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The Institutional Footprint

An empirical study of the relationship between institutional ownership and idiosyncratic volatility in Scandinavian stock markets

Philip Gjelstad-Ditlevsen **Nicholas Oberg Magnussen**

Supervisor: Andreas Ørpetveit

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Philip Gjelstad-Ditlevsen

Nicholas Oberg Magnussen

Abstract

This thesis investigates the impact of institutional ownership on idiosyncratic volatility in Scandinavian stocks. The study applies CAPM regression analysis to estimate idiosyncratic volatility, akin to Xu and Malkiel (2003). Utilizing a comprehensive dataset on institutional ownership, the investigation is conducted by running fixed effects panel regressions on Scandinavian stocks, more specifically stocks listed on the Copenhagen, Helsinki, Oslo, and Stockholm exchanges, from 2017 to 2022. We regress idiosyncratic volatility on institutional ownership lagged by one quarter, controlling for variables such as company size, leverage, and stock turnover. Our findings suggest that there is a statistically significant and positive relationship between institutional ownership and idiosyncratic volatility. These insights challenge traditional portfolio theory and have significant implications for investors and market regulators. For investors, our findings suggest a need to reconsider diversification strategies in light of changing market dynamics. For regulators, proactive monitoring and policy adaptation to counter the destabilizing nature of institutional ownership is essential for maintaining market stability. The research conducted adds to the understanding of the dynamics between institutional ownership and idiosyncratic volatility in Scandinavia.

Keywords – Institutional Ownership, Idiosyncratic Volatility

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1 Introduction

Between 1962 and 1997, idiosyncratic volatility in the US stock market experienced a sustained increasing trend (Campbell et al., 2001). From 1997 onwards, the trend in idiosyncratic volatility first declined, then began to increase again, experiencing sporadic spikes during the tech bubble in 1999, the financial crisis of 2008, and the COVID-19 pandemic of 2020 (Campbell et al., 2023). In the meantime, institutional ownership in US equity markets has increased twelvefold, from 6.1% in 1960 to almost 70% in 2022 (Bas et al., 2023; Xu & Malkiel, 2003). Researchers believe these two developments are not coincidental and attribute the trend in idiosyncratic volatility to the growing institutionalization of equities (Brandt et al., 2010; Che, 2018; Xu & Malkiel, 2003).

Against the backdrop of growing empirical evidence indicating shifts in aggregate levels of idiosyncratic volatility, one can assume that the premise and theoretical foundation on which many investors base their stock investments and diversification strategies are undergoing unnoticed yet fundamental shifts. Since the early research of Sias (1996), who found a significant and positive relationship between idiosyncratic stock volatility and institutional ownership in the US, the topic of institutional ownership has become a fervent source of discussion. Similar research for stock markets in China and Japan yielded different results. Hu et al. (2022) and Chang and Dong (2006) found the impact of institutional ownership on idiosyncratic risk to be positive for the Chinese and Japanese stock markets. The inconsistent nature of the results indicates the need for more comprehensive research.

The primary objective of this thesis is to systematically explore this relationship through the hypothesis that greater institutionalization in Scandinavian stocks leads to increased idiosyncratic volatility. The analysis will be conducted using a panel dataset that includes company-specific information for the majority of companies listed on the Copenhagen, Helsinki, Oslo, and Stockholm stock exchange between 2017 and 2022. To the best of our knowledge, this is the first study to investigate this hypothesis through an analysis of all listed Scandinavian companies.

To investigate the relationship, we apply the method utilized by Xu and Malkiel (2003) to estimate a proxy for idiosyncratic volatility through CAPM regression. Based on daily price data, we estimate quarterly idiosyncratic volatility levels for all companies in our sample from 2017 to 2022. As suggested by Chichernea et al. (2013), using lagged levels of institutional ownership better captures the relationship because changes in idiosyncratic volatility are assumed to happen after the degree of institutional ownership changes. Empirically, we identify the ownership-volatility relationship by running fixed effects regressions between idiosyncratic volatility and lagged institutional ownership. The rationale for this is that, given the nature of our data, there is a potential for the interference of unobserved company- and time-specific heterogeneities. We run three models, whereas the first two include ticker and date fixed effects separately, and the third includes both ticker and date fixed effects. This specification enables our analysis to make a clear distinction between the impact of entity-specific and temporal effects. Additionally, to further isolate the effect of institutional ownership, we control for other factors that might affect idiosyncratic volatility, such as company size, stock turnover, and degree of leverage. We also run an expanded analysis in which idiosyncratic volatility is regressed on institutional ownership separately for all four individual stock exchanges.

Our results find a positive association between idiosyncratic volatility and lagged institutional ownership. More specifically, a 1% increase in institutional ownership is associated with a 0.3% increase in idiosyncratic volatility. We find that the estimated association constitutes a 13.8% increase in idiosyncratic volatility relative to its sample mean. This relative change highlights the potential for significant shifts in idiosyncratic volatility attributable to within-ticker and within-quarter-year variations in institutional ownership. By considering the standard deviation of institutional ownership, we find that a one standard deviation increase yields an expected change in idiosyncratic volatility of 0.06%. Within the econometrical context of our fixed effects model, our estimated effect is similar to the findings of Hu et al. (2022), who finds a comparable effect size of 0.06% per standard deviation increase in institutional ownership. Xu and Malkiel (2003) and Che (2018) use pooled OLS, but also find a positive and significant relationship. However, caution is necessary when comparing these results, as different methodologies can yield varied outcomes.

Our findings also hold true across two of the Scandinavian markets, Copenhagen and Helsinki, with different nuances in the strength of the relationships. We find that a 1% increase in institutional ownership for stocks listed on the Copenhagen and Helsinki stock exchange is associated with a 1.3% and 0.8% increase in idiosyncratic volatility. In terms of economic interpretation, this translates into a 75.1% and 42.5% increase in idiosyncratic volatility relative to the sample means, respectively. To ensure further robustness, we conduct three additional regressions for the whole dataset using institutional ownership lagged by two, three, and four quarters. The impact of institutional ownership consistently emerges as significant and positive for all tests, affirming the reliability of our initial findings.

In discussing our findings, we find that our hypothesis aligns with existing literature, which may offer a potential explanation for the positive correlation between institutional ownership and idiosyncratic volatility. The concept of institutional herding, as illustrated by Scharfstein and Stein (1990) and further supported by Xu and Malkiel (2003) and Froot et al. (1992), provides a compelling framework. This theory posits that institutional investors often act alike to external cues and are influenced by each other's trading decisions. Furthermore, Che (2018) might indicate the type of investors responsible for the rise in idiosyncratic volatility. Her research suggests that foreign institutional investors increase idiosyncratic volatility while domestic investors do the opposite. While our study does not distinguish between foreign and domestic, one can speculate that the increased idiosyncratic volatility observed in our findings results from predominantly institutional foreign investors.

The implications of our findings are of interest to various market participants. Prevailing foundational theoretical models within portfolio theory, as pioneered by Markowitz and Sharpe, advocate for market efficiency and suggest that diversification within a portfolio can effectively eliminate idiosyncratic volatility, implicating that only systematic risk is compensated for. Statman (1987) states that a well-diversified portfolio must include at least 30 randomly chosen stocks, yet this assumes stable levels of idiosyncratic volatility among them. If then, unbeknownst to the average investor, aggregate levels of idiosyncratic volatility change, the assumptions for which much of their investing activities are based on also change. Our findings carry significant implications for investors and portfolio managers attempting to manage the risk of their diversified stock portfolios. Investors aiming to minimize the idiosyncratic volatility of their holdings need to account for total institutional ownership. Our results imply that high levels of institutional ownership indicate high levels of idiosyncratic volatility. Second, the findings have several policy implications. A higher level of institutional ownership could threaten market stability for the Copenhagen and Helsinki stock exchange. Regional regulators are therefore encouraged to monitor the trading behavior of institutional investors and establish policies to stabilize financial markets.

The remainder of the paper is organized as follows. Section 2 provides an overview of existing literature and develops our hypothesis. Section 3 describes our research design, describing the data utilized, the construction of the variables used in the analysis, and the empirical strategy. Section 4 presents the empirical findings from the primary and expanded analyses. Section 5 discusses the findings, the assessment of the robustness of these findings, and the limitations of our study. The paper concludes with sections 6 and 7, which include our conclusion and suggested avenues for future research.

2 Literature Review & Hypothesis

In this section, we delve into the literature, introducing different perspectives on our primary research topic and empirical studies made by academics. Building on this literature, we then detail the development of our hypothesis.

2.1 Empirical Studies on Idiosyncratic Volatility

The research presented in this thesis is related to several strands of literature. As mentioned in the introduction, the most influential research on the trend of idiosyncratic volatility was done by Campbell et al. (2001). Decomposing stock return volatility at the market-, industry- and firm-level, their research found that even though total volatility for the overall US stock market has been relatively constant from 1962 to 1997, the idiosyncratic volatility of equity returns has increased for the same period. Moreover, they demonstrated that correlations among individual stocks have decreased over time, and concurrently, the market model's explanatory power has weakened. Conducting a study akin to that of Campbell, Brandt et al. (2010) challenged the notion of a continuous positive trend in idiosyncratic volatility from 1962 to 1997, positing that it was merely an episodic phenomenon rather than a sustained time trend. Their findings showed a complete reversal of this trend, with idiosyncratic volatility falling below pre-1990 levels by 2007. Furthermore, by replicating and extending the critical findings of Campbell, Chiah et al. (2020) found that between 1926 to 1962 and 1998 to 2017, idiosyncratic volatility fell, underpinning the notion that their findings might have been sample-specific to their chosen period.

Continuing on their previous research, Campbell et al. (2023) later found that even though total volatility in the US has remained high since 1997, average levels of idiosyncratic volatility were lower from 1997 to 2022 than from the initial period 1962 to 1997. This development could be explained mainly by low levels of idiosyncratic volatility following the 1990s technology boom and bust, which later increased during the financial crisis of 2008 and remained high until the Covid-19 pandemic. Other research has attempted to conduct similar studies based on the methods devised by Campbell et al. (2001). Researching the Norwegian stock market, Che (2018) found no apparent trend in aggregate idiosyncratic volatility from 1980 to 2009. Conversely, Sternbrink and Tengvall (2001) found that market and industry level volatility for the Stockholm stock exchange increased from 1988 to 2001, while idiosyncratic volatility in the same period had been stable. Zhang (2010) also observed a significant upward trend in idiosyncratic volatility from 1980 to 2000, followed by a downward trend after 2000.

