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Expected Seasoned Equity Offerings

A study of the difference in abnormal return between expected- and unexpected SEOs

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1. Abstract

In this thesis, the focus is on expected seasoned equity offerings (SEOs) completed by firms listed on the Oslo Stock Exchange or the Oslo Axess in the period between January 2011 and August 2015. We test a prediction that firms expected to execute an SEO should experience a less profound stock price reaction on the announcement date, as the market should already have factored in these expectations.

The scope of the analysis was to examine the stock price reaction for firms on both the expectation- and announcement date. The analysis was based on two selections, one where all SEOs were defined as expected, and another where all were defined as unexpected. Separating firms in this way made it possible to analyze the difference in stock price reaction for expected- and unexpected SEOs on announcement. The input necessary to make inferences about the stock price reactions was gained through an event study. Furthermore, we examined how various firm characteristics affected the abnormal return.

The most interesting results obtained through our analysis was that firms expected to execute an SEO actually experienced a larger, not a smaller negative abnormal return on the announcement date in comparison with firms that unexpectedly executed an SEO. The explanation for our surprising result may be that the majority of firms in the group of “expected SEOs” were firms with liquidity constraints. Additionally, the same firms experienced a large negative abnormal return on the expectation date.

From our cross-sectional analysis, we observed that large capitalized firms where the market expected the SEO experienced a less negative announcement effect compared to firms with unexpected SEOs. Furthermore, firms connected to a crisis issue experienced a higher negative abnormal return on both event dates relative to those connected to growth. This result was equivalent for both expected- and unexpected SEOs.

2. Preface

This thesis is part of our Master of Science in Financial Economics at the Norwegian School of Economics. The process has been both interesting and challenging, with the collection of data as the most time-consuming part. Throughout the work, we have gained invaluable insights into the Norwegian SEO market.

We would like to acknowledge our supervisor, Thore Johnsen, for constructive and essential feedback and input. His insights have undoubtedly improved our analysis. We would also like to thank Swedbank for providing us with access to their research products. Without this access, we would not have been able to create this thesis. We especially want to thank Peter Hermanrud, Chief strategist in Swedbank, for guidance throughout the whole process of this study.

Norwegian School of Economics

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3. Introduction

When firms are in need of external financing they can either issue debt or equity. The two most prominent reasons for why firms are in need of new capital are new investment opportunities and current liquidity constraints. Regardless the reason, the market will have a reaction to news related to raising new capital.

In recent decades, numerous studies have investigated the announcement effect of seasoned equity offerings. Common to all of these studies are the observed negative abnormal return. However, the market may expect the equity issue prior to the announcement. Given the efficient market hypothesis, these expectations should then already be reflected in the stock price on announcement. In accordance with this, we predict that the announcement effect is less profound for the firms expected to complete an SEO in comparison with those unexpectedly issuing new equity. Through this paper, we are trying to put an answer to this question.

Our hypotheses are as follows:

H0: There will be no difference in the announcement effect of expected- and unexpected SEOs.

H1: The announcement effect of expected SEOs are smaller than for unexpected SEOs.

In our analysis, we examine the announcement effect for expected- and unexpected SEOs. In addition, we examine the abnormal return for expected SEOs around the date where we defined the SEOs to be expected by the market. Moreover, we will try to examine the underlying reasons behind the observed abnormal returns by controlling for various firm characteristics.

4. Fundamental finacial theories

Capital structure form the basis for all firm's financial decisions, and are consequently a powerful tool to explain the motivation behind various decisions. To provide a deeper understanding of factors affecting equity issues we will in this chapter go through different fundamental financial theories related to capital structure.

4.1 Capital structure in perfect capital markets

A perfect capital market is characterized by the following:

- No taxes
- All financial transactions are free of charge
- No bankruptcy costs (there is no increased costs of financing with debt instead of equity)
- Equivalence in borrowing costs for both firms and investors
- Symmetry of market information (all market participants have excess to the same information)
- No effect of debt on firm's earnings before interest and taxes

The most important insight regarding capital structure goes back to Modigliani and Miller (MM). In the article "The Cost of Capital, Corporation Finance and the Theory of Investment" (1958), based on the assumption of a perfect capital market, MM argued that capital structure is irrelevant for the total value of the firm. Total firm value is the value of equity additional to the value of debt. However, since the cost of capital is different for different securities, it is logical to presume that debt is a cheaper and better source of capital than equity. MM defended this by uttering that with leverage the cost of equity would increase, and consequently offset the effect of leverage.

From the latter insight, MM constructed two propositions:

MM Proposition I: States that the firm's market value is independent of the firm's capital structure. Accordingly, the total cash flow paid out is unaffected by the capital structure.

MM Proposition II: Suggests that the firm's weighted average cost of capital remains constant independent of their capital structure. In other words, the cost of equity will increase proportionally to the share of debt. This is due to the relationship between debt and risk. Increased debt are followed by increased risk, which in turn will increase the required cost of equity.

$$WACC = r_E \frac{E}{D+E} + r_D \frac{D}{D+E}$$

where r_E is the expected cost of equity, r_D is the expected cost of debt, E is the share of equity, and D is the share of debt.

4.2 Capital structur in imperfect markets

If we assume that Miller and Modigliani's' proposition I and II do not hold and that capital structure do in fact matter, then this must stem from market imperfections. It is among other things stated that taxes and bankruptcy costs do significantly effect a firm's stock price, and in additional papers, even MM includes both the effect of taxes and bankruptcy costs. As it is more reasonable to presume that imperfections exist in the real world, we are introducing theories trying to explain capital structure including such imperfections.

4.2.1 The trade-off theory

Kraus and Litzenberger (1973) recognized the tax benefits from interest payments through the introduction of the trade-off theory. According to Kraus and Litzenberger, firms have to balance equity and leverage in a manner that optimizes capital structure. Maximizing tax benefits and minimizing financial distress costs, which occur with increased leverage, achieves the optimal capital structure. The value of a firm characterized with leverage is expressed by the following:

$$V^L = V^U + NPV(Tax\ shield) - NPV(Bankruptcy\ costs)$$

where V^L are firm value with leverage, and V^U are firm value without leveraged. Comparing this theory with MMs irrelevance proposition, the main difference is the potential benefits and costs of debt.

4.3 Asymmetric information and capital structure

In financial markets, informational asymmetries are particularly profound. There is a fair amount of empirical evidence suggesting that stocks often are issued under unequal access to information. Managers have private information about the firm's prospects that outside investors do not have access to. According to Milton Harris and Artur Raviv (1991), one potential determinant of capital structure is asymmetrical information. Several researches have studied how asymmetrical information affects the choice of the firm's capital structure.

4.3.1 The lemons problem

One of the most important contributions to the literature on asymmetric information is George Akerlof's paper "The Market for Lemons: Qualitative Uncertainty and the Market Mechanism". His main point was that if a buyer are not able to observe the quality of the product, the buyer are only willing to pay an average price for the product. At this price, the only products offered are of low quality, the lemons. This is referred to as adverse selection. The same applies in the stock markets, if the seller, which in case of an SEO is represented by the firm's management, have superior information compared to outside investors. If investors are not able to observe the true value of a firm prior to buying stocks, they will only be willing to pay an average price. Consequently, managers will only issue stock if they consider the firm overvalued. This problem makes issuing equity costly. (Akerlof, 1970)

Adverse selection leads to the lemons principle:

"When a seller has private information about the value of a good, the buyer will discount the price they are willing to pay due to adverse selection" (Berk & DeMarzo, 2014).

Adverse selection has several important implications for equity issuance. (1) The stock price will decline on the announcement of an equity issue due to the signal that the equity may be overpriced. (2) The stock price tends to rise (relative to the market) prior to the announcement of an equity issue, as the firm delay the issue until positive information becomes public, and (3) firms tend to issue equity when information asymmetries are minimized in order communicate its true firm value.

4.3.2 The Pecking order theory

In the article “The Pecking Order, Debt Capacity, and Information Asymmetry (1984), Myers and Majluf introduced the pecking order theory. The theory asserts that firms adhere to a hierarchy of financing sources and prefer retained earnings (internal financing) to debt, and debt to equity. Raising equity is presumed to be a “last resort” solution, and is implemented when it is no longer sensible to issue any more debt. The theory postulates that equity is less preferred due to information asymmetry (adverse selection). Investors will place a lower value to the new equity issued, which makes issuing equity costly.

Myers and Majluf (1984) showed that if there are asymmetrical information between investors and managers, then equity could be mispriced by the market. As a result, if firms are required to finance a growth opportunity by issuing equity, underpricing may be so severe that new investors capture excess return, while existing shareholders experience a net loss. Thus, the firm will reject the opportunity, as they want to protect existing shareholders. In the literature, this problem is referred to as the underinvestment problem, and can be avoided using external financing which are not mispriced by the market (undervalued). On the other hand, in a perfect capital market where there is no asymmetrical information, the opportunity would have been accepted (Harris & Raviv, 1991).

4.3.3 The market-timing hypothesis

The pecking-order hypothesis does not provide a clear prediction regarding a firm’s overall capital structure, aside from a general preference of financing sources. The firm’s overall capital structure will also depend on whether the firm’s management believe that the firm is currently under- or overpriced. This is referred to as the market-timing hypothesis (Berk & DeMarzo, 2014). According to this theory, SEOs are motivated primarily by managers' desire to take advantage of open financing windows to sell overvalued equity. Empirical studies show that the market-timing hypothesis has a statistically significant influence on the decision to conduct an SEO. (Baker & Wurgler, 2002)

Furthermore, it has previously been conducted an interesting study about the interaction between the market-timing hypothesis and the pecking order in the financing decision of firms. A brief summary of this study is found in the appendix chapter 12.1.1.

