Stockholm School of Economics
Department of Finance
Master Thesis in Finance

The Impact of Institutional Ownership on Idiosyncratic Volatility

- A study of Swedish companies listed on the OMX 2004-2007

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Abstract

How does idiosyncratic volatility relate to the proportion of institutional ownership in a company? This thesis investigates the question by running cross-sectional regressions, using panel data on Swedish firms included in OMX Mid Cap and Large Cap between the years 2004 and 2007. We start by constructing a measure of idiosyncratic volatility. This is done by estimating systematic and idiosyncratic components of stock return in a CAPM regression, inspired by Campbell et al. (2001). We then regress idiosyncratic volatility on the proportion of institutional ownership, while controlling for the size and the solidity of each company. Our findings suggest that there is a significantly positive relationship between institutional ownership and the idiosyncratic volatility of the stock-return. These findings are in line with the findings of previous studies, e.g. Malkiel & Xu (2003).

Keywords: Idiosyncratic Volatility, Institutional Ownership

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Contents

1 Introduction **4**

2 Motivations and Previous Research **5**
2.1 Previous Studies on Idiosyncratic Volatility 6
2.2 Our Contribution 8

3 Hypothesis **8**
3.1 Institutional Herding 9
3.2 Institutional Trading, Price Changes and Volatility 10

4 Data and Construction of Variables **10**
4.1 Idiosyncratic Volatility 11
4.1.1 Estimation Procedure 11
4.1.2 Data and Summary Statistics 12
4.2 Institutional Ownership 13
4.2.1 Estimation Procedure 13
4.2.2 Data and Summary Statistics 14
4.3 Control variables 15

5 Empirical Findings **15**

6 Conclusion and Discussion of Results **19**

7 Suggestions for Further Research **21**

A Appendix **25**
A.1 Regression Results 25
A.2 Companies in the Study 27

List of Figures

1 Normality plot of the Error Term with the Idiosyncratic Volatility as Independent Variable 18
2 Normality plot of the Error Term with Logarithmic Values of Idiosyncratic Volatility as Independent Variable 19

List of Tables

1 Summary Statistics of Idiosyncratic Volatility 13
2 Summary Statistics of Major Owners 14
3 Summary Statistics of Institutional Ownership 14
4 Regression Results for Idiosyncratic Volatility as the Dependent Variable 16
5 Regression Results for Logarithmic Values of Idiosyncratic Volatility as the Dependent Variable 25
6 Regression Results for Logarithmic Values of Idiosyncratic Volatility as the Dependent Variable with HAC adjusted error terms . . 26
7 Companies in the Study 27

1 Introduction

Stock market volatility has been the subject of a considerable amount of research since the beginning of the 1980s when Shiller (1981) and LeRoy & Porter (1981) argued that stock prices are far too volatile to be explained by the variability of fundamentals such as dividends. These findings challenged the notion of stock-market efficiency and in the following years, several studies were presented that developed models in order to capture and explain the stock-market volatility. In 1990, Schwert studied the aggregate volatility of a sample of US equities and found that volatility followed a cyclical pattern but as a whole, had not increased over time. This finding was later supported by Campbell et al. (2001). They applied a method of decomposing total stock volatility into three components; market-level, industry-level and firm-level volatility with the ambition to determine if the different components show any trends over time. Their findings suggested that between 1962 and 1997, the firm-level volatility of equity returns, also called idiosyncratic volatility, had increased noticeable relative to market-level and industry-level volatility that had been rather stable.

Following these findings, several researchers have conducted studies with the ambition to explain changes in idiosyncratic volatility. Among the more well-researched hypotheses of why idiosyncratic volatility has increased are a higher proportion of institutional ownership and trading, increased volatility in cash-flows due to intensified competition and increased firm leverage. It has also been proposed that the observed upward trend in idiosyncratic volatility was only an effect of the chosen sample period. Research on this topic have been presented as recently as this summer, June 2008, by Brandt et al. and we find it very encouraging to be writing our thesis on a subject of such current interest.

The main purpose of this thesis is to study the effect of institutional ownership on idiosyncratic volatility. This is done by performing a cross-sectional analysis on a Swedish panel dataset containing companies included in OMX Mid Cap and Large Cap between the years 2004 and 2007. To our best knowledge, this is the first study to investigate this hypothesis by analyzing data on Swedish companies.

We begin the thesis by presenting our motivations and previous research on the subject. We then move on to formulate the hypotheses for our study, followed by an introduction to our dataset and the construction of regressions variables. After this, we present the methodology we use to test our hypothesis. The last part concludes with a presentation and discussion of our results and how they relate to the findings in other studies. In this part we will also make suggestions for further research.