2.2 Research on shifts in Idiosyncratic Volatility

Following the initial research made by Campbell, multiple hypotheses have been presented to try and explain the development of idiosyncratic volatility. A theoretical framework would suggest that the primary sources for change in idiosyncratic volatility would be a change in either the variance of a firm's expected cash flow, a change in the variance of discount rates, or a change in the covariance between the cash flow and discount rate shocks Campbell et al. (2001). Irvine and Pontiff (2005) pointed out that an intensification in US company competition, attributable to deregulation and increased foreign competition, led to an upward trend in cash-flow volatility between 1962 to 2003. Expanding on the same concept of more significant variability in cash flow, Fink et al. (2005) find that during the same period as researched by Campbell et al. (2001), two reinforcing factors may explain the increase in idiosyncratic volatility: an increase in the number of new listings and a notable decrease in the average age of firms at the time of their IPO. The average age had been reduced dramatically from almost 40 years in the early 1960s to less than five years by the late 1990s. Brown and Kapadia (2007) furthered this argument, suggesting that the increase in idiosyncratic volatility may have resulted from the financial liberalization and consequent ease at which younger, higher-risk companies can access capital markets. Adding to this discourse, Zhang (2010) proposes that fundamental variables, such as earnings and sales, work as robust determinants of idiosyncratic volatility. The suggestion of institutional ownership as a potential driver behind the increased trend in idiosyncratic volatility first came from Sias (1996), who concluded that an increase in institutional ownership results in an increase in idiosyncratic volatility.

2.3 Research on impact of Institutional Ownership

The most prominent research focusing on institutional ownership as a potential explanation for the rise in idiosyncratic volatility was done by Xu and Malkiel (2003). They argued that the rise in trading activity made by institutional investors, which had increased from an average of 5.1% in 1950 to 49.6% in 1998, might have increased market sensitivity to shifts in investor sentiment. By running cross-sectional regressions across every stock on the S&P 500 between 1989 and 1996, they found a positive relationship between the proportion of institutional ownership in individual stocks and the idiosyncratic volatility of their returns. Brandt et al. (2010) maintained this notion but proposed that the rise in idiosyncratic volatility during the Campbell period stemmed from speculative activities rather than a general trend. They argue that the heightened idiosyncratic volatility during the period was primarily fueled by the high trading of individual investors in low-priced stocks, concluding that idiosyncratic volatility levels are higher among stocks and industries with a greater concentration of retail investors. As mentioned before, Che (2018) found that foreign institutional investors exacerbated idiosyncratic volatility, while domestic institutional and individual investors had the opposite effect. This was because foreign institutional investors are momentum traders, trade the most, and have the shortest investment horizons. Individual investors, on the other hand, are contrarian traders, trade the least, and have the longest investment horizons. Domestic institutional investors fell between the two extremes (Che, 2018).

In contrast, P. J. Dennis and Weston (2001) found that institutional investors play a significant role in stabilizing the stock markets by countering the irrational behaviors of individual investors through informed trading strategies and proactive management. This perspective was further supported by Cheng et al. (2011), who discovered a negative relationship between institutional ownership and idiosyncratic volatility. Their findings indicate that institutional investors mitigate risk through informed trading. Further challenging the findings of Xu and Malkiel (2003), Hu et al. (2022) used panel data from 2005 to 2015 for the Chinese and US stock markets. They observed that institutional ownership in the US had a negative relationship with idiosyncratic volatility, while the relationship for the Chinese stock market was positive. The difference in relationships was assumed to originate from the fact that institutional investors in the US are more prudent and risk-averse. In contrast, Chinese institutional investors have a higher risk-bearing capacity due to state control, indicating that the impact differs significantly across various market environments..

2.4 Hypothesis development

The theoretical and empirical evidence from previous literature suggests that the relationship between idiosyncratic volatility and institutional ownership might not be so straightforward. Through many different analyses, academic research has found contradictory results, in some cases yielding positive relationships and in others negative relationships. To systematically explore this relationship, we propose the following hypothesis: A greater institutionalization in Scandinavian stocks leads to increased idiosyncratic volatility. The hypothesis is based on the notion that a more concentrated and consolidated ownership structure in the stock market, in terms of institutionalization, will increase idiosyncratic volatility. All market participants make up what one could call the governing market-wide average. In an environment with many market participants, a situation in which buy and sell decisions are widely dispersed, non-systematic portfolio changes made by individual investors tend to average out, resulting in minimal market impact. However, as institutionalization in the stock market increases, this leads to fewer decision-makers, increasing the likelihood of purely random fluctuations (Poterba & Summers, 1987). In the theoretical limit, where the market only consists of a single investor, random decision-making would lead to infinite volatility, as there are no other market participants to offset the impact (Friedman, 1995). Moreover, when market prices fluctuate for purely random reasons, the signals and incentives on which the stock market depends are distorted. An example of this can be derived from the stock market crash of October 1987. Of a total trading volume of $20 billion that day, one institution alone sold $1.3 billion in stock and another $700 million in futures, something which resulted in a spike in idiosyncratic volatility (Fink et al., 2010; SEC, 1988).

By systematically examining this hypothesis, the study seeks to shed light on the influence of institutional ownership on idiosyncratic volatility. Our study aims to contribute to a more nuanced and comprehensive understanding of these market dynamics, moving beyond the traditional paradigms of financial market behavior. This exploration is particularly pertinent in Scandinavian markets, where unique regional characteristics might further influence these dynamics, offering valuable insights into understanding these regional financial markets.

3 Research Design

3.1 Data

The objective of this study is to explore the connection between the degree of institutional ownership in Scandinavian stocks and their corresponding idiosyncratic volatility. The sample period was chosen to balance the benefits of a longer timeline against the breadth of cross-sectional data. Opting for a more extended period would introduce more variability but would also narrow down the number of companies consistently listed on the exchange throughout that time.

We initially obtained data on institutional ownership for 1,109 companies in Scandinavia. However, to ensure the robustness of our study, we excluded any firm without complete data for the entire period under review to avoid skewed results. The need for a significant cross-sectional analysis led us to select the six years from Q1 2017 to Q4 2022, yielding data for 561 companies. Further exclusion due to inefficient data availability for control variables yielded data for 520 companies distributed across the stock exchanges as follows: 79 for Copenhagen, 81 for Helsinki, 134 for Oslo, and 226 for Stockholm. The full overview of the included companies is presented in C in Appendix.

Since institutional ownership data is typically only accessible quarterly, the remaining data variables were collected at this interval for consistency. Consequently, we amassed 12,480 observations: 1,896 for Copenhagen, 1,944 for Helsinki, 3,216 for Oslo, and 5,424 for Stockholm. Our dataset includes company-specific details regarding idiosyncratic volatility institutional ownership and data for our control variables: size, leverage, turnover, and the three Fama-French factors: HML, SMB, and Momentum. We incorporate daily yields of 10-year government bonds from each country as a proxy for risk-free rate when calculating the excess returns needed to estimate idiosyncratic volatility.

Our data was extracted from several providers. We gathered institutional ownership information from Modular Finance's Holdings database. Daily stock returns were computed using price data obtained from Refinitiv and Nasdaq. Nasdaq supplied daily price information for firms listed on the Copenhagen, Stockholm, and Helsinki exchanges, whereas Refinitiv was the source for the Oslo stock exchange price data. Additionally, Refinitiv provided data regarding company size and stock turnover for the companies in question. Bloomberg provided data on leverage, while data on European Fama-French factors was collected from Kenneth R. French's website.

3.2 Variables

In the following, we will provide a brief overview of the main variables in our analysis: idiosyncratic volatility, institutional ownership, as well as our control variables. A.1 in Appendix presents a comprehensive list of all variables.

3.2.1 Idiosyncratic Volatility

The main outcome variable of the analysis is idiosyncratic volatility. The idiosyncratic volatility of a stock is an unobservable measure, and since its estimation depends on its relation to the systematic risk of the same stock, its estimation is highly model-dependent.

There are various methods for estimating proxies for idiosyncratic volatility. In our research, we follow the methodology of Xu and Malkiel (2003), in which total volatility is estimated and decomposed into systematic and idiosyncratic components. In order to estimate the systematic component, we construct a value-weighted portfolio containing all stocks in each of our samples for Copenhagen, Helsinki, Oslo, and Stockholm. The value-weighted portfolio return is calculated using daily stock returns for each company and weighing these returns using weights based on daily market capitalization at the end of day $t-1$. Data for market capitalization is lagged by one day when calculating daily portfolio returns because investors do not have access to real-time market capitalization data when making investment decisions. Therefore, utilizing market capitalization data without a lag could lead to a look-ahead bias in backtesting, as it presupposes access to information at the day's outset, which, in reality, would only be available after the day has concluded. The portfolio excess return is calculated using the following formula:

$$Rp_i = \sum_n w_{ni}(r_{ni} - rf_i) \tag{3.1}$$

Where the estimated weight for stock n on day i is represented by w_{ni} and excess return of stock n on day i is represented by $(r_{ni} - rf_i)$, in which the risk-free rate on day i

is subtracted from the return of stock n on day i. The calculated excess return of the portfolio is taken to represent the daily return of the entire market portfolio. This allows us to employ it as a proxy for the market's excess return in the following CAPM regression that must be conducted to estimate idiosyncratic volatility:

$$R_{ni} = \alpha + \beta_n Rm_i + \varepsilon_{ni} \tag{3.2}$$

Here, R_{ni} represents the daily excess return for firm n on day i, while Rm_i is the value-weighted excess return of the market portfolio on day i. The idiosyncratic volatility of the stock return is defined as the variance of the error term minus the mean of the error terms $(\varepsilon_{ni} - \mu_n)^2$, however since we assume an OLS regression, the mean of the error term will by design be equal to zero. The estimation of quarterly idiosyncratic volatility for each stock is therefore done using the following formula:

$$\sigma^2_{nt} = \sum_{i \in t} \varepsilon^2_{ni} \tag{3.3}$$

where, i denotes the days in quarter t.