4.3.4 Time-varying adverse selection

The time-varying adverse selection is a dynamic analogue of the static pecking order theory. According to this explanation, firms will issue equity when stock prices are high if a high stock price coincides with low adverse selection. According to Bayless and Chaplinsky (1996), firms could see periods of low asymmetric information as a window of opportunity to issue equity. They define window of opportunity to exist when the information asymmetry is at historically low levels in the whole economy. In such periods, firms are able to signal their value and intent to investors more precisely.

Due to the shortcomings of the trade-off and pecking order theory, the market-timing hypothesis and time-varying adverse selection has become the more prominent theoretical explanations behind SEOs. (Fama & French, 2005)

4.4 The efficient market hypothesis

The efficient market hypothesis (EMH) is based on the idea that the competition among investors works to eliminate all positive-NPV trading opportunities (Berk & DeMarzo, 2014). According to this hypothesis, the market will adapt to new information when it becomes available to the market. As we regard an equity issue as new information, we find it relevant to go thoroughly through the concept of efficiency in order to predict the effects that the news of an equity issue may have on the stock price. We will later in chapter 8.1, tie the market efficiency hypothesis together with the event study.

From the introduction, we recognized that the degree of efficiency in the market is highly dependent on analysts and investors. If the market consists of numerous analysts and investors, the efficiency in the market would be strong (Bodie et al., 2014). Conversely, Grossman and Stiglitz (1980) argue, based on their study that investors are only motivated to analyze and search for new information if this can result in excess return. Due to their findings, Grossman and Stiglitz presented a model of market efficiency, where the equilibrium consists of a certain degree of disequilibrium. The model indicates that the stock price only partly reflects new information, and that those who analyze and search for new information will gain accordingly.

According to Fama (1970), there are three forms of the EMH: weak, semi-strong and strong market efficiency. The weak form of the EMH states that prices only reflect historical information. In other words, you cannot beat the market by looking at charts and graphs. The semi-strong form of the EMH says that returns in the market reflect all publicly available information. Meaning that whenever an announcement occurs in the market, the stock prices will move to reflect this. At last, the stock prices in a strong efficient market will contain both public and private information.

5. Equity issues

5.1 Introduction & Seasonal equity offering (SEO)

In today's business environment, firms are dependent of external capital as retained earnings not always are sufficient. Firms are reliant on being able to fund value enhancing growth investments, or to strengthen their liquidity situation. To raise external capital, firms can either issue debt or seek potential investors in the stock market. However, it is not always feasible for firms to take on more debt and they have to turn to the equity market.

Definition:

"New equity issued by a firm whose stocks are already publicly traded. All equity issues occurring after an IPO can be regarded as SEOs, where an IPO is defined as the process of selling stock to the public for the first time"

- *(Berk & DeMarzo, 2014)*

SEOs may involve shares sold to existing shareholders (rights offer), new shares (a cash offer) or both. With a rights issue existing shareholders have the privilege to buy a specified number of new shares in the firm at a specific price within a subscription period. If all existing shareholders are offered to buy the same number of new shares at the same price, and all shareholders choose to exercise their right, there will be no dilution effect. Thus, rights offerings offset the dilutive effect, meaning that existing shareholders are protected from underpricing. Contrary, in a cash offer the firm offers the new shares for general sale. As a result, the firm's existing shareholders will see its stock value diluted. Alternatively, the firm could choose to issue stocks to a relative small number of selected investors. This is referred to as a private placement, and investors involved are usually large banks, mutual funds, insurance companies and pension funds.

5.1.1 Dilution

As stated above, existing shareholders may be subject to a dilution effect when the firm issue new shares. An increase in the number of outstanding shares can result in altered ownership share, control, earnings, and value per stock. On the contrary, in a perfect capital market issuing new shares will not result in a dilution effect. As long as the firm is selling the new shares at a fair price, the issue will neither result in a loss or gain for the existing shareholders. This is a result from increased assets, which will offset the dilution effect (Berk & DeMarzo, 2014).

To avoid undergoing the costly issuance process more than once, SEOs are often priced with a discount. This makes the issue more attractive to new investors, thus increasing the probability of successfully raising the targeted amount. Discounted prices will however have consequences for existing shareholders, where the value for existing shareholders automatically becomes diluted. However, if the firm manage to reinvest the capital raised for equal or greater returns than the capital requirement then the issue of new stocks will not result in dilution. In order to accomplish this, the firm have to convince investors to take part in the issue without the discount, and it is necessary that the firm is able to signalize to the market it has unique investment-/growth opportunities in the near future.

5.1.2 Equity issue in perfect capital markets

According to Asquith and Mullins, (1986, 1), firms should not be reluctant to issue equity in large, efficient capital markets. Asquith and Mullins argue that this is due to investor’s many possible investment opportunities, and each firm’s assets constitutes only a fraction of the total assets available. This means that there exists a large variety of approximate substitutes, which makes the demand curve for a firm’s stock in a strong efficient market close to horizontal. Firms are thereby not dependent of a price discount to attract new investors, and should instead be able to issue new stocks to the current market price.

In a perfect capital market, the firm value is determined based on expected future cash flows. If investors base the value of a stock in accordance with expected future cash flows, the dilution effect in earnings will be disregarded. Consequently, as long as the firm generates sufficient returns on the new capital, the stock price should remain unchanged in a perfect capital market, with full efficiency (Asquith & Mullins 1986, 1).

5.2 The stock price behavior around equity issues – previous studies

In this chapter, we will introduce a brief overview of earlier studies related to the stock price behavior around the equity issue. In the study conducted by Korajcyk et al., (1990) the stock's return over and above the return on an equal-weighted index are displayed 500 days preceding and 100 days following the announcement. The sample used in the study is the New York Stock Exchange and the American Exchange (NYSE/AMEX). The results retrieved from the study can be summarized by:

1. A cumulative excess return for the NYSE/AMEX firms of 43.8 % 500 days prior to the issue announcement.
2. Whereas in the event window (-2, 2) of the equity issue announcement, there was an abnormal return of 3.0 % for the same selection.

Asquith and Mullins (2) (1986), and Masulis and Korwar (1986) findings are consistent with the results summarized above. In addition, Barclay and Litzenberger (1988) support the results on the short-term price drop of the equity issue announcement.

We are in the following going to present studies related to the announcement effect of SEOs. According to several researchers, the market reaction to the announcement of an SEO is on average a price decline of about 3 %. These findings are consistent with the theory of adverse selection, which as mentioned earlier, indicates that firms want to protect existing shareholders against dilution of earnings and tend to issue new equity when they believe their stocks are overvalued. Since investors in the market are aware of this mindset, the consequences of announcing an equity issue is accordingly a stock price reduction. (Berk & DeMarzo, 2014).

Carlson et al., (2006), shares another possible explanation for the stock price behavior. They argue that the behavior of the stock price may not have to do with the actual SEO announcement, but instead are explained by the conditions that led the firm to conduct the SEO. When a firm decides to raise external capital it is often because the firm plans to fund strategic growth opportunities, or in some cases because the firm are close to covenant breach. This hypothesis focuses on growth issues, and explains the observed price drop by the decrease in the firm's beta, which is a consequence of the new investments with higher risk. Researchers have found empirical support for this hypothesis (Berk & DeMarzo, 2014).

5.2.1 Other hypothesis to the announcement effect

The price-pressure hypothesis

Myron Scholes introduced in the article "The Market for Securities: Substitutions Versus Price Pressure and the Effects of Information on Share Prices" (1972) the price-pressure hypothesis. He explains the observed drop in the stock price by a falling demand curve. This is based on the view that all firms are unique, and there are no perfect substitutions in the market. Due to this, the selling price needs to be below the current market price in order to attract new buyers.

The investment opportunity hypothesis

Miller and Rock (1985) explained the sudden price drop following the news of an equity issue by the signaling effect of firm's lack of capital. On the other hand, if firms have the opportunity to make investments that will increase firm value, this will most likely result in a positive market reaction to the news of an equity issue.

The wasteful investment hypothesis

The investment opportunity hypothesis may be associated with the Wasteful investment hypothesis presented by Barclay and Litzenberger (1988). The hypothesis states that if a firm unexpectedly issues equity, this is a signal of investments opportunities. If the net present value of these investments are below zero, the stock price will drop. Furthermore, the size of the value destruction are dependent on the size of the new equity issue. However, if the capital raised is used to pay off debt, the issue will not affect the stock price.

5.3 A selection of earlier event-studies

We will in the following present previous event studies done in relation to the announcement effect on stock prices. The selected studies, summarized in table

5.1, do however not differentiate between expected- and unexpected SEOs, and will be used only as a general benchmark for our results. Although the research periods varies a lot, all studies show the result of negative abnormal return following the announcement of an SEO.

Table 5.1

Study	Published	Market	Sectors	Period	Number of Issues	Event Window	CAAR
Asquith and Mulins	1983	NYSE + ASE		1963-1981	531	(-1, 0)	-2.70 %
Mikkelson and Partch	1986	NYSE + ASE		1972-1982		(-1, 0)	-3.56 %
Masulis and Korwar	1986	NYSE + AMEX	Industrials	1963-1980	1406	(-20. 21)	-3.25 %
			Public Utility			(-20. 21)	-0.68 %
D`Mello et. al.	2003	USA		1979-1996	2286	(-1, 1)	-1.20 %
			Industrials			(-1, 1)	-1.50 %
			Utility			(-1, 1)	-0.77 %
			Finance			(-1, 1)	-0.81 %
Wang	2011	USA		1984-2006	3045	(-1, 1)	-2.84 %

Asquith and Mullins (1986, 1) found that the price drop following the issue was correlated with the size of the SEO. A larger issue resulted in a greater value destruction of the respective firm. In contrast, Mikkelson and Parch (1986) did not find any relationship between the size of the issue and the firm’s value destruction. Additionally, Asquith and Mullins also looked into the relative performance of the stock both before and after the issue. In the two years prior to the issue the accumulated excess return of the stock was 33 %. Whereas in the two years succeeding the issue the excess return dropped to -6 %.