2 Motivations and Previous Research

Financial theory and standard asset-pricing models suggest that investors should diversify their portfolios so that all idiosyncratic risk is eliminated. Since only systematic risk is priced, investors are not compensated for taking on idiosyncratic risk and it should hence be in their interest to eliminate idiosyncratic risk completely. In the light of this, one might reasonably express doubts about the interest in a study of this kind. However, as we will argue below, there are still many reasons why idiosyncratic volatility is relevant for investors and other market participants.

Firstly, investors may fail to diversify their portfolios in a way that completely eliminates idiosyncratic risk. This may be due to for instance capital constraints, transaction costs and liquidity needs. Reasons for large holdings of individual stocks may also be due to controlling incentives and restrictions set by corporate compensation policies. Investors with under-diversified portfolios are not only affected by shifts in the market volatility, but also from shifts in idiosyncratic volatility (Campbell et al. 2001).

Further, conventional wisdom predicts that a portfolio containing approximately 20 to 30 stocks can be considered to be well-diversified. However, as Malkiel & Xu (2004) point out, this is only true if the stocks are picked out randomly. Since this is rarely the case, the adequacy of the approximation depends on the idiosyncratic volatility of the constituent stocks in the portfolio.

Idiosyncratic volatility is also important since larger pricing errors in individual stocks are possible when idiosyncratic volatility increases, making it potentially

more profitable for arbitrageurs to trade with the purpose of exploiting these pricing errors. However, it also increases the risk of holding an undiversified portfolio, making it more costly to take large positions in individual stocks (Shleifer & Vishny 1997).

Further, idiosyncratic volatility is also essential for pricing stock options since the price depends on the total-return volatility of the individual stocks (Black & Scholes 1973).

Lastly, the interest in idiosyncratic volatility is also motivated by the fact that researchers have found empirical evidence that idiosyncratic volatility is priced by the market (see Brown & Ferreira (2004) and Ang et al. (2004)).

2.1 Previous Studies on Idiosyncratic Volatility

In 2001, Campbell et al. published the paper "Have Individual Stocks become more volatile? An empirical Exploration of Idiosyncratic Risk ", which became very influential for the subsequent research made on volatility of individual stocks. By decomposing stock-return volatility into three components; market-level, industry-level and firm-level volatility, they were able to study aggregate trends over time for the different components. Their results show that aggregate idiosyncratic volatility exhibited a strong positive trend during the sample period between 1962 and 1997, relative to the market-level volatility that was rather stable. Further, they concluded that correlations among individual stock returns had decreased, while the number of stocks needed to create a portfolio with a given level of diversification had increased.

Several hypotheses have since then been presented in order to explain these changes in idiosyncratic volatility. Irvine & Pontiff (2005) test two hypotheses that might explain the upward trend; idiosyncratic news in cash flows and market inefficiencies. They analyze cash flow volatility on US data between 1963 and 2003 by using three measures; earnings per share, cash flow per share and sales per share. Their findings suggest that the trend in idiosyncratic volatility exactly mirrors a trend in cash-flow volatility. Their main explanation for the upward trend in cash-flow volatility is an economy-wide intensification of competition, something that they suggest might be attributable to deregulation in

industries and entrance of foreign competitors into local markets.

The findings presented in a paper by Fink et al. (2005), suggest that the upward trend in idiosyncratic volatility is driven by the fact that the age of a typical firm at the date of its IPO has fallen dramatically during the last 50 years. They argue that since younger firms tend to be more risky, the decline in average age of IPOs has caused the idiosyncratic volatility to increase significantly.

Malkiel & Xu (2003) argue that an increase in the proportion of institutional ownership of securities might help to explain the increase in stock market volatility. To test this hypothesis, they used panel data on institutional ownership for each stock in the S&P 500 between the years 1989 and 1996. The relation between the proportion of institutional ownership and idiosyncratic volatility was then examined by running cross-sectional regressions across companies, while controlling for the size of the company. Their findings suggest that an increased proportion of institutional ownership can help to explain the increase in idiosyncratic volatility. They also find that idiosyncratic volatility is positively related to expected earnings growth.

Dennis & Strickland (2005) also test the possible effect of increased institutional ownership, along with the hypotheses that the upward trend in idiosyncratic volatility can be explained by leverage and increased firm focus. Their statistical methods are slightly different from the ones used by Malkiel & Xu (2003) but their conclusions are similar. Their time-series regressions show that idiosyncratic volatility is positively related to institutional ownership, increased firm-focus and leverage. From their cross-sectional regressions, they concluded that changes in idiosyncratic volatility are positively related to changes in institutional ownership.