3.2.2 Institutional Ownership

The main test variable of the analysis is institutional ownership. We define institutional ownership as the stakes held by entities such as fund companies, pension & insurance firms, investment & private equity groups, and foundations. The variable is categorized using Holdings' unique classification method. We aimed to collect data on the proportion of stock ownership by large institutions whose investment strategies are reactive to market movements. This approach involves omitting owners like founding families and government entities, who are likely to have longer-term objectives and may not be as inclined to purchase or divest a company based on economic conditions. Essentially, these are institutions characterized by high portfolio turnover rates. Since we aim to understand how the institutionalization of stocks affects idiosyncratic volatility, we decide to incorporate one-quarter lag to the independent variable. This allows us to capture the direction of causality better, especially as ownership levels from a prior period often influence idiosyncratic volatility in the following period Che (2018).

3.2.3 Control Variables

Our regression analysis controls for factors like company size, turnover, and leverage. Our size variable is the market capitalization measured on the last day of each financial quarter. Including size is crucial for several reasons. First and foremost, we control for size to ensure that the leverage and institutional ownership results are not simply a size proxy effect. Falkenstein (1996) noted that there is a tendency for institutional investors to favor companies with larger market capitalizations. Cheung and Ng (1992) also identified a negative correlation between company size and total volatility. Furthermore, it is recognized that larger firms generally have better access to debt markets, which might imply a positive correlation between size and leverage. As presented in A.2 in Appendix, we can see from the correlation matrix that none of the variables exhibit significant correlational concerns.

This study measures leverage using the debt-to-equity ratio as a proxy for each company. It is vital to include leverage as a control variable due to its significant association with a company's risk profile and financial health. High leverage can intensify idiosyncratic stock volatility by increasing financial risk. Moreover, the degree of leverage influences institutional investors' strategies, with some favoring high-leverage firms for their potential returns and others preferring companies with lower leverage for their perceived stability (P. Dennis & Stricklang, 2004). By controlling for leverage, the analysis can more effectively isolate the influence of institutional ownership on idiosyncratic volatility, separating it from the impacts of leverage.

Our turnover variable is defined as the volume of daily trading over a quarter, divided by the median number of shares outstanding over the same period, using this as a proxy for stock liquidity. Turnover is factored into the analysis because it has been associated with higher total volatility, as evidenced by Schwert (1989). It is also essential to control for turnover to ensure that the leverage and institutional ownership results are not simply a liquidity proxy effect. Furthermore, Falkenstein (1996) observed that institutional investors prefer more liquid stocks, likely because it allows them to sell prominent positions without significant price impact.

3.3 Descriptive Statistics

As presented in Table 3.1, Scandinavian companies in the sample have an average quarterly idiosyncratic volatility of 2.25% and a median slightly lower of 1.89%. The measured standard deviation is 1.36%, which indicates moderate fluctuations when looking at the whole region. Institutional ownership has an average of 35.97%, with a median of 32.99% and a standard deviation of 24.94%, which suggests substantial and diverse levels of institutional presence in Scandinavian companies, highlighting the heterogeneous nature of Scandinavian companies. The average size of companies in terms of market cap is $ 3.13 billion. However, a median of $ 0.41 billion indicates a skewed distribution towards smaller companies and a highly diverse set of companies in terms of financial scale. This is further supported by a high standard deviation of $ 7.79 billion. Average leverage is high at 67.49%, with a median of 51.44% and a standard deviation of 60.35%. This reflects a significant and diverse set of debt-to-equity levels across the region. The average turnover rate is 16.21%, a median of 9.35%, and a standard deviation of 22.35%, indicating varying trading activity in each company.

Table 3.1: Summary statistics for all data[1]

Our dataset summary statistics provide valuable insights into the characteristics of Scandinavian companies. In table 3.1 we present our sample summary statistics for our main variables and control variables. We report the number of companies – quarterly observations, 520 companies over 24 quarters, which, as mentioned before sums up to 12,480 observations for each variable. To refine our data and minimize the potential distortion caused by extreme outliers, we have employed a winsorization at the 1% levels for both tails. This technique is done to all continuous variables such as IVOL, Size, Leverage, and Turnover. By trimming outliers, we replace them with the nearest value within this boundary, with the aim at getting results that are not driven as much by extreme values.

Variable	N	Median	Mean	St.Dev	Min	Max
IVOL (%)	12,480	1.89	2.25	1.36	0.64	8.54
IO (%)	12,480	32.99	35.94	24.94	0.13	86.22
Size (USDbn)	12,480	0.41	3.13	7.79	0.00	51.77
Leverage (%)	12,480	51.44	67.49	60.35	0.00	198.32
Turnover (%)	12,480	9.35	16.21	22.34	0.09	146.73

As presented in A.3-A.6 in Appendix, we see that the individual summary statistics

[1] The summary statistics are presented in percentage terms for the reader's convenience. The analyzed data, however, are in decimal format.

for Copenhagen, Helsinki, Oslo, and Stockholm reveal distinct financial profiles for each market. For idiosyncratic volatility, Oslo exhibits the highest mean and standard deviation of 3.05% and 1.72%, while Copenhagen has the lowest mean and standard deviation of 1.73% and 0.96%, respectively. For our statistical sample, this suggests greater price variability in Oslo and more stable stock prices in Copenhagen. In terms of institutional ownership, Stockholm records the highest mean and standard deviation of 42.21% and 25.68%, while Copenhagen holds the lowest mean and standard deviation of 30.93% and 23.66%, respectively. This indicates a more significant and varied institutional presence in Stockholm, while Copenhagen exerts more uniform institutional investment levels. Concerning company size, Copenhagen has the highest mean size and standard deviation of $ 4.97 billion and $ 10.24 billion, respectively. On the other hand, Oslo exhibits the lowest mean size of $ 2.02 billion but a significant variability, as indicated by its standard deviation of $ 6.10 billion. In terms of leverage, Oslo has the highest mean and standard deviation of 95.58% and 106.77%, respectively. This indicates a market with a wide range of debt levels. Conversely, Copenhagen has the lowest mean leverage level of 62.39%. Furthermore, Oslo and Stockholm are tied for the highest mean turnover of 17.11%, with Oslo showing the most variability, with a standard deviation of 25.13%. On the other hand, Helsinki has the lowest mean turnover and standard deviation of 9.76% and 11.59%, respectively.

3.3.1 Stationarity in Data

To address the potential for non-stationarity in our dataset, we conducted Augmented Dickey-Fuller-Fisher-Chi-square (ADF-Fisher Chi-square) tests for all variables included in our analysis. To avoid the potential for spurious results in our regression, the ADF-Fisher Chi-square tests provide valuable insight into the stationarity of our variables, which is very important for our panel data. The ADF-Fisher Chi-square test applies Augmented Dickey-Fuller (ADF) tests to each individual time series in the panel and calculates a p-value for each test. The Augmented Dickey-Fuller-Fisher (ADF-Fisher) test then combines these individual p-values into a single test, creating a single test statistic that follows a Chi-square distribution. The overall combined statistic is then used to test the joint null hypothesis that all individual series in the panel contain a unit root. The reason for choosing the ADF-Fisher Chi-square test over alternatives such as the Levin, Lin & Chu (LLC) test is because the LLC test requires homogeneous coefficients across the cross-section, making it more sensitive to outliers. The ADF-Fisher Chi-square test, on the other hand, is more flexible in handling heterogeneity across panels and is less sensitive to cross-sectional dependence (Levin et al., 2002).

The results from the ADF-Fisher Chi-square tests are presented in A.7 in Appendix. Evidently, the combined p-values for IVOL, IO, Leverage, and Turnover were extremely low and far below the threshold of 5%, indicating strong evidence against the null hypothesis of a unit root, suggesting that the variables are, in fact, stationary. The size variable, however, has a combined p-value of 1, indicating non-stationarity. We decide to logarithmically transform this variable to deal with the possibility of spurious results that may arise from including the size variable and prevent any misleading results.

3.4 Empirical Strategy

Given the nature of our panel data, which includes quarterly observations from 2017 to 2022 for 520 Scandinavian companies, we expect to encounter unobserved characteristics for each individual company that could potentially influence our dependent variable. Some of these company characteristics may include management quality and ownership structure, company culture, brand reputation, company age, and geographical location. In parallel, there may be unobserved effects specific to the time-series component of the panel data set. These effects generally refer to factors that are consistent over time for all entities in the dataset but may differ across the same entities, such as macro trends and industry-specific changes. Some effects include inflation, GDP growth, tax policies, political stability, and investor sentiment. Not controlling for such effects may cause omitted variable bias in a regular OLS model. By focusing on the within-company and within-time variations, our objective is to control for these unobserved heterogeneities and isolate the effect of institutional ownership.

3.4.1 Model Specification

To control for these unobserved effects, we decide whether using a random effects model over a fixed effects model is appropriate. Choosing between a random effects and fixed effects model hinges on the nature of the assumed heterogeneities. A random effects model will be more efficient than a fixed effects model because it accounts for within-entity and between-entity variations. However, this added efficacy depends on the assumption of uncorrelation between the unobserved individual-specific effects and the independent variables. To decide which model to choose, we run a Hausman test to determine whether this assumption is met. The result, presented in A.8 in Appendix, shows differences between the two models, signifying that the assumption of no correlation is not satisfied. Therefore, we chose to move forward with a fixed effects model. Given the nature of our data, which consists of companies' financial data, we expect both firm-specific characteristics and economy-wide shocks and trends that may influence idiosyncratic volatility. Furthermore, since our panel data is balanced with many cross-sectional units and time periods, we choose to cluster our standard errors in both dimensions so that the model can better account for potential cross-sectional and temporal correlation structures, leading to a more robust and reliable inference.