Masulis and Korwar (1986) explored the circumstances surrounding the equity issue. In particular, they examined the effect from how the firm used their proceeds on the stock price. The results showed a significant drop in stock prices for both firms related to the industrial sector and the publicly utility sector. Their findings suggested that firms within the industrial sector experienced a larger stock price drop compared with those belonging to the public utility sector.

In 2003 D`Mallo et al. conducted a study on the relationship between the announcement effect and the sequence of SEOs conducted by industrial, utilities and financial institutions. He found that the drop in market value was largest for firms related to the industrial sector and smallest for firms within the utility sector. This is in line with what Masulis and Korwar (1986) found in their study.

Yuequan Wang (2011) shows in his study a positive significant correlation between earnings timeliness and the abnormal return following an equity issue. This means that firms more punctual in their earnings announcements experience less of a price reduction during an equity issue. Wang believed this was due to less information asymmetry between the firm and their investors.

6. Methodology

6.1 Event study

The aim of this chapter is to give a description of the quantitative research methodology we have applied to answer our stated hypotheses. Based on MacKinlay (1997), which claims the following: *"A measure regarding the effects of an economic event on the value of a firm can be constructed straightforwardly using an event study"* we have decided to conduct an event study.

We will follow the approach used in the article *"Event studies in Economic and Finance"* (MacKinlay, 1997). Roughly, the structure involves estimating what the normal stock return would be around the event, given that the event did not take place, and deducting this from the actual return. We then end up with the abnormal return.

6.1.1 Underlying assumption

The main requirement of an event study is an efficient stock market. This implies that stock prices react quickly and accurately to new information. If the stock prices do not react quickly to new information, then we do not know that the event actually affected the stock price. A basic assumption underlying the event study is that the efficient market hypothesis (EMH) (Fama, 1970) holds. The usefulness of the study depends on this assumption.

6.1.2 Procedure for an event study

There is no unique structure of an event study, but there is a general flow of analysis. Before we go deeper into this flow, we will introduce some important notations:

τ	the event time where returns will be indexed
$\tau = 0$	the event date
$T_1 + 1 \leq \tau \leq T_2$	represents the event window

$T_0 + 1 \leq \tau \leq T_1$	the estimation window
$T_2 + 1 \leq \tau \leq T_3$	post-event window (if applicable)
$L_1 = T_1 - (T_0 + 1)$	the length of the estimation window
$L_2 = T_2 - (T_1 + 1)$	the length of the event window
$L_3 = T_3 - (T_2 + 1)$	the length of the post-event window (if applicable)

6.1.3 Event window

When conducting an event study an event window needs to be defined. This is the period where the stock price of the firms involved in the event of interest will be examined. We will discuss the events of interest in chapter 7.3.1. According to the EMH, events based on publically available information should be incorporated in the stock price immediately. Thus, one should ideally use a one-day event window. However, it is usual to apply an event window larger than the exact event of interest. A larger event window permits examination of periods surrounding the event. MacKinlay (1997) & Peterson (1989) also suggest doing several test with different event windows, because the market may not always be efficient. On the other hand, there are some weaknesses by choosing a large event window. For instance, McWilliams & Siegel (1997), argue that choosing a longer event window creates a problem related to controlling for the actual effects of the event. Brown & Warner, 1985 states that a longer event window severely reduces the power of the test statistics, which may lead to false inferences about the significance of an event. Furthermore, it has been empirically demonstrated that the short event window usually captures the effect of an event (Netter & Ryngaert, 1990), (Dann, et al., 1977) & (Mitchell & Netter, 1989).

6.1.4 Estimation window

In order to assess the event's impact we need to have a measure of the abnormal return. The abnormal return is defined as the actual ex post return of the stock over the event window minus the normal return of the firm over the same period. Where the normal return are the expected return not affected by the event. (MacKinlay, 1997). There are two requirements for estimating the normal return. First, to estimate the normal performance we need to define an estimation window. Secondly, we have to choose which model to use to estimate the normal return. The latter requirement is discussed in the appendix chapter 12.2.1.

The estimation window should be long enough to estimate reliable abnormal returns. In addition, it is not usual that the event window is included in the estimation window. This is to prevent that the event itself will influence the normal performance model parameter estimates (MacKinlay, 1997). MacKinlay (1997) and, Brown and Warner (1985) recommend using an estimation window of 200 trading days. At last, we have decided to disregard the possibility of including a post-event window, and we will therefore not go further into this part of the methodology.

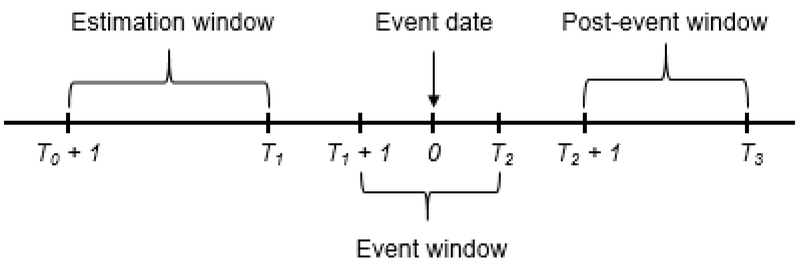


Figure 6.1

The approach of how to model normal return, abnormal return and the average cumulative abnormal return are described in detail in the appendix chapter 12.2.1 and 12.2.2.

6.2 Cross-sectional analysis of abnormal return

In order to investigate if there are certain criteria that can explain the observed abnormal return, it is possible to run a cross sectional analysis. This type of analysis is conducted at a specific point in time, and returns a p-value indicating whether the independent variables have a significant effect on the dependent variable. We will conduct two different types of cross-sectional studies. The first one is the two-sample t-test for independent observations, whereas the second one is an ordinary least squares regression (OLS). The description of these methods are presented in the appendix chapter 12.2.4 and 12.2.5.

6.3 Weaknesses of linear square regression

There are some limitations and pitfalls when applying the least square regression. The most common problems related to the least square regression is outlier sensitivity, non-linearity, too many independent variables, dependence among variables, heteroscedasticity, and noise in the independent variables (variances in independent variables). In the following paragraphs, we will go through each of them. All information is based on the article “Problems of Linear Least Square Regression” by Burger and Repisky (2012).

6.3.1 Outlier sensitivity

Outliers are data points within the dataset, which are deviating in extreme from all the other values. The weakness of the least square regression is that it is highly sensitive to such outliers. The regression can perform very poorly when the dataset contains excessively large or small values for the dependent variable compared to the rest of the values. Since the method’s objective is to minimize the sum of the squared error, any outlier will have a disproportionately large effect on the resulting constants that are being solved for.

6.3.2 Non-linearity

Linear models always attempt to place a line through one-dimensional data sets that fits the best through two-dimensional data sets respectively. Furthermore, in higher dimensional datasets a generalization of a plane (i.e. a hyperplane) are used. Due to this, the least square regression, in fact all linear regression methods, suffer from the major drawback that most systems are not linear in the real world.

6.3.3 Too many independent variables

It is logical to believe that the more information we have about what we are trying to model, the easier it should be to make predictions about it. Burger and Repisky argue that the opposite occasionally can be the case. According to their study, many algorithms suffer from the problem that a higher number of available information can lead to worse results, under certain conditions. The least square regression method is in particular disposed to the problem, where it is usually good to have a large amount of data in the dataset, there can be created serious difficulties if to many independent variables are included. Hence, instead of including every independent variable available into the regression model, it is recommended to focus on those that are likely to be good predictors of the output variable. This will increase the possibility that the least square solution is unique.

6.3.4 Dependence among independent variables

If the independent variables are significantly correlated with each other, the least square method may sometimes according to Burger and Repisky lead to poor predictions.

6.3.5 Heteroskedasticity

Heteroscedasticity is defined as the data points in the dataset that have unequal variances in their values along the feature axis. The existence of heteroscedasticity means that some data points are more likely to be affected by noise than other data points, which in return makes the data points exposed for heteroscedasticity less reliable than the rest.

6.3.6 Variance/noise in the independent variables

Another problem related to the least square regression model is that it is designed to comprehend variances or errors in the dependent variable, and not for the independent variable. The existence of noise in the independent feature variable can arise for several reasons, depending on the context, including among other things measurement errors, transcription error , rounding error, or uncertainty in the object that are being studied.

7. Description of the datasets

In this chapter, we will go through our applied datasets. Dataset 1 contains a group of firms that represents SEOs that are defined as expected, and dataset 2 is a selection of firms that represents SEOs that are defined as unexpected. In total, we have a selection of 81 SEOs, including both private placements and rights issues. Out of these, 69 are derived from the Oslo Stock Exchange and 12 from the Oslo Axess, registered for the period between 2011 and August 2015. For the completed list of included SEOs, see appendix chapter 12.3.

The datasets are composed of SEOs fulfilling the following criteria:

- The firm had at the time of the issue, been listed on either the Oslo Stock Exchange or the Oslo Axess for at least 250 days prior to the event dates.
- The size of the issue was at least NOK 100 million.
- The issue constituted at least 5 % of the firm's market capitalization on the day prior to the announcement.

Throughout the rest of our thesis, we will refer to the group of firms consisting of expected SEOs as expected SEOs, and the group of firms representing unexpected SEOs as unexpected SEOs.

