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Does information asymmetry vary between insiders in different industries

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Abstract

In this master thesis, we examine the level of private information of insiders on the Oslo Stock Exchange. We contribute to the understanding of the issue by recognizing how the sector characteristics influence insider return. First, we allocate each firm into its adjoining sector before we divide the sectors into two groups, Exogenous and Endogenous. The first group contains insiders in sectors where exogenous factors steer much of the stock price, while the second group has insiders in sectors with low exposure towards these factors. By doing so we hope not only to isolate the sector characteristics, but also to get two groups that is well-constructed for testing against each other.

We apply a long-term event study of one year, where we investigate the abnormal return of the two groups. A particular challenge in our long-term study is to measure the underlying risk between the two groups. This is critical, as even a small error in risk adjustment could accumulate to significant misrepresentation of the abnormal return. To control for estimation error, we use a factor model containing factors that Skjeltop, Næs and Ødegaard (2011) have shown fits the Norwegian market.

We conclude that sectors have a large impact on insider's abnormal return. The insiders that we classify as Endogenous outperformed the Exogenous group with 5.85%, showing possession of superior predictability. Additionally, if outsiders were to follow buy trades of the Endogenous group, our results suggest that they can earn abnormal return. We therefore find support of the weak-form of efficiency.

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Introduction

In this master thesis we explore insiders' level of private information on the Oslo Stock Exchange. We investigate whether the degree of inside information differs between sectors. As there are different underlying economic factors moving the stock price in each sector, we argue that insiders in some sectors should have a better base of information to predict the direction of the stock price. Our research question is therefore as follows:

Does information asymmetry vary between insiders in different sectors?

This paper is unique in the way we classify insiders. First we allocate insiders into its adjoining sector, then we divide sectors into two groups, Exogenous and Endogenous. The first group contains insiders in sectors where exogenous factors, like commodity prices, steer much of the stock price. The second group has little exposure to these factors. Our theory is that Endogenous insiders only need to predict firm-related factors, while Exogenous insiders would additionally have to predict the exogenous factor that steer the stock price. Hence, Exogenous insiders can't fully exploit their superior firm-related information due to the commodity price exposure.

By dividing the insiders, we hope to isolate the sector characteristics and get two groups that is well-constructed for testing against each other. We also believe the Oslo Stock Exchange is an appropriate exchange for investigating our hypothesis as it has a high concentration of commodity-driven stocks.

Compared to existing research we apply a rather long-term analysis of abnormal return. We believe that insiders are long term investors and therefore trade on information with prices impact further in the future. Additionally, we believe that interpreting an insider trade is highly challenging for the market, and we would therefore like a long period to truly capture the asymmetry in information between the insiders.

Motivation and Economic problem

The literature has given much attention to insiders as they are said to be better informed about the state of the firm. Specifically, the literature has investigated whether insiders take advantage of their superior information through trading of the company's stock. An article in the *Individual Investor* (Feb. 1998, p. 54) illustrates how insiders are better informed:

“Company executives and directors know their business more intimately than any Wall Street analyst ever would. They know when a new product is flying out the door, when inventories are piling up, whether profit margins are expanding or whether production costs are rising... You always hear about the smart money. Generally, that is the smart money.”

Jeng, Metrick and Zeckhauser (2003) finds three motives to study insider trading: science, profit and policy. Profit tries to develop optimal trading strategies by following insider transactions. Science uses the result from insider transactions to find implications on the market efficiency theory. Policy seeks to determine the effectiveness of insider-trading rules, and the implications of any insider advantages for both fairness and market performance. Through this classification, our main focus in this master thesis is therefore the profit motive, as we measure information through profit.

We will also use our results to present implications regarding the science motive, as it is closely intertwined with our profit analysis. If insiders can earn abnormal return, we can say that the strong form of market efficiency is violated. Similar if outsiders can earn abnormal return by following insider trades, then the semi-strong form is violated. Hence, the result on insider profitability closely relates to the market efficiency hypothesis.

Literature Review

As the research on insider trading have been extensive, both the approach and the methodology have varied. We will in this chapter present previous research to help explain our choices, why others have done it differently and where we separate ourselves.

Profit for subgroups of insiders

Even though there are several articles regarding insider trading and the profit motive, there are none that have used sectors as a mean to explain the variation of asymmetric information between insiders. The closest study we could find was the one from Baesel and Stein (1979). They found evidence that bank directors are in possession of superior information, not only to the average investor but also to the ordinary insider. We believe that to get a better understanding of the result, an extension would be to separate insiders for both position and sector.

The literature has investigated the abnormal return for insiders in different position in the firm. Wang, Shin and Francis (2012) investigated the difference in abnormal return for CEOs and CFOs. Despite arguing that CEOs are the most important executive in the firm, they found that CFOs are better informed about future earnings. In fact, over a 12-month period CFOs outperform CEOs by 5%.

As Morgan (2002) reasoned, the disagreement between bond rates indicates that firms in the financial sector are less transparent than firms in other sectors. This gives reason to believe that the private information of insider trades is more valuable in some sectors than others. Insiders in some sectors might generate a higher return as they help the market to the correct price.

Jaffe (1974) was one of the first that constructed a subgroup of insider trades. By constructing an intensive trading sample, consisting of firms with 3 to 5 more buy than sell transactions and a holding period for 8 months. He found that all insiders possess private information, however, only the subgroup of intensive trading were able to earn abnormal return after transaction cost. Also Gelband (2005) tested whether outsiders could earn abnormal return by following the most valuable

subgroups of insider transactions. He found substantial evidence for outsiders' possibility to earn abnormal return.

Time horizon

Compared to existing research we apply a rather long-term analysis of abnormal return. We believe that insiders are long term investors and therefore trade on inside information with price impact further in the future. The use of long horizon is supported by Piotroski and Roulstone (2005) which stated that:

“The use of a long measurement window increases the odds that our sample captures both the performance signals being used by insiders and the transaction themselves”

Ke, Huddart and Petroni (2003) finds that insiders trade as long as 2 years prior to an economically significant event, to profit from their information. This gives support to our beliefs that insiders make a transaction on the basis of long-term factors. Additionally, they find indications that insiders don't actively use their private information short-term as insiders have a desire to prevent the appearance of exploiting private information. Insiders still profits from their private information, however, they shift their trades to an earlier time. Both Elliot, Morse and Richardson (1984) and Beneish and Vargus (2002) find supporting results when investigating the long term effects of insider trading.

Articles that use a shorter time frame investigates the price effects surrounding the time of announcement, and how the private information is implemented into prices. This approach fits articles like Seyhun (1998), where the motive is to investigating market efficiency, regulations and violations. We argue that we can give a conclusion on market efficiency with our time horizon. If the market efficiency theory holds, the abnormal return generated by the insider trade should be zero after the information has reached the market, regardless of the time horizon.