As mentioned, utilizing the fixed effects approach allows us to isolate the impact of institutional ownership on idiosyncratic volatility while accounting for other variables. These include Size, Leverage, Turnover, HML, SMB, and Momentum. By incorporating these factors into our fixed effects model, we can more accurately isolate the effect of institutional ownership on idiosyncratic volatility, ensuring the quality and robustness of our analysis. This approach mitigates the potential biases from effects as mentioned above. Our fixed effects model is specified by the following regression:

$$IVOL_{i,t} = \beta_1 IO_{i,t-1} + \beta_2 X_{i,t} + \alpha_i + \delta_t + \varepsilon_{i,t} \tag{3.4}$$

where $IVOL_{i,t}$ is the idiosyncratic volatility of company i at time t. $IO_{i,t-1}$ denotes our main independent variable, lagged institutional ownership for company i at time $t-1$. In addition to our main analysis, we control for six other variables, which as part of our regression is signified by the term $X_{i,t}$. Here, the term represents a vector of control variables for company i at time t , where $X \in \{$Size, Leverage, Turnover, HML, SMB, and Momentum$\}$.

This model includes ticker fixed effects, α_i, which capture unobserved, time-invariant characteristics specific to each company, essentially isolating the cross-sectional variation. By including ticker fixed effects, we account for company characteristics, such as business model, corporate culture, and management quality, which could affect institutional ownership and idiosyncratic volatility. Furthermore, the model also includes date fixed effects, δ_t, which capture the unobserved effects common to all companies at each quarter, isolating the time variation. This will allow the analysis to further discern how variations in institutional ownership between companies within the same quarter relate to variations in their idiosyncratic volatility, independent of wider market or economic conditions that might affect all companies. The error term for company i at time t is represented by the term $\varepsilon_{i,t}$.

The main specification of our analysis includes both ticker and date fixed effects. The dual nature of this model is advantageous as it allows us to get a more nuanced and accurate understanding of the dynamics between institutional ownership and idiosyncratic volatility. This is especially important when there is reason to believe that there are unobserved characteristics in the cross-section and temporal dimension that could potentially affect the estimated effects of the predictors.

4 Empirical Findings

The following section presents our empirical findings from the regression analysis and explores the potential for causal inference where applicable. Our main regression analysis explores the effect of institutional ownership on idiosyncratic volatility for Scandinavian companies. In this regression, we include three distinct fixed effects models: the first model includes ticker fixed effects, the second is confined to date fixed effects, while the third includes both ticker and date fixed effects. This approach enables a more apparent distinction between the effects attributable to enduring entity-specific and temporal effects that affect all entities. In addition to our main analysis, we include an expanded analysis to investigate potential geographical discrepancies further. Examining the relationship between institutional ownership and idiosyncratic volatility individually for each stock exchange adds robustness to our main results.

4.1 Main Analysis

Model 1 in 4.1 details a regression including ticker fixed effects. We find that, for any given company in our sample, a 1% increase in institutional ownership is associated with a 0.70% increase in idiosyncratic volatility. This effect is statistically significant at the 0.1% level and is identified from the within-company variation over time, meaning that the coefficient captures the estimated effect of institutional ownership within each company over time. Conversely, Model 2 in 4.1, includes only date fixed effects. This model estimates the effect of institutional ownership across all companies in the sample, within each quarter-year. Model 2 estimates a coefficient of –0.008, indicating that a 1% increase in institutional ownership across companies is associated with a 0.80% decrease in idiosyncratic volatility. The difference in the sign of each coefficient is interesting. Within each company, increases in institutional ownership are associated with increases in idiosyncratic volatility. Conversely, within each quarter-year, an increase in institutional ownership is associated with a decrease in idiosyncratic volatility. This disparity highlights the distinct influences that company-specific and temporal factors exert on the dynamic between institutional ownership and idiosyncratic volatility. Model 3 includes both ticker and date fixed effects and estimates a positive and statistically significant coefficient of

0.003. The association is less pronounced compared to Model 1 and exhibits a contrasting sign than found in Model 2. The coefficient found in Model 3 indicates that within every quarter-year and within every company, a 1% increase in institutional ownership is associated with a 0.30% increase in idiosyncratic volatility. This figure represents an absolute change in the dependent variable. With regards to economic interpretation, our summary statistics, as presented in Table 3.1, provide context for the magnitude and relative increase of this effect. The mean idiosyncratic volatility of our sample stands at 2.25%. Our findings suggest that a 1% increase in institutional ownership constitutes a 13.30% (calculated as 0.30 / 2.25) increase in idiosyncratic volatility relative to its sample mean. The relative change highlights the potential for significant shifts in idiosyncratic volatility attributable to within-ticker and within-quarter-year variations in institutional ownership. Furthermore, employing standard deviation as a benchmark, we found that a one standard deviation increase in institutional ownership results in a 0.06% (calculated as 0.3 x 0.2) increase in idiosyncratic volatility. This subtle change, though seemingly minor, becomes significant in large portfolios. Our findings, highlighting the impact of institutional ownership on market volatility, align with similar research by Hu et al. (2022).

Table 4.1: IVOL-IO Relationship

This table presents the estimated coefficients obtained from panel regressions examining the relationship between idiosyncratic volatility (IVOL) and lagged institutional ownership (IO). The table includes three models; the first includes both ticker and date fixed effects, while the second and third models are restricted to only ticker and date fixed effects. The two additional models are included to compare results across different specifications, highlighting the effect of unobserved heterogeneities on our results. Other control variables are described in A.1 in Appendix. Size, Leverage, and Turnover are logarithmically transformed. The standard errors, displayed in parentheses, are clustered along the ticker and data dimension and are heteroskedasticity-robust. The levels of statistical significance are indicated by the following:
+ p < 10%, * p < 5%, ** p < 1%, *** p < 0.1%.

IVOL	(1)	(2)	(3)
IO	0.007**	-0.008***	0.003+
	(0.002)	(0.001)	(0.002)
Size	-0.002	-0.005***	-0.001
	(0.001)	(0.000)	(0.001)
Leverage	0.006***	0.003*	0.004***
	(0.001)	(0.001)	(0.001)
Turnover	0.069***	0.067***	0.057***
	(0.007)	(0.005)	(0.005)
HML	-0.008		
	(0.012)		
SMB	-0.023+		
	(0.012)		
Momentum	-0.006		
	(0.010)		
Date FE		X	X
Ticker FE	X		X
Num.Obs.	11,960	11,960	11,960
R2	0.629	0.374	0.702

As for the other control variables, the associated effect on idiosyncratic volatility seems to be the same across all models. Interestingly, size is only statistically significant in Model 2, which includes date fixed effects. This indicates that within each quarter-year, a 1% increase in size is associated with a 0.50% decrease in idiosyncratic volatility. Furthermore, the associated effects of leverage and turnover are more pronounced in Model 1 compared to Models 2 and 3. The strong and positive associative effect from turnover, which proxies for trading activity, might indicate that a greater degree of investor attention and trading in response to new information leads to increased idiosyncratic volatility. Moreover, high turnover could be associated with speculative trading, where trading expectations of short-term price movements may contribute to increased idiosyncratic volatility.

The Fama-French variable SMB is only included in Model 1. The variable has a negative coefficient of 0.022 and is statistically significant at the 10% level. This indicates that within each company, a 1% increase in the SMB value (which measures the performance of small-cap stocks relative to large-cap stocks) is associated with a 2.30% decrease in idiosyncratic volatility, after accounting for company-specific characteristics. This implies that periods favoring small-cap stocks are associated with lower idiosyncratic volatility compared to periods favoring large-cap stocks. In Model 1, the Fama-French factors (HML, SMB, and Momentum) are included due to their role in capturing time-specific variation, which is particularly relevant when only ticker fixed effects are considered. However, in the models where date fixed effects are incorporated, such as in Models 2 and 3, these variables become redundant as the time-specific variation is already absorbed by the model.

In evaluating the effectiveness of Models 1, 2, and 3 with respective R^2 values of 62.90%, 37.40%, and 70.20%, it appears that Model 3, which includes both ticker and date fixed effects, is the most effective in explaining the variation in idiosyncratic volatility. However, a distinction must be made for what kind of variation all three models explain. Model 1 explains the variation within each company, controlling for inherent company characteristics, while Model 2 explains the variation within each quarter-year for all companies, accounting for time-specific events. Model 3, on the other hand, explains the variation within both within each company over time and across all companies within each quarter-year, capturing the nuances of company-specific and time-specific characteristics. Therefore, the differences in R^2 are not really comparable across models, but rather indicates which of the models explain a larger proportion of the specific type of variation it is designed to address. Since our research question focuses on the effect of institutional ownership on idiosyncratic volatility within each quarter-year for all companies, Model 3 emerges as the most relevant, as it captures both the within-company variation over time and the across-company variation within each quarter-year.

4.2 Expanded Analysis

As mentioned, we expand the analysis to investigate potential geographical discrepancies by isolating the same relationship for all four stock exchanges. Undertaking a detailed analysis of Scandinavian companies on a country-by-country basis allows for a nuanced understanding of how local factors and diverse national contexts may shape the impact of institutional ownership on idiosyncratic volatility. In addition, the expanded analysis provides robustness to the overall findings from the main analysis by ensuring that observed patterns holds across distinct environments. In line with our main analysis, we include both ticker and date fixed effects for the secondary analysis, estimating one fixed effects regression for each stock exchange. Our expanded analysis engages in the potential geographical discrepancies that may exist between countries.

Table 4.2: IVOL-IO Relationship isolated for each stock exchange

This table presents the estimated coefficients obtained from panel regressions examining the relationship between idiosyncratic volatility (IVOL) and lagged institutional ownership (IO) for each stock exchange isolated. The model specification includes ticker and date fixed effects, in line with our main regression analysis, Model 1 under 4.1. This is done to control for unobserved cross-sectional and temporal heterogeneities that might affect our results. Other control variables are described in A.1 in Appendix. Size, Leverage, and Turnover are logarithmically transformed. The standard errors, displayed in parentheses, are clustered along the ticker and data dimension and are heteroskedasticity-robust. The levels of statistical significance are indicated by the following:
+ p < 10%, * p < 5%, ** p < 1%, *** p < 0.1%.