7.1 Datasets

7.1.1 Dataset 1

Dataset 1 consist of expected SEOs. In order to analyze whether the SEO was expected or not, we created several key words, which we considered as possible indicators of a near- or medium term SEO. The process entailed looking for keywords utilizing equity- and credit research, firm's press releases and quarterly reports, and news articles. If we observed any of the keywords or other indications prior to the announcement date, the SEO fulfilled the criteria for dataset 1. The most commonly used keywords are presented below.

- **Breach of covenant** – *if a firm is in breach of covenant, it means that the firm is not able to meet their debt obligations.*

- **Waiver** – *when a firm is close to being in breach of covenant the issuer of the firm's debt obligation may grant the firm a waiver, which can be described as new conditions to fulfill their obligation.*

- **Liquidity constraint** – *if a firm has liquidity constraints then the firm is in lack of cash.*

- **Refinancing needs** – *refers to the replacement of an existing debt obligation with either new debt under different terms, or equity.*

- **Stretched loan** – *is a loan that is extended to firms in direct need of financing, and it requires a large portion of the firm's cash flows to service. The benchmark is usually 50 % of the firm's gross income or more.*

- **Negative cash balance estimates** – *this may indicate that the firm will be in need of cash in the near- or medium term, depending on how far ahead the forecast is.*

7.1.2 Dataset 2

Dataset 2 consist of SEOs that we have not identified as expected prior to the announcement. We defined an SEO as unexpected if no keywords and no other indications of an upcoming issue appeared prior to the announcement date.

7.2 Composition of the datasets

We find it relevant to go briefly through the composition of industries in our datasets. As observed from table 7.1, the largest difference between the dataset is that dataset 1 is more tilted towards oil exploration and production, while dataset 2 is more tilted towards information technology and health care.

Table 7.1

	Dataset 1	Dataset 2	OSEBX
Oil Exploration and Production	30.0 %	3.2 %	17.7 %
Finance	12.0 %	3.2 %	16.8 %
Materials	2.0 %	3.2 %	13.3 %
Consumer Staples	4.0 %	3.2 %	9.7 %
Oil Service	26.0 %	22.6 %	8.9 %
Information Technology	10.0 %	29.0 %	3.9 %
Industrials	4.0 %	9.7 %	3.7 %
Shipping	12.0 %	6.5 %	1.9 %
Real Estate	-	6.5 %	1.5 %
Health Care	-	12.9 %	0.2 %
Telecommunications	-	-	12.6 %
Consumer Discretionary	-	-	9.6 %
Utilities	-	-	0.2 %

Although dataset 1 and 2 is a composition of SEOs from various industries, the breakdown into industries does not perfectly replicate the OSEBX index. In that matter, our results cannot immediately be generalized to the Oslo Stock Exchange as a whole.

In table 7.2, we present the average market capitalization for both datasets. This shows that the average size of the firms in each dataset were similar, and that the difference in results for the respective datasets can not be explained by differences in market capitalization.

Table 7.2

	Expected	Unexpected
Market capitalization	2 954 504 770	4 250 018 513

7.3 Choice of event date, event window and estimation window

In chapter 6.1, we went through the process of choosing the event- and estimation window. In this section, we specify our choice of event dates, and event- and estimation windows.

7.3.1 Event dates

The events of interest are respectively the date when the market first expect the SEO and the date of the announcement. For the event date "expectation" we will only apply dataset 1 (expected SEOs), whereas for the event date "announcement" we will apply both datasets. Conducting three different event studies, allows us to compare the difference in stock price reaction for expected SEOs on both event dates, and in addition observe the difference between expected- and unexpected SEOs on the announcement date.

The selected expectation date was the date the first keyword indicating a near- or medium term SEO appeared. For the announcement date, we utilized Newsweb and press releases. We found this approach the most suitable as it gives the most accurate announcement date.

7.3.2 Event window

Particularly due to the high uncertainty surrounding the exact expectation date of the SEOs, we decided to apply several estimation windows. From chapter 4.4, we know, depending on the degree of efficiency, that the market may use some time adjusting to new information. Consequently, we find it useful to include event windows consisting of both days prior to and succeeding the event date. Additionally, by using larger event windows, we are able to increase the probability of including the "true date" for when the SEOs are expected by the market. Although there is less uncertainty related to the announcement date, we decided to employ the same event windows in order to see the development in abnormal return. We have chosen the following event windows:

- From 20 days prior to until 20 days succeeding the event date (-20,20)
- From 10 days prior to until 10 days succeeding the event date (-10,10)
- From 5 days prior to until 5 days succeeding the event date (-5,5)
- From 2 days prior to until 2 days succeeding the event date (-2,2)
- From 1 day prior to until 1 day succeeding the event date (-1,1)

- From 1 day prior to until 5 days succeeding the event date (-1,5)
- From 1 day prior to until 10 days succeeding the event date (-1,10)

7.3.3 Estimation window

As mention in section 6.1.4, several academics recommend to use an estimation window of 200 trading days. However, due to the lack of available stock data we applied an estimation window of 190 days (going from 220 to 30 days before the event date). Lastly, we decided to disregard the possibility of including a post event-window as we found it necessary to delineate our study.

7.3.4 The market index

From the appendix chapter 12.2, we know that in order to estimate normal returns we have to define a market portfolio. We are using the Oslo Børs Benchmark Index (OSEBX) as an approximate to the market portfolio. This is a natural choice since the majority of or data consist of firms listed on the Oslo Stock Exchange.

7.4 Limitations of a small sample size

When presenting and interpreting our results, it is important to have knowledge of the limitations of using a small sample size. The limitations created by a small sample size can have profound effects on the outcome and worth of the study. One or two firms may have extremely detrimental effects on the empirical results while using a limited number of event observations (MacKinlay, 1997). We will in the following present the main problems by applying a small sample size.

The problem concerning the small sample size is the influence it has on the descriptive statistics. The ability of a statistical test to show features that truly exist in the observations declines when the size of the sample declines. The interpretation of results, in particular the p-value, may be a concern. The p-value determines if the statistical test is significant or not, referring to whether or not a difference is large enough to matter. With a small sample size, the ability to detect such significant differences between observed values becomes weaker.

Another major problem is that a small sample size may produce false-positive results, or overestimate the magnitude of a relationship. This is referred to as a type II error. Since statistical test provide results in terms of either rejecting or accepting the hypothesis, using a small sample may result in rejecting (accepting) a hypothesis that should be accepted (rejected). (Hackshaw, 2008) and (Veria, n.d.)

7.5 Excluded data

Among the SEOs that fulfilled the criteria stated in chapter 7, we have excluded six observations. Two expected and four unexpected SEOs. The reason for why we excluded these is summarized in table 7.3.

Table 7.3

Company	Reason
Seabird Exploration	Not traded in the event window up until announcement
Sevan Marine	Experience extreme returns in the estimation window
American Shipping Company	Experience extreme returns in the estimation window
Aker Philadelphia Shipyard	Experience extreme returns in the estimation window
Domstein	Not traded in the latter part of the event window
Saga Tankers	Not traded in the primary parts of the event window

Seabird Exploration (SBX) is a classical example of an SEO conducted to keep the firm floating (liquid). The firm was not trading the days prior to the announcement date due to a suspension. SBX was not able to repay their outstanding bonds, and was basically bankrupt. The first day SBX was permitted to trade on the stock exchange after the suspension was on the actual announcement date. On this particular date, SBX announced a restructuring plan containing among other things the expected SEO, resulting in a 70 % reduction of market value.

To get a better understanding of our data sample, we examined the computed CAAR when excluding the highest positive and negative observations. The exclusion was based on the CAAR in the event window (-10, 10) for both expected- and unexpected SEOs on the announcement date. By excluding all observations showing CAAR greater or less than +/- 30 %, we excluded nine observations from dataset 1 and seven from dataset 2. For the results, see appendix chapter 12.4.1.

We chose to do our analysis on the dataset only excluding the observations in the table above. The reason for this is that the remaining observations are highly relevant for the study, and the exclusion would result in both of our cross-sectional analyses returning inconclusive results. In addition, as 1/5 of our combined datasets contained observations above or below +/- 30 %, our observations were evenly distributed across the scale.

8. Event study

8.1 Expectaton date

Conducting an event study for the expectation date with respect to dataset 1 (Expected SEOs), we obtained the following results:

Table 8.1

Event window (τ_1, τ_2)	**(-20, 20)**	**(-10, 10)**	**(-5, 5)**	**(-2, 2)**	**(-1, 1)**	**(-1, 5)**	**(-1, 10)**
$\overline{CAR}(\tau_1, \tau_2)$	-1.17 %	-6.08 %	-2.74 %	-1.42 %	-0.38 %	-1.01 %	-2.38 %
Median	-1.48 %	-4.19 %	-1.61 %	-0.92 %	-0.05 %	-1.31 %	-2.43 %
t-value	-0.330	-2.630	-1.660	-1.030	-0.360	-0.750	-1.520
p-value	0.745	0.011	0.103	0.310	0.722	0.454	0.134
Std. Dev.	0.036	0.163	0.117	0.098	0.076	0.094	0.110
Skewness	-0.460	-0.579	-0.477	-0.890	-1.287	0.153	-0.546
Excess kurtosis	3.560	0.643	1.436	3.000	3.593	0.313	1.167
N	50	50	50	50	50	50	50

From table 8.1 we found that the average abnormal return, depending on the event window, was between -6.08 % and -0.38 %. Where the corresponding median values ranged from -4.19 % to -0.05 %. Looking at the different p-values, we observe that the only event window statistically significant at a 0.05 level was the event window (-10, 10), with a p-value of 0.011. Focusing on the significant event window (-10, 10), we found an average abnormal return of -6.08 % and a median value of -4.19 %. This may indicate that the existence of outliers were still present. Furthermore, we found a negative skewness of -0.579 and excess kurtosis of 0.643. This can be interpreted as though the observations were not normally distributed, and suffered from a long tailed distribution.

