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Do following celebrity investors earn abnormal returns? A study from Oslo Stock Exchange (OSE)

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Thank you,

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Abstract

The main purpose of this thesis is to study the possibility of earning abnormal returns by following celebrity investor transactions. It could appear through the media that there is a general consensus that financial celebrities have an impact on stock prices. We address this issue by studying a handpicked selection of celebrity investor transactions on the Oslo Stock Exchange in the period from 2006 to 2016. We find that stocks that are traded by celebrity investors earn abnormal returns in the short-term. However, our results are not significant. Thus, our results can only imply that there exist a possible celebrity premium and that the celebrity trading, because of a market under reaction, affect stock prices. The market under reaction may be caused by a number of possible factors. We have in our study chosen to address the following potential factors to explain the possible market under reaction: Price drift, insider trading, investor overconfidence, herding and media.

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1 Introduction

Over the years, the mass media has devoted more attention to the stock market and its key players. There are frequently headlines in the Norwegian media that a stock has skyrocketed after being bought by a celebrity investor. The financial newspaper *Hegnar* have recently published some motivating articles that investors can obtain abnormal returns by following celebrity investors trades, e.g “You could have become rich by following Røkke the last five years”(Hegnar, 2017)¹, “Herd leader Spetalen plays with the herd”(Hegnar, 2017)² and “Christen Sveaas doubles his money on the Oslo Stock Exchange”(Byberg, 2017)³. In other words, the trading of celebrity investors has been given great attention in the financial news. Financial celebrities have been given the role of herd leaders in the market, which is also one of the effects we will study in our thesis. If our chosen investors can affect stock prices solely through trading and obtain abnormal returns, then it will be of great interest to study as both researchers and investors have tried to challenge the efficient market hypothesis throughout history.

In our thesis we will study whether it is possible to obtain abnormal returns by following the transactions made by celebrity investors on the Oslo Stock Exchange. We predict that the celebrity status our chosen investors possess will affect investors forecast prediction, not only because the celebrity investors are believed to be superior stock pickers, but also because their names are more familiar to the market. We use the quantity of media coverage the investors receive as our proxy for celebrity, since recent research have found clear evidence that there is a strong link between media coverage and celebrity status (Rojek, 2015), (Giles, 2000), (Rein et.al, 1997), (Boorstin, 1987). Total measure of media coverage is measured as the number of appearances of an investor's name in the Atekst-database, where all Norwegian newspapers are gathered.

In the case of celebrity investors’ knowledge towards their potential effect on stock prices, they should have incentives for leaking their investments to the media. One potential effect is that they buy more shares in the days prior to a sale. We do not find a clear or documented pattern that this happens on a regular basis,

¹ <http://www.hegнар.no/Nyheter/Boers-finans/2017/07/Du-kunne-bliitt-styrtrik-paa-fem-aar-ved-aa-foelge-Roekke>

² <http://www.hegнар.no/Nyheter/Boers-finans/2017/08/Bjellesauen-leker-med-saueflokker>

³ <http://www.hegнар.no/Nyheter/Boers-finans/2017/08/Christen-Sveaas-dobling-paa-boersen>

but there are some observations especially linked to Spetalen where he increases his total amount of shares and then sells all shares shortly after. If celebrity investors were to have a positive effect on stock prices, we should then observe a celebrity premium, which is defined as the abnormal returns obtained by following transactions made by celebrity investors. The potential celebrity premium is calculated through cumulative average abnormal returns. In order to estimate the abnormal returns, we have adopted an event study methodology as outlined by MacKinlay (1997). Further, to create inference of our results, we used Carhart's four-factor model to calculate expected stock price excluding a celebrity investors' investment.

There is today little research conducted on the performance of following celebrity investors. However, recent research conducted on Warren Buffett, Chairman and CEO of Berkshire Hathaway, found that Warren Buffett has substantially outperformed the market during his time in the company (Martin and Puthenpurackal, 2008). Further, that investors could earn abnormal returns of about 5.3 % by simply following Warren Buffett's investments in publicly traded stocks (Hughes et. al., 2010). Similar research has been conducted on celebrity analysts. Bonner et. al. (2007) found that the level of media coverage could affect the initial market reaction to the forecast revision given by the celebrity analyst.

Motivated by the above-mentioned research, the main purpose with our study will be to examine the possible advantages celebrity investors possess in the market. Further, given an advantage, how the following market under reaction can create a possibility for investors to obtain abnormal returns simply by following the trades of our chosen celebrity investors. Due to the fact that our data have been carefully handpicked, we only have a relatively small sample size. Hence, it is not conclusive on all topics, but rather suggest possible explanations for the given results. Our data observed 315 unique trades distributed on 14 investors on the Oslo Stock Exchange in the timespan between 2006 and 2016. Where we define the financial crisis from 2007Q4 to 2009Q2 (Kupiec and Lee, 2012).

When analysing our results, we observed that following celebrity investors on the short-term yields abnormal returns, before it converges back to zero and ends up being negative in the long run. However, as we did not obtain significant results,

we cannot reject our null hypothesis that following celebrity investor trades does not give any abnormal returns. But, merely imply that there is a possibility to earn abnormal returns by following our chosen investors. Further, we link our results to the aspect of under reaction in the market by exploring multiple factors that is believed to give plausible explanations for the implied market under reaction in our study. We consider overconfidence by sophisticated market participants towards the celebrity investors, where the financial celebrities have been given the role as herd leaders in the market by the mass media. In addition, since a high ratio of our chosen investors is insiders, the study of insider trading is also relevant for our thesis.

The remainder of the thesis proceeds as follows. Section 2 gives a review of relevant literature and research on the validity of the efficient market hypothesis, factors that explain the market under reaction, and further, the potential for investors to earn abnormal returns in the market. Section 3 presents the hypotheses examined in our paper. Section 4 provides the methodology to estimate the desired results. Section 5 describes how we collected and filtered our data. Section 6 presents the empirical results found in our study. Section 7 concludes our research. Section 8 provides some critique to our research and motivation for further research.

2 Theory and Literature Review

In this section, we provide the theory and rationales behind market under reaction, and empirical results that are in contrast of the EMH, suggesting the possibility for investors to earn abnormal returns in the market. Although our study is limited to following celebrity investors, the relevance of insider trading is also of interest to our paper, as many of our chosen investors are characterised as insider traders.

There is today little research that has been conducted on the specific topic of financial celebrities and how they affect stock prices. Researching the field around following celebrity investors can prove to be of significant importance as it can be based on different motives. Are markets efficient, and if so, at what degree? Moreover, if the market under reacts, is it possible to develop optimal strategies, following the actions of financial celebrities, to achieve similar success? Furthermore, it can provide better understanding towards how information can

give you a superior advantage in the market. In our case, investors could potentially have a strategy that will earn them significant abnormal returns.

2.1 Efficient market hypothesis: Motivating example

The efficient market hypothesis (EMH), also known as the random walk theory, is a hypothesis stating that current stock prices fully reflect available information about the value of a firm. Thus, it should be impossible to earn abnormal returns compared to the market, by using already known information. The term “efficient market” was first used in a paper by E.F.Fama (1970). The paper stated that in an efficient market, on average, competition will cause the full effects of new information on intrinsic values to be reflected in actual prices.

There are three forms of market efficiency: Weak form, semi-strong form and strong form efficiency. Financial markets such as the Oslo Stock Exchange is said to be more of the semi-strong form efficiency. An efficient market, in the semi-strong form, would quickly converge equilibrium prices to reflect the information content. Thus, it is possible to earn abnormal returns for an insider, but not for an outsider following these signals, as the information is already reflected in the price. Generally the EMH questions the ability of financial analysts and investors to find mispriced securities. However, it does not claim that stock prices are correct at all time, but rather states that stock prices are correct on average. This means that at any point in time, stocks may be mispriced with the market reacting to quickly correct the mispricing. We will in this paper compare our strategy against the EMH, both short and long-term, to test the validity of the hypothesis.

2.2 Market Under reaction

If the market under reacts to public disclosures, it would make sense to mimic a strategy following celebrity investors and achieve quite similar success. Warren Buffett, Chairman and CEO of Berkshire Hathaway, has substantially outperformed the market during his tenure in the company. Martin and Puthenpurackal (2008) studied the equity portfolio of Berkshire Hathaway over the period from 1976 to 2006 in order to explore potential explanations for its superior performance. They found that investors can earn significantly annualized abnormal returns of about 5.3% by using Carhart's (1997) four-factor model.

Simply by creating a portfolio that mimics the investments made in publicly traded stocks, rebalanced at the beginning of every month following public disclosure. A similar study by Hughes et. al. (2008) found that from 1980 to 2006 it has been possible to earn similar abnormal returns simply by following Buffett's own investments disclosed by Berkshire Hathaway. They considered overconfidence by sophisticated market participants and under reaction to information contained in public disclosures of changes in Berkshire Hathaway's holdings of stocks as contributing factors.

2.3 Price Drift

Price drift refers to situations when a stock or group of stocks are performing opposed to the efficient market hypothesis, where stock prices are said to reflect all available information at any point in time. Numerous factors and reasons have been identified to explain these anomalies and prior research suggest that this pattern exists due to the fact that the market responds gradually to recently released information.

Hou et.al. (2014) examines if stock price drift occurs after analysts' earnings forecast revisions, using data from the Australian stock market over the period 1992 to 2009. The study finds evidence that stocks with upward-revised forecasts receives higher future returns than similar stocks. The spread between stocks with upward-revised forecast and downward-revised forecast converges to zero when the time horizon increases. This suggests that the information from the analysts' forecast revisions gradually is being incorporated into the prices. The results are consistent with previous research that investors do not sufficiently adjust their beliefs to reflect publicly available information. Thus, stocks with higher information uncertainty experience higher price drift.