	(1) Copenhagen	(2) Helsinki	(3) Oslo	(4) Stockholm
IO	0.013*	0.008**	0.002	0.000
	(0.006)	(0.002)	(0.002)	(0.002)
Size	0.000	-0.000	-0.003	0.001
	(0.001)	(0.002)	(0.002)	(0.001)
Leverage	0.003	0.005*	0.004*	0.003+
	(0.003)	(0.002)	(0.002)	(0.001)
Turnover	0.082***	0.072***	0.049***	0.059***
	(0.013)	(0.013)	(0.007)	(0.006)
Date FE	X	X	X	X
Ticker FE	X	X	X	X
Num.Obs.	1,817	1,863	3,082	5,198
R2	0.640	0.592	0.692	0.664

The coefficient for lagged institutional ownership is positive for the Copenhagen and

Helsinki stock exchanges and statistically significant at the 5% and 1% levels, respectively. Their coefficients indicate that a 1% increase in lagged institutional ownership is associated with 1.30% increase in idiosyncratic volatility for stocks on the Copenhagen stock exchange and a 0.80% increase for stocks on the Helsinki stock exchange within each quarter-year for all companies. The coefficients for the Oslo and Stockholm stock exchanges are not statistically significant. This suggests that the positive and significant relationship between lagged institutional ownership and idiosyncratic volatility, as presented in our main analysis in 4.1, is mainly driven by significant results from the Copenhagen and Helsinki stock exchanges. In terms of economic interpretation, the estimated association for Copenhagen and Helsinki suggests that a 1% increase in institutional ownership constitutes a 75.10% (calculated as 1.30 / 1.73) and 42.50% (calculated as 0.77 / 1.81) increase in idiosyncratic volatility relative to their sample means, respectively. This highlights a substantial impact on idiosyncratic volatility for stocks listed on the Copenhagen and Helsinki stock exchange from the within-ticker and within-quarter-year variation in institutional ownership.

The impact of Size is statistically insignificant across all stock exchanges. Leverage has a positive and statistically significant effect on idiosyncratic volatility for stocks on the Helsinki, Oslo, and Stockholm exchanges. Their coefficients indicate that a 1% increase in leverage is associated with a 0.50%, 0.40%, and 0.30% increase in idiosyncratic volatility for stocks on the Helsinki, Oslo, and Stockholm stock exchanges, respectively. The associated effect is lowest for the Stockholm Stock Exchange. These results confirm the positive association between leverage and idiosyncratic volatility, as found in our main analysis under 4.1.

For all stock exchanges, the coefficient for Turnover has a strong, positive, and statistically significant association with idiosyncratic volatility. The coefficients are all statistically significant at the 0.1% level. The coefficients indicate that a 1% increase in turnover is associated with a 8.20%, 7.20%, 4.90%, and 5.90% increase in idiosyncratic volatility for Copenhagen, Helsinki, Oslo, and Stockholm, respectively. The high level of statistical significance, as supported by the results from our main analysis, suggests that turnover is an important and consistent predictor of idiosyncratic volatility across all four stock exchanges, with the strongest impact seen for stocks on the Copenhagen stock exchange.

Our expanded analysis gives us a more precise presentation of the relationship associated with institutional ownership and idiosyncratic volatility across the different Scandinavian exchanges. The analysis suggests that only the Copenhagen and Helsinki stock exchanges exhibit historical institutional investment patterns that consistently impact idiosyncratic volatility with statistical significance. Copenhagen shows the strongest link, while Helsinki has the weakest association. Leverage is consistently associated with higher idiosyncratic volatility across stocks listed on the Helsinki, Oslo, and Stockholm stock exchanges. However, it is statistically insignificant for stocks listed on the Copenhagen Stock Exchange. This highlights the risk associated with high debt levels. The impact of leverage on idiosyncratic volatility is the strongest for Helsinki and Oslo, which might suggest regional nuances regarding how financial risk is perceived and its effect on market behavior. The associated impact of turnover is universally strong, positive, and significant for stocks on all stock exchanges, reflecting the influence of stock liquidity on idiosyncratic volatility.

5 Discussion

Before drawing our conclusions, we first re-examine our initial hypothesis and discuss how our results support it. Next, we contextualize our findings into the wider context of existing academic literature. We then delve into the broader implications of our results, inspecting the practical and theoretical consequences. This is then followed by an in-depth assessment of the robustness of our study. Finally, we consider the limitations and constraints inherent in our research design.

5.1 Economic Significance

Our results reveal a positive and statistically significant relationship between institutional ownership and idiosyncratic volatility in Scandinavian stocks, after controlling for within-ticker and within-quarter-year variation, and accounting company size, leverage, and stock turnover. This result confirms our hypothesis that greater institutionalization in Scandinavian stocks leads to increased idiosyncratic volatility. To grasp a better understanding of the economic significance, we look at the relative change in idiosyncratic volatility from its sample mean. The mean idiosyncratic volatility of our sample stands at 2.25%. Our findings suggest that a 1% increase in institutional ownership constitutes a 13.30% (calculated as 0.30 / 2.25) increase in idiosyncratic volatility relative to its sample mean. The relative change highlights the potential for significant shifts in idiosyncratic volatility attributable to within-ticker and within-quarter-year variations in institutional ownership. We also look at standard deviation to provide a benchmark to define a typical change in institutional ownership. By multiplying the coefficient with the standard deviation, we can effectively measure the expected variation in idiosyncratic volatility resulting from one standard deviation increase in institutional ownership. This calculation reveals a projected change of just 0.06% (calculated as 0.30 x 0.20) in idiosyncratic volatility for each standard deviation increase in institutional ownership. This modest increase may appear economically insignificant at first glance. However, it gains importance when viewed in the context of large portfolios where even small percentage changes can translate into significant absolute numbers. Our calculations align with those of Hu, Jiang, and Xue (2022), who finds a similar result measured at 0.06%.

5.2 Explanations

This relationship might be attributable to several factors. As mentioned, the proposed notion of this hypothesis stems from the mechanism of institutionalization decreasing the number of market participants, exacerbating the individual actions of those few decision-makers. With fewer participants to offset a market impact, the results may suggest that a higher degree of institutional ownership in Scandinavian stock could lead to a scenario where random buy and sell decisions may have an outsized and more pronounced market impact. This cause-and-effect mechanism is in line with the findings of Friedman (1995), who suggest that greater institutionalization distorts the signals and incentives on which the stock market depends. This observation resonates with the works of Hu et al. (2022), who identified a similar result in the Chinese stock market. The Chinese is characterized of having a high degree of state ownership. The level of institutional ownership is low compared to the US, approximately 5% vs. 50% institutional ownership as of 2015 (Hu et al., 2022). However, since stocks already are heavily state-owned, a greater institutionalization of stocks would effectively reduce the number of market participants, which in the Chinese context, already is low. This increase in institutional ownership would, therefore, lead to greater idiosyncratic volatility in Chinese stocks.

Furthermore, there are various other channels in which this relationship may occur, as suggested by other empirical research. Firstly, researchers state the importance of investment strategies employed by institutional investors. In this context, noteworthy research by Grinblatt et al. (1995), Chan et al. (1996), and Sias and Starks (1997) collectively highlight a tendency for institutional investors to utilize short-term momentum trading. This perspective is further reinforced by research conducted by Che (2018), who found that the positive relationship between institutional ownership and idiosyncratic volatility observed for Norwegian stocks was mainly driven by foreign institutional investors utilizing momentum trading strategies. Furthermore, Vayanos and Woolley (2013) and Zykaj et al. (2017) assert that stocks subject to momentum trading tend to exhibit elevated levels of idiosyncratic volatility. This body of research aligns with our hypothesis, reinforcing the idea that a higher degree of institutionalization may lead to heightened volatility.

Another compelling explanation is presented by Scharfstein and Stein (1990), who argue that institutional herding plays a crucial role in the relationship between institutional investors and idiosyncratic volatility. Institutional herding, characterized by synchronized investment decisions among investors, amplifies buying and selling pressures on specific stocks. Such coordinated actions may be a key contributor to increased idiosyncratic volatility. The concept is further supported by Xu and Malkiel (2003) and Froot et al. (1992), who note that since institutional investors comprise of a small and relatively homogeneous group, they often respond to the same exogenous signals and often draw conclusions from each other's trading activities, which in turn leads to concurrent trading. This collective behavior enhances the likelihood of uniform actions among institutions. Since it takes volume to make prices move (Karpoff, 1987), high trading volumes are often followed by high volatility. Consequently, the idiosyncratic volatility of the specific stock rises. However, if the market is sufficiently large enough, the average market volatility tends to decrease. This effect is attributable to the diversification effects, where the rise in idiosyncratic volatility for the particular stock is counterbalanced by the unique risks associated with other stocks within a large market. As a result, this leads to a more stable overall market volatility (Litimi et al., 2016). The assertion that price movements are volume-driven could suggest that elevated trading is associated with herding within the context of institutional investments. Given this perspective, our results may suggest that institutional herding is a characteristic of institutional investors in Scandinavia and a particularly acute phenomenon for stocks listed on the Copenhagen and Helsinki stock exchange.

5.3 Implications

Our findings, which illuminate a profound dynamic between the level of institutional ownership and idiosyncratic volatility, present clear implications for all market participants. As formulated by Markowitz and Sharpe, classic portfolio theory assumes that through diversification an investor is able to effectively eliminate the idiosyncratic volatility of their portfolio, effectively reducing the risk profile of said portfolio to its systematic risk component. As stated by Statman (1987), a well-diversified portfolio can eliminate all idiosyncratic volatility if it includes at least 30 randomly selected stocks. However, the premise for this notion is that levels of idiosyncratic volatility remain stable. If then, unbeknownst to the average investor, levels of idiosyncratic volatility change, the assumptions for which much of their investing activities are based on also change. This forces investors and managers to re-evaluate their portfolios. When assessing their risk exposure and managing their diversification strategies, investors and managers must be acutely aware of the concentration of institutional ownership of the stocks on which their portfolio holdings include. A high degree of institutional ownership may cause elevated levels of idiosyncratic volatility, effectively disrupting the diversification effect. This is of particular significance to smaller investors, as they have smaller, less diversified portfolios due to financial constraints. Moreover, small investors typically have less financial expertise and may not be fully aware of this heightened idiosyncratic risk.