As we observe an increasing negative CAAR throughout the entire event window (-10, 10), we found it interesting to compute a graph ranging over a larger period. On this basis, we have presented a visual overview of the development in CAAR for both the event windows (-10, 10) and (-20, 20).

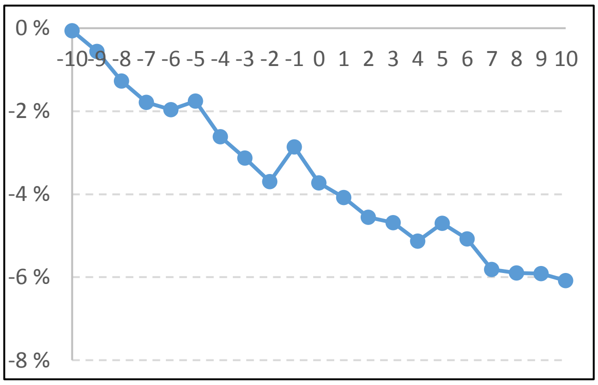


Figure 8.1

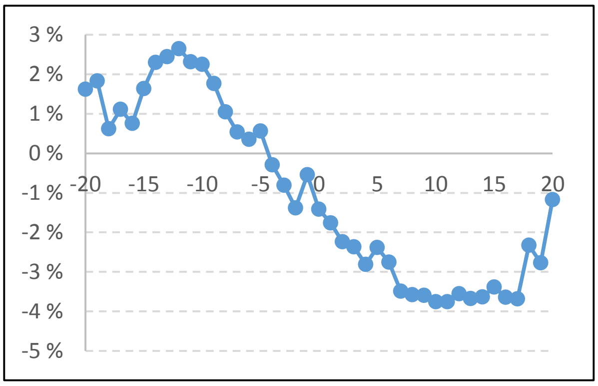


Figure 8.2

From figure 8.1, we observe a gradual negative development in CAAR. This may reflect that the expectations related to the near- or medium term SEOs were gradually assimilated by the market. This trend may also indicate that the majority of the included firms were experiencing negative momentum. The most substantial effect was observed on day 0, where the abnormal return constituted a reduction of 0.87 %. Furthermore, the median value proved to be negative on almost every day of the event window. The negative median values imply that the majority of the firms in dataset 1 were experiencing a negative stock price reaction throughout the event window. This mitigates the concern related to type II errors. Looking at figure 8.2 presenting the event window (-20, 20), we observe that both prior to and succeeding the event window (-10, 10) CAAR had a positive development. We consider the stock price reaction observed after day 10 to be either a stabilization effect in the market after overreacting to the new information, or an indication that the expectations were not adjusted by the market.

Another key element is to associate our results with the EMH. Most researchers argue that the market is semi-strong, and since our data are based on publically available information, this suggests that new information should have had an immediate effect on the stock price. This is inconsistent with our findings, where no evidence of an immediate effect appeared during the event window (-10, 10).

Table 8.2 contains all SEOs defined as expected. The table presents the different key words that indicated the SEO, and the accumulated abnormal return for the days (-10, -1), 0 and (1, 10). There was no clear correlation between the observed abnormal return and the key words characterizing the SEO as expected. However, the more obvious the need for equity, the more negative the abnormal return tended to be.

Table 8.2

Observation	(-10, -1)	0	(1, 10)	Total	Key word
Archer	-2 %	-1 %	8 %	4 %	Breach of convenant, need of new capital
Asetek	-6 %	14 %	-23 %	-14 %	Still burning cash. Large capital need
Bridge Energy	-7 %	-4 %	1 %	-10 %	Potential share issue
Deep Sea Supply	3 %	7 %	-1 %	9 %	Intention to acquire new-builds
Det Norske Oljeselskap	-7 %	0 %	14 %	6 %	Need to raise capital by 2012
Det Norske Oljeselskap	-3 %	-2 %	-1 %	-6 %	Capital needed for committed developments
Det Norske Oljeselskap	-7 %	4 %	-3 %	-6 %	Covenant at risk, new capital required anyhow
DNO	13 %	-4 %	1 %	9 %	Soaring working capital and weak cash flow
DOF	-1 %	-2 %	0 %	-3 %	High financial risk, debt/capitalization of 73 %
Dolphin Group	-8 %	1 %	-27 %	-33 %	Only in a conservative scenario the company is in need of capital
Eitzen Chemical	-9 %	-17 %	-1 %	-28 %	The company will run out of cash earlier than expected
Frontline	-3 %	-6 %	-3 %	-11 %	Liquidity issue
Havila Shipping	1 %	-1 %	-6 %	-5 %	Financing of new-builds
Havila Shipping	10 %	2 %	-1 %	11 %	Close to breaching interest coverage covenant
Höegh LNG Holdings	3 %	3 %	6 %	12 %	No room for new-builds unless capital is raised
Interoil Exploration and Production	-4 %	-2 %	-13 %	-18 %	Negative equity and stressed liquidity
Marine Harvest	-18 %	-4 %	3 %	-18 %	Breach of covenant, equity issue cannot be ruled out
Sparebank 1 SMN	-3 %	1 %	1 %	-1 %	Capital requirements are getting tougher
Sparebanken Møre	1 %	1 %	-5 %	-3 %	DNB cuts the interest rate, indicating difficult times ahead
Northland Resources	-4 %	-3 %	-26 %	-33 %	It's highly likely that a share issue is required
Norse Energy Corp.	-15 %	-26 %	-7 %	-48 %	The company could face financing requirements
Norse Energy Corp.	-42 %	0 %	-5 %	-47 %	Equity covenant waiver. New equity is likely
Sparebank 1 Nord-Norge	3 %	-1 %	1 %	3 %	DNB cuts the interest rate, indicating difficult times ahead
Sparebank 1 Nord-Norge	0 %	0 %	-1 %	-1 %	The new Basel-framework approved
Norwegian Energy Company	-26 %	0 %	3 %	-23 %	Stretched balance sheet, covenant issues
Norwegian Energy Company	-1 %	-4 %	8 %	4 %	Covenant risk
North Energy	-10 %	0 %	12 %	1 %	Need funding for development. Likely source: Equity issue
Polarcus	-5 %	2 %	0 %	-3 %	Covenant at risk
Polarcus	-1 %	0 %	-6 %	-7 %	A large equity issue is most likely needed
Polarcus	7 %	2 %	21 %	30 %	It's high leverage is not sustainable
Prospector Offshore Drilling	9 %	2 %	-7 %	4 %	Equity needed for new-builds
Prosafe	2 %	0 %	-1 %	1 %	Need capital to finance new-builds
Questerre Energy Corporation	18 %	-3 %	-8 %	6 %	Funding risk. Potential dilution effect is significant
Q-Free	13 %	1 %	-7 %	7 %	Need to secure financing to build infrastructure
Renewable Energy Corporation	4 %	-1 %	-8 %	-5 %	May breach covenants and require new financing
Renewable Energy Corporation	10 %	-4 %	3 %	8 %	Significant debt wall in 2014
REC Silicon	3 %	1 %	14 %	18 %	Dependent on getting paid and stop inventory build up
Rocksource	9 %	-1 %	18 %	25 %	Will face external financing needs
Rocksource	-11 %	-2 %	-6 %	-19 %	Funding needs
Salmar	-22 %	13 %	-18 %	-26 %	Negative cash balance
Scana Industrier	9 %	-4 %	-11 %	-5 %	Stressed liquidity
Scana Industrier	14 %	-4 %	-11 %	0 %	Breach of covenants
Sevan Drilling	2 %	-1 %	-9 %	-9 %	Covenant waiver
SinOceanic Shipping	-30 %	1 %	-5 %	-34 %	Need to raise equity to finance new-builds
Sparebank 1 Østfold Akershus	-7 %	0 %	-3 %	-10 %	Capital requirements are getting tougher
Songa Offshore	-1 %	1 %	1 %	2 %	Further cash is needed
Songa Offshore	-7 %	-4 %	1 %	-9 %	Liquidity issue
Spectrum	-5 %	1 %	-4 %	-8 %	Assumes financing, probably through equity
Sparebank 1 SR-Bank	-1 %	0 %	1 %	0 %	The new Basel-framework approved
Wentworth Resources	-15 %	0 %	-7 %	-22 %	Liquidity relies on being able to raise capital

8.2 Announcement date

In this section, we analyze the stock price reaction on the announcement date by applying both dataset 1 (expected SEOs) and dataset 2 (unexpected SEOs). We will first go through the results for each test separately, and secondly compare them.

8.2.1 Expected SEOs

The results obtained applying dataset 1 on the announcement date are presented in table 8.3. Contrary to the earlier event studies showing an abnormal return of around 3 %, our results proved to be slightly higher (for earlier studies see chapter 5.3). This may be a result of distinguishing between expected- and unexpected SEOs, as well as a smaller sample size.