Market Efficiency

How the market absorbs the information of an insider transaction closely relate to the market efficiency hypothesis, a cornerstone of modern financial theory. As Fama (1965) stated:

“In an efficient market, competition among the many intelligent participants leads to a situation where, at any point in time, actual prices of individual securities already reflect the effects of information based both on events that have already occurred and on events which, as of now, the market expects to take place in the future.”

Insiders should therefore not be able to earn abnormal return when the strong-form holds, as their private information already is reflected in the stock price.

Lin and Rozeff (1995) found that on average, up to 88% of the private information to be reflected in the stock price within one trading day, supporting evidence for the strong-form efficiency. Eckbo and Smith (1998) also finds supporting evidence to the strong-form. By applying a time-varying expected return setting, they document zero abnormal performance by insiders.

Contradicting to the result of Lin and Rozeff (1995), the majority of research finds evidence that insiders make abnormal profit, giving support to the semi-strong form. By estimating the return for insider trades over a 6-month period, Jeng, Metrick and Zeckhauser (2003) found that insiders earn abnormal return of 6%, which is similar to what Finnerty (1976) found. Beneish and Vargus (2002) finds supporting evidence that insiders' abnormal return was explained by their private information of economic factors of their firms. Givoly and Palmon (1985) investigated when the abnormal return accumulated, and found evidence suggesting that the abnormal return endured beyond the time of disclosure.

A part of the existing literature finds evidence that even the semi-strong form of efficiency is broken. Jaffe (1974) was one of the first that found evidence for profitable outsiders by following insider trades. Further, Baesel and Stein (1979) also found the return to accumulate several months after the inside trade, giving outsiders the opportunity to profit. Later, Bettis, Vickrey and Vickrey (1997)

found supporting evidence. As the market then is not efficient with respect to all publicly available information, it is in the weak form of efficiency.

Methodology

There are several methods for measuring abnormal return. When trying to find the best fit for both our time horizon and objective, we have considered both the intensive trading method, performance evaluation and an event study. They are all appropriate for estimating abnormal return, however with some different drawback and applicability as described in Jeng, Metrick and Zeckhauser (2003).

Choice of model

Intensive-trading

In addition to assess insider trades, the intensive-trading method have an additional criterion for inclusion. These criteria often relate to net buy transactions over a given period, i.e. only firms with 3 more buy- than sell-transactions are included in this month's portfolio.

This is a good way to provide outside-investors with buy and sell signals. The biggest drawback for the intensive-trading method is the potential loss of return. As the filter criterion need a period to end before including the right stocks, the return that follows the days after transaction will possibly be lost.

Performance-evaluation

In the performance-evaluation method, abnormal return is measured through the construction of a portfolio. Transactions are placed in a portfolio on the day after the actual trade occur and are held over a specific period. The abnormal return is measured as the stock return minus the market return.

The advantages with the performance-evaluation is firstly that all abnormal return is included in the analysis, as the stock gets included right after the actual trade. Additionally, it allows us to adjust for style and decompose by time horizon and firm characteristics.

The performance method will give us a wrong conclusion due to our need to separate for sectors. If we compare a portfolio consisting of firms in only one sector to the broad market index, the underlying risk would not be the same. This means that the sector portfolio is expected to yield a higher or lower return than the market.

As we need to be able to separate for sectors, the use of a broad market index creates an issue. The underlying risk in one sector would not be equal to the index, and they should therefore yield different returns. We then interpret a higher abnormal return as superior information instead of a higher risk measure. A possible solution could be to compare the sector portfolio to a sector-index. However, we then have the risk of benchmark contamination which is described by Loughran and Ritter (2000):

“A test is biased towards high explanatory power and no abnormal returns if it uses a benchmark that is contaminated with many of the firms that are the subject of the test. In the limit, the minimum power test is when the benchmark is composed of the same firms, with the same weights, as the sample being tested. If this is true, there will always be zero abnormal performance”.

This problem will be critical on a small exchange like Oslo stock exchange as some stocks are the sole driver of sectors. I.e. when considering insiders from Telenor, the return would be almost exactly like the sector-index, as the correlation between the index and Telenor is 91%.

Event study

The classic event study described by MacKinlay (1997) is used for measuring the effect of an economic event on the value of the firm. By estimating past risk-factors we find expected return of a security over a period which will be compared to actual returns.

The event study dominates the empirical research for corporate finance (Campbell, Lo, MacKinlay, & Whitelaw, 1998). These studies focus on abnormal

return around a date of announcement. Hence, one of the criteria for a successful event study is the ability to identify precisely the date of event. As stated in Jeng and Zeckhauser (2003), an event study comes with some statistical difficulties. With a long time-horizon, the result is quite sensitive to the expected return estimation. As stated by Eckbo (2008):

“...risk-adjusted return measurement is the Achilles heel for long time horizons for at least two reasons. First, even a small error in risk adjustment can make an economically large difference when calculating abnormal returns over horizons of one year or longer, whereas such errors make little difference for short horizons. Thus, the precision of the risk adjustment becomes far more important in long-horizon event studies. Second, it is unclear which expected return model is correct, and therefore estimates of abnormal returns over long horizons are highly sensitive to model choice”.

Conclusion

Of the three methods, we find the event study to be the best fit for our analysis. As we need to capture the information of the insider, we need to be able to include the trading day, we therefore find the intensive trading method to be unsuitable. The performance approach is not appropriate for us to use as we most likely will miss-interpret the result and end up with a wrong conclusion due to benchmark contamination.

We are in the upper range when considering our time horizon to the applicability for an event study. As stated by Eckbo (2008), a one-year event study is just within the workable time period for an event study, without too serious statistical challenges. By using this method, we can use a very precise date of event, which allows us to capture all the information that the insider is trading on.

To better adjust for the stock characteristics, we can use factors that are better suited for the Norwegian market. We use a three-factor model containing the market, a size factor and a liquidity factor. We choose these factors, as Skjeltnor,

Næs and Ødegaard (2011) find that these provide the best fit for the Norwegian stock returns.

Event study

MacKinlay (1997) defines an event study as a statistical method used for measuring the effect of an economic event on the value of firms.

Procedure for an Event Study

- i. Event definition
- ii. Estimation expected returns
- iii. Define estimation window
- iv. Estimation procedure
- v. Testing procedure

Event definition

The event of interest is the reported insider transactions on the Oslo Stock Exchange. We want to investigate whether insiders are able to predict long-term stock price movements as argued in the literature review. We are therefore using a relatively long event window of 250 trading days. This is similar to other articles with a related motive as us, like Baesel and Stein (1979), Givoly and Palmon (1985) and Wang, Shin and Francis (2012)

Insiders must disclose their trade at the latest 9 am the following day of the trade. Therefore, to capture the insider returns, we include the day before the disclosure of transaction in the event window. As a result, we will use an event window from $t = -1$ to $t = 249$.