2.4 Performance of financial professionals

The above-mentioned studies of Warren Buffett are the only research we have found on the specific topic of celebrity investors. However, the performance of financial professionals in the stock market is well documented in past research. Numerous studies have studied the performance of mutual funds and recommendations of financial professionals to determine if they outperform the

market or other suitable benchmarks. Most of the research conducted has come to the conclusion that mutual funds do not have significant stock-picking abilities, beginning with Jensen (1968).

Fang and Yasuda (2013) find evidence that skill differences do exist and that they tend to consistently beat the market and other analysts. However, due to timing disadvantages, following these celebrity analysts gives more limited returns. In our study we are to examine more on the side of the followers and effects of the potential returns on following such media covered investors.

2.5 Performance of following insider trading

What are the returns to following insider trading? This is a question that has scientific implications for the study of market efficiency. The performance of following insider trades is typically measured by examining the abnormal returns generated within a given period of time. Prior research indicates that insider buying (selling) activity precedes positive (negative) abnormal returns that persist over relatively long time horizons. Meaning, investors may benefit from the knowledge of previous insider trades, which is consistent with the fact that the financial press and investment advisors frequently provide information on insider trading activity (Sivakumar & Waymire 1994). Since a high share of our observations in our study is mandatory notifications of trade, the literature and previous research conducted on the topic of insider trading is therefore relevant for our thesis.

Research by (Eckbo and Smith 1998) of insider trading on the Oslo Stock Exchange, finds that the abnormal performance disappears when insiders actual value-weighted portfolio returns are used or when a multifactor market model allowing for time-varying expected returns is applied. Neither the conditional Jensen's alpha nor the conditional portfolio weight performance measure indicates abnormal returns by insiders. The results are in stark contrast to most of the other literature, by questioning if insider trading can generate abnormal returns. Their research also highlights the shortfalls of using event-studies, as used by other researchers on studying long-term financial relationships.

2.6 Investor overconfidence

There have been numerous studies related to the subject of investor overconfidence. Alpert and Raifa (1982), Klayman et.al. (1999) and Soll and Klayman (2004) all studied overconfidence in the form of individual investors tendency to overestimate the precision of their own private information. Daniel et.al. (1998) studied investor overconfidence and their tendency to put too much weight on their own private information. They included biased self-attribution in their study, this led to “asymmetric shifts in investors’ confidence as a function of their investment outcomes”. Odean (1998) confirms the link between tendencies towards overestimating own precision of reading private information and the market under reactions towards pricing anomalies. In Shiller’s (2000) herding literature, investor overconfidence is described as “trust in experts”. Shiller argues that such an effect causes prices to increase (decrease) and therefore yield positive (negative) abnormal returns.

2.7 Herding

A more in-depth explanation of this phenomenon is relevant as the literature on financial professionals indicates herding, either implicitly or explicitly. Humans have a strong tendency to belong to a group, an instinct that often manifests in herding behaviour. In finance, a herd instinct relates to instances in which individuals gravitate to the same or similar investments based almost solely on the fact that many others are investing in those stocks. The fear of regret of missing out on a profitable investment is a key factor behind herd instinct. This may lead to exaggerated movements in stock prices. The eagerness over dotcom stocks in the late 1990s was driven by cheap money, easy capital, market overconfidence and pure speculations. For Investors it did not seem to matter that most of the dotcom start-ups were not generating any profits. The herding phenomenon made investors eager to get involved in the next initial public offering and just as the market peaked, investment capital dried up, leading to the bursting of the bubble.

During the 1990s it was developed several theories, which could explain why institutional investors would trade together. Scharfstein and Stein (1990) argued that managers could neglect private information and due to reputational risks of trading differently than other managers, they end up trading with the herd.

Another explanation, as outlined by Froot and Thaler (1990), Hirshleifer et.al. (1994), herding might be due to managers receiving correlated private information, i.e. from using the same indicators for their analysis. Further, managers may use better-informed managers' historic investments as basis for trading in the same direction (Bikhchandani et.al. (1992)). Last, investors may have the same aversion towards stocks with a certain characteristic, for instance less risky stocks or lower liquidity stocks (Falkenstein (1996)).

Wermers (1999) study the trading activity of the mutual fund industry from 1975 through 1994. They analyse whether mutual funds herd in their trades and if such herding have a stabilizing or destabilizing impact on stock prices. If stocks are bought in a destabilizing manner, we should observe an increase in stock prices followed by a decrease. Whereas, if stocks are bought in a stabilizing manner, we should observe an increase in stock prices without a subsequent price decrease. When looking at subgroups of stocks, they find in their study much higher level of herding, compared to the average stocks, especially on the sell-side. They also find higher levels of herding in stocks with extreme prior-quarter returns than in other stocks. This implies that herds form more often on the buy-side in high past return stocks and on the sell-side in low past return stocks. This evidence implicates the use of momentum strategies by growth-oriented funds as an important source of herding. Chan et al. (1996) suggest in a related study that the momentum effect is caused by a delayed reaction of investors to the information in past returns and past earnings. Herding plays a significant role in this mechanism, since herding is highly related to trading strategies with permanent price impact and that herding can provide additional cross sectional explanatory power in predicting future stock returns after controlling for momentum in returns.

2.8 Media

We measure celebrities as the quantity of media coverage an investor receives. Our starting point was the "Atekst-mediearkivet" which is a database containing all the largest Norwegian newspapers. The reasoning behind this implementation is that besides the effect of celebrity on the reaction of investors, we cannot exclude the possibility that media coverage received by these investors also is a contributing factor. Since our chosen group of celebrity investors have a large

exposure in the media, then if the media provides information and connection between the herd leaders and the market that affects stock prices, the role of the media would be related to our study.

Given the mass media's broad reach, one might predict it to affect stock prices. Past research has found clear evidence that media can influence people's beliefs or behaviour in general. Mass media play an important role in disseminating information to a broad audience, especially to individual investors. Over the years, media has devoted more attention to the stock market and its key players. Recent research shows that the media plays an important role in the stock price formation process, however, with primarily focus on firms and not investors.

Bonner et al. (2007) examines the effect of the sell-side celebrity analysts on investor reaction to analysts' earnings forecast revision. According to the paper, the level of media coverage can affect the initial market reaction to the celebrity forecast revision. The findings are consistent with the prediction that market participants react more strongly to forecast revisions issued by analysts whose names are more familiar.

Tetlock (2007) attempts to characterize the relationship between the content of media reports and daily stock market activity, focusing on the Wall Street Journal's column on U.S. stock returns. The study finds evidence that news media content can predict movements in broad indicators of stock market activity. High media pessimism predicts a downward pressure on prices, followed by a reversion to fundamentals. In addition, high or low values of media pessimism forecast high market trading volume, and low market returns lead to high media pessimism. The findings suggest that measures of media content serve as a proxy for investor sentiment or non-informational trading.

3 Hypotheses

In this section, we present and explain the hypotheses examined in our paper. They are based on the premise that the EMH do not completely hold in real life, thus there is a possibility to obtain abnormal returns in the market.

Our main hypothesis is constructed with a motivation to explore a way of earning abnormal returns. Previous literature and research is sceptic towards exploiting information in order to earn abnormal returns and towards strategies that can consistently beat the market over time. We want to develop a strategy without the need for technical, analytical or fundamental analysis. Over the last decades there have been a lot of research conducted on insider trading, with previous research providing inconsistent results. But, what if it is possible to add a “celebrity effect” to insider trading? We further choose to isolate the celebrity effect and to investigate whether celebrity investors are able to consistently beat the market. Further, we want to explore if mimicking a celebrity portfolio can earn abnormal returns. For this to hold in the short-term, the efficient market hypothesis is assumed to be violated. Thus, we developed the following main hypothesis:

Do following celebrity investors earn abnormal returns?

3.1 Sub hypotheses

Our main hypothesis will be analysed through combining sales and purchases, and by splitting them individually. Furthermore, we will also search for other characteristics, such as stock, time and investor characteristics. In order to get enough observations in each analysis, we choose to combine sales and purchases. Hence, not differentiating between sales and purchases in our sub hypotheses. Our sub hypotheses are created for sensibility purposes and are formulated in the following sub chapters.

3.1.1 Do following celebrity investors’ purchases earn abnormal returns?

While the main hypothesis involves buying and shorting, shorting is much more complicated compared to purchases. Following celebrity investors’ purchases is more available for the public and gives access for entering a stock at a price more equal to the initial investment you are to follow. Also there is more risk involved in shorting a stock, as the potential downside is infinite. Hence, investors tend to demand higher returns for shorting a stock, compared to buying.

3.1.2 Do following celebrity investors' sales (short-sales) earn abnormal returns?

Shorting potentially yields an unlimited loss and increases the risk of an investment substantially. Previous known research also indicates that trades connected to sales yields lower abnormal returns than trades connected to purchases (Lakonishok and Lee (2001), Jeng et al. (2003)). Lakonishok and Lee (2001) argue that this is caused by different sales motives, more specifically that sales transactions might be motivated by the need for liquidation.

3.1.3 Do following celebrity investors during the financial crisis earn abnormal returns?

One of the reasons for choosing a time span ranging from 2006-2016 was in order to also analyse data from the financial crisis. Kupiec and Lee (2012) define in their study the financial crisis as the period from Q4 2007 until Q2 2009. Taken under consideration that OSE reached a temporary top in May 2008 and Lehman Brothers went bankrupt in September 2008, we still believe Kupiec and Lee's approximation that it started earlier is quite accurate for OSE as well. Research by Schwert (2011) found that stock volatility was at a historically high level during the financial crisis (in the US). However, unlike the great depression the high volatility did not linger for long. Hence, trading in such times could lead to higher losses compared to a diversified portfolio like the market index. Especially when considering that traders are known to operate in high volatility stocks and volatility stocks are more exposed to times of distress and "noise". We would like to analyse whether celebrity investors are superior to others and more able to succeed in "early exit", thus more capable of foreseeing upcoming financial distress in the market.