Table 8.3

Event window (τ_1, τ_2)	**(-20, 20)**	**(-10, 10)**	**(-5, 5)**	**(-2, 2)**	**(-1, 1)**	**(-1, 5)**	**(-1, 10)**
$\overline{CAR}(\tau_1, \tau_2)$	-4.41 %	-3.12 %	-4.57 %	-5.04 %	-6.69 %	-5.16 %	-5.64 %
Median	-5.97 %	-1.15 %	-4.43 %	-3.39 %	-4.50 %	-6.69 %	-4.04 %
t-value	-1.080	-1.000	-1.840	-2.340	-2.870	-2.250	-2.200
p-value	0.286	0.320	0.072	0.024	0.006	0.029	0.032
Std. Dev.	0.041	0.220	0.176	0.152	0.165	0.162	0.181
Skewness	-0.188	0.126	-0.266	-1.238	-1.803	-0.700	-0.617
Excess kurtosis	1.304	0.848	1.100	2.905	5.949	1.623	1.453
N	50	50	50	50	50	50	50

Observing CAAR for the selected event windows, we found it to be between -6.69 % and -3.12 %, and the median values respectively between -6.69 % and -1.15 %. From the p-values in table 8.3, we found that the event windows (-2, 2), (-1, 1), (-1, 5) and (-1, 10) were statistically significant at a 0.05 level. As we conducted a thorough research of each individual announcement date, we expected the most significant effect to be found in the shorter event windows. This is supported by our descriptive statistics, where we found the most prominent effect in the event window (-1, 1), with a p-value of 0.006. The respective CAAR and median value was -6.69 % and -4.50 %. The difference between the mean and the median value may be indicative of some outliers. Moreover, we detect the same bias as mentioned earlier, the skewness and the excess kurtosis. The development in CAAR for the event window (-10, 10) is illustrated in figure 8.3 when we compare the two datasets.

Our results indicated a semi-strong efficiency in the market, where the announcement had an immediate effect on the stock price. However, in accordance with the EMH we would expect the observed abnormal return to be less negative as the event should already be reflected in the stock price. This result may be an indication that we were not able to identify expected SEOs.

8.2.2 Unexpected SEOs

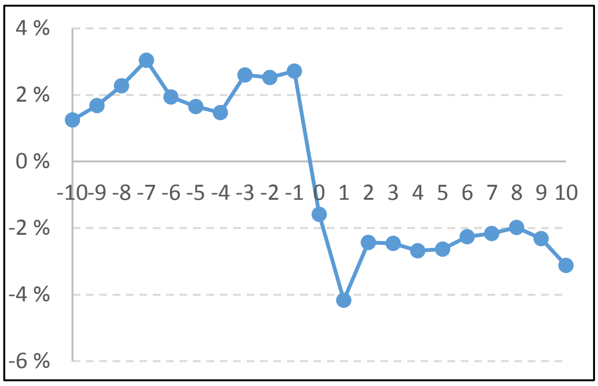
The results obtained based on dataset 2 on the announcement date are presented in table 8.4.

Table 8.4

Event window (τ_1, τ_2)	**(-20, 20)**	**(-10, 10)**	**(-5, 5)**	**(-2, 2)**	**(-1, 1)**	**(-1, 5)**	**(-1, 10)**
$\overline{CAR}(\tau_1, \tau_2)$	-1.04 %	-2.37 %	-0.57 %	1.79 %	-1.20 %	-2.19 %	-3.06 %
Median	-0.77 %	-3.55 %	0.39 %	0.21 %	-0.90 %	-3.17 %	-3.47 %
t-value	-0.180	-0.630	-0.200	0.670	-0.480	-0.910	-1.27
p-value	0.859	0.532	0.846	0.511	0.633	0.371	0.212
Std. Dev.	0.058	0.038	0.029	0.027	0.025	0.024	0.024
Skewness	-0.062	0.171	-1.274	-0.934	-2.951	-1.942	-2.041
Excess kurtosis	1.634	2.051	4.751	4.678	12.651	8.180	8.422
N	31	31	31	31	31	31	31

To our surprise, we found that the CAAR for all event windows were smaller for unexpected SEOs in comparison with expected SEOs. This means that the announcement effect was larger for expected SEOs. Clearly, there has to be some other explanation for this result. One possible explanation is that the SEOs in dataset 1 (expected SEOs) are composed by a majority of firms in need of capital due to liquidity problems, whereas dataset 2 (unexpected SEOs) are more associated with investment opportunities. This is a result from the key words used to identify expected SEOs, where most are related to negative momentum.

Figure 8.3 and 8.4 illustrates the development in CAAR for both expected- and unexpected SEOs for event window (-10, 10).



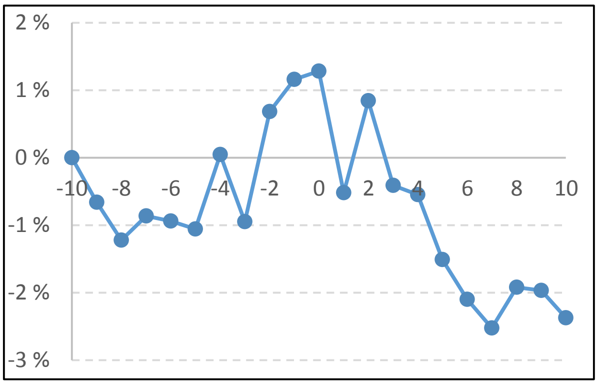


Figure 8.3 – Expected

Figure 8.4 - Unexpected

By comparing the two figures, it is clear that the announcement effect was greater for expected SEOs. We observe a value destruction for expected SEOs on day 0, with an abnormal return equal to -4.30 %. For the unexpected SEOs, we did not observe the usual pattern around the announcement date. The return proved to be volatile, and we found the largest effect to appear on day 1, with an abnormal return of -2.49 %. However, day 1 is followed by a positive stock price reaction before it falls again after day 2.

8.3 Testing the abnormal return

In order to answer whether the observed announcement effect was significantly different for unexpected- and expected SEOs, we tested the observed abnormal return for the two data samples. The test was conducted on the event-window (10, 10).

In table 8.5, we have performed a t-test on the observed announcement effect for expected- and unexpected SEOs.

Table 8.5

	Expected (0)	Unexpected (1)	0-1
$\overline{CAR}(\tau_1, \tau_2)$	-3.12 %	-2.37 %	-0.75 %
Median	-1.15 %	-3.55 %	2.40 %
t-value			-0.153
p-value			0.439
N	50	31	81

As shown in table 8.5, expected SEOs experienced a greater fall in market value. This is contrary to what we expected to find. However, the difference in CAAR of -0.75 % was not statistically significant. Form the median values, we found that unexpected SEOs experienced the largest abnormal return. Due to the differences in the observed mean and median values, we decided to test the median. For this matter, we utilized the Wilcoxon Rank Sum Test, see appendix 12.2.3. Table 8.7 presents the obtained results, with a p-value of 0.9613. This indicates that the difference in median values was not statistically significant, and we were not able to conclude with any significant difference in returns between the two groups.

Table 8.6

	Expected	**Unexpected**
Ranksum	2039	1282
Expected	2050	1271
z	0.107	
Prob > |z|	0.9149	

We observe a difference in the experienced abnormal return between expected- and unexpected SEOs. However, the difference was not significant, and we found no evidence supporting our hypothesis claiming that expected SEOs would experience a less profound fall in market value on the announcement date.

8.4 Rebased analysis

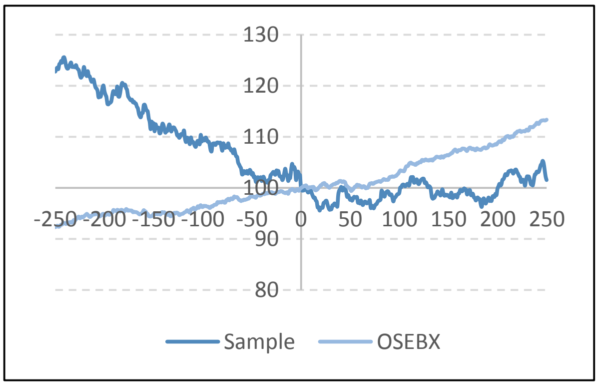
Until this point in the analysis, we have examined the abnormal return around the expectation- and the announcement date. However, it would be interesting to try to explain the effects on the stock returns for a larger timeframe around these dates, and how the development was different for expected- and unexpected SEOs. In this part of the analysis, we utilized both datasets.

In the following, we have performed a rebased analysis comparing the performance of both datasets with OSEBX. This makes it possible to analyze the relative performance of the sample in comparison to the index. We have plotted the stock performance rebased at time zero, where time zero represents the date of execution. The execution date is an interesting date for investors considering buying stocks in a firm where a private placement is expected. This date is represented by the date that the book building closed. The results proved to be driven by some extreme observations. In order to give a more “normalized picture” of the performance, we excluded the firms that more than tripled in value or lost more than 66 % in the period before or after the execution date. Table 8.7 represents the list of excluded observations. The figures prior to excluding the observations, can be found in the appendix chapter 12.4.2.

Table 8.7

Ticker	**Date**
Expected	
Asetek	25.02.2015
Dolphin Group	22.04.2015
Interoil Exploration and Production	13.03.2013
Norse Energy Corp.	25.03.2011
Norse Energy Corp.	17.02.2012
Norwegian Energy Company	23.10.2013
Polarcus	07.10.2014
Renewable Energy Company	27.07.2012
Scana Industrier	03.02.2012
Scana Industrier	29.06.2015
Unexpected	
Idex	03.01.2014
Siem Offshore	02.09.2015
Thin Film Electrinics	30.10.2013
Weifa	03.09.2014
Weifa	10.09.2014

In figure 8.5 and 8.6, we plotted the return for the expected- and unexpected SEOs. The x-axis displays the number of days relative to time zero, where the y-axis consists of the rebased value of both the sample and the OSEBX. The figures shows the average rebased return for the included firms in the period from 250 weekdays prior to the issue, until 250 weekdays after the issue. We used weekdays as a proxy for trading days since this made it easier to apply this type of analysis. Concerning the weekdays that were not trading days, we brought forward the last value prior to that day.