In 2008, Brandt et al. conducted a similar study as Campbell et al. (2001) where they used a sample containing data until 2007. Their results show that the positive trend in idiosyncratic volatility, recorded between 1962 and 1997, was completely reversed and below pre-1990 levels by 2007. These findings suggest that the increase in idiosyncratic volatility in the 1990s was an episodic phenomenon rather than a time trend. This is further supported by Jonasson

& Karakitsios (2006) with a study of Swedish data between 1982 and 2005, using the same methodology as Campbell et al. (2001). Their results did not indicate any positive deterministic trend for the whole period. Instead, they showed that all three components of total stock volatility had returned to their long-run levels in the years following the turbulent market in the late 1990s and early 2000s.

2.2 Our Contribution

The fluctuations in aggregate idiosyncratic volatility over time lies at the center of interest in most studies cited above. As mentioned, new evidence has recently been presented (even as late as this summer), that suggests that the observed increase in aggregate idiosyncratic volatility was mainly an effect of the chosen sample period. One could argue that these findings also reject the different hypotheses and findings put forward to explain the previous increase in idiosyncratic volatility, given that for instance the proportion of institutional ownership have not decreased or that the age of a typical firm at the date of its IPO has not returned to historical levels. In the light of this, we consider it to be of interest to reexamine hypotheses that have previously been proposed and test if they still hold when using more recent data that does not indicate an upward trend in aggregate idiosyncratic volatility. We have chosen to examine the hypothesis previously proposed by Malkiel & Xu (2003) and Dennis & Strickland (2005) that there is a positive relation between institutional ownership and idiosyncratic volatility.

3 Hypothesis

Volatility is a measure of changes in the price or return of a financial instrument in a given time period. According to financial theory, stock prices equal the present value of future expected dividend cash flows. In an efficient market, changes in the stock price should hence be attributable to new information and anticipations about discount factors, dividend levels or other dynamics related to these factors. Since volatility is a measure of stock price fluctuations, it is reasonable to expect that it should also be affected by news and changes in these factors. In this study, our aim is to investigate whether the proportion of

institutional ownership can explain the level of idiosyncratic volatility. Below we present relevant theories in order to reinforce our hypothesis.

3.1 Institutional Herding

There are several theories predicting herding behavior among institutional investors. Banerjee (1992) proposes a sequential decision model where decision makers make their decisions sequentially. According to Banerjee, each decision maker will, to some extent, ignore her own private information and instead follow the previously made decisions by other decision makers. This behavior is rational since previously made decisions may be based on important information that only these decisions makers possess. Sequential decisions made by optimizing individuals will therefore be characterized by herding behavior.

Further, asset managers may choose to follow decisions made by other asset managers in order not to stand out should the market move against them. If the whole market makes the same mistake, they will not be singled out and therefore not considered to be worse investors than their competitors. This may lead managers to run with the herd instead of deviating even though the manager has information suggesting that a deviating strategy is more likely to be better (Scharfstein & Stein 1990). The herding behavior is also likely to be stronger in down markets since the labor market for asset managers may be tighter and reputation becomes more important. Malkiel & Xu (2003) also highlight the fact that institutional investors often are homogenous and get their news from the same sources, which increases the probability that institutions act similarly and move together.

Empirical studies on herding behavior have shown ambiguous results. For instance, Klemkosky (1977), Lakonishok et al. (1992) and Wermers (1999) have not found evidence of institutional herding to any larger extent. However, Griffin et al. (2003) found a strong correlation between changes in institutional ownership and stock returns on a daily level. The existence of herding behavior among institutions is also supported by Dennis & Strickland (2002) who found that, conditioned on an event of positive or negative market return greater than two percent, stocks with higher proportion of institutional ownership have a greater absolute value of return than stocks with lower proportion of institu-

tional ownership.

3.2 Institutional Trading, Price Changes and Volatility

Other phenomena that have been studied are the effects of institutional trading on the price and volatility of stocks. Chan & Lakonishok (1995) study the price impact of institutional trading and found that even though institutions split larger trades into smaller ones, they tend move prices. Further, Sias et al. (2001) find support of their hypothesis that institutions trade because they have superior knowledge and that these trades move prices, rather than buying stocks that have increased in value. Not only does institutional trading move prices, Bushee (2004) finds evidence that stock return volatility is related to institutional ownership, given that the institutions have a short investment horizon and small positions in the companies.

In conclusion, we believe that the tendency of institutions to herd together, coupled with the findings that trades of institutional investors tend to move prices, make the stock return for companies with a higher proportion of institutional ownership more volatile. Our hypothesis is hence the following:

The idiosyncratic volatility of a company's shares is positively correlated to the proportion of institutional ownership of that specific company.