3.1.4 Do following trades where multiple investors enter a stock earn abnormal returns?

Since celebrity investors are known to have their own "trading environment", we would like to analyse the effect of multiple investors entering the same stock. As outlined earlier under the herding chapter, there are theories regarding why investors trade together. Therefore, we would like to analyse whether celebrity investors trade together with other celebrity investors. Specifically, we would like

to analyse a concentrated form of herding, where the herding effect starts at the beginning of the investment. Combined with observing several trades in the data collection part where multiple investors cooperate in investments, we want to see if a strategy relying on trusting more than one investor can earn abnormal returns.

3.1.5 Do following John Fredriksen earn abnormal returns?

John Fredriksen represents a significant part of our total observations (see table 1). By representing almost 30% of our total observations John Fredriksen alone, if a superior investor, might cause a biased generalized conclusion about following celebrity investors. To avoid such bias we investigate our data sample by both excluding observations related to John Fredriksen, and by analysing his trades separately.

3.1.6 Do following celebrity investors' trades classified as insider trades earn abnormal returns?

Eckbo and Smith (1998) found that insiders do not earn abnormal returns. What if we are to add the celebrity effect to insider trades? We want to analyse whether following celebrities' insider trades could earn abnormal returns.

3.1.7 Do following celebrity investors' trades in Small-cap, Mid-cap or Big-cap stocks earn abnormal returns?

According to Fama and French (1993) different firm characteristics do affect returns. They draw the conclusion that investors tend to demand higher risk premiums when investing in small-capitalized firms. We have divided each stock into the 25% smallest, 50% middle and 25% largest capitalized firms. These calculations are based on average values over the time period up until the trade was completed.

3.1.8 Do following celebrity investors' trades in Small P/B, Mid P/B or Big P/B stocks earn abnormal returns?

To further investigate Fama and French's research, we choose to look at characteristics related to Price to book ratio. Once again we divide each stock into the 25% smallest, 50% middle and 25% largest firms with respect to Price to book

ratio. Fama and French (1993) suggest that size and price to book are proxies for distress. Hence, investors that create higher returns based on these factors are able to tell how financially vulnerable a firm is.

3.2 How are stock developments prior to events?

Out of curiosity we have investigated the development of each stock prior to the event. We conduct this analysis in order to see if investors tend to leak their investments prior to the event. This does not necessarily make sense, due to potential loss of returns, in case of celebrity investors' knowledge of potential effects their investments cause on a stock. Speculators often accuse some investors of having "investor clubs" and discussing potential investments. Such effects might be of great interest to analyse, thus, we choose to include this topic in our analysis.

4 Methodology

In order to test the market reaction towards financial celebrities, we will employ an event-study methodology. The following section explains step by step how our event-study is built and the models that have been employed.

4.1 Event study

An event study is a statistical method to measure the impact of an event on the value of a firm. The idea is to find the abnormal return attributable to the event being studied, by adjusting for the return that stems from the price fluctuation of the market as a whole (Black and Gilson, 1995). The general approach starts with a proxy for what the stock's return would have been in the absence of the event. Abnormal return is estimated as the difference between the stock's actual return and the chosen benchmarks return. If the changes are to be notable we need to assume rational and efficient markets (McWilliams and Siegel 1997), which again could bias long run testing, thus also affect the measure of risk adjusted abnormal returns (Kothari & Warner 1997). Still, event studies are a frequently used and robust method to study abnormal returns. Our study will be conducted on the basis of the methodology used in MacKinlay (1997).

To be able to conduct an event study we need to define the event of interest and identify the period over which the stock prices involved in the event will be examined (MacKinlay 1997). After identifying the event, it is necessary to determine the selection criteria. We have chosen to conduct the same procedure as given by MacKinlay (1997). Estimation of the events impact requires calculations of the abnormal-, normal-, and cumulative returns by using daily data. The rationale behind studying daily data is that shorter data better detect abnormal returns compared to longer observations. Our study will be conducted on when a mandatory notification of trade is reported on Newsweb and thereby reaches the public and then find the abnormal return on the stock by examining different time periods after the announcement. In order to decide whether or not our observations are abnormal, we need to find the normal returns. This will be estimated by using the Market Model approach and Carharts four-factor model. Further, in order to measure abnormal returns we will compare the normal returns with actual returns in the event window for each firm. To conclude whether there is a statistical significant abnormal return, different test-statistics will be employed. Following, the methods we have chosen to use for the event study is presented:

4.2 Estimation window and event window

The event window is included to capture the market reaction of the celebrity investor transaction and to test for short-term asymmetric information. Since information about the purchase might have occurred before the announcement or the market responds deferred. We find it interesting to examine if there are any immediate market reaction to the public disclosure of a trade made by a financial celebrity. Thus, we also include the 1st day and the 1st week of trading in addition to 1 month, 3 months, and 6 months, where we define each month as 20 trading days. This gives us an event window consisting of the following days: 1, 5, 20, 60, and 120 days. The mentioned event windows will give us scenarios over five different periods, investigating both immediate effects and long-term effect. Such information may help us to see how the trades move compared to the EMH and thus lead to attain different types of trading strategies.

In order to calculate the expected returns and to be sure that we capture all of the stock's volatility in our regression it is important to choose an estimation window that is long enough, albeit long estimation windows increases the chance of structural breaks. The most common choice when defining the estimation window, when feasible, is to use the period prior to the event as the estimation window. Prior research suggests an estimation window ranging between 100- to 300 trading days when using daily data. MacKinlay (1997) uses in his study 120- and 250 trading days prior to the event when using daily data and the market model. In accordance to his paper, we will use a 250 tradingdays estimation window, i.e. one year, in our study. To obtain best possible statistical reliable results we have chosen to exclude 20 trading days prior to the announcement. This is to not include information that may distort the results, due to potential information leakage in the market.

4.3 Estimation of normal returns

In order to determine if the observed returns are abnormal in any direction, we need to estimate normal returns. A number of approaches are available to calculate normal returns. Loosely grouped there are both statistical models and economic models to calculate the abnormal return of a stock. Where the first category follows from statistical assumptions regarding the behaviour of stock returns, therefore not dependent on any economic arguments. In contrast, economic models rely on assumptions concerning investors' behavior and are not solely based on statistical assumptions. The statistical models assume that stock returns are jointly multivariate normal and independently and identically distributed through time. While this assumption is strong, it is in practice sufficient for the constant mean return model and the market model to be correctly specified, as the inferences using the models seem robust to deviations from the assumption (MacKinlay 1997).

Since economic models are based on several questionable assumptions and are dated they are rarely used in studies according to MacKinlay. We will in our study therefore only employ statistical models in our study. MacKinlay (1997) presents three models as the most frequently used models for measuring normal returns: the constant mean return model, the market model, and the factor model. The

constant mean return model is regarded as the perhaps simplest model. Whereas the market model can be seen as a potential improvement by removing the portion of the return that is related to the variation in the markets return, the variance of the abnormal return is reduced. Which in turn could lead to better ability to detect event effects. Factor models are motivated from the gain of reducing the variance of the abnormal return by exploring more of the variation in the normal return. The gains from employing multifactor models are limited because the marginal explanatory power of additional factors is small. However, the variance reduction will be greater in cases where firms are in the same industry or have same characteristics, leading to improved estimates. We will therefore use an expansion of the market model and employ Carhart's four-factor model to estimate our returns.

4.4 Estimation of the models

In order to test our models we need the normality assumption to hold, and according to Henderson (1990), geometric returns give stronger normality returns. Hence, we choose to conduct a logarithmically approach in calculating our returns. A second reason for this is due to the fact that they are calculated as continuously compounded returns. This makes it easier to accumulate returns across time periods and receive the calculations as time-additive. Hence, our calculations will be obtained from the following equation:

$$R_{i,t} = \ln\left(\frac{p_{i,t}}{p_{i,t-1}}\right) \quad (1)$$

4.5 Market Model

For any given stock i at time t the market model is given by:

$$R_{i,t} = \alpha_i + \beta_{i,t}R_{m,t} + \varepsilon_{i,t} \quad (2)$$

Where:

R_{it} : are the period- t returns on stock i

R_{mt} : are the period- t returns on the market portfolio

ε_{it} : is the zero mean disturbance term (firm specific risk)

α_{it} : intercept (Return of R_i if R_m is zero)

β_{it} : Slope (systematic risk for stock i)

Under general conditions OLS is a steady estimation procedure for the market model parameters. The OLS parameters will be calculated by the following equations:

$$\hat{\alpha}_i = \hat{\mu}_i - \hat{\mu}_m \hat{\beta}_i \quad (3)$$

$$\hat{\beta}_{i,m} = \frac{\sum_{T=T_0+1}^{T_1} (R_{it} - \hat{\mu}_i) (R_{mt} - \hat{\mu}_m)}{\sum_{T=T_0+1}^{T_1} (R_{mt} - \hat{\mu}_m)^2} \quad (4)$$

$$\hat{\sigma}_{ui}^2 = \frac{1}{L_1 - 2} \sum_{T=T_0+1}^{T_1} (R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt})^2 \quad (5)$$

Where:

μ_i : the average stock returns

$\hat{\mu}_m$: the average market returns

4.6 Carhart's four-factor model

The Carhart four-factor model by Carhart (1997) is an extension of the Fama-French three-factor model done by Fama & French (1993). The three-factor model is an asset pricing model that expands on the CAPM by adding one factor that controls for size-effects SMB (small minus big), and one factor that controls for book-to-market effects HML (high minus low). However, Fama and French states that while value beats growth and small beats large on the long-term, investors must be able to wait out the extra short-term volatility and periodic underperformance that could occur on short time period. Carhart (1997) extends the three-factor model by including a momentum factor. Momentum in a stock is the tendencies for the stock price to continue rising if it is going up and continue declining if it is going down. A stock is found to show momentum if the prior 12 months average return is positive, after 12 months the profitability drop and go towards a mean reversion phase.