Estimation of expected return

The event study is sensitive to estimation, as illustrated by Rozeff and Zaman (1988). They introduce a method where they applied factors as market value of equity and e/p ratio. The abnormal return decreased substantially when implementing the new factors, in fact outsiders were no longer profitable by

following insider trades. Lakonishok and Lee (2001) finds supporting evidence for firm size factor. In their sample, insiders' intensive buying was usually for small firms. Their abnormal return was reduced to half when adjusting for the B/M factor, showing the sensitivity of estimation-error in these studies.

To get a more accurate estimation of the expected return, we want to expand the single factor model to a multifactor model. We choose to deviate from the standard three factor model presented by Fama (1993) which normally is used. Instead we use a three-factor model containing the market, a size factor and a liquidity factor. We choose these factors, as Skjeltorp, Næs and Ødegaard (2011) find that these factors provide the best fit for the Norwegian stock returns.

$$R_{it} - R_{ft} = \alpha_{it} + \beta_{it}(R_{mt} - R_{ft}) + s_{it}SMB_t + l_{it}LIQ_t + \varepsilon_{it} \quad (1)$$

$$E(\varepsilon_{it}) = 0 \quad (2)$$

$$var(\varepsilon_{it}) = \sigma_{\varepsilon_i}^2 \quad (3)$$

In this equation, R_{it} are the period-t return on security i , R_{mt} is the return of the market portfolio, while ε_{it} is the zero-mean disturbance term. Further, SMB is the difference between the returns on diversified portfolios of small and big stocks and LIQ is a liquidity index. β_{it} , s_{it} and l_{it} are slopes in the multiple regression.

$$\hat{\alpha}_i = \hat{\mu}_i - \hat{\beta}_{it}\hat{\mu}_i - \hat{s}_{it}SMB_t - \hat{l}_{it}LIQ_t \quad (4)$$

$$\hat{s}_i = \frac{\sum_{\tau=T_0+1}^{T_1} (R_{i\tau} - \hat{\mu}_i) (SMB_{m\tau} - \hat{\mu}_m)}{\sum_{\tau=T_0+1}^{T_1} (SMB_{m\tau} - \hat{\mu}_m)^2} \quad (5)$$

$$\hat{l}_i = \frac{\sum_{\tau=T_0+1}^{T_1} (R_{i\tau} - \hat{\mu}_i) (LIQ_{m\tau} - \hat{\mu}_m)}{\sum_{\tau=T_0+1}^{T_1} (LIQ_{m\tau} - \hat{\mu}_m)^2} \quad (6)$$

$$\hat{\beta}_i = \frac{\sum_{\tau=T_0+1}^{T_1} (R_{i\tau} - \hat{\mu}_i) (R_{m\tau} - \hat{\mu}_m)}{\sum_{\tau=T_0+1}^{T_1} (R_{m\tau} - \hat{\mu}_m)^2} \quad (7)$$

We find the parameters by applying the OLS-regression which gives us the exposure to each risk factor.

Define estimation window

The estimation window is the period prior to the event window and is used for estimating expected return. The event window is not included to prevent the event from interfering with the expected return parameters.

There are both advantages and disadvantages by choosing a long estimation window. The disadvantage with using a longer estimation window is the lack of “fresh” data, but it reduces the possibility of estimating the parameters with random variation. We find it reasonable to choose the same estimation window of 250 days as MacKinlay (1997), Givoly and Palmon (1985) and Seyhun (1986).

Estimation procedure

The abnormal return is the actual ex post return of the security over the event window minus the expected return over the same period. The expected return is defined as the estimated return without conditioning on the event taking place. Using the factor model presented by Skjeltop, Næs and Ødegaard (2011) to measure the expected return, the sample abnormal return is:

$$AR_{i\tau} = R_{i\tau} - (Rf_t + \hat{\alpha}_i + \hat{\beta}_i R_{m\tau} + \hat{s}_i SMB_\tau + \hat{l}_i LIQ_\tau) \quad (8)$$

The abnormal return is the disturbance term of the model. Under the null hypothesis, conditional on the event window market returns, the abnormal returns will be jointly normally distributed with a zero conditional mean and conditional $\sigma^2(AR_{i\tau})$ variance.

The average abnormal returns are then calculated as:

$$\overline{AR}_{i\tau} = \frac{1}{N} \sum_{i=1}^N AR_{i\tau} \quad (9)$$

Testing the Hypothesis:

To test the information asymmetry between the Exogenous and Endogenous groups, we use a two-sided t-test where we assume unequal variance:

$$T = \frac{(\overline{AR}_1 - \overline{AR}_2) - (\overline{\mu}_1 - \overline{\mu}_2)}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}} \quad (10)$$

AR_i is the cumulative abnormal return for the two subsets i , whereas μ_i is the expected cumulative abnormal returns for the insiders. σ_2^2 is the variance, while n_i is the number of observations. The test statistic distribution is approximated as an ordinary t-distribution with the degrees of freedom calculated using:

$$v = \frac{\left(\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}\right)^2}{\frac{\left(\frac{\sigma_1^2}{n_1}\right)^2}{n_1 - 1} + \frac{\left(\frac{\sigma_2^2}{n_2}\right)^2}{n_2 - 1}} \quad (11)$$

Sectors and Classifications

We are using the Oslo Stock Exchange industry classification to differentiate between sectors¹. This classification is based on the Global Industry Classification Standard where both the source of earnings and market perception are recognized factors. Definitions and distribution of each sector can be found in the appendix.

We will use these classifications to allocate each firm into its adjoining sector. Then we divide sectors into two groups, Exogenous and Endogenous. The first group contains insiders in sectors where exogenous factors steer much of the stock price, while the second group has insiders in sectors with low exposure towards these factors.

We categorize Financial, Health Care, Information Technology, Telecommunications Services, Utilities and Consumer Discretionary as the Endogenous sectors. In the Exogenous group, we include Consumer Staples, Energy, Industrials, and Real Estate. We will make a more detailed elaboration about the sectors and our classifications below.

Exogenous Group

The Energy sector contains firms that are exposed to the entire supply chain for oil, gas, coal and fuels. In our data sample we find 80% of our transactions to be related to oil service and exploration. We find that this sector is heavily impacted by the oil price, as the GICS Energy Sector on Oslo Stock Exchange has a correlation close to 60% of the Crude Oil Brent according to our calculations.

Form the GICS classification, Consumer Staples is a sector that should be placed in the Endogenous group. Despite this, we include Consumer Staples in the Exogenous group due to the high concentration of companies that are exposed to seafood prices. In fact, close to 90% of all transactions can be classified as seafood-companies, whereas most of them are subject to the salmon price.