4 Data and Construction of Variables

The goal of this study is to determine if the proportion of institutional ownership in a company is related to the idiosyncratic volatility of the stock return. We do this by using a dataset based on Swedish companies listed on the OMX from January 2004 to December 2007 and categorized as Mid and Large Cap the 31 December 2007. The chosen sample period was largely an effect of the tradeoff between a longer time span and a larger cross-sectional sample. A longer time span would increase the variability in the company specific data, but reduce the number of companies in the cross section that had their stocks listed for the full time period. Since it is of importance to have a large cross-sectional spread when performing our data analysis, we chose a time span of four years which gave us a dataset containing 97 different companies and a total of 388 data

points. The dataset contains company specific information about ownership, solidity, market cap and the daily returns of the individual stocks. We use the Swedish overnight interest rate as a proxy for the risk-free rate.

The market values have been collected from Fristedt & Sundqvist (2004-2007) and are given in million of Swedish kronor. The solidity measures have been collected from the companies' annual reports. It is defined as the shareholders' equity value divided by the company's total assets.

4.1 Idiosyncratic Volatility

Since idiosyncratic volatility is unobservable, we have to estimate a volatility measure that can be used as empirical proxy in our statistical investigation.

4.1.1 Estimation Procedure

The estimation procedure is based on CAPM and resembles the one used by Malkiel & Xu (2003), and which was further applied by Dennis & Strickland (2005). This method is based on a decomposition of total firm return into a systematic component and an idiosyncratic component. The corresponding volatility can also be decomposed into the same two components. In order to estimate the systematic component, we have to construct a value-weighted portfolio containing all stocks in our sample. The weight that is applied to the individual stocks during year t is based on market cap at the end of year $t-1$ and is held constant throughout year t. The portfolio excess return is therefore given by:

$$R_p = \sum_n w_n R_n, \tag{1}$$

where w represents the weight and R_n is the excess return of stock n in the portfolio. For the purpose of this study we consider our constructed portfolio to be the complete market portfolio, which enables us to use the portfolio excess return as the market excess return in our CAPM regressions.

$$R_{id} = \beta_i R_{md} + \tilde{\eta}_{id}. \tag{2}$$

In this model, R_{id} is the excess return of firm i on the day d and R_{md} is the value weighted excess return of the portfolio consisting of all stocks in the sample for day d.

The excess return is achieved by subtracting the daily return of the Swedish overnight interest rate from the daily logarithmic returns of the individual stocks. This gives us the statistical relation between the return of the stock and the return of the market. However, we are interested in the idiosyncratic volatility, i.e. the excess volatility of the stock over the market. The volatility of the stock return is defined as the variance of the return over the year. This gives us the volatility in year t of the ith firm's stock as:

$$\mathrm{Var}(\mathrm{R}_{it}) = \beta_i^2 \mathrm{Var}(\mathrm{R}_{mt}) + \mathrm{Var}(\tilde{\eta}_{it}). \tag{3}$$

As we can see in equation 3 above, the variance of the return is made up of two components where the first corresponds to the variance in the market. The last term is the most interesting one as it corresponds to the variance of the stock return in excess of the market-return variance. The variance is computed as $\sum_{s\in t}(\tilde{\eta}_{is} - \mu_i)^2$, where μ_i is defined as the mean of the error terms. Because the regression method is constructed in such a way that that μ_i equals zero, the calculation of the yearly volatility of the error term simplifies to:

$$\hat{\sigma}_{it}^2 = \sum_{s\in t} \tilde{\eta}_{is}^2, \tag{4}$$

where s denotes the days in year t.

4.1.2 Data and Summary Statistics

The daily returns for the individual companies and the Swedish overnight rate have been collected from Thomson DataStream. If a company has a dual-class share system, we use the most liquid share as the base for our volatility measure. This is in most cases the B-class share. The idiosyncratic volatility is estimated for each of the four years in our sample. This gives us yearly idiosyncratic volatilities for each company in our sample. We present summary statistics for the idiosyncratic volatility in table 1 on page 13.

The panel mean of the idiosyncratic volatility is 0.076. This means that the average stock in the sample portfolio has an idiosyncratic volatility of 7.6 percent, compared to an average of 2.5 percent for the volatility of the market return per year. The mean values for the different years are very similar and do not change

much over the years in the sample. However, the ratio between the mean values and their standard deviations vary significantly, suggesting changing spreads between individual firm volatilities. Lastly, the fact that the average size of the idiosyncratic volatility component is larger than the size of the systematic volatility component is in line with the results from Jonasson & Karakitsios (2006).