The Four-Factor Model for any given stock i at time t is given by:

$$R_{i,t} = \alpha_i + \beta_{i,t} R_{m,t} + \beta_{i,SMB} SMB_t + \beta_{i,HML} HML_t + \beta_{i,PR1YR} PR1YR + \varepsilon_{i,t} \quad (6)$$

Where the extended parameters to the Market Model are given by.

$\beta_{i,SMB}$: Coefficient for SMB (estimate of risk for size factor)

SMB_t : Premium of the size factor (small minus big factor)

$\beta_{i,HML}$: Coefficient for HML (estimate of risk for book-to-market factor)

HML_t : Premium of the book-to-market (high minus low factor)

$\beta_{i,PR1YR}$: Coefficient for Momentum (estimate of risk for Momentum factor)

$PR1YR$: Premium on winners minus losers (momentum factor)

The multifactor model regression follows the same method and assumptions as the Market Model and is given by:

$$\hat{\alpha}_i = \hat{\mu}_i - \widehat{\beta}_{i,m} R_{m,M} - \widehat{\beta}_{i,SMB} SMB_t - \widehat{\beta}_{i,HML} HML_t - \beta_{i,PR1YR} PR1YR_t \quad (7)$$

$$\widehat{\beta}_{i,m} = \frac{\sum_{T=T_0+1}^{T_1} (R_{it} - \hat{\mu}_i) (R_{mt} - \bar{\mu}_m)}{\sum_{T=T_0+1}^{T_1} (R_{mt} - \bar{\mu}_m)^2} \quad (8)$$

$$\widehat{\beta}_{i,SMB} = \frac{\sum_{T=T_0+1}^{T_1} (R_{it} - \hat{\mu}_i) (SMB_t - \bar{SMB})}{\sum_{T=T_0+1}^{T_1} (SMB_t - \bar{SMB})^2} \quad (9)$$

$$\widehat{\beta}_{i,HML} = \frac{\sum_{T=T_0+1}^{T_1} (R_{it} - \hat{\mu}_i) (HML_t - \bar{HML})}{\sum_{T=T_0+1}^{T_1} (HML_t - \bar{HML})^2} \quad (10)$$

$$\widehat{\beta}_{i,PR1YR} = \frac{\sum_{T=T_0+1}^{T_1} (R_{it} - \hat{\mu}_i) (PR1YR_t - \bar{PR1YR})}{\sum_{T=T_0+1}^{T_1} (PR1YR_t - \bar{PR1YR})^2} \quad (11)$$

$$\hat{\sigma}_{ui}^2 = \frac{1}{L_1 - 2} \sum_{T=T_0+1}^{T_1} (R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt} - \widehat{\beta}_{i,SMB} SMB_t - \widehat{\beta}_{i,HML} HML_t - \beta_{i,PR1YR} PR1YR_t)^2 \quad (12)$$

4.7 Abnormal returns

In the following section the measuring and analysing of abnormal returns is considered. From our developed framework, abnormal returns are given by the following equations.

$$AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt} \quad (13)$$

$$AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt} - \widehat{\beta}_{i,SMB} SMB_t - \widehat{\beta}_{i,HML} HML_t - \beta_{i,PR1YR} PR1YR_t \quad (14)$$

The abnormal returns will be jointly normally distributed and a zero conditional mean and variance equal to:

$$\sigma^2(AR_{it}) = \sigma_{\varepsilon i}^2 + \frac{1}{L_1} \left(1 + \frac{(R_{mt} - \widehat{\mu}_m)^2}{\widehat{\sigma}_m^2}\right) \quad (15)$$

From the above equation, the variance of the abnormal returns has two components. The first component is the disturbance variance, in our paper calculated from either the market model or the multifactor model. The second component is additional variance due to the sampling error. According to MacKinlay (1997), when the length of the estimation window increases the sampling error will converge towards zero. The event window can in practice be conducted to be large enough to make it reasonable to assume that the sampling error is zero.

4.8 Aggregation of Abnormal returns

In order to draw inferences for the chosen event, the abnormal return observations needs to be aggregated through time and across stocks. The cumulative abnormal return (CAR) is given by:

$$CAR_t(\tau_1, \tau_2) = \sum_{t=\tau_1}^{\tau_2} AR_{it} \quad (16)$$

Given N events, it is also necessary to find the sample aggregated abnormal returns and variance for the period. Given by the following equations:

$$\overline{AR}_t = \frac{1}{N} \sum_{i=1}^N AR_{it} \quad (17)$$

$$var(\overline{AR}_t) = \frac{1}{N^2} \sum_{i=1}^N \sigma_{u,i}^2 \quad (18)$$

The cumulative average return and variance are then given by:

$$\overline{CAR}(\tau_1, \tau_2) = \sum_{t=\tau_1}^{\tau_2} (\overline{AR}_t) \quad (19)$$

$$var(\overline{CAR}(\tau_1, \tau_2)) = \sum_{t=\tau_1}^{\tau_2} var(\overline{AR}_t) \quad (20)$$

4.9 Statistical tests

The null hypothesis that the abnormal returns are zero will be tested using the following version of a standard t-test:

$$\theta_{(\tau_1, \tau_2)} = \frac{\overline{CAR}_{(\tau_1, \tau_2)}}{\overline{\sigma}^2(CAR_{(\tau_1, \tau_2)})^{1/2}} \quad (21)$$

4.10 Event study weaknesses

Despite being used in numerous previous studies, a number of issues often arise when conducting an event study. The main weakness is due to the fact that it holds the level of risk constant, which could bias long run testing, and thus also affects the measure of risk adjusted abnormal returns. Eckbo and Smith (1998) highlight the shortfalls of using event-studies on studying long-term financial relationships. MacKinlay (1997) also discusses potential biases, which are likely to arise when conducting an event study methodology. In our study the most relevant issues are the inference with event date uncertainty, which will be addressed in the data chapter, and robustness. Event studies are based on an assumption that returns are “jointly normal and identically distributed” (MacKinlay, 1997). Further, another potential bias is the non-trading effect on variances and covariance. Therefore stocks that are not traded on a daily basis will be excluded in our analysis.

5 Data

Combining Atekst, Newsweb, Bloomberg and Bernt Arne Ødegaards⁴ databases we were able to obtain the data we needed to conduct our analysis. Atekst is a search engine providing articles from historic news media. Newsweb is Oslo Stock Exchange (OSE) official database and displays all mandatory notifications for listed and delisted companies. Bloomberg contains all stock market data, and were used to gather returns, and firm characteristics data. Bernt Arne Ødegaards database, which Professor Kjell Jørgensen recommended, were used to collect variables for Carhart's four-factor model. In the following paragraphs we will go through the process of identifying investors and events, criteria that needs to be fulfilled in order to analyse the event, and necessary stock market data.

5.1 Time period

We have chosen a time period ranging from 2006 to 2016. The reason for choosing this time span is that we want to analyse if these investors are superior to

⁴ http://finance.bi.no/~bernt/financial_data/ose_asset_pricing_data/index.html

others during the financial crisis from 2007-2009. The length of the time period is chosen based on possible opportunities to find enough observations required to analyse the data. Further, we want to analyse the newest available data in order to investigate up to date validity.

5.2 Identifying celebrity investors

As explained earlier in the media paragraph we define “celebrity investors” or “financial celebrities” by the amount of media coverage received. More specifically we created a list of potential celebrity investors, based on grouping names created by media, for instance, “kjendisinvestor” and “bjellesau”. This led to a list consisting of 20 investors, which is displayed in appendix 10.1. To avoid selection bias we only included observations dated after the first time the investor was recognised as a celebrity investor. This was done to avoid including observations that contributed to making the investor famous. Hence, trades observed prior to this date were excluded.

5.3 Identifying events

Most celebrity investors invest through an unknown amount of investing companies. In addition to Atekst, Brønnøysunds Registre center were used to identify each investing company related to each investor. In pursuance of minimizing the amount of irrelevant “hits” on Atekst’s retriever database these companies were used in a search pattern including the investor's name and words such as “buy”, “sell”, “stocks” and synonyms in the same category. After identifying a trade, the trade is cross checked with the Newsweb database whether it is subject to mandatory notifications of trade either through disclosure of large shareholdings or insider trading.

Another aspect of identifying events is identifying the stock and its historic data. Some stocks are subject to numerous name changes. In these cases each stock is tracked from the origin of the trade up until today. This might be caused by investors buying a stock in order to skip the IPO and continue its trades on the OSE. Another explanation is that they purchase another company for the purpose of changing their business model. For instance, when Bionor acquired Solon

Eiendom and refocused their core business model from a pharmaceutical company to a real estate company (Takla, 2016)⁵.

According to section 3-6 of the Securities Trading Act, primary insiders are any member of the board, senior employee, member of the control committee and auditor associated with the issuing undertaking (Finanstilsynet, 2015)⁶. Hence, another and more direct approach were to find which companies the investors had such a position in. In such circumstances all trades will be categorized as insider trades, thus subject to mandatory notifications of trade. Mandatory notifications of trade is regulated by the Norwegian Securities Act and have detailed descriptions regarding, among others, name of the trader or company, why the trade is subject to the notification and time of purchase, sale, exchange or subscription of shares issued. These observations were found through the Newsweb database. Also disclosures of large shareholdings are subject to mandatory notification of trade. Such trades occur when changes in ownership hits, exceeds or falls below 5%, 10%, 15%, 20%, 25%, $\frac{1}{3}$, 50%, $\frac{2}{3}$ or 90% of shares or voting rights. The trades are providing real time data, which enables us to locate the exact date of the trade. However, Locating trades solely through the media does not necessarily give us the exact time the trade was carried out.