¹ https://www.oslobors.no/ob_eng/markedsaktivitet/#/list/shares/quotelist/ob/all/all/false

In our sample, firms in the Materials sector are mostly manufacturers of steel, paper, metals, fertilizers and aluminum. These are firms that are exposed to commodities in their production, either as revenue, costs or both. In example, Norsk Hydro has a correlation to the aluminum price of 92% according to Nordnet².

GICS classifies the Industrials sector to include manufacturers and distributors to a wide range of subcategories. In our sample over 40% of the trades comes from the marine and shipping firms with high revenue exposure towards shipping freight rates (Geman, 2009).

The last sector that we classify as Exogenous is Real Estate. In our data sample 80% of the trades is classified as Real Estate Operating Companies. These companies are acquiring and managing real estates. This makes them exposed to both real estate prices and rental prices. We do however see that this sector could be placed in the Endogenous group, and will present an alternative classification in the robustness of the results chapter.

In summary we include all the above mentioned sectors in the Exogenous group. We believe these are sectors with exposure towards exogenous factors which are steering the stock price.

Endogenous Group

Over 80% of our Health Care transactions consists of Biotechnology and Pharmaceutical companies, which are mostly related to discovery and development of drugs and are therefore mainly affected by firm related factors.

The Information Technology sector consist of a wide range of subsectors, where Internet Software Services and IT Consulting and Services dominates our data sample. These companies usually have cost arising from salary and delivers

² <https://blogg.nordnet.no/norsk-hydro-glem-tallene-rent-spill-pa-aluminium/>

services and not products and are therefore not affected by exogenous factors. The same can be said about the Telecommunications Services sector.

We also classify the Financials Sector as Endogenous as almost 60% of the transactions comes from Equity Certificates. These are banks with an indirect exogenous exposure, which results from default risk associated with lending to intermediaries with specific price exposures (Geman, 2009). Their customer base is mostly private customers with limited exposure towards businesses resulting in low exposure towards exogenous factors.³

The Utility sector consists of Electric and Power Producers. We argue that due to high restrictions in the market, their main income is the spread between producing power, and the spot price. Therefore, their main exposure is towards the economic cycle, as the demand for power might decline. We recognize that the Utility sector could be considered an exogenous sector, and will present an alternative classification in the robustness of the results chapter.

For our transactions in the Consumer Discretionary sector, over 60% comes from the subsectors Home Furnishing and Publishing and Printing. We find it reasonable to argue that these companies are mostly affected by the economic cycle, and not the commodity market.

We include all the above mentioned sectors in the Endogenous group. We believe these are sectors that are mainly affected by firm related factors. We will emphasize that while our Endogenous sector may be affected by exogenous factors in some way, we believe this exposure is neglectable. The main exposure of these companies are therefore the economic cycle.

³ <http://www.paretosec.no/aktuelt?itemId=Aktuelt:279>

Data

Insiders are operating in a highly regulated market due to the potential for exploiting superior information. An insider is therefore subject to certain requirements in respect of trading and reporting. Sections 4-2 and 3-6 of the Securities Trading Act⁴ requires all primary insiders to notify Oslo Stock Exchange of transactions in any financial instruments issued by the company. Following each transaction, the Oslo Stock Exchange release this information to the public through their database “NewsWeb”.

Data Source

We have received insider-transaction data from Oslo Stock Exchange, containing all publications of insider transactions on NewsWeb from 2008 until December 2016. From the data we have extracted the date of disclosure, purchase price and transaction amount. Stock- and index-prices are extracted from OBI Financial data at BI Norwegian Business School.⁵

Selection Criteria

We are investigating both buy- and sell-transactions on the Oslo Stock Exchange. To avoid biased results, multiple transactions within a firm on the same day are accumulated to one transaction. Further, we have excluded Oslo Axess which has a low correlation with the Oslo Stock Exchange All Share Index. If we include these, they would lead to biased estimates of expected return.

As we are interested in capturing the information that insiders possess, we include both stocks and equity certificates. We exclude all other instruments, as they are more likely to be exercised due to institutional factors rather than as a result of special information (Jaffe, 1974). Due to similar argumentation we are also excluding employee stock programs.

We include equity certificates, as they have clear similarities to stocks. We argue that insiders are in the same position regarding information flow as with regular

⁴ https://www.oslobors.no/ob_eng/Oslo-Boers/Trading/Market-surveillance/Insider-trading

⁵ http://finance.bi.no/~bernt/obidata/obidata/equity_prices/all_data.html

companies. The main differences lie in their owners' rights to the asset and influence over the companies governing bodies⁶.

⁶ <https://www.sparebankforeningen.no/en/egenkapitalbevis/about-equity-certificates/>

Description of the data

When separating for each sector we see that some have few observations and are of little value when it comes to testing. When adding each sector into the Exogenous and Endogenous group, we get a higher number of observations, leading to more robust results. We therefore believe that the two categories are suitable for testing.

In total our sample consists of 3456 number of trades which are well balanced between the Endogenous and the Exogenous group. The Endogenous group contain 1519 trades, where the Finance sector is the biggest with roughly 35% of the trades.

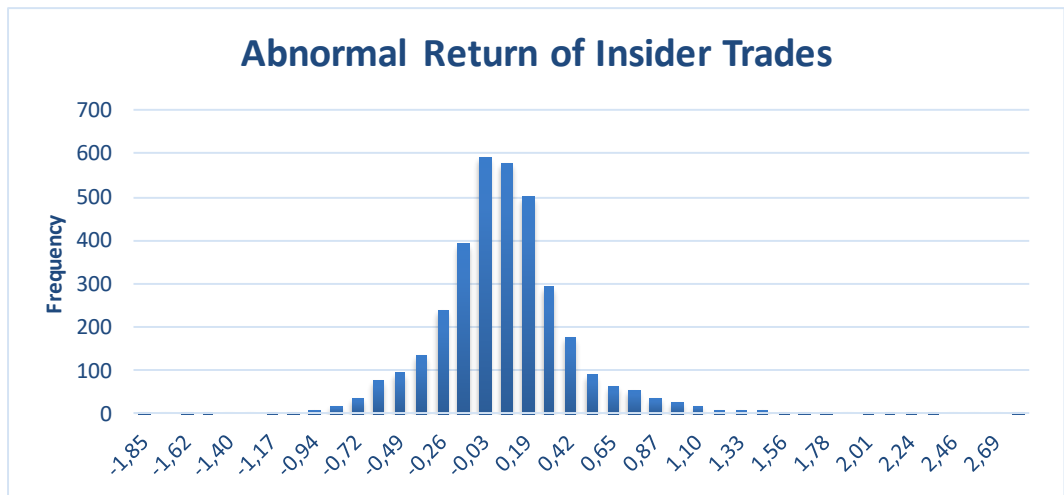
<i>Total data sample</i>			
Industry	No. of Trades	Industry	No. of Trades
Endogenous		Exogenous	
Consumer Discretionary	272	Consumer Staples	267
Finance	526	Energy	793
Health Care	120	Industrials	516
Information Technology	464	Material	167
Telecommunications Services	80	Real Estate	194
Utilities	57		

The Exogenous group contain 1937 trades, where the Energy sector is the biggest with 40% of the trades. This makes our results quite sensitive towards both the Finance and the Energy sector, which will have a big impact on our results.