In addition to investors, the empirical evidence presented in the thesis could merit the attention of market regulators, particularly in Copenhagen and Helsinki. Our data indicates that trades from institutional investors are not only passive adjustments but are influential enough to increase the idiosyncratic volatility of stocks, affecting broader market stability. Regulators might consider adopting a more proactive stance by closely monitoring and analyzing the trading behaviors of institutional investors, or tracking stocks that boast a significant level of institutional ownership. This way, regulators can gain valuable foresight into potential market fluctuations, allowing for preemptive measures to maintain stability.

Our findings highlight the importance of maintaining transparent stock ownership structures. A thorough understanding of the composition and behavior of market actors can equip all participants with the knowledge necessary to navigate the complexities of price movements. Our findings particularly caution investors about stocks with a high concentration of institutional investors, which might lead to increased idiosyncratic volatility. Ensuring the free flow of information is paramount in creating a level playing field. When market participants are well-informed, they are empowered to make better-informed investment decisions. In turn, this contributes to more rational pricing of stocks and a more stable market environment.

5.4 Robustness

In this section we will examine the robustness of our empirical results and address the potential endogeneity issue. To confirm the stability of our results, we run three additional regression models with multiple quarter lagged institutional ownership to capture delayed effects. Lagging allows for a more accurate depiction of the relationship between the two variables as the effects of institutional ownership often unfold over time rather than instantaneously (Che, 2018). Furthermore, including these models reinforces the relationship found in our main analysis. We estimate a new fixed effects regression model which now opens up for multiple lags:

$$IVOL_{i,t} = \beta_1 IO_{i,t-j} + \beta_2 X_{i,t} + \alpha_i + \delta_t + \varepsilon_{i,t} \tag{5.1}$$

Where $j \in \{2, 3, 4\}$ and $X \in \{\text{Size, Leverage, Turnover}\}$. As presented in B.2, the estimated regression coefficients from all three lagged models demonstrate a statistically significant and positive association between institutional ownership and idiosyncratic volatility. We observe that the estimated relationship increases in magnitude with each lag. The fact that significant effects are observed at different lag intervals strengthens the conclusion that institutional ownership exerts a sustained impact over time, rather than being a transient or coincidental factor.

Furthermore, the persistence in the relationship over time could be treated as evidence against a potential endogeneity problem. The potential for reverse causality is introduced by the simultaneous nature of the relationship of institutional ownership and idiosyncratic volatility. As demonstrated by Sias (1996), securities which exhibit greater idiosyncratic volatility may attract institutional investors. However, as the magnitude of the estimated relationship increases over time, this finding may suggest evidence against a reverse causality issue.

To further explore the possibility of endogeneity, we draw upon the works of Che (2018), who employed Fama and MacBeth (1973) approach to tackle the issue of reverse causality. Examining the relationship between investment holdings and idiosyncratic volatility, Che concluded that the fluctuation in idiosyncratic volatility is influenced by investor holdings, not the reverse. This suggests that investors are actively contributing to idiosyncratic volatility rather than reacting to it. This conclusion is in line with the findings of Xu and Malkiel (2003), who utilized a Granger test to determine that while past levels of institutional ownership are predictive of future idiosyncratic volatility, there was no evidence of the opposite. Badrinath et al. (1989) suggests that due to the prudent man principle, institutional investors generally favor more stable investments that exhibit less volatility, as clients might not view the risky investments as prudent enough. Additionally, Arbel et al. (1983) argue that institutional investors often prefer larger stocks as they generally carry lower risk and enhanced liquidity. Conversely, smaller stocks, who are often characterized by higher volatility and reduced liquidity, are less appealing to these investors. These observations support the notion that institutional investors are not drawn to highly volatile stocks, which might contradict a potential endogeneity problem. However, we acknowledge that given the difference in methodology between these approaches, and the complex nature of the researched relationship, the potential issue of endogeneity is still relevant.

5.5 Limitations and Restrictions

Throughout the development of this thesis, we have encountered several limitations, both regarding data availability and our own restrictions. One significant consideration was the inclusion of profitability as a control variable in our analysis, as done by Xu and Malkiel (2003). Nevertheless, we faced challenges due to the limited and in some cases, missing data. Including profitability as a control variable would have necessitated a considerable reduction in the number of firms fit for the analysis. We decided to exclude this variable from our analysis on behalf of this constraint and its potential impact.

Furthermore, the fixed effects model is structured to implicitly account for general economic trends, which, to a certain degree, mitigates the risk of omitted variable bias from not including GDP and inflation. Nonetheless, directly incorporating these macroeconomic indicators into our analysis could allow for a more detailed examination. Enabling us to dissect and quantify the impact of GDP and inflationary trends. Controlling for company age is also something we presumably could have included, because age often works as a proxy for multiple factors that reflect the stabilizing effects of an aging company. However, the nature of our regression model, which includes ticker fixed effects, would control for such age-based heterogeneities.

While the analysis provides valuable insights, it also has limits due to its scope and framework. Firstly, the time scope of the data is relatively short, encompassing a period of six years. Secondly, although our model's framework controls for time-invariant factors, one should be cautious about generalizing these results to broader Scandinavian market trends. Idiosyncratic volatility is a dynamic metric subject to fluctuations over different periods, as the literature we reviewed earlier emphasized. It is, therefore, imperative to interpret the results of this thesis with an understanding of these limitations. The conclusions and results are drawn from a specific period and dataset.

6 Conclusion

This thesis has explored whether increased institutionalization in Scandinavian stocks leads to increased idiosyncratic volatility. Our study utilized a comprehensive panel dataset comprising the majority of companies listed on the Copenhagen, Helsinki, Oslo, and Stockholm stock exchange between 2017 and 2022. We adopted the methodology presented by Xu and Malkiel (2003) to estimate a proxy for idiosyncratic volatility through a CAPM regression. Our investigation employed a fixed effects regression framework, integrating both ticker and date fixed effects. We also incorporated controls for company size, leverage, and stock turnover, as well as the three Fama-French factors. This approach allowed us to isolate the specific impact of institutional ownership on idiosyncratic volatility.

Our empirical findings indicate a positive relationship where a 1% increase in institutional ownership is associated with a 0.30% rise in idiosyncratic volatility. The relationship was statistically significant in the Copenhagen and Helsinki markets. We find that the estimated association constitutes a 13.80% increase in idiosyncratic volatility relative to its sample mean. Furthermore, to contextualize an economic interpretation, a one standard deviation rise in institutional ownership translates into a 0.06% increase in idiosyncratic volatility. Although this figure may appear small at first glance, it carries implications within the scale of large investment portfolios. These results also echo the broader trends noted in seminal studies such as those by Xu and Malkiel (2003), Hu et al. (2022) and Che (2018).

Our contribution has provided deeper insights into the dynamic relationship between institutional ownership and idiosyncratic volatility in Scandinavian stock markets. Our results challenge the traditional assumptions of portfolio theory with regards to diversification. This insight is crucial for investors and portfolio managers, signaling the need for a re-evaluation of diversification strategies, especially in portfolios characterized by substantial institutional ownership. We also shed light on the need for market regulators to consider strategies and policies to preserve market stability and safeguard market participants.

7 Suggestions for Further Research

Building on the findings laid forth in our analysis, we propose several avenues for future research that could extend the understanding of the relationship between institutional ownership and idiosyncratic volatility. A natural extension of our research would be to further differentiate between different types of institutional investors. Giving a better understanding of how investment strategies, as well as how investment horizons impact idiosyncratic volatility. Additionally, a sector-specific analysis could prove valuable. Offering insights into how different sectors respond to different ownership structures, as certain sectors may be more susceptible to investor sentiment and institutional trading patterns. Extending the period of the research would be beneficial, as it would capture a broader array of market conditions and investor behavior. Although these research pathways would demand substantial data, the output would strengthen the understanding of idiosyncratic volatility.

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Appendices

A Research Design

Table A.1: Variable Definitions

Variable	Definition
Main outcome variable	
Idiosyncratic volatility	Idiosyncratic volatility (in percentage) estimated from daily stock price return data
Main test variable	
Institutional ownership	Holdings (in percentage) of Scandinavian stocks by fund companies, pension & insurance firms, investment & private equity groups, and foundations
Other control variables	
Size	Market capitalization (in USDbn). Used in log form in panel regressions
Leverage	Debt/Equity (in percentage). Used in log form in panel regressions
Turnover	Volume of daily trading over a quarter, divided by median number of shares outstanding over the same period (in percentage)
HML	Quarterly high-minus-low values for European stocks
SMB	Quarterly small-minus-big values for European stocks
Momentum	Quarterly momentum values for European stocks

Table A.2: Correlation Matrix

This table presents the result from a correlation matrix for all included variables in the analysis. All variables are tested in their original, untransformed form.

	IVOL	IO	Size	Leverage	Turnover	HML	SMB	Momentum
IVOL	1.000	-0.275	-0.275	0.080	0.329	-0.058	-0.077	0.024
IO	-0.275	1.000	0.397	0.024	0.149	0.004	-0.006	0.001
Size	-0.275	0.397	1.000	0.020	0.122	0.022	0.016	-0.012
Leverage	0.080	0.024	0.020	1.000	-0.029	-0.025	-0.001	0.007
Turnover	0.329	0.149	0.122	-0.029	1.000	-0.035	0.054	-0.010
HML	-0.058	0.004	0.022	-0.025	-0.035	1.000	-0.034	-0.558
SMB	-0.077	-0.006	0.016	-0.001	0.054	-0.034	1.000	-0.242
Momentum	0.024	0.001	-0.012	0.007	-0.010	-0.558	-0.242	1.000

Table A.3: Summary statistics for Copenhagen stock exchange

This table presents sample summary statistics for our main variables and control variables for the Copenhagen stock exchange. We report the number of companies – quarterly observations, 79 companies over 24 quarters, which, as mentioned before sums up to 1896 observations for each variable. To refine our data and minimize the potential distortion caused by extreme outliers, we have employed a winsorization at the 1% levels for both tails. This technique is done to all continuous variables such as IVOL, Size, Leverage, and Turnover. By trimming outliers, we replace them with the nearest value within this boundary, with the aim at getting results that are not driven as much by extreme values.