Through these approaches we have found 516 observations related to 20 investors, as well as numerous observations, which was excluded at an early stage due to not fulfilling demanded criteria.

5.4 Data cleaning and criteria

In the interest of making inference of our study, certain criteria need to be met before finalizing the dataset.

5.4.1 Available data

As we have chosen an estimation period of 250 days prior to the trade and have performance calculations up until 120 days after the trade, we need stocks that can

⁵ <https://www.dn.no/nyheter/2016/11/21/0846/Eiendom/bionor-kjoper-solon-eiendom-for-en-milliard-kroner>

⁶ <https://www.finanstilsynet.no/globalassets/regulations/laws/securities-trading-act.pdf>

provide this data. Trades completed too close to listing (initial public offering) or delisting of a stock is therefore excluded.

5.4.2 Tradable assets at the OSE (Oslo Stock Exchange)

One criterion is that the stocks are traded on OSE, more specifically, Oslo Børs. Newsweb provides information on which stock exchange each stock is traded on. Unlisted stocks and stocks traded on Oslo Axess is therefore excluded. Also trades in stocks that are not traded on a daily basis, particularly low volume stocks, are excluded.

5.4.3 Short-term trades

We define short-term trades as trades bought and held for less than 20 trading days. If a trade is considered as short-term, we remove the purchase from our long-term analysis. However, we do measure the long-term effect of the sale. Similarly if the investor sells shares and choose to buy more in the days following the sale. This leads to an uneven number of observations for each investment horizon that are to be analysed.

5.4.4 Consecutive trades

Comparable to short-term trades, as explained in the above topic, trades conducted over consecutive days will be filtered. I.e. if a trader buys shares in a stock 3 days in a row, only the first trade will be included in our analysis. Overlapping trades between different investors will only be counted as one trade. This causes problems, as our results would have been biased as the effect of a trade would have been double or tripled depending on the number of trades conducted.

5.4.5 Distinguishing between operational investments and pure investment and holding trades

The Brønnøysund Register Centre includes industry codes that helps distinguish between operational and pure investment and holding companies. In this way we are able to distinguish between trades made for strategic and synergy purposes and thereby isolate the celebrity effect of a trade.

5.4.6 Trades completed within periods of “noise”

An important aspect when measuring returns is that the market is stable. High volatility in returns can affect estimations of normal returns and therefore also abnormal returns, leading to potentially biased calculations. Having this in mind, we choose to exclude observations within periods related to mergers, equity issuing and acquisitions including voluntary and mandatory offers. Note that this type of filtering is only performed in stock specific noise periods and not based on general noise in the market. Such filtering helps to avoid trades in stocks that typically involves large fluctuations inside our estimation period and should therefore potentially reduce standard deviations.

5.4.7 Change of stock exposure

To ensure that the trade has some sort of economic value for the investor, it is important that the investor takes a degree of economic risk, identified through change of stock exposure. I.e. extending or entering into an unchanged TRS (Total Return Swap) agreement is not a change of stock exposure.

5.4.8 Reliability of news

To further isolate the celebrity effect of a trade, it is important with reliable sources and exact dates of when the trade was publicly known. This is also highlighted through MacKinlay (1997) under inferences in event date uncertainty. In order to get as unbiased results as possible, especially in the short-term analysis, we need to operate with accurate dates. Observations from diffuse and inaccurate news articles are excluded. We only use observations reported in national newspapers, so that we are sure that these trades reaches the public. Hence, trades that are only reported through local newspapers are excluded. Trades subject to mandatory notifications are publicly known the instant they are traded. Trades that is not obliged to inform the market, insider trading and disclosure of large shareholdings, must be discovered through different channels. These observations are either dated to the date of the first newspaper to publish an article or through shareholder lists, often written in the newspaper. Typically a shareholder list of all the biggest stockowners is published weekly.

5.4.9 Comparing observations up against other news that potentially can affect the stock price

In order to further isolate the celebrity effect of trades, we have compared each observation up against news that may have affected the stock. This is done through the Newsweb database. Each observations date is controlled against the stocks mandatory notifications of trade and available news provided through Newsweb. I.e. if an insider has traded on the same date as a celebrity investor, the observation is excluded from our analysis.

5.5 Stock market data

As mentioned we used Bloomberg's database in order to collect stock market data. In order to remove potential dividends and stock-splits we choose "return index", which corrects for such effects by reinvesting dividends. Choosing this approach helps us to avoid sudden stock movements and equalizes these effects in the stock price. For sensitivity purposes market capitalization and price to book ratio was also downloaded.

5.6 Descriptive statistics

After extensive cleaning and filtering, the data set consists of 315 unique observations in 74 different stocks. If we consider the fact that some observations are combined with multiple investors we end up with 338 observations. The table below summarizes all observations distributed between our 14 chosen investors.

	<u>Purchases</u>	<u>Sales</u>	<u>Sum</u>	<u>%</u>
John Fredriksen	93	8	101	6.2%
Kjell Inge Røkke	16	5	21	29.9%
Idar Vollvik	17	3	20	5.9%
Øystein Stray Spetalen	22	26	48	14.2%
Tor-Olav Trøim	14	0	14	4.1%
Jens Ulltveit-Moe	19	18	37	11%
Christen Sveaas	7	3	10	3%
Tor-Aksel Voldberg	17	5	22	6.5%
Jan Haudemann-Andersen	14	7	21	6.2%
Arne Blystad	9	7	16	4.7%
Arne Fredly	4	2	6	1.8%
Petter Stordalen	12	4	16	4.7%
Trygve Hegnar	3	1	4	1.5%
Celina Midelfart	1	0	1	0.3%
Sum	249	89	338	100%
%	74%	26%	100%	

Table 1: Summary of all investor trades analysed in our data sample.

An obvious observation is that John Fredriksen represents almost 30% of the total transactions in our data set. Also the three most active investors represent more than 50% of our sample. Another observation is that there is only one woman included on the list, representing only 0.3% of our sample. A possible explanation might be that there are not many female investors circulating in the media at the moment. Thus, there are not as many women that possess the status as a celebrity investor and those who possess this status, do not trade in a way that is captured by the media. We also see that we have a total of 74% purchases and 26% sales. This might be a result of the number of insider trades and that they sit on the shares for an unknown time period. Another possible explanation might be that celebrity investors, as well as insider traders, knows that they have an effect on stock prices. Therefore they tend to buy in portions over a dispersed time period and sell all shares in one transaction.

5.7 Data weaknesses

Although our data is subject to massive filtering, we do believe it suffers from some drawbacks. First of all 52% of the trades in our data is subject to mandatory notifications of trade, through primary insider trading. This could induce bias in the data set as these trades are regulated through the Norwegian Securities Act,

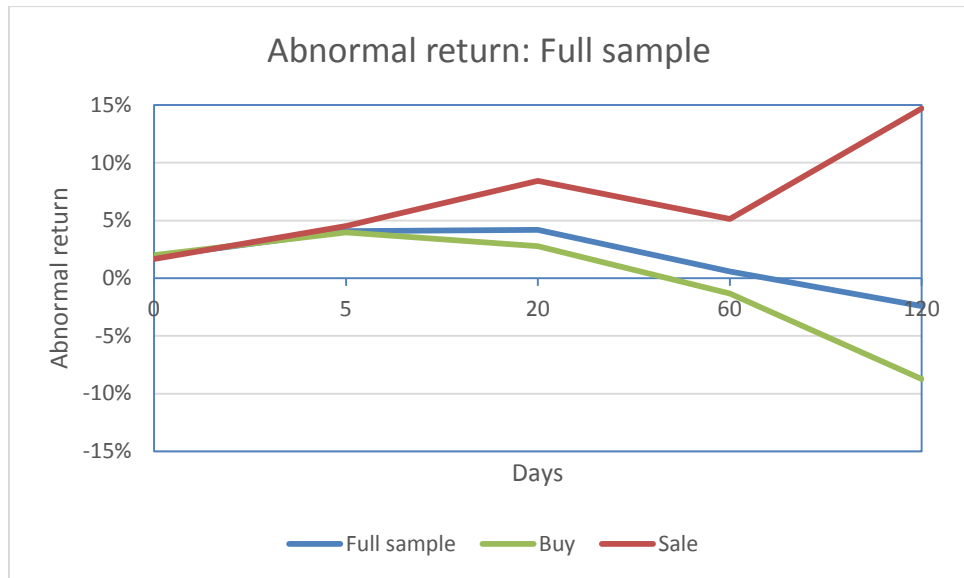
which is stricter towards insider trades than ordinary share of ownership. Previous research indicates little consensus towards whether insider trading earn abnormal return. While Eckbo and Smith (1998) argues that insiders do not earn any abnormal returns, Einarsen (2009) finds evidence that insiders immediately earn a cumulated average abnormal return of 1.3% in the 3 days after a trade.

By heavily relying on discovering data through mandatory notifications of trade, insider trades and disclosures of large shareholdings, the last one might cause our dataset to consist of a high number of smaller stocks. Disclosures of large shareholdings rarely occur in bigger stocks and are not observed through our analysed time period.

We have no data consisting of potential shorting from any celebrity investor. Another drawback is the potential loss of observations. The media does not necessarily pick up investments conducted by celebrity investors. Therefore we have probably lost numerous trades that have gone under the radar. However, since we have chosen to short observations related to sales, we might suffer from different investor sales motives. I.e. if an investor sell a share for liquidity purposes it does not necessarily mean the investor think the price will fall. However, we assume the effect is the same as investing motives is not necessarily addressed in the media.