Out of the total 3456 trades, 2782 where buys, and 674 where sell transactions. The balance between the Endogenous and the Exogenous sectors remain fairly balanced, even after the separating between buy and sell transactions.

<i>Sample size</i>			
	Total	Buy	Sell
Endogenous	1519	1200	319
Exogenous	1937	1582	355
Total	3456	2782	674

When looking at our abnormal return graphically, we find similar results as Felipe Aparicio and Javier Estrada (2001). They show that predicting errors can be very large, particularly in the tails, and that the normal distribution, unlike the scaled-t distribution, consistently underestimates the probability of both positive and negative large returns.



Findings

We have divided our findings into the two motives, profit and science (Jeng et al., 2003), which we introduced in the motivation chapter. First, we present our result regarding the profit motive. We then discuss and connect our result to the existing literature. Lastly, we present our result on the science motive in the same manner.

Profit

Exogenous vs Endogenous – Results

To test our hypothesis, we investigate the difference in abnormal return generated by our two groups, Endogenous and Exogenous. We find that the insiders as we classify as Endogenous outperformed the Exogenous insiders by 5.85%. The result is statistically significant on a 1% level and are in support of our hypothesis. The Endogenous group yields an abnormal return of 4.52%, while the Exogenous group yields a negative abnormal return of 1.34%.

Categories		
	Total AR	No. Of Trades
Endogenous	4,52 %	1519
Exogenous	-1,34 %	1937
Diff	5,85%***	3456

*** Significant on a 1% level

** Significant on a 5% level

* Significant on a 10% level

In the Endogenous group, Health Care is the sector that performs the best with an abnormal return of 10.12%, while Telecommunications Services is the weakest performer with an abnormal return of 2.27%. However, both groups have a low number of observations compared to the financial sector which has the biggest impact on the Endogenous return with an average return of 4.77%.

Endogenous sample		
Industry	AR	No. of Trades
Consumer Discretionary	4,41 %	272
Finance	4,77 %	526
Health Care	10,12 %	120
Information Technology	2,75 %	464
Telecommunications Services	2,27 %	80
Utilities	8,43 %	57

Consumer Staples is the Exogenous sector with the highest abnormal return of 6.45%. The biggest driver of the negative return is unquestionably the Energy sectors which yields a negative abnormal return of 4.64%, followed by Real Estate with a negative abnormal return of 3.77%.

<i>Exogenous sample</i>		
Industry	AR	No. of Trades
Consumer Staples	6,45 %	267
Energy	-4,64 %	793
Industrials	-1,07 %	516
Material	3,90 %	167
Real Estate	-3,77 %	194

Exogenous vs Endogenous - Discussion

For our two categories, Endogenous and Exogenous, we find results suggesting that the Endogenous insiders truly have superior predictability compared to the Exogenous. Our finding of subgroups that are generating abnormal return is a violation of the random walk theory (Fama, 1965). Our result is strengthened as all the Endogenous sectors yields a positive abnormal return, meaning that no sector is the sole driver of return. The result is not as clear for the Exogenous group. Although 3 out of 5 sectors yields a positive abnormal return, the driver of return lies in the two worst performing sectors.

The discovery of profitable subgroups is not new to the research. Baesel and Stein (1979) concluded that bank director was in a position to make a higher abnormal return than the average insider. The role might have an impact, but our results suggest that most of the superior information lies in the sector. Despite not looking at roles, our findings indicate that the result of Baesel and Stein (1979) would have been different if bank directors was substituted with Energy directors.

We contribute to the literature by recognizing the sector-impact on the abnormal return for insiders. Over the different sectors we find the return to be highly fluctuant and research that only observes the average insider will therefore not grasp the complete dynamics of insider return. We reason that an Endogenous insider only need to predict firm-related factors, while an Exogenous insider

would additionally have to predict the exogenous factor that affects the stock price. Since insiders don't have any private information about commodities, the Exogenous insiders might not get as much paid for their information.

Our separation of sectors is challenging a lot of existing literature as we find groups of insiders that are yielding a negative abnormal return. We have yet to discover literature that suggests that some insiders are generating negative abnormal return on average. We have similar results as the literature when it comes to the average investor, and believe the lack of diversification of the data is the reason this has not been discovered yet. Even though our results challenge the existing literature, we find our results reasonable given our argumentation regarding prediction of exogenous factors.

Buy- and sell-transaction - Findings

When isolating buy transactions, we find the Endogenous insiders outperformed the Exogenous insiders by 9.43%. The difference is statistically significant at the 1% level and is in support of our hypothesis. The Endogenous group yields an abnormal return of 6.43% while the Exogenous group yields a negative abnormal return of 3.00%.

Industry	Buy AR	Sell AR
Endogenous	6,43 %	-2,68 %
Exogenous	-3,00 %	6,09 %
Difference	9,43%***	-8,77**

When isolating sell transactions, we find a contrary result regarding the difference in return. The Exogenous group outperformed the Endogenous by 8.77%, which is statistically significant on a 5%-level. The Endogenous group yields a negative abnormal return of 2.68%, while the Exogenous group yields a positive abnormal return of 6.09%.

The difference between buy and sell transactions is mostly explained by the Energy sector, which yields an abnormal return of 14.21%. For the Endogenous sectors, the Finance sector has shifted from positive to negative abnormal return.

This have a big impact on the difference, as the Finance sector is the biggest sector within the Endogenous sectors.

Buy- and sell-transaction - Discussion

As Baesel and Stein (1979) argued, there are other reasons for sell- than buy-transactions, which should lead sell trades to be less

Total Sample	
Buy Transaction	1,07 %
Sell Transaction	1,94 %

profitable. While short selling is not allowed, sell-transactions are stimulated by other factors, i.e. liquidity needs. Further, top executives are frequently compensated with options and unrestricted shares, suggesting the need to be net sellers over time (Wang et al., 2012). We have also seen by our extensive work with the NewsWeb-messages that it is not unusual for top executive to sell their holdings once leaving the firm. Employee-stock-program is not included in our thesis, hence buy transactions are therefore rarely stimulated by other reasons than profit.

From our total sample we find sell trades to be more profitable than buy trades. We are surprised about the conflicting result on buy- and sell-trades. Despite our intuitions telling us this is strange, our results is consistent with both Eckbo and Smith (1998), Seyhun (1998), Finnerty (1976) and Givoly and Palmon (1985). Further investigation shows us that this anomaly could be a result of our estimation method. Eckbo and Smith (1998) found the same results as us with the standard event study, but when using a time varying expected return, they find that the sell transactions abnormal return disappears.

