dependent variables, market cap, share price and volatility are in natural logarithm form. The models all include firm, period, listing and industry fixed effects. Standard errors clustered by firm are presented in parentheses. ***, **, * represents significance at the 1, 5, 10% level, respectively.

	(1)	(2)	(3)	(4)
VARIABLES	Log(Quoted)	Log(Quoted)	Log(Effective)	Log(Effective)
Constant	-2.440***	-2.782***	-3.718***	-3.931***
	(0.129)	(0.129)	(0.155)	(0.160)
Log(Market cap)	-0.345***	-0.347***	-0.182***	-0.181***
	(0.022)	(0.017)	(0.027)	(0.024)
Log(Share price)	-0.051**	-0.063***	-0.236***	-0.243***
	(0.022)	(0.014)	(0.027)	(0.023)
Log(Volatility)	0.054	0.172***	0.167***	0.228***
	(0.041)	(0.029)	(0.051)	(0.048)
Institutional	-0.173*	0.057	-0.037	0.084
	(0.093)	(0.068)	(0.104)	(0.102)
Sum blocks (≥5%) votes	0.884***	0.272***	0.355***	0.005
	(0.090)	(0.069)	(0.104)	(0.105)
Log(Turnover)		-0.275***		-0.157***
		(0.017)		(0.022)
Observations	6,343	6,338	5,965	5,960
R-squared	0.854	0.901	0.497	0.508