6 Results

This chapter is organised in the matter of answering our main hypothesis, followed by our sub hypotheses for sensibility purposes. Sensitivity analysis is executed in order to further analyse more specific trading strategies, based on investor and firm characteristics. Where some of these analyses are conducted in pursuance of eliminating potential biases. We have analysed the performance of following celebrity investors in a range from 0 to 120 trading days, or approximately 0 to 6 months. More specifically (0), (0,5), (0,20), (0,60) and (0,120) trading days. Out of curiosity we have chosen to analyse stock developments prior to the event. After presenting our results, we will discuss our findings in the light of theory and earlier research. Further, we will test the validity of our research trough statistical tests.



Graph 1: Abnormal returns obtained from the full data sample and segregated into buy and sale.

6.1 Following celebrity investors' investments

Our results are summarized in table 2 below. We see that the cumulative average abnormal returns (CAAR) are positive from the day of the event up until 3 months after. According to our findings most of the returns are achieved through the first week and held relatively stable until 1 month after the event. Following the first month, CAAR starts to decline and at 6 months after the event we have negative returns.

These results indicate a short-term premium in following celebrity investors' transactions. In the first week such a strategy yields abnormal returns of 4.09%, and 4.18% in the first month. In the long run the returns are negative, thus in order to maximize returns it will not be beneficial to hold the stocks for more than one month. Furthermore appendix 10.2 highlights that CAAR reaches a peak of 4.34% at trading day number 8 after the event.

Carhart's four-factor model									
Event window	Full sample			Purchases			Sales		
	CAAR (%)	σ (%)	P	CAAR (%)	σ (%)	P	CAAR (%)	σ (%)	P-v.
(0)	1.85	7.67	0.40	2.00	8.14	0.40	1.66	6.61	0.40
(0,5)	4.09	12.72	0.37	3.97	12.94	0.38	4.53	12.65	0.36
(0,20)	4.18	18.83	0.41	2.77	16.87	0.43	8.44	23.69	0.36
(0,60)	0.57	31.59	0.49	-1.32	32.75	0.48	5.14	28.79	0.43
(0,120)	-2.42	51.92	0.48	-8.73	51.89	0.43	14.71	49.18	0.38

Table 2: Cumulative average abnormal returns for 5 different event windows on respectively full sample, purchases and sales.

6.1.1 Purchase transactions

Following trades related to purchases is the easiest trading strategy for investors to follow and provides lower risk compared to a strategy following sales. Our results indicate a positive CAAR of 3.97% in the first week, followed by declining returns. After 6 months such a strategy yields a negative CAAR of 8.73%. The only time events related to purchases outperforms sales is the immediate effect occurring on the event day. Another interesting observations are that the standard deviation of purchases and sales is relatively similar at most investment horizons.

6.1.2 Sales transactions

Our results violates previous researchers conclusions that trades connected to sales yields lower abnormal returns than purchases (Lakonishok and Lee(2001), Jeng et al.(2003)). Apart from the event day, sales transactions yields superior CAAR compared to purchases in every aspect of our time span. Also sales transactions creates higher return the longer the time horizon, indicating that celebrity investors are either better at foreseeing "loser" stocks or that loss of celebrity investor confidence in a stock keeps other investors away.

6.2 Following celebrity investors during the financial crisis

The immediate celebrity effect (AAR(0) 2.96%) of a trade during the financial crisis yields higher AAR than previous analysis. However, the 6 month CAAR is more negative at -7.69%. An important aspect of our analysis is the lack of observations related to shorting. For instance we know that Petter Stordalen had gains (Norwegian and Swedish stocks), related to shorting, of 150 million kroner

during the first 6 months of the financial crisis (E24, 2008)⁷. Another important note is that shorting was banned in financial stocks for a period during the end of 2008 and start of 2009 (Finanstilsynet, 2008)⁸. In other words, following celebrity investors' sales in these stocks was not possible. However, our results indicate short-term positive CAAR, hence the effect of following celebrity investors during times of distress also potentially yields positive abnormal returns. Another observation is that standard deviations do not deviate significantly from the full dataset and can for our sample be said to contradict with Schwert's (2011) findings that volatility is at a historically high during the financial crisis.

Event Window	Carhart's four-factor model					
	Financial Crisis			Full sample excl. Fin. Cris.		
	CAAR (%)	Σ (%)	P	CAAR (%)	σ (%)	P
(0)	2.81	7.26	0.35	1.63%	7.74	0.42
(0,5)	4.90	11.57	0.34	3.90%	12.96	0.38
(0,20)	4.05	19.41	0.42	4.20%	18.70	0.42
(0,60)	-1.83	29.86	0.48	1.14%	31.96	0.49
(0,120)	-8.60	48.62	0.44	-0.96%	52.57	0.49

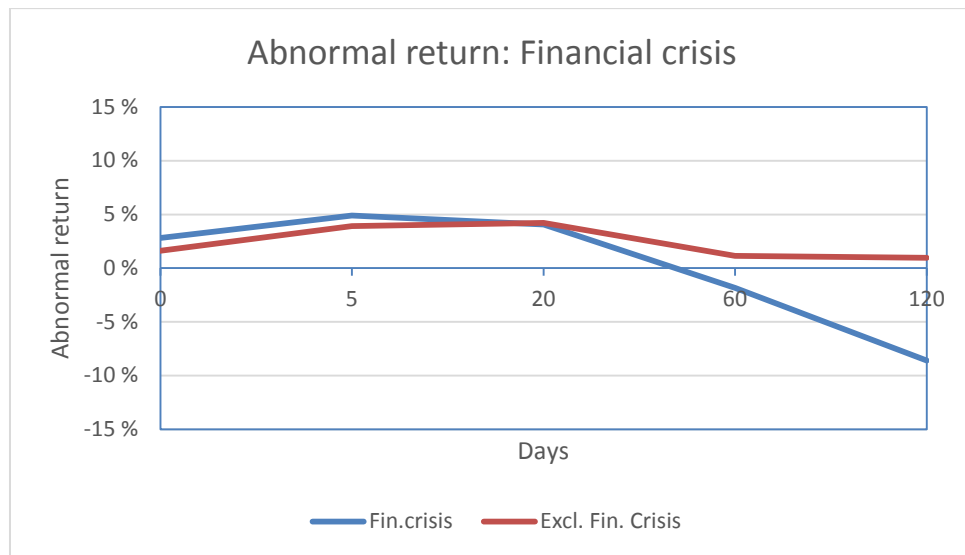
Table 3: Cumulative average abnormal returns during the financial crisis, and full sample excluding the financial crisis.

6.2.1 Sample excluding the financial crisis

We found that outsiders who follow celebrity investors can earn a CAAR of 4.20% after one month, with a sample excluding the financial crisis. The long run (6 month) CAAR is -0.96%. Compared to investments completed during the financial crisis, the effect of a celebrity trading in a stock was higher in the short-term (less than 1 week), but more negative in the long-term (up to 6 months). Also we note that excluding the financial crisis from the data sample does not notably affect standard deviations, as these continue to be high.

⁷ <http://e24.no/makro-og-politikk/stordalen-mot-stroemmen/2210705>

⁸ <https://www.finanstilsynet.no/nyhetsarkiv/pressemeldinger/2008/midlertidig-forbud-mot-shorthandel-i-finansaksjer/>



Graph 2: Showing cumulative average abnormal returns during the financial crisis and cumulative average abnormal returns when excluding the financial crisis from the sample size.

6.3 Following trades where multiple investors enter/exit a stock

As can be seen from table 4, all event windows yield positive CAARs and higher returns compared to the full dataset. From 2.98% the first day, CAAR reaches 9.75% at the end of one week of trading days. An important note is that we only have 22 observations involving multiple investors. One single event that decreases our results is Spetalen and Stordalen’s investment in Norske Skog, which fell 58% in 6 months during 2007-2008. Stordalen has later revealed that he looks at this investment as his “all-time worst” investment decision (Hegnar, 2009)⁹. However, our observation related to investments in this category, is that stocks tend to react stronger when multiple investors enter the same stock.

Event Window	Carhart’s four-factor model		
	Multiple investors		
	CAAR (%)	σ (%)	P
(0)	2.98	6.00	0.31
(0,5)	9.75	14.15	0.25
(0,20)	7.81	14.63	0.30
(0,60)	8.39	26.80	0.38
(0,120)	6.46	33.90	0.43

Table 4: Cumulative average abnormal returns for trades where multiple investors enter/exit the same stock.

⁹ <http://www.hegnar.no/Nyheter/Boers-finans/2009/06/Vaar-verste-investering-noensinne>

6.4 Following the most active single investor

In sum we have 315 observations from 14 investors, of these trades, John Fredriksen represent close to 30%. We want to avoid a biased result which risk being generalized based on the performance of one single investor. In order to do so we choose to analyse a sample only involving John Fredriksen's trades, as well as following the other investors by excluding John Fredriksen.

Event Window	Carhart's four-factor model					
	John Fredriksen			Excl. Fredriksen		
	CAAR (%)	σ (%)	P	CAAR (%)	σ (%)	P
(0)	0.56	3.94	0.44	2.55	8.77	0.39
(0,5)	1.63	9.09	0.43	5.22	13.92	0.35
(0,20)	-0.05	11.53	0.50	6.11	20.54	0.38
(0,60)	-7.26	28.81	0.40	4.16	32.15	0.45
(0,120)	-14.13	52.4	0.39	2.95	50.81	0.48

Table 5: Cumulative average abnormal returns for trades related to John Fredriksen and full sample excluding John Fredriksen.