The buy transactions demonstrate that Endogenous firms are able to identify and time favorable situations. However, their predictability completely disappears when it comes to sell transactions. The total opposite conclusion is true for the Exogenous firms, which seems capable of timing unfavorable situations. This is somewhat consistent with Wang, Shin and Francis (Wang et al., 2012) who finds CFO's to outperform the CEO's when observing buy transactions. When observing sale transactions, they find the opposite results.

Transaction Size - Findings

We have divided the sample by transaction size to identify different investor types. Our goal is to isolate the insiders trading for profit. We argue that big insiders in a firm might have other reasons for trading than for profit, and that small insiders might possess less information.

The first group is containing transactions from 0 – 100 000. The second is containing transaction between 100 000 and 10 million, while the third contains trades from 10 million and above.

In all three classes we find Endogenous to outperform Exogenous. For both the Small and Medium transaction size we find the difference in abnormal return to be slightly above 6% in favor of the Endogenous group. The difference between the groups drops to 3.12% when considering the large transactions.

Transaction Size			
	Small < 100.000	Medium 100.000 - 10 M	Large > 10M
Endogenous	3,09 %	5,85 %	-0,38 %
Exogenous	-3,44 %	-0,36 %	-3,50 %
Weighted Avg	0,17 %	2,10 %	-2,49 %
Diff	6,53 %	6,21 %	3,12 %

We have done further investigation by separating into smaller intervals of the Medium group. We still find that the Endogenous group outperforms the Exogenous, while the most informative trades lie in the interval between 1 and 5 million. Both groups yield a positive return, where the Exogenous group have an average abnormal return of 6.2% and the Endogenous 0.53%. Note that this analysis suffers from a low number of observations, and hence lower robustness.

Transaction Size - Discussion

The finding that the large class of insiders yield poorer returns than the average insider is not new to the literature as both Lorie and Niederhoffer (1968) and Givoly and Palmon (1985) have found similar results. We argue that the largest insiders might have other intentions with their trades than just exploiting their

private information. It is likely that larger insiders are requirement to emphasis corporate governance factor, i.e. purchase stocks to obtain controlling power.

When considering our overall results regarding transaction size, we find that the Endogenous group outperforms the Exogenous group in all transactions sizes. Insiders in the Small class are on average not able to earn abnormal return when taking transaction costs into account (Gelband, 2005). We do find however that the Endogenous insiders in the Small group are relatively equal to the average insider, where they are able to earn abnormal return, but that outsiders are unable to follow them and yielding abnormal return.

The discovery that the Medium class are the class who possess the best predicting power of the three classes gives some us some confirmation of our preexisting beliefs. We agree with the discussion from Givoly and Palmon (1985), which argued that larger transaction is more likely to be stimulated by inside information. The possession of large inside information should therefore result in a higher stake made by the insider. When considering the discussion in the paragraph above, we argue that if the insider trade for profit, the more they invest the more information they have about the direction of the stock.

Science

Previous research on insider trading has differed in conclusion on market efficiency hypothesis, where support for all three forms have been claimed.

When considering all insider trades, without separating between them, we find an abnormal return of 1.24%. If an outsider where to follow these trades, much of the rather small abnormal return would most likely already be realized in the stock prices (Givoly & Palmon, 1985). If we had stopped our analysis on insider trading on the average insider, the result would be in support of the semi-strong form.

We find groups of insiders that earn a high abnormal return when investigating subgroups. In example, if the outsiders where to follow the buy trades of the

Endogenous group, our results suggest that they can earn abnormal return. The conclusion stands even after adjusting for transaction costs and the reaction of the disclosure itself (Jana, Goergen, & Renneboog, 2006).

Insiders as well as outsiders are in fact able to earn abnormal return on the private information, our results support the weak-form efficiency as the market don't absorb the information once a trade is made public.

Our results on the average insider, as well as the subgroups receives support from Jaffe (1974) when it comes to in- and outsiders. From his total sample Jaffe finds the average insiders to be in possession of special information. While outsiders would not earn abnormal return, supporting the semi-strong form of efficiency. However, for his subgroup with intensive trading sample findings support the weak form of market efficiency as outsiders are able to profit from insider trades.

Another argument for different conclusions regarding market efficiency is presented by Eckbo and Smith (1998). They found inconsistently result compared to the majority. They argument that expected return and risks vary over time. By using three alternative performance estimators in a time-varying expected return setting, they document that the abnormal return is a result of measurement error, and not due to superior information. Which gives support to the strong-form efficiency.

Robustness of the results

Estimation error

A main challenge for obtaining correct results, is to estimate a correct expected return. As we are separating the sectors into Exogenous and Endogenous sectors, our results could get a potential bias if our factor model is better at capturing changes in stock prices in specific sectors. Due to our long time-horizon, our results are particularly sensitive to even small estimation errors.

Factor model

As previously discussed, an event study is sensitive to estimation. When Rozeff and Zaman (1988) and Lakonishok and Lee (2001) included new factors in their model, they found the abnormal return to decrease substantially. To observe the sensitivity of our model, we have done an analysis with a one factor model (Fama & French, 1993). When using the one factor model we find the average insider to yield an abnormal return of 2.25% which is approximately 1% higher than with our three factor model. We also find less volatility in our sector returns. This gives us confidence that we are able to capture more of the underlying risk in the data using the factors provided by Skjeltorp, Næs and Ødegaard (2011).

Return over time

To get a better understanding of the robustness of our results, we divide the data in two sample periods, one from 2008 until 2012 and one from 2013 until 2016. The sample containing data from 2008 to 2012 gives us a difference of 1,77% in favor of Endogenous group. While the difference supports our hypothesis, the result is not significant.

	2008 - 2012		2013 - 2016	
	Total AR	No. of Trades	Total AR	No. of Trades
Endogenous	2,40 %	889	7,50 %	630
Exogenous	0,63 %	1132	-4,11 %	805
Diff	1,77 %	2021	11,61%***	0

In the sample containing data from 2013 to 2016 we find a considerable difference of 11,61% in favor of the Endogenous group, which is statistically significant on a 1% level. The difference between the two time-periods is heavily affected by the Energy sector which yielded a negative return of 15.63%. Further investigation shows us that the negative returns from the Energy sector is concentrated in buy-transactions around 2014. We find this reasonable as the Energy stock prices in that period took a serious hit after severe drop in oil price in the mid of 2014. If we exclude the data from the oil crisis, we do however find the same pattern as described earlier.

The Endogenous group outperforms the Exogenous group in all time periods, except for the years 2011 and 2012. This is years where the Energy Sector performed extremely well, and consequently pushed the average abnormal return for the Exogenous group up.