Year	Min	Max	Mean	Standard Deviation
2004	0.013	0.423	0.076	0.068
2005	0.014	0.635	0.069	0.072
2006	0.019	0.360	0.080	0.051
2007	0.018	0.190	0.078	0.034
Total	0.013	0.635	0.076	0.058

Table 1: Summary statistics of idiosyncratic volatility over the sample period.

4.2 Institutional Ownership

Due to complications in classifying the type of different owners in the companies, we use an estimation procedure which is presented below.

4.2.1 Estimation Procedure

Since we are only interested in the proportion of institutional owners in this thesis, it is of importance to isolate the institutional owners in the dataset from other types of owners such as founding families. The founders will most likely have a long-term horizon for their interest in the company, whereas for example a mutual fund will be more prone to buy or sell depending on the economic climate and consequently have a larger portfolio turnover. In order to try and isolate the institutional owners of each company we therefore use the share of capital held by the 25 largest owners and subtract the share of equity held by any owner with more than 10 percent of the voting power. We consider it likely that these investors have other incentives than strictly financial to keep their holdings in a company. The result is obviously only a estimate for the institutional ownership. It is likely that there are some owners with less than 10 percent of the voting power but that still have other incentives for their investment in the company. It is also probable that there are owners with more

than 10 percent of the voting power that have purely financial goals but that will be excluded from the institutional ownership measure with our method.

4.2.2 Data and Summary Statistics

The ownership data have been collected from the books "Ägarna och makten" by Fristedt & Sundqvist (2004-2007). The data for a given year is the share of capital held by the 25 largest owners at the close of the last trading day the previous year. The dataset also includes data on the share of capital held by owners with more than 10 percent of the voting power. We count any owner spheres or coalitions as one owner. Summary statistics for the 25 largest owners and our estimate for institutional owners are presented in table 2 and table 3 below.

Year	Min	Max	Mean	Standard Deviation
2004	0.357	0.964	0.769	0.110
2005	0.384	0.979	0.753	0.113
2006	0.404	0.977	0.763	0.106
2007	0.474	0.970	0.774	0.099
Total	0.357	0.979	0.765	0.107

Table 2: Summary statistics of the major owners of the companies over the sample period.

Year	Min	Max	Mean	Standard Deviation
2004	0.119	0.865	0.457	0.177
2005	0.113	0.826	0.458	0.164
2006	0.113	0.914	0.464	0.177
2007	0.117	0.886	0.479	0.172
Total	0.113	0.914	0.465	0.172

Table 3: Summary statistics of the institutional ownership of the companies over the sample period.

The mean of the institutional ownership in a company listed on OMX in Stockholm is 46.5 percent and the standard deviation is 17.2 percent as can be seen in table 3. The proportion of institutional ownership appears to have a much

larger variation than the proportion of equity held by the 25 largest owners, where the standard deviation is 10.7 percent, see table 2.

4.3 Control variables

In order to avoid biases due to omitted variables in our regression analysis, we need to introduce a number of control variables. Firstly, we control for the size of the companies, measured as market cap, since previous research suggests that there is a negative correlation between the size of the company and the volatility of the company's stock price (Cheung & Ng 1992). Secondly, we control for the solidity of the company. Traditional capital structure theory predicts that changes in corporate financial structure changes the variability in stock returns. Leverage also tends to increase the beta of an individual stock (Malkiel & Xu 2003) and for these reasons, we find it relevant to control for the level of solidity in the cross-sectional investigation.

5 Empirical Findings

To determine whether a cross-sectional relation between institutional ownership and idiosyncratic volatility exists we start by regressing the following cross-sectional model for each year:

$$\text{Vol}_i = \alpha + \beta_1 \text{Institutional Ownership}_i + \beta_2 \ln(\text{Mcap})_i + \beta_3 \text{Solidity}_i + \epsilon_i. \quad (5)$$

Dennis & Strickland (2005) point out that this approach might be problematic since institutional investors may prefer large and more liquid stocks. If this is the case, it might introduce problems with multicollinearity that can affect our regression results. However, when checking for pair-wise correlation between the variables for size and institutional ownership, we find that this is rather low (0.287), indicating that multicollinearity will most likely not affect our results to a large extent.

The regression results for each year are summarized in table 4 on page 16. As we can see, the coefficients for institutional ownership are positive and significant for all years except 2004, where the coefficient has a p-value of 0.925.

The regression results for the year 2006 show the strongest result with a coefficient of 0.099 for the institutional ownership.