Variable	N	Median	Mean	St.Dev	Min	Max
IVOL (%)	1,896	1.54	1.73	0.96	0.64	8.54
IO (%)	1,896	30.53	30.93	23.66	0.13	86.22
Size (USDbn)	1,896	0.57	4.97	10.24	0	51.77
Leverage (%)	1,896	41.94	62.39	58.81	0	196.43
Turnover (%)	1,896	8.55	14.35	21.45	0.09	146.73

Table A.4: Summary statistics for Helsinki stock exchange

This table presents sample summary statistics for our main variables and control variables for the Helsinki stock exchange. We report the number of companies – quarterly observations, 81 companies over 24 quarters, which, as mentioned before sums up to 1944 observations for each variable. To refine our data and minimize the potential distortion caused by extreme outliers, we have employed a winsorization at the 1% levels for both tails. This technique is done to all continuous variables such as IVOL, Size, Leverage, and Turnover. By trimming outliers, we replace them with the nearest value within this boundary, with the aim at getting results that are not driven as much by extreme values.

Variable	N	Median	Mean	St.Dev	Min	Max
IVOL (%)	1,944	1.62	1.81	0.89	0.64	8.54
IO (%)	1,944	35.67	35.17	21.33	0.23	80.81
Size (USDbn)	1,944	0.39	2.82	6.65	0.01	51.77
Leverage (%)	1,944	63.55	72.59	53.93	0.01	183.66
Turnover (%)	1,944	5.83	9.76	11.59	0.09	146.73

Table A.5: Summary statistics for Oslo stock exchange

This table presents sample summary statistics for our main variables and control variables for the Oslo stock exchange. We report the number of companies – quarterly observations, 134 companies over 24 quarters, which, as mentioned before sums up to 3216 observations for each variable. To refine our data and minimize the potential distortion caused by extreme outliers, we have employed a winsorization at the 1% levels for both tails. This technique is done to all continuous variables such as IVOL, Size, Leverage, and Turnover. By trimming outliers, we replace them with the nearest value within this boundary, with the aim at getting results that are not driven as much by extreme values.

Variable	N	Median	Mean	St.Dev	Min	Max
IVOL (%)	3,216	2.63	3.05	1.72	0.64	8.54
IO (%)	3,216	23.35	28.79	23.74	0.13	86.22
Size (USDbn)	3,216	0.26	2.02	6.1	0	51.77
Leverage (%)	3,216	55.84	95.98	106.77	0	360.33
Turnover (%)	3,216	8.07	17.11	25.13	0.09	146.73

Table A.6: Summary statistics for Stockholm stock exchange

This table presents sample summary statistics for our main variables and control variables for the Stockholm stock exchange. We report the number of companies – quarterly observations, 226 companies over 24 quarters, which, as mentioned before sums up to 5424 observations for each variable. To refine our data and minimize the potential distortion caused by extreme outliers, we have employed a winsorization at the 1% levels for both tails. This technique is done to all continuous variables such as IVOL, Size, Leverage, and Turnover. By trimming outliers, we replace them with the nearest value within this boundary, with the aim at getting results that are not driven as much by extreme values.

Variable	N	Median	Mean	St.Dev	Min	Max
IVOL (%)	5,424	1.84	2.11	1.15	0.64	8.54
IO (%)	5,424	42.49	42.21	25.68	0.13	86.22
Size (USDbn)	5,424	0.5	3.27	7.95	0	51.77
Leverage (%)	5,424	47.82	58.11	49.24	0	155.16
Turnover (%)	5,424	11.58	18.64	23.3	0.1	146.99

Table A.7: ADF-Fisher Chi-Square Test results

This table presents the results from an ADF-Fisher Chi-Square Test for stationarity. All variables are tested in their original, untransformed form.

No	Variable	χ^2 Statistic	Degrees of Freedom	P-Value	Stationarity
1.1	IVOL	3151.4283	1040	6.46E-211	Stationary
1.2	IO	1278.4852	1016	3.33E-08	Stationary
1.3	Size	838.7942	1008	0.999966	Not Stationary
1.4	Leverage	1357.7751	994	1.01E-13	Stationary
1.5	Turnover	2374.4090	1036	1.2E-106	Stationary

Table A.8: Hausman Test Results

This table presents the result from a Hausman test, performed to determine the appropriate model specification between fixed effects and random effects. Institutional ownership is lagged by one quarter, while Size, Leverage, and Turnover are all logarithmically transformed.

Panel 1: Hausman Test Results

1.1 Test Details:

Model: $IVOL \sim IO + Size + Leverage + Turnover$

Chi-Squared Statistic: 10.802

Degrees of Freedom: 4

P-Value: 0.02888

1.2 Conclusion:

The p-value of the Hausman test is less than 0.05, suggesting that the fixed effects model is more appropriate than the random effects model for this data.

B Additions to Main Findings

Table B.1: Expanded analysis with additional model specifications

This table presents the estimated coefficients obtained from panel regressions examining the relationship between idiosyncratic volatility (IVOL) and institutional ownership (IO) lagged by one quarter, for each stock exchange isolated. This addition to the expanded analysis includes three model specifications for each stock exchange: the first including ticker and date fixed effects, the second including only ticker fixed effects, and the third including only date fixed effects. This is done to control for unobserved cross-sectional and temporal heterogeneities that might affect our results. Other control variables are described in A.1 in Appendix. Size, Leverage, and Turnover are logarithmically transformed. The standard errors, displayed in parentheses, are clustered along the ticker and data dimension and are heteroskedasticity-robust. The levels of statistical significance are indicated by the following:
+ $p < 10\%$, * $p < 5\%$, ** $p < 1\%$, *** $p < 0.1\%$.

	Copenhagen	Copenhagen	Copenhagen	Helsinki	Helsinki	Helsinki	Oslo	Oslo	Oslo	Stockholm	Stockholm	Stockholm
IO	0.013*	0.021***	-0.002	0.008**	0.011**	-0.003	0.002	0.005+	-0.006*	0.000	0.005	-0.009***
	(0.006)	(0.005)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.001)
Size	0.000	-0.001	-0.002***	-0.000	-0.002	-0.003***	-0.003	-0.007*	-0.007***	0.001	0.001	-0.005***
	(0.001)	(0.002)	(0.000)	(0.002)	(0.002)	(0.001)	(0.002)	(0.003)	(0.001)	(0.001)	(0.002)	(0.000)
Leverage	0.003	0.006+	0.006*	0.005*	0.009***	-0.000	0.004*	0.007***	0.002	0.003+	0.004**	0.000
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Turnover	0.082***	0.086***	0.079***	0.072***	0.084***	0.069***	0.049***	0.065***	0.066***	0.059***	0.067***	0.051***
	(0.013)	(0.014)	(0.011)	(0.013)	(0.014)	(0.010)	(0.007)	(0.007)	(0.007)	(0.006)	(0.009)	(0.005)
HML		-0.003			-0.008			-0.017			-0.004	
		(0.010)			(0.011)			(0.015)			(0.012)	
SMB		-0.023*			-0.016			-0.018			-0.028*	
		(0.010)			(0.011)			(0.015)			(0.013)	
Momentum		-0.005			-0.008			-0.012			-0.003	
		(0.008)			(0.009)			(0.011)			(0.011)	
Date FE	X		X	X		X	X		X	X		X
Ticker FE	X	X		X	X		X	X		X	X	
Num.Obs.	1817	1817	1817	1863	1863	1863	3082	3082	3082	5198	5198	5198
R2	0.640	0.562	0.403	0.592	0.483	0.336	0.692	0.610	0.432	0.664	0.556	0.437

Table B.2: Robustness test including multiple lags

This table presents the robustness test examining the lagged relationship between idiosyncratic volatility (IVOL) and lagged institutional ownership (IO). The table includes three models regressing idiosyncratic volatility on institutional ownership lagged by 2, 3, and 4 quarters. The models include both ticker and date fixed effects. Other control variables are described in A.1 in Appendix. Size, Leverage, and Turnover are logarithmically transformed. The standard errors, displayed in parentheses, are clustered along the ticker and data dimension and are heteroskedasticity-robust. The levels of statistical significance are indicated by the following:
+ $p < 10\%$, * $p < 5\%$, ** $p < 1\%$, *** $p < 0.1\%$.

	(1)	(2)	(3)
IO_2Qlag	0.0045*		
	(0.0017)		
IO_3Qlag		0.0052**	
		(0.0017)	
IO_4Qlag			0.0053*
			(0.0020)
Size	-0.0007	-0.0008	-0.0008
	(0.0012)	(0.0012)	(0.0012)
Leverage	0.0036***	0.0037***	0.0037**
	(0.0009)	(0.0009)	(0.0010)
Turnover	0.0567***	0.0562***	0.0576***
	(0.0050)	(0.0052)	(0.0053)
Date FE	X	X	X
Ticker FE	X	X	X
Num.Obs.	11440	10920	10400
R2	0.7040	0.7060	0.7070