Stability of returns

When exploring the stability of return for each sector, we find the most consistent performers to be Consumer Discretionary and the Consumer Staples, both performing above the average in 7 out of 9 years. The two worst performers are the Energy and the Real Estate Sector, where both are performing below average in 7 out of 9 years.

When examining the volatility of abnormal returns, we find that both groups have the same standard deviation. This is a good confirmation that the model is capable of estimating risk across the different sectors. As expected, Health Care has the highest standard deviation of return, while the Utilities sector has the lowest. With both high and consistent return, Utilities looks like the most attractive sector to follow. On the downside, Utilities suffers from a low number of observations, making the result less reliable.

Classification of Exogenous and Endogenous sectors

As discussed in the sectors and classifications chapter we have examined the sensitivity of our group construction. It could be argued that Real Estate and Utilities should change groups. As they are now, both are increasing the difference between the Exogenous and the Endogenous group.

By placing Real Estate in the Endogenous group, and the Utilities in the Exogenous group we find the Exogenous sector yield a negative return of 0.91% and the Endogenous group to yield an abnormal return of 3.72%. The difference is then 4.63%, which is still significant on a 1% level. Hence, our conclusions would be the same, even after the reclassification.

<i>Robustnes of Classification</i>		
	Original AR	Alternative AR
Endogenous	4,52 %	3,72 %
Exogenous	-1,34 %	-0,91 %
Diff	5,85%***	4,63%***

Bias Transactions.

A drawback of our model is that the companies in which there are insider trades is not equally distributed. Consequently, a company in which there are many trades will have a higher weight of the average abnormal return compared to a company with a few number of trades. This clustering has the potential to create biased estimates which could affect our results and conclusions

The same drawback applies for each sector since there are an uneven distribution of sectors in which there are insider trades. As discussed above we could get a potential bias if the factor models don't capture the effects of each sector equally good.

Further, if there are several trades within a short time period in one company, the same abnormal returns are added repeatedly. Hence, these companies will have a higher influence on the insider portfolio. We have aggregated the trades that fell on the same day and aggregated the most extreme cases where there where

transactions within the same two weeks. Due to the long event window, we choose not to adjust trades that are in the same event window, as we would lose too much data to make any robust conclusions.

Survivorship bias

Our event study is vulnerable to survivorship bias. As we require in total two years of data, any company that gets taken of the exchange during that period is excluded from our sample. This can result in an overestimation of return as firms with an extremely negative return, like firms that goes bankrupt, gets removed from the model. This is a problem for us due to our long horizon.

Conclusion

In this master thesis we have tested whether information asymmetry varies between insiders in different sectors on the Oslo Stock. We applied the industry classification GICS to allocate each insider transaction into their respective sector. Further, we have recognized the nature of each sector and merged them into two new sector-groups; Endogenous and Exogenous. The Exogenous group contains sectors that is exposed to exogenous factors, while the Endogenous group has a low exposure towards these factors.

We apply a long-term event study of one year, where we investigate the abnormal return of the two groups. As estimation is critical in a long-term event study, we have controlled for estimation error with a factor model containing factors that Skjeltnor, Næs and Ødegaard (2011) have shown to be the best fit of the Norwegian market.

Our five main results:

- On average sell transactions are more profitable than buy transactions.
- What we classify as the middle transaction size is the most profitable.
- We find support to the weak-form efficiency
- We find groups of insiders yielding negative abnormal return
- We find that the sectors we classify as Endogenous have superior timing and predictability compared to the average- as well as the Exogenous insider.

Our first result shows that insiders are better at predicting unfavorable than favorable situations for the firm, which is supported in the literature. We find this somewhat surprising, as there should be other reasons for selling than simply profit, like the need for liquidity.

When considering our second result, we argue that that as long as the insider trade for profit, the more they invest the more information they have about the direction of the stock. We argue this, as the largest insiders might have other intentions with their trades than just exploiting their private information. It is likely that larger insiders are requirement to emphasis corporate governance factor, i.e. purchase stocks to obtain controlling power.

The third result both contradicts and support existing literature as discussed in the findings chapter. We find that the strong-form of efficient market is violated as insiders are able to earn abnormal return. Further, based on the degree of abnormal return we also find violations of the semi-strong form as outsiders are able to earn abnormal return by following insiders. Hence, the market is not able to absorb all the information that an insider transaction reveal. Our result is then in support of the weak-form efficiency.

Our fourth result challenges a lot of the existing literature, as we find insiders in sectors that are yielding a negative abnormal return. We have similar results as the literature when it comes to the average investor, and believe that the lack of separation of the data is the reason this has not been discovered yet. We find our separation and result reasonable given our argumentation regarding prediction of exogenous factors.

The fifth result is new to the literature as sectors seems to have a large impact on insider return. Our result finds strong evidence in support of our hypothesis, as the Endogenous group outperformed the Exogenous group 5.85%, the gap increases to 9,43% when observing only buy-trades. We find the Finance sector to be the biggest driver for the Endogenous group, while the Energy sector is the biggest driver for the Exogenous group.

Our conclusion on information asymmetry could nevertheless be a misinterpretation of our results. If insiders in one sector is better than the other at predicting stock prices, we conclude that insiders in the sector have more private information. However, while the Endogenous insiders only need to predict firm-related factors, the Exogenous insiders must in addition predict commodity prices. As insiders don't possess private information about commodities, Exogenous insiders don't get paid as much for their information as Endogenous insider.

We can conclude that insiders in some sectors have a higher ability to earn abnormal return. However, we cannot conclude if it is due to a different level of information or that some sectors are just more sensitive to the private information that insiders possess.

Appendix

Definitions - Global Industry Classification Standards⁷

Energy Sector: The Energy Sector comprises companies engaged in exploration & production, refining & marketing, and storage & transportation of oil & gas and coal & consumable fuels. It also includes companies that offer oil & gas equipment and services.

Materials Sector: The Materials Sector includes companies that manufacture chemicals, construction materials, glass, paper, forest products and related packaging products, and metals, minerals and mining companies, including producers of steel.

Industrials Sector: The Industrials Sector includes manufacturers and distributors of capital goods such as aerospace & defense, building products, electrical equipment and machinery and companies that offer construction & engineering services. It also includes providers of commercial & professional services including printing, environmental and facilities services, office services & supplies, security & alarm services, human resource & employment services, research & consulting services. It also includes companies that provide transportation services.

Consumer Discretionary Sector: The Consumer Discretionary Sector encompasses those businesses that tend to be the most sensitive to economic cycles. Its manufacturing segment includes automotive, household durable goods, leisure equipment and textiles & apparel. The services segment includes hotels, restaurants and other leisure facilities, media production and services, and consumer retailing and services.