Year	Dependent Variable	Institutional Ownership	ln Market cap	Solidity	R^2
2004	Idiosyncratic Volatility	0.003	-0.020	-0.009	0.249
	SE	(0.367)	(0.004)	(0.032)	
	p-value	0.925	0.000	0.790	
2005	Idiosyncratic Volatility	0.085	-0.019	0.002	0.213
	SE	(0.042)	(0.004)	(0.035)	
	p-value	0.046	0.000	0.954	
2006	Idiosyncratic Volatility	0.099	-0.017	0.020	0.298
	SE	(0.026)	(0.003)	(0.022)	
	p-value	0.0000	0.0000	0.374	
2007	Idiosyncratic Volatility	0.050	-0.009	-0.004	0.190
	SE	(0.019)	(0.002)	(0.016)	
	p-value	0.010	0.000	0.801	
Total	Idiosyncratic Volatility	0.058	-0.016	0.001	0.195
	SE	(0.016)	(0.002)	(0.002)	
	p-value	0.000	0.000	0.933	

Table 4: Regression results for the ols regressions with idiosyncratic volatility as the dependent variable.

In order to get a summary statistic for our panel data, we perform a pooled OLS regression where we pool all four years together. The results are also shown in table 4 above. The results from this regression do not differ much from the regressions for the individual years. We will therefore focus our discussion on the pooled regression from now on.

The coefficient for institutional ownership has a value of 0.058 and is statistically significant at the 1 percent level. The economic interpretation of this is that if the institutional ownership increases by one percentage unit, then idiosyncratic volatility will on average increase by 0.058 percentage units given that market cap and solidity are held constant. To put this result into perspective, we relate it to our descriptive statistics of the variables.

The standard deviation of the institutional ownership measure is 17.2 percent. Hence, a change in institutional ownership by one standard deviation results in an increase in the idiosyncratic volatility of approximately 1 percentage unit, given that the size and the solidity of the company is held constant. Since the mean of the idiosyncratic volatility across companies is 7.6 percent, a 1 percentage unit change would result in a 13 percent increase in idiosyncratic volatility. Assuming the idiosyncratic volatility is normally distributed, roughly 95 percent of the companies will have their idiosyncratic volatilities within two standard deviations away from the mean. The resulting spread in idiosyncratic volatility is 5.6 to 9.6 percent, which indicates that the there is an economical significance for the change in idiosyncratic volatility as a result of institutional ownership.

The coefficient for the logarithm of market cap is significant at a 1 percent level for all five regressions and the coefficients in all regressions have the expected negative sign. Hence, we can conclude that idiosyncratic volatility appears to be negatively correlated with the size of the company.

Moving on, we note that the solidity coefficient has a p-value of 0.993 in our pooled regression, making it statistically insignificant. This is also true for the regressions for the individual years. There can be several explanations for this result. Firstly, our solidity measure is based on book values rather than market values. The leverage effect theory predicts that negative stock returns increases financial leverage, which in turn affects the equity risk and hence the stock-return volatility. Since our proxy for this effect is not based on market values, it is not likely to capture the changes in financial leverage due to negative returns adequately and this is likely to decrease the explanatory power of our solidity variable. Secondly, Braun et al. (1995) show that it is unclear whether leverage will have any significant impact on the idiosyncratic component of total volatility and Malkiel & Xu (2003) note that during the 1990s, idiosyncratic volatility appeared to increase while US companies were reducing their leverage. Hence, our findings suggest that the capital structure of a firm does not affect the idiosyncratic volatility but due to limitations in the measure used for solidity, this result should be regarded with caution.

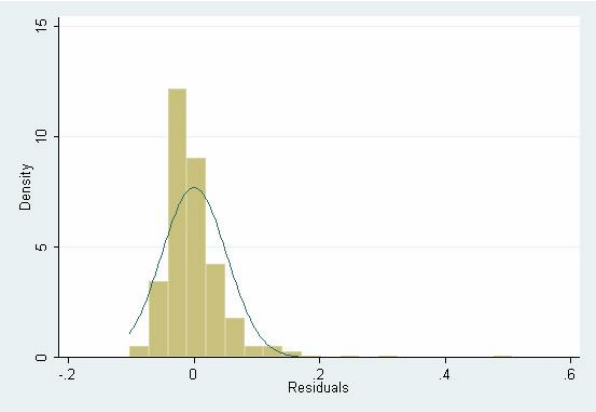

Figure 1: A plot of the error terms the idiosyncratic volatility as independent variable and the normal distribution curve as comparison

In a first assessment of the robustness of our results, we note that the error terms in the performed OLS regressions are positively skewed (see figure 1) and do not resemble a normal distribution. If the error-term distribution indicates on a significantly non-normal distribution, this may result in too wide or too narrow confidence intervals. Further, as noted by Malkiel & Xu (2003), the error terms from the regressions are also much likely to exhibit problems with heteroscedasticity. In order to correct for these problems, we follow the method proposed by Malkiel & Xu (2003) and use a logarithmic transformation of the volatility variable as dependent variable and reestimate the model. The results from the regressions are presented in table 5 in the appendix on page 25. As we can see, the coefficient for institutional ownership is still significantly positive and supports our hypothesis. From figure 2 on page 19, we can also conclude that the logarithmic transformation appears to have reduced the problem with positively skewed error terms.