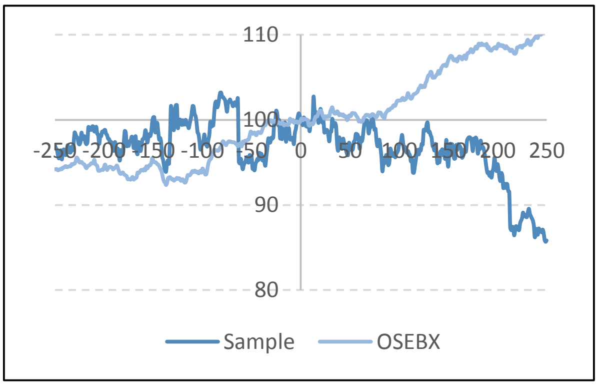


Figure 8.5 – Expected

Figure 8.6 – Unexpected

Prior to the execution date, we observe a high degree of underperformance for the expected SEOs. However, after the execution we observe a slightly positive trend towards the long-term OSEBX growth. For unexpected SEOs, the trend was very different. In contrast to the results for expected SEOs, we found that the stocks in this selection perform better prior to the execution date and more poorly after.

The negative return observed in figure 8.5, strengthens our impression that dataset 1 contains a majority of firms experiencing a negative momentum. The stabilization effect observed in the same dataset succeeding the issue may be explained by a reduction in uncertainty concerning the firm's liquidity problems. However, if this was the case we would expect to find a more immediate reaction after the execution date. On the other hand, the figure presenting unexpected SEOs surprisingly indicates a negative development succeeding the execution date. We expected to see a more positive trend, as the majority of the firms in dataset 2 are connected to growth issues.

As our sample is small, these observations may not show the true development of expected- and unexpected SEOs. In addition, the obtained observations may also be a result of random chance.

9. Cross-sectional analysis

9.1 Independent two-sample t-test

In this chapter, we explore the factors behind the observed abnormal return for both event dates applying both dataset 1 (expected SEOs) and dataset 2 (unexpected SEOs). In order to perform the two-sample t-test, we divided the observations from both datasets into two separate parts based on firm characteristics. For continuous variables, dataset 1 was divided into two groups of 20 and dataset 2 into two groups of 14. When testing discrete metrics, the samples were divided accordingly. These groups respectively represents the largest- and the smallest observed values for each metric tested. We used the t-test to test whether the difference in abnormal return between the two groups was statistically significant. Each test was conducted using the event window (-10, 10).

9.1.1 Market capitalization

There are several explanations for why large-cap firms may receive a different market reaction in comparison with small-cap firms. Firstly, it is suggested that the market more closely monitors larger firms. When a firm is closely monitored, it is reasonable to expect the market to be taken less by surprise when that firm issues new equity. In accordance with this, we predict that the stock price of large-cap firms will fall less in comparison with small-cap firms. Secondly, the market often perceives larger firms as safer. This also supports the prediction that the stock price reaction is less profound for large-cap firms. On the other hand, if small-cap firms are issuing new equity with the objective to make profitable growth investments, this will probably have a greater effect on their future value relative to large-cap firms (the investment opportunity hypothesis). This effect is examined in chapter 9.1.2. In order to make any inferences about the effect on abnormal return from firm size, we have tested the abnormal return of large- and small-cap firms against each other. We have the following hypotheses:

$$H0{:}\ \mu(0) - \mu(1) \leq 0$$

$$H1{:}\ \mu(0) - \mu(1) > 0$$

Where μ(0) and μ(1) represent respectively firms with larger market capitalization and firms with smaller market capitalization. H0 states that larger-cap firms will experience a less profound effect on their stock price.

Expected SEOs on expectation date

Testing for the effects from firm size applying dataset 1 on the expectation date we obtained the following results:

Table 9.1

	Large-cap (0)	Small-cap (1)	0-1
$\overline{\text{CAR}}(\tau_1, \tau_2)$	-1.00 %	-10.85 %	9.85 %
Median	-0.33 %	-8.95 %	8.62 %
t-value			2.079
p-value			0.023
N	20	20	40

It is quite clear from our descriptive statistics that small-cap firms, with a CAAR of -10.85 %, experienced a larger value destruction relative to the large-cap firms, with a CAAR of -1.00 %. With a p-value of 0.023, the difference in CAAR of 9.85 % was statistically significant at a 0.05 level. We also observed a very low (high) median for large-cap (small-cap) firms, which indicates that most of the large-cap (small-cap) firms in dataset 1 experienced lower (higher) value destruction. This mitigates the uncertainty related to type II errors. Figure 9.1 illustrates the development in CAAR for small- and large-cap firms in the event window (-10, 10).

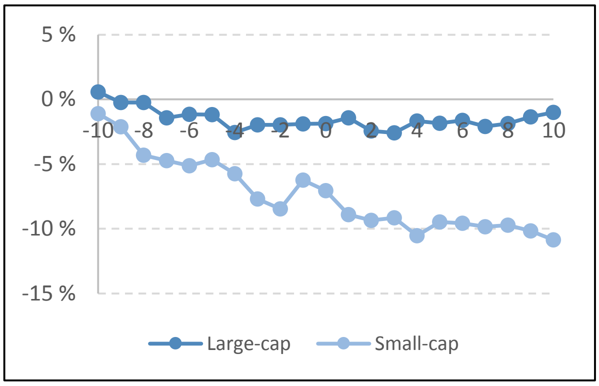


Figure 9.1

From the figure, we observe that small-cap firms do experience a larger negative stock price reaction in comparison with large-cap firms throughout the entire event window.

Expected and unexpected SEOs on announcement date

In the following, we examine the difference in firm size, and its impact on the announcement effect, for both expected and unexpected SEOs. The results obtained for each test are presented in table 9.2. We will briefly analyze the results from each dataset individually, and at the end compare the results.

Table 9.2

	Expected			Unexpected		
	Large-cap (0)	Small-cap (1)	0-1	Large-cap (0)	Small-cap (1)	0-1
$\overline{CAR}(\tau_1,\tau_2)$	2.96 %	-10.11 %	13.08 %	-3.24 %	-7.03 %	3.80 %
Median	0.99 %	-8.52 %	9.51 %	-2.47 %	-3.96 %	1.49 %
t-value			1.900			0.545
p-value			0.033			0.296
N	20	20	40	14	14	28

Looking at the results for expected SEOs, we found that the CAAR for small-cap and large-cap firms were respectively -10.11% and 2.96 %, constituting a significant difference in CAAR of 13.08 %. From the results representing unexpected SEOs, we observe a weak analogous tendency. However, with a p-value of 0.296, the difference in CAAR of 3.80 % was not statistically significant. Figure 9.2 and 9.3 presents the development in abnormal return for both expected- and unexpected SEOs on announcement using the event window (-10, 10).

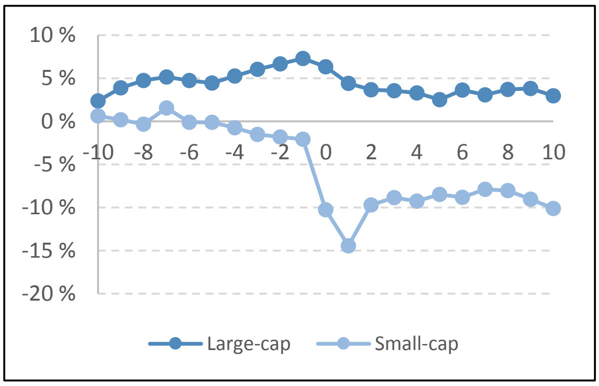


Figure 9.2 – Expected

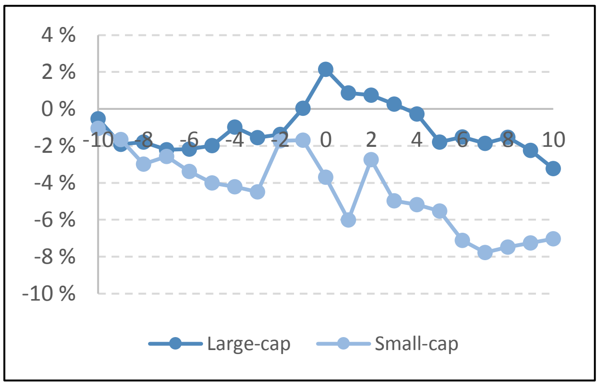


Figure 9.3 – Unexpected

From what we observe in figure 9.2, it is evident that the announcement creates a difference in abnormal returns depending on whether the firm was characterized by large-cap or small-cap. The largest effect was found on day 0, where the abnormal return for small-cap and large-cap firms was equal to respectively -8.17 % and -0.95 %. By looking at figure 9.3, we observe indications on a similar trend. However, this difference was not large enough to reject our null hypothesis. Comparing expected- and unexpected SEOs, we found that the difference in abnormal return was larger for expected SEOs relative to those unexpected. This is somewhat surprising, but understandable as our event study returned a larger negative abnormal return for expected SEOs.

Analyzing the stock price reaction independently for large-cap and small-cap firms, we observe a more negative abnormal return for large-cap firms when the SEO was unexpected in comparison with those expected. Whereas small-cap firm experienced a larger negative abnormal return when the SEO was expected. We find this difference particularly interesting, and it may indicate that expected SEOs in large cap firms are sufficiently accounted for in the market. This may be related to large cap firms being more closely monitored by the market.

9.1.2 Growth or crisis

Referring back to chapter 9.1.1, we would predict a difference in stock price reaction for firms issuing new equity in order to make profitable investments (growth issues), and firms completing an issue to keep the firm liquid (crisis issues). This coincides with the “Investment opportunity hypothesis” explained in chapter 5.2.1. If the firm raises capital to make profitable investments, the market will most likely react positively to the news of an SEO. However, Carson et al. (2006) argue that stock price can drop due to a decrease in the firm’s beta, which is a consequence of the higher risk of the new investment. Contrary, if the issue is executed to keep the firm liquid, a larger negative stock price reaction is expected. Based on a combination of statements from analysts prior to the announcement and statements from the firm itself, the SEO is characterized as either a growth- or crisis issue.

$$H0: \mu(0) - \mu(1) \geq 0$$

$$H0: \mu(0) - \mu(1) < 0$$

Our hypotheses are stated above, where crisis- and growth issues are represented by μ(0) and μ(1). By grouping our selection of SEOs with respect to these characteristics, we located 30 crisis issues and 20 growth issues in dataset 1. The equivalent numbers for dataset 2 were 6 and 25.