Consumer Staples Sector: The Consumer Staples Sector comprises companies whose businesses are less sensitive to economic cycles. It includes manufacturers and distributors of food, beverages and tobacco and producers of non-durable household goods and personal products. It also includes food & drug retailing companies as well as hypermarkets and consumer super centers.

Health Care Sector: The Health Care Sector includes health care providers & services, companies that manufacture and distribute health care equipment &

⁷ <https://www.msci.com/documents/10199/4547797/GICS+Sector+definitions-Sep+2016.pdf/7e5236a8-2ddd-4e29-a8bf-18f394c7f0fb>

supplies, and health care technology companies. It also includes companies involved in the research, development, production and marketing of pharmaceuticals and biotechnology products.

Financials Sector: The Financials Sector contains companies involved in banking, thrifts & mortgage finance, specialized finance, consumer finance, asset management and custody banks, investment banking and brokerage and insurance. It also includes Financial Exchanges & Data and Mortgage REITs.

Information Technology Sector: The Information Technology Sector comprises companies that offer software and information technology services, manufacturers and distributors of technology hardware & equipment such as communications equipment, cellular phones, computers & peripherals, electronic equipment and related instruments, and semiconductors.

Telecommunication Services Sector: The Telecommunication Services Sector contains companies that provide communications services primarily through a fixed-line, cellular or wireless, high bandwidth and/or fiber optic cable network.

Utilities Sector: The Utilities Sector comprises utility companies such as electric, gas and water utilities. It also includes independent power producers & energy traders and companies that engage in generation and distribution of electricity using renewable sources.

Real Estate Sector: The Real Estate Sector contains companies engaged in real estate development and operation. It also includes companies offering real estate related services and Equity Real Estate Investment Trusts (REITs).

*Overview of Subsectors for the Exogenous group***Energy**

<i>Integrated Oil and Gas</i>	15	2 %
<i>Oil and Gas Drilling</i>	105	13 %
<i>Oil and Gas Equipment and Service</i>	416	52 %
<i>Oil and Gas Exploration and Production</i>	222	28 %
<i>Oil and Gas Storage and Transportation</i>	35	4 %
	793	100 %

Materials

<i>Aluminum</i>	19	11 %
<i>Construction Materials</i>	1	1 %
<i>Diversified Metals and Mining</i>	31	19 %
<i>Fertilizers and Agricultural Chemicals</i>	22	13 %
<i>Paper Production</i>	36	22 %
<i>Specialty Chemicals</i>	8	5 %
<i>Steel</i>	50	30 %
	167	100 %

Industrials

<i>Aerospace and Defence</i>	16	3 %
<i>Airlines</i>	28	5 %
<i>Building Production</i>	13	3 %
<i>Construction and Engineering</i>	87	17 %
<i>Construction and Farm Machinery</i>	14	3 %
<i>Environmental and Facilities Services</i>	16	3 %
<i>Human Resource and Employment Service</i>	9	2 %
<i>Industrial Machinery</i>	127	25 %
<i>Marine</i>	198	38 %
<i>Oil and Gas Equipment and Service</i>	7	1 %
<i>Research and Consulting Services</i>	1	0 %
	516	100 %

Consumer Staples

<i>Packadged food (Seafood)</i>	234	88 %
<i>Packaded food (Orkla)</i>	33	12 %
	267	100 %

Real Estate

<i>Real Estate Development</i>	35	18 %
<i>Real Estate Operating Companies</i>	159	82 %
	194	100 %

*Overview of Subsectors for the Endogenous group***Consumer Discretionary**

<i>Auto Parts And Equipment</i>	55	20 %
<i>General Merchandise Stores</i>	1	0 %
<i>Home Furnishings</i>	55	20 %
<i>Homefurnishing Retail</i>	1	0 %
<i>Hotels Resorts and Cruise Lines</i>	24	9 %
<i>Internett Retail</i>	9	3 %
<i>Publishing and Printing</i>	117	43 %
<i>Specialty Store</i>	10	4 %
	272	100 %

Financials

<i>Banks</i>	30	6 %
<i>Consumer Finance</i>	4	1 %
<i>Equity Certificate</i>	295	56 %
<i>Investment Banking and Brokerage</i>	20	4 %
<i>Life and Health Insurance</i>	34	6 %
<i>Multi-Line Insurance</i>	34	6 %
<i>Multisector Holdings</i>	12	2 %
<i>Other Diversified Financial Services</i>	21	4 %
<i>Property and Causalty Insurance</i>	19	4 %
<i>Regional Banks</i>	33	6 %
<i>Specialized Finance</i>	24	5 %
	526	100 %

Health Care

<i>Biotechnology</i>	52	43 %
<i>Health Care Equipment</i>	16	13 %
<i>Health Care Technology</i>	6	5 %
<i>Pharmaceuticals</i>	46	38 %
	120	100 %

Information Technology

<i>Application Software</i>	19	4 %
<i>Communication Equipment</i>	12	3 %
<i>Electronic Components</i>	4	1 %
<i>Electronic Equipment and Instruments</i>	52	11 %
<i>Electronic Manufacturing Services</i>	21	5 %
<i>Home Entertainment Software</i>	10	2 %
<i>Internet Software Services</i>	106	23 %
<i>IT Consulting and Services</i>	130	28 %
<i>Semiconductor Equipment</i>	34	7 %
<i>Semiconductors</i>	10	2 %
<i>System Software</i>	13	3 %
<i>Techology Hardware, Storage and Peripher</i>	47	10 %
<i>Telecommunications Equipment</i>	6	1 %
	464	100 %

Telecommunications Services

<i>Integrated Telecommunications Services</i>	80	100 %
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Utilities

<i>Electric Utilities</i>	29	51 %
<i>Independent Power Producers and Energy</i>	26	46 %
<i>Renewable Electricity</i>	2	4 %
	57	100 %

Return for buy transactions over the individual sectors.

Buy Transactions		
Industry	AR	No. of Trades
Endogenous		
Consumer Discretionary	7,05 %	210
Finance	6,39 %	423
Health Care	13,02 %	104
Information Technology	3,37 %	367
Telecommunications Services	11,34 %	46
Utilities	8,41 %	50
Exogenous		
Consumer Staples	12,41 %	196
Energy	-7,64 %	684
Industrials	-2,40 %	387
Material	-2,02 %	133
Real Estate	-4,16 %	182
Total	1,07 %	2782

Return for sell transactions over the individual sectors.

Sell Transactions		
Industry	AR	No. of Trades
Endogenous		
Consumer Discretionary	-4,54 %	62
Finance	-1,89 %	103
Health Care	-8,75 %	16
Information Technology	0,43 %	97
Telecommunications Services	-10,00 %	34
Utilities	8,52 %	7
Exogenous		
Consumer Staples	-10,00 %	71
Energy	14,21 %	109
Industrials	2,92 %	129
Material	27,05 %	34
Real Estate	2,19 %	12
Total	1,94 %	674

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