Another potential problem with our regressions is the presence of serial correlation in the error terms. Previous findings suggest that volatility is persistent which may cause the standard errors of the coefficients to have a downward bias in our model. To test for this, we re-estimate model 5 with the logarithmic transformation of idiosyncratic volatility and heteroscedasticity- and auto-correlated consistent standard errors (HAC). The results, which can be found in table 6

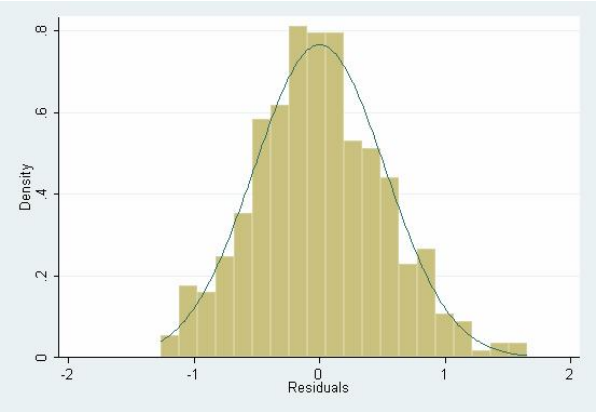

Figure 2: A plot of the error terms the logarithmic values of idiosyncratic volatility as independent variable and the normal distribution curve as comparison

in the appendix, still reveal a significantly positive coefficient for institutional ownership and our conclusions are hence still valid.

6 Conclusion and Discussion of Results

In this thesis, we examine the relation between institutional ownership and idiosyncratic volatility. Our hypothesis is based on theories about herding behavior and previous findings of the effect of institutional trading on stock prices. The theories on herding behavior predict that institutional investors are likely to herd around investments decisions, either to avoid being alone making poor investment decisions or as an effect of a sequence of decisions where each decision is made on the basis of what has been decided before. Regarding the effect of institutional trading on stock prices, previous studies have found that even though institutional investors split large trades into smaller ones, their trading tends to move stock prices. In the light of this, we find it reasonable to believe that the proportion of institutional ownership will have a positive effect on the level of idiosyncratic volatility.

By decomposing stock-return volatility into a systematic and an idiosyncratic component, using a method proposed by Campbell et al. (2001), we are able to isolate the idiosyncratic volatility of the stock returns in our sample. We then

use these estimates to perform cross-sectional regressions over the proportion of institutional ownership, while controlling for size and solidity of the companies. Consistent with our hypothesis, we find that there is a positive relation between idiosyncratic volatility and institutional ownership in the cross-section. We are also able to show that the coefficient for institutional ownership is significant in both a statistical and an economical sense. These findings are in line with previous findings on the subject, presented by Malkiel & Xu (2003) and Dennis & Strickland (2005). Although our initial regression exhibits some statistical problems with the standard errors, we are able to confirm the statistical significance of our results by running further regressions with a logarithmic transformation of idiosyncratic volatility and HAC adjusted standard errors.

Due to a limited amount of time and shortages in our data, our method relies on a set of estimates and assumptions about the data. Most notably, the fact that we do not have access to the exact proportion of institutional ownership in the sample companies makes the robustness of our results dependent on our definition and estimation of the ownership variable. Although we consider our estimation to be fairly good, an exact value of the proportion would undoubtedly have increased the reliability of our findings.

As previously pointed out by Malkiel & Xu (2003), a contemporaneous relation between institutional ownership and idiosyncratic volatility does not reveal the true causality. It could hence be the case that in reality, it is the level of idiosyncratic volatility that determines the proportion of institutional ownership and not the other way around. One way to test this is by running a test for Granger causality but due to the limited span of years in our dataset, such a test could be highly misleading. However, Malkiel & Xu (2003) perform this test and are able to reject the opposite causality. Further, it does not seem plausible that a company with high idiosyncratic volatility would attract institutional investors to a larger extent than companies with low idiosyncratic volatility. Thus, although it would have been interesting to test our data for causality, we do not find the lack of such a test to be fatal for the credibility of our findings.