C List of Analyzed Companies

Stockholm

- AAK
- ABB
- Abliva
- AcadeMedia
- Active Biotech
- Addtech
- AFRY
- Alfa Laval
- AddLife
- Alimak Group
- Addnode Group
- Anoto Group
- AQ Group
- Arise
- Arctic Paper
- ASSA ABLOY
- Atlas Copco
- Alligator Bioscience
- Atrium Ljungberg
- Attendo
- Axfood
- AstraZeneca
- B3 Consulting Group
- Bactiguard Holding
- BE Group
- Beijer Alma
- Beijer Ref
- Bergman & Beving
- Besqab
- Betsson
- Bilia
- Billerud
- BioInvent International
- BioGaia
- Biotage
- Byggmax Group
- Boliden
- Bonava
- Bong
- Björn Borg
- Boule Diagnostics
- Bravida Holding
- Bergs Timber
- Brinova Fastigheter
- BTS Group
- Bufab
- Bulten
- Bure Equity
- Camurus
- Cantargia
- Castellum
- Catella
- Catena
- Cavotec
- Concordia Maritime
- CellaVision
- Cloetta
- Clas Ohlson
- Concejo
- Coala-Life Group
- Concentric
- Coor SMH
- C-Rad
- Creades
- Catena Media
- CTT Systems
- Dedicare Group
- Diös
- Dometic Group
- Doro
- Duni
- Duroc
- Dustin Group
- Elekta
- Elanders
- Elon
- Elos Medtech
- Eltel
- Electrolux
- Empir Group
- Enea
- Eniro Group
- Eolus Vind
- Ependion
- Episurf Medical
- Ericsson
- Evolution
- Ework Group
- Fabege
- Fagerhult Group
- Fingerprint Cards
- Fastpartner
- Formpipe Software
- G5 Entertainment
- GARO
- Getinge
- Gränges
- HANZA
- Havsfrun Investment
- Hexagon
- HMS Networks
- Hansa Biopharma
- Hoist Finance
- Holmen
- Hexpol
- Hexatronic Group
- Hufvudstaden
- Humana
- Husqvarna
- Immunovia
- Mendus
- Indutrade
- Industrivärden
- Intrum
- Investor
- Inwido
- Image Systems
- ITAB Shop Concept
- INVISIO
- JM
- KABE Group
- Karolinska Development
- Kindred Group
- Kinnevik
- Knowit
- Lagercrantz Group
- Lammhults DG
- Latour
- Lindab International
- Lifco
- Loomis
- Lucara Diamond
- MedCap
- MEKO
- Moberg Pharma
- Moment Group

- Micro Systemation
- Midsona
- Medivir
- Mycronic
- NAXS
- NCC
- Nelly Group
- Net Insight
- NGS Group
- Nibe Industrier
- Nilörngruppen
- Nederman Holding
- Nobia
- Nolato
- Note
- NP3 Fastigheter
- Novotek
- OEM International
- Oscar PH
- Öresund
- Ortivus
- Orexo
- Proact IT Group
- Peab
- PION Group
- Platzer FH
- Pandox
- Precise Biometrics
- Prevas
- Pricer
- Probi
- ProfilGruppen
- Railcare Group
- Ratos
- Raysearch Laboratories
- Rejlers
- Resurs Holding
- Rottneros
- Saab
- Sagax
- Sandvik
- Saniona
- SAS
- SCA
- Scandi Standard
- SEB
- Sectra
- Securitas
- Sensys Gatso Group
- Scandic Hotels Group
- Sinch
- SinterCast
- Skanska
- SKF
- SkiStar
- Swedish Biovitrum
- Softronic
- SSAB
- Starbreeze
- Stendörren Fastigheter
- Strax
- Stockwik Förvaltning
- Svedbergs
- Studsvik
- Svolder
- Sweco
- Swedbank
- Systemair
- Tele2
- Telia Company
- Tethys Oil
- TF Bank
- Thule Group
- Tobii
- Traction
- TradeDoubler
- Trelleborg
- Troax Group
- VBG Group
- Vitec Software Group
- Vitrolife
- Vivesto
- Volati
- Volvo
- Wallenstam
- Wihlborgs Fastigheter
- Wise Group
- Xano Industri
- Xbrane Biopharma
- Xvivo Perfusion

Oslo

- 5th Planet Games
- ABG Sundal Collier
- ABL Group
- Aqua Bio Technology
- Axactor
- Aega
- AF Gruppen
- Arendals Fossekompani
- Avance Gas
- Akastor
- Aker
- Aker BP
- Aker Solutions
- AKVA Group
- Awilco LNG
- AMSC
- Aquila Holdings
- Archer
- Arribatec Group
- Asetek
- Atea
- Austevoll Seafood
- ArcticZymes Technologies
- B2 Impact
- Bakkafrost
- Belships
- Byggma
- BlueNord
- Bonheur
- Bouvet
- Borregaard
- BW LPG
- BW Offshore
- Carasent
- ContextVision
- Circio Holding
- DNB Bank
- DNO
- EAM Solar
- Eidesvik Offshore
- Electromagnetic Geoservices
- Endúr
- Ensurge Micropower
- Entra
- Europris
- Equinor
- EQVA
- Flex LNG

- Frontline
- Gaming IG
- Gjensidige Forsikring
- Goodtech
- Golden Ocean Group
- Grieg Seafood
- Gyldendal
- Havila Shipping
- Hofseth BioCare
- Hexagon Composites
- Hunter Group
- IDEX Biometrics
- Itera
- Jinhui Shipping and Transportation
- Kid
- Kitron
- KMC Properties
- Kongsberg Automotive
- Kongsberg Gruppen
- Lerøy Seafood Group
- Medistim
- Magnora
- Mowi
- Multiconsult
- Napatech
- Norwegian Air Shuttle
- Navamedic
- NEL
- NEXT BG
- Norsk Hydro
- Nekkar
- Nordic Semiconductor
- Nordic Mining
- North Energy
- NRC Group
- Odfjell
- Odfjell Drilling
- Olav Thon ES
- Orkla
- Otello
- Oceanteam
- Pareto Bank
- PCI Biotech Holding
- Panoro Energy
- PGS
- Philly Shipyard
- Photocure
- Polaris Media
- Pioneer Property Group
- Protector Forsikring
- Prosafe
- Questerre Energy
- Q-Free
- Reach Subsea
- REC Silicon
- GC Rieber Shipping
- RomReal
- Saga Pure
- SalMar
- Selvaag Bolig
- SeaBird Exploration
- Scana
- Scatec
- Schibsted
- S.D. Standard ETC
- Stolt-Nielsen
- Solstad Offshore
- SpareBank 1 SR-Bank
- Storebrand
- StrongPoint
- Subsea 7
- Techstep
- Telenor
- TGS
- Tomra Systems
- Treasure
- Thor Medical
- Veidekke
- Vistin Pharma
- Vow
- Voss Landmandsbank
- Wallenius Wilhelmsen
- WW Holding
- XXL
- Yara International
- Zalaris

Copenhagen

- Agat Ejendomme
- ALK-Abelló
- Alm. Brand
- Ambu
- Atlantic Petroleum
- Bavarian Nordic
- BioPorto
- BankNordik
- Bang & Olufsen
- Carlsberg
- Chr. Hansen Holding
- Coloplast
- Columbus
- Danske Andelskassers Bank
- Danske Bank
- DFDS
- Djurslands Bank
- D/S Norden
- DSV
- EAC Invest
- Fast Ejendom Danmark
- FLSmidth & Co.
- Flügger Group
- Fynske Bank
- Gabriel Holding
- German High Street Properties
- Glunz & Jensen Holding
- Genmab
- GN Store Nord
- Grønlandsbanken
- Harboes Bryggeri
- Brdr.Hartmann
- H+H International
- Hvidbjerg Bank
- ISS
- Jeudan
- Københavns Lufthavne
- Kreditbanken
- Lån og Spar Bank
- Lollands Bank
- A.P. Møller - Mærsk
- Matas
- Møns Bank
- NKT
- NNIT
- Nordic Shipholding
- Novo Nordisk
- Nordfyns Bank
- NTR Holding
- Novozymes
- Ørsted

- Per Aarsleff Holding
- Parken S&E
- Pandora
- Prime Office
- Roblon
- Royal Unibrew
- Ringkjøbing Landbobank
- Rockwool
- RTX
- Schouw & Co
- SimCorp
- SKAKO
- Skjern Bank
- Solar
- SP Group
- Sparekassen Sjælland-Fyn
- Spar Nord Bank
- Scandinavian Tobacco Group
- Strategic Investments
- Sydbank
- Tivoli
- Topdanmark
- Torm
- Tryg
- UIE
- Vestjysk Bank
- Vestas Wind Systems
- Zealand Pharma

Helsinki

- Aspocomp Group Plc
- Afarak Group SE
- Aktia Bank Plc
- Bank of Åland Plc B
- Alma MC
- Apetit Plc
- Aspo Plc
- Atria Plc A
- Bittium Corporation
- CapMan Plc
- Caverion Oyj
- Cargotec Oyj
- Consti Plc
- Citycon Oyj
- Digia Plc
- Elecster Oyj A
- Elisa Corporation
- Enento Group Oyj
- eQ Oyj
- Etteplan Oyj
- Exel Composites Plc
- Finnair Oyj
- Fortum Corporation
- Fiskars Corporation
- Glaston Corporation
- HKScan Oyj A
- Honkarakenne Oyj B
- Huhtamäki Oyj
- Innofactor Plc
- Ilkka Oyj 2
- Konecranes Plc
- Kesla Oyj A
- Kemira Oyj
- Kesko Corporation A
- KONE Corporation
- Lassila & Tikanoja Plc
- Martela Oyj A
- Marimekko Corporation
- Metsä Board Oyj A
- Metso Oyj
- Neste Corporation
- NoHo Partners Oyj
- Nokia Corporation
- Oriola Corporation A
- Olvi Plc A
- Orion Corporation A
- Outokumpu Oyj
- Ovaro Kiinteistösijoitus Oyj
- Pihlajalinna Oyj
- Panostaja Oyj
- Ponsse Oyj 1
- QPR Software Plc
- Qt Group Oyj
- Raisio Plc K
- Raute Corporation
- Revenio GC
- Sampo Plc A
- Sanoma Corporation
- Scanfil Plc
- Solteq Oyj
- SRV Group Plc
- SSH Communications Security Oyj
- Stockmann Plc
- Suominen Oyj
- Tecnotree Corporation
- Teleste Corporation
- Talenom Oyj
- Tokmanni Group Oyj
- Trainers' House Plc
- Tulikivi Oyj A
- Nokian Tyres Plc
- UPM-Kymmene Corporation
- Uponor Oyj
- Vaisala Corporation A
- Valmet Corporation
- Viking Line Abp
- Wetteri Oyj
- WithSecure Corporation
- Wärtsilä Corporation
- Wulff Group Plc
- YIT Corporation