6.4.1 Following John Fredriksen

We observe that a strategy constructed to follow John Fredriksen will, based on our event windows, only yield positive CAAR up until the end of the first week. Hence, a short-term strategy could be beneficial yielding a CAAR of 1.63%, but on the contrary, the long run CAAR yields -14.13%. Comparing Fredriksen's investments with the full data sample, the full sample yields superior CAAR in all our event windows. Based on these findings it is reasonable to conclude that John Fredriksen's investments does not create biased results by representing the majority of positive CAARs.

6.4.2 Excluding John Fredriksen

We observe that in all event windows CAAR is superior following a strategy excluding John Fredriksen trades, opposed to a strategy of only following John Fredriksen's trades. Another observation is that the 6-month event window (long-term) now has turned positive, this is an indication that Fredriksen has negative long-term effect on the full data sample. Also the results related to Fredriksen seem to have marginally higher standard deviations.

6.5 Following investments based on firm characteristics

As earlier mentioned, Fama and French (1993) argued that firm characteristics do affect returns and that investors require higher returns if they are to invest in smaller capitalized firms. In order to analyse such potential effects, we have chosen to analyse trades in stocks related to Market capitalization and price to book ratio. Recalling from chapter 5, we have divided both categories in the 25% largest, 50% middle and 25% smallest stocks.

6.5.1 Following investments based on Market Capitalization

This hypothesis will study whether different market capitalization yields different returns. After distributing each firm into its own category we have from small to large respectively 60, 159 and 94 observations in each category. The immediate short-term CAAR, up to one week, is more than twice as high for small-cap firms compared to mid- and big-cap firms. However, big-cap firms seem to be superior in the 6-month window, yielding a CAAR of 3.39%, compared to negative returns for small and mid-cap firms. Despite lower returns in most event windows, big capitalized firms tend to have marginally lower standard deviations in all event windows. In the short run there are indications that Fama and French's research is correct and that small-cap firms on average do provide higher returns to their investors.

Event window	Small-cap.			Mid-cap.			Big-cap.		
	CAAR (%)	σ (%)	P	CAAR (%)	σ (%)	P	CAAR (%)	σ (%)	P
(0)	4.30	10.78	0.35	1.65	7.00	0.41	0.63	5.77	0.46
(0,5)	7.74	18.56	0.34	3.24	11.00	0.38	3.51	10.07	0.36
(0,20)	6.97	21.71	0.37	3.19	19.69	0.44	4.09	14.74	0.39
(0,60)	6.40	35.69	0.43	-2.91	31.54	0.46	2.82	27.92	0.46
(0,120)	-0.14	52.43	0.50	-6.66	56.55	0.45	3.39	41.65	0.47

Table 6: Cumulative average abnormal returns of transactions distributed between small-,mid- and big-cap. stocks.

6.5.2 Following investments based on P/B

This hypothesis will investigate whether stock with different price to book (P/B) ratios yields different returns. After distributing firms from small to big we get respectively 81, 162 and 72 observations in each category. In contrast to market capitalization characteristics, there are no clear indication that firms with different

price to book (P/B) ratio generates higher returns than others. Stocks with high P/B are the only firms that yield positive CAAR in every event window. And mid P/B is the category generating highest immediate return (2.28%) on the first day. Based solely on CAAR there is no indications that different level of P/B ratio is a superior investing target compared to others for our data sample.

Event window	Low P/B			Mid P/B			High P/B		
	CAAR (%)	σ (%)	P	CAAR (%)	σ (%)	P	CAAR (%)	σ (%)	P
(0)	1.13	4.69	0.40	2.28	9.11	0.40	1.70	6.66	0.40
(0,5)	4.44	10.97	0.34	3.93	12.17	0.37	4.07	15.44	0.40
(0,20)	4.12	17.86	0.41	3.46	18.60	0.43	5.85	20.28	0.39
(0,60)	-1.41	29.34	0.52	-0.58	30.45	0.49	5.39	35.79	0.44
(0,120)	-6.46	50.47	0.55	-2.07	53.22	0.48	1.35	50.25	0.48

Table 7: Cumulative average abnormal returns of transactions distributed between low-, mid- and high price to book ratios.

6.6 Following celebrity investors classified as insiders

Eckbo and Smith (1998) find that insiders earn zero or negative abnormal returns on OSE. By adding a celebrity effect to insider trades, we find positive CAAR from day 1 up until 1 month and negative CAAR in the long run (3 and 6 month). Trades classified as insider trades equals 52% of our full sample and John Fredriksen represents 57% of these. Comparing these results with the full sample, there are indications that trades classified as insider trades perform worse than trades not classified as insider trades.

Event Window	Carhart's four-factor model		
	Insiders'		
	CAAR (%)	σ (%)	P
(0)	1.22	5.71	0.42
(0,5)	2.73	9.51	0.39
(0,20)	2.24	14.52	0.44
(0,60)	-2.67	30.52	0.47
(0,120)	-7.10	52.63	0.45

Table 8: Cumulative average abnormal returns of trades which is classified as insider trades.

6.7 Stock developments prior to events

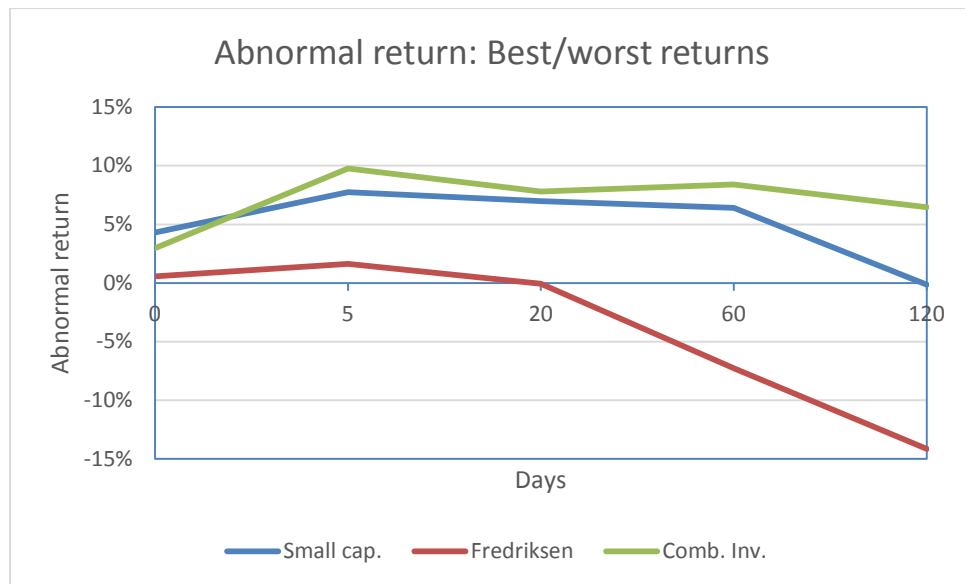
Information related to events involving news that may have an effect on stock prices can tend to be leaked prior to the event. When analysing such effects we find indications that the CAAR yields a positive return of 0.87 % from day -3 to -1 prior to the event. Thus, this might indicate that information regarding celebrity investors trades may be leaked prematurely. However, we do not obtain any significant results.

Event window(day)	Carhart's four-factor model		
	CAAR (%)	σ (%)	P-val.
-3	0.44	3.88	0.45
-2	-0.15	6.15	0.49
-1	0.58	5.05	0.45
(-3,-1)	0.87	9.50	0.46

Table 9: (Cumulative) average abnormal returns prior to the event.

6.8 Summary of empirical results

When summarizing our results, we found that sales yield higher CAAR than purchases. Investments where multiple investors enter or exit the same stock yields the highest CAAR in all windows, apart from sales in the 6 month window. Fredriksen decreases CAAR, thus a portfolio excluding his investments yields higher CAAR. The financial crisis decreases CAAR in the long run, but have higher CAAR in the short run. Insiders yield lower CAAR than the full sample. Small-capitalized stocks yield high CAAR in the short run and low in the long run. Big-capitalized stocks have marginally lower standard deviations and positive, quite low, returns in all event windows. All over, the standard deviations are very high in every analysed sample. Hence, there are clear indications on high volatile reactions in stocks subject to celebrity transactions.



Graph 3: Graphical display of the cumulative average abnormal returns of transactions related to small-capitalized stocks, John Fredriksen and multiple investors entering/exiting the same stock. A display of two of the best performing (small-cap and multiple investors) strategies as well as one of the worst (John Fredriksen) performing strategy.

6.9 Market under reaction

As presented in appendix 10.2 and table 2, our results indicates that there is an under reaction in the market in the short-term event window. Although much of the abnormal returns occur in the days around the event, there is no sign of reversion in the short-term. However, there is still a drift occurring in the days following the announcement. The abnormal returns obtain the highest value after 8 days, where the abnormal returns is more than doubled from day one. In the long run the abnormal returns converges back to approximately zero around the 60 days event window. As Oslo Stock Exchange is said to be of the semi-strong form efficiency, prices should quickly be driven to equilibrium to reflect the publicly available information. This might imply that the EMH does not hold, as new information reflected in the trading conducted by the celebrity investors is not being quickly nor completely reflected in the stock prices.

6.10 Verification of market under reaction

The mentioned under reaction on the short-term analysis show indications that the market is not fully efficient as the news, good or bad, should be reflected quickly in the stock prices with no major price drift. Below we will present possible explanations for why the market seems to be under reacting and thus add some extra explanatory power to our results.

6.10.1 Price Drift

Numerous factors and reasons can be identified to help explain these anomalies in the market. Since our results indicates that the market are performing opposed to the EMH, as the trading from celebrity investors is only gradually being incorporated into the stock prices. It seems likely to assume that price drift is present in the market as the abnormal returns converges to zero when the time horizon increases. This is also in accordance with previous research that investors are insufficiently adjusting their belief to reflect all available public information in the market, thus the market only responds gradually to recently released information.