7 Suggestions for Further Research

During the process of writing this thesis, we have come upon several related topics and methods that we believe would be interesting to examine in future studies. To start with, our generalization of institutional investors does not distinct between differing investment strategies between for example mutual funds and pension funds. This would obviously require a much more extensive data collection but it would most certainly contribute to the existing body of knowledge concerning idiosyncratic volatility. We also think it would be a good idea to extend the number of companies used in this study by including for example companies listed on the smaller exchanges as well.

We chose to test the hypothesis of a positive relation between institutional ownership and idiosyncratic volatility but, as mentioned in the previous research-section, there are several other hypotheses that we think it would be interesting to test on more current and Swedish data. For example to examine the relation between stock-return volatility and cash flow volatility of individual firms. If analyzing Swedish data, it would also be interesting to dwell deeper into the system with dual-class shares and its implications on the idiosyncratic volatility.

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A Appendix

A.1 Regression Results

Year	Dependent Variable	Institutional Ownership	ln Market cap	Solidity	R^2
2004	ln Idiosyncratic Volatility	0.371	-0.245	-0.004	0.333
	SE	(0.364)	(0.036)	(0.321)	
	p-value	0.311	0.000	0.989	
2005	ln Idiosyncratic Volatility	0.675	-0.261	-0.113	0.452
	SE	(0.324)	(0.030)	(0.271)	
	p-value	0.040	0.000	0.678	
2006	ln Idiosyncratic Volatility	1.029	-0.248	0.048	0.436
	SE	(0.257)	(0.030)	(0.222)	
	p-value	0.0000	0.0000	0.831	
2007	ln Idiosyncratic Volatility	0.642	-0.164	-0.179	0.262
	SE	(0.216)	(0.030)	(0.216)	
	p-value	0.015	0.000	0.408	
Total	ln Idiosyncratic Volatility	0.675	-0.209	-0.072	0.295
	SE	(0.162)	(0.017)	(0.138)	
	p-value	0.000	0.000	0.602	

Table 5: Regression results for the ols regressions with logarithmic values of idiosyncratic volatility as the dependent variable.

Year	Dependent Variable	Institutional Ownership	ln Market cap	Solidity	R^2
2004	ln Idiosyncratic Volatility	0.371	-0.245	-0.004	0.333
	SE	(0.303)	(0.041)	(0.335)	
	p-value	0.224	0.000	0.990	
2005	ln Idiosyncratic Volatility	0.675	-0.262	-0.113	0.452
	SE	(0.320)	(0.043)	(0.257)	
	p-value	0.038	0.000	0.661	
2006	ln Idiosyncratic Volatility	1.029	-0.248	0.048	0.436
	SE	(0.279)	(0.032)	(0.273)	
	p-value	0.0000	0.0000	0.862	
2007	ln Idiosyncratic Volatility	0.642	-0.164	-0.179	0.262
	SE	(0.249)	(0.039)	(0.255)	
	p-value	0.011	0.000	0.484	
Total	ln Idiosyncratic Volatility	0.675	-0.209	-0.072	0.295
	SE	(0.206)	(0.029)	(0.212)	
	p-value	0.001	0.000	0.735	

Table 6: Regression results for the ols regressions with logarithmic values of idiosyncratic volatility as the dependent variable with HAC adjusted terms.

A.2 Companies in the Study

Active Biotech	HIQ International	Ratos
Addtech	Holmen	Retail and brands
Alfa Laval	HQ	Saab
Assa Abloy	Hufvudstaden	Sandik
Atlas Copco	Höganäs	SAS
Avanza	IFS	SCA
Axfood	Industrivärden	Scania
Axis	Intrum Justitia	SEB
Ballingslöv	Investor	Seco Tools
Beijer Alma	JM	Sectra
Bilia	Kinnevik	Securitas
Billerud	Klövern	Semcon
Boliden	Kungsleden	SHB
Brinova	Latour	Skanditek
Broström	Lundbergs	Skanska
Bure Equity	Lundin Petroleum	SKF
Cardo	Meda	Skistar
Castellum	Mekonomen	SSAB
Clas Ohlson	Micronic Laser Systems	Studsvik
Cloetta Fazer	Midway Holding	Sweco
D. Carnegie & Co	MTG	Swedish Match
Electrolux	Munters	SäkI
Elekta	NCC	Tele2
Eniro	Neonet	Telelogic
Ericsson	New Wave Group	TeliaSonera
Fagerhult	Nibe Industrier	Trelleborg
Fast Partner	Nobia	VBG
Getinge	Nordea	Volvo
Gunnebo	Nordnet	Wallenstam
H&M	Orc Software	Ångpannefreningen
Haldex	PA Resources	Öresund
Heba	Peab	
Hexagon	Q-med	

Table 7: The companies in our study