6.10.2 Investor overconfidence

Another explanation for the market under reaction could be the investor overconfidence in both their own ability and information, or in the celebrity investors' expertise. The reasoning is that investors are overlooking recent events, predominated by their own private information and beliefs. Hence, creating an under reaction in the market, as indicated in our study. Since investor overconfidence can occur in two opposite directions it is therefore twofold.

Investors' overconfidence in their own private information is one possible explanation for the market under reaction, but it does not explain the immediate abnormal returns given by the celebrity investors trading. Thus, it is likely to be due to the other explanation of investor overconfidence, that is, overconfidence in the celebrity traders stock picking ability. The abnormal returns are a result of the sudden increase or decrease in demand for a stock. This sudden demand might be related to the investor overconfidence in the celebrity investor. The event that one celebrity investor have bought (sold) a stock might in itself be considered as positive (bad) news when other investors have confidence in the celebrity investor. However, as our results indicate, the new information related to the transactions from the celebrity investors is being incorporated over time by the investors. This could indicate that investors put too much weight on their own private information before adjusting their belief to the value of the new information. This is in accordance with our short-term results, shown by the market under reaction as well as the short-term increase in abnormal returns.

6.10.3 Herding

The overconfidence towards the celebrity investor can be related to herding. Since celebrity investors can be believed to have superior expertise one would like to mimic the behaviour of the celebrity investor. Investors also tend to gravitate towards the same or similar investments based on the fact that many others are investing in the same stock. Where the fear of missing out on a profitable investment is also a key factor behind herding. All the mentioned reasons might explain the exaggerated movement in stock prices found in our data. According to the study done by Wermer (1999), since our results indicates first an increase in stock prices followed by a decrease, it leads us to assume that the stocks in our data have been bought in a destabilizing manner.

In order to analyse whether some celebrity investors exploit their position as herd leaders, we investigated an earlier spotted pattern that Spetalen tends to buy more shares prior to selling all shares. Such behaviour might indicate knowledge towards his position in the market, hence his own potential effect on stock prices. Further, such a signal is in our study only valid if he buys shares less than 2 months prior to selling and that the investor has more than two trades in the same stock. Recalling Hegnar (2017) article where Spetalens credibility as a herd leader is questioned, we find indications towards his lack of reliability in following his investments. As shown in appendix 10.3, we find seven observations in six different stocks, where we might speculate that Spetalen tries to push the price of his stocks up before selling.

6.10.4 Media

Given the mass media's broad reach received by our chosen group of investors, it is likely to assume that media have a contributing factor in the phenomenon of herding, creating a connection between the celebrity investor (herd leader) and the market (herd). As the media is found to play an important role in disseminating information to the individual investors, it also plays an important role in the stock price formation process. Where high media optimism (pessimism) predicts an increase (decrease) in prices. Hence, as herding is found to be a likely contributing factor to explain the market under reaction, the role of the media is then related to our findings. Our findings are also in line with the prediction that individual

investors react more strongly to forecast revisions whose names are better known in the market, found in the study conducted by Bonner et al. (2007).

6.10.5 Performance of following insider trading

If it is possible to obtain abnormal returns on insider trades, then there is a violation of the efficient market hypothesis. As mentioned earlier, 52 % of our data is classified as insider trades, we also find abnormal returns on insider trades conducted by celebrity investors on the short-term. Hence, insider trading is also a contributing factor in explaining the market under reaction that is indicated in our study. This is in line with previous literature on insider trading. As found in the research of Sivakumar and Waymire (1994) investors may benefit from the knowledge of insider trades. However, our general results indicate performance in contrast to the study done by Eckbo and Smith (1998) on insider trading on the Oslo Stock Exchange, where they questioned the possibility to generate abnormal returns on insider trading.

6.11 The Celebrity premium

To summarize, there are multiple plausible reasons for the celebrity premium, given by the abnormal returns in our study. As mentioned, the celebrity investors may possess extraordinary stock picking ability or be perceived to possess this quality. This could indicate that the celebrity investors' private information are superior to the "normal" investors' private information. In this case, the overconfidence in the celebrity investor could lead to herding, then a sudden increase or decrease in demand for a stock which later on is reversed would be rational. Because uninformed investors would mimic the informed investors. A reason behind this could be that a big part of trades done by celebrity investors is categorized as insider trades, as also demonstrated by our data. Also having a celebrity investor holding the amount of shares necessary to trigger the mandatory notification of trade, a method we used to find a large part of our data, could in itself increase the value of a stock and create higher expectations of the stock's future value. Further as already discussed, the media coverage also creates a link between the celebrity investor and the market. It must be noted that the exact reason for the celebrity premium is hard to conclude, as our results are not significant. Our study only indicates the existence of a premium following

celebrity investors trading, given by a under reaction in the market on the short-term, with our long-term study showing signs of an incomplete reversion.

6.12 Test statistics

By performing simple T-tests, based on return and standard deviations, we cannot conclude that our results are significant. Standard deviations tend to be at a high level in every aspect of our analysis. The closest we are from getting a significant number is a p-value of 0.25 within our sub hypothesis involving multiple investors, event window (0,5), where the CAAR yields 9.75% with standard deviation of 14.15%. In the same event window for our main hypothesis, we recall that we have a CAAR of 4.09%, with standard deviation of 12.72%. Meaning that approximately 68% of our events are observed between -8.63% and 16.81%. Naturally, such a spread indicates really low explanatory power and we are not close to rejecting our null hypothesis that you cannot earn abnormal returns by following celebrity investors' investments. Even by trimming our dataset for extreme outliers by 10% we still do not generate significant results. There might be numerous explanations behind such insignificant results. For instance, investors might be attracted to volatile stocks where the upside is substantial. Another explanation, might be timing issues and that the last 10 years have been subject to unpredictable macro effects, i.e. the oil turmoil that occurred in the fall of 2014.

7 Conclusion

This thesis studies the trading possibilities by following celebrity investors' stock investments on the Oslo Stock Exchange. In order to conduct our study, we analysed 315 unique transactions during the time period from 2006 to 2016. These transactions were conducted by 14 different investors, classified as celebrity investors through national media coverage. To observe potential celebrity effects on stock prices we performed an event study methodology as outlined by MacKinlay (1997). The general results from all transactions indicates short-term abnormal returns, with a cumulative peak 8 days after the event. Segregating observations into purchases and sales indicates contradicting stock price behaviour. Purchases yield on average short-term positive returns, but these stock price increases tend to reverse and become negative in our long-term event window (6 months). Sales however, tend to become more negative the longer the

time horizon, hence yielding positive long-term abnormal returns by shorting celebrity investors sales. None of the above yields significant results at 1-, 5- nor 10% level.

In the search for significant abnormal returns we divided our observations into several sub-categories. These were based on time, firm and event characteristics. Among others, we investigated transactions during the financial crisis, the investor with the biggest sample size, and firm characteristics related to market capitalization and price to book ratio. There were indications that John Fredriksen was a weaker performer and that small-capitalized firms tend to yield higher returns. However, we were not able to find any significant results.

Due to extreme volatility in celebrity investors' effect on stock prices we were not able to draw any conclusion supported by significant test statistics, neither for our main hypothesis nor sub hypotheses. Therefore, we cannot conclude that it is possible to earn abnormal returns by following celebrity investors' investments.

8 Research critique and further research

Further research should aim to make inference between trading volume and effects on stock prices. In this way, potential increases in stock prices caused by high volumes could be drawn into the analysis. Due to the lack of information related to trading volume in a significant amount of our sample such analysis were not conducted. Also differences in the percentage of stock ownership could possibly be analysed. These are in some degree subject to mandatory notifications of trade through disclosure of large shareholding. However, on OSE celebrity investors do not have enough observations of that type, in our time period, to make reliable inferences. Another possible approach could be to compare against analyst recommendation and see how their forecast revisions are around event days. Recalling the limits of event studies, especially towards long-term analysis, one could also form portfolios based on buy and hold strategies.

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10 Appendix

Appendix 10.1 Initial investors, prior to filtering

Investor	Investor	Investor
Arne Blystad	Edvin Austbø	Olav Thon
Arne Fredly	Idar Vollvik	Petter Stordalen
Bjørn Kjos	Jan Haudemann-Andersen	Tor-Olav Trøim
Bjørn Rune Gjelsten	Jan Petter Sissener	Tore Aksel Voldberg
Celina Midelfart	Jens Ulltveit Moe	Trygve Hegnar
Christen Sveaas	John Fredriksen	Øystein Stray Spetalen
Dagfinn Sundal	Kjell Inge Røkke	

Appendix 10.2 Carhart four-factor model

Abnormal returns and Cumulative average abnormal returns, day 0 to day 20.

Event day	AR	CAR
0	1.94%	1.94%
1	1.35%	3.29%
2	0.15%	3.45%
3	0.34%	3.79%
4	0.30%	4.09%
5	0.10%	4.19%
6	-0.25%	3.94%
7	0.26%	4.20%
8	0.14%	4.34%
9	-0.03%	4.31%
10	-0.23%	4.08%
11	-0.26%	3.83%
12	0.11%	3.93%
13	0.02%	3.95%
14	0.32%	4.27%
15	0.06%	4.33%
16	-0.09%	4.24%
17	-0.37%	3.88%
18	-0.03%	3.84%
19	0.31%	4.16%
20	-0.06%	4.09%

Appendix 10.3 Spetalens purchases conducted close to sales.

Øystein Stray Spetalen			
Date	TICKER(STOCK)	Buy	Sale
18.06.07	SINO	X	
07.08.07	SINO		X
13.11.07	KVE	X	
20.12.07	KVE		X
31.10.10	SEVAN	X	
15.12.10	SEVAN		X
11.09.13	REC	X	
01.11.13	REC		X
14.04.15	AQUA	X	
16.04.15	AQUA	X	
28.04.15	AQUA		X
05.04.16	NEL	X	
24.05.16	NEL		X