Expected SEOs on expectation date

The results obtained from the t-test carried out for dataset 1 on the expectation date are shown in table 9.3.

Table 9.3

	Crisis (0)	Growth (1)	0-1
$\overline{CAR}(\tau_1, \tau_2)$	-8.33 %	-2.71 %	-5.62 %
Median	-5.99 %	-0.88 %	-5.12 %
t-value			-1.269
p-value			0.105
N	30	20	50

We found that the negative abnormal return is greater for crisis issues, with a CAAR equal to -8.33 %, compared to growth issues where the observed abnormal return was - 2.71 %. This is supported by figure 9.3 where we present a visual overview of the development in CAAR for the event window (-10, 10). Although the difference in abnormal return was quite large, we were not able to disregard our null hypothesis.

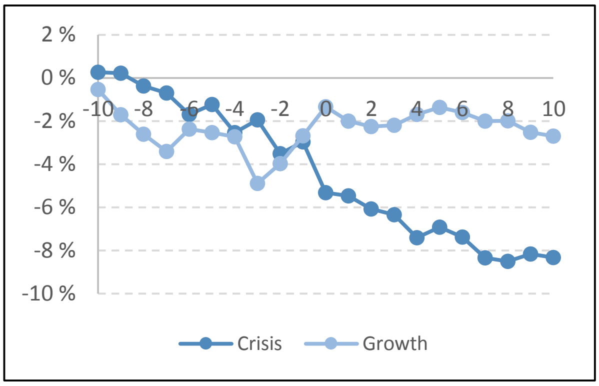


Figure 9.4

From figure 9.4, we observe the largest difference to occur on day 0, where the abnormal return for crisis- and growth issues were respectively -2.35 % and 1.34 %.

Although the difference in CAAR was not found to be significant, the figure displayed a different trend for the two groups after day 0.

Expected and unexpected SEOs on announcement date

The test completed on the announcement date for expected- and unexpected SEOs returned the following results.

Table 9.4

	Expected			Unexpected		
	Crisis (0)	**Growth (1)**	**0-1**	**Crisis (0)**	**Growth (1)**	**0-1**
$\overline{CAR}(\tau_1, \tau_2)$	-6.68 %	2.22 %	-8.89 %	-16.42 %	1.00 %	-17.42 %
Median	-8.52 %	0.84 %	-9.36 %	-13.25 %	-0.34 %	-12.92 %
t-value			-1.597			-1.512
p-value			0.059			0.091
N	30	20	50	6	25	31

For expected SEOs, we observe that crisis issues experienced an abnormal return of -6.68 %, whereas growth issues experienced a positive abnormal return of 2.22 %. We found the same trend for unexpected SEOs, except that the difference in CAAR was almost twice the size. From the observed p-values, we are not able to reject our null hypothesis for any of the datasets. However, the p-value for expected SEOs was close to being significant at a 0.05 level. The high p-value for dataset 2 may be explained by the small sample of unexpected crisis issues.

In order to visualize the stock price reaction for both scenarios, we present in figure 9.5 and 9.6 the development in CAAR for the event window (-10, 10).

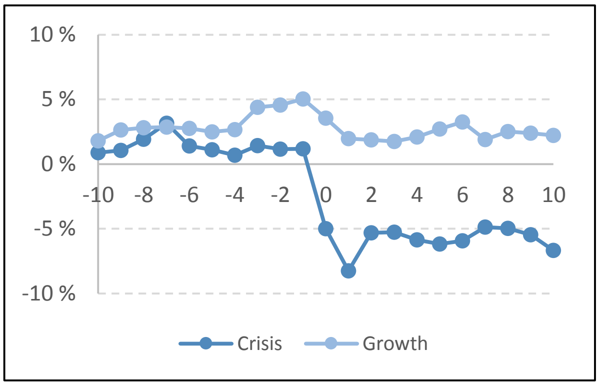


Figure 9.5 – Expected

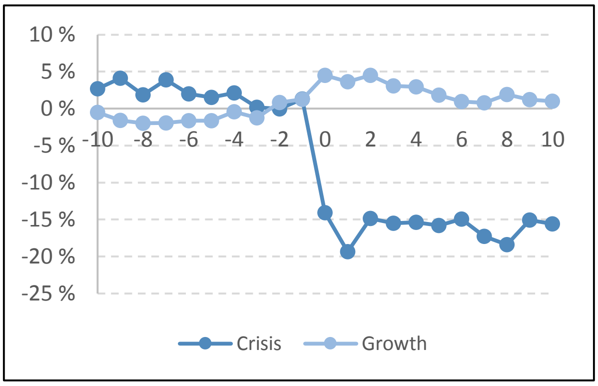


Figure 9.6 – Unexpected

From figure 9.5, we get a clear picture of the difference in abnormal return between growth- and crisis issues for expected SEOs. On day 0, where we found the largest effect, both crisis- and growth issues had a negative abnormal return of respectively -6.17 % and -1.50 %. For unexpected SEOs, the largest effect also appeared on day 0, with abnormal return of -15.38 % for crisis issues and 3.11 % for growth issues. Both figures indicate that there was a difference in stock price reaction whether the issue was characterized by crisis or growth.

The trend of expected- and unexpected SEOs proved to be similar for both growth- and crisis issues. However, expected SEOs experienced a negative abnormal return on day 0, while the same effect for unexpected SEOs was positive. For *crisis,* unexpected equity issues returned a larger negative abnormal return than those expected. Note: the results for unexpected SEOs was impacted by two large negative observations, which was amplified by a narrow sample of crisis issues.

9.1.3 Abnormal return for the expected SEOs

As we in this thesis are interested in the relationship between the abnormal return on the expectation date and the announcement date for expected SEOs, we found it relevant to examine this in a t-test. In the test, we only applied dataset 1 containing expected SEOs. We predict SEOs experiencing a larger abnormal return on the expectation date to have a less profound stock price reaction on announcement. This is based on our assumption that the market adjusts to new information related to the expected SEOs. Our hypotheses are as followed:

$$H0: \mu(0) - \mu(1) \geq 0$$

$$H1: \mu(0) - \mu(1) < 0$$

Where μ(0) represents SEOs with less negative abnormal returns, and μ(1) symbolizes SEOs with larger negative abnormal returns.

Table 9.5

	Less neg. (0)	More neg. (1)	0-1
$\overline{\text{CAR}}(\tau_1, \tau_2)$	4.10 %	-5.46 %	9.56 %
Median	-1.15 %	-2.10 %	0.94 %
t-value			1.460
p-value			0.076
N	20	20	40

From table 9.5, we observe a positive relationship between the abnormal return on the two dates. The firms that experienced a larger negative abnormal return on the expectation date also experienced a more negative announcement effect. This is the opposite result of what we predicted.

A probable explanation for this result is that we were not able to identify the correct expectation date. In addition, as previously suggested, the dataset applied may consist of a majority of firms experiencing negative momentum. In this way, the firms suffering from a more negative momentum on the expectation date may still be facing the same momentum on announcement. Although the difference was quite large, we were not able to reject our null hypothesis. From figure 9.7, we observe a difference in the development of the abnormal return. However, on day 0, we observe a larger negative abnormal return for firms that experienced less negative abnormal return on the expectation date. On the other hand, the group experienced a corrective effect in the following days.

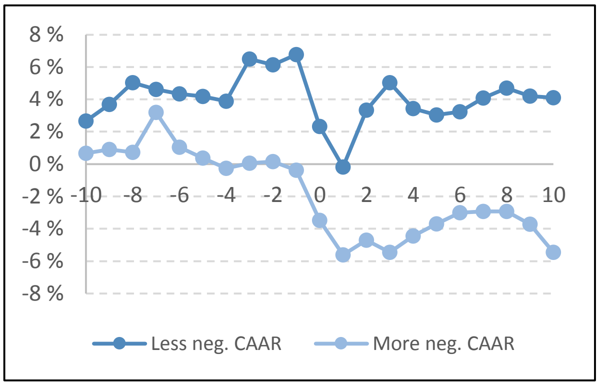


Figure 9.7

9.1.4 Summary of t-tests

Table 9.6

	Expectation			Announcement						
	Expected SEOs			Expected SEOs			Unexpected SEOs			
	[0]	[1]	[0]-[1]	[0]	[1]	[0]-[1]	[0]	[1]	[0]-[1]	H_0
Market cap.	-1.00 %	-10.85 %	9.85 %	2.96 %	-10.11 %	13.08 %	-3.24 %	-7.03 %	3.80 %	Large.cap < Small.cap
Relative size	-10.85 %	-0.32 %	-10.54 %	-7.71 %	6.23 %	-13.94 %	-10.71 %	1.58 %	-12.29 %	Big size > Small size
Growth/Value	-8.06 %	-1.77 %	-6.29 %	-3.82 %	-1.62 %	-2.20 %	-3.74 %	0.08 %	-3.81 %	Value < Growth
Low/High asy. info.	-1.36 %	-10.80 %	9.44 %	-2.40 %	-3.73 %	1.33 %	0.90 %	-5.86 %	6.76 %	Low asy. < High asy.
Crisis/Growth	-8.33 %	-2.71 %	-5.62 %	-6.68 %	2.22 %	-8.89 %	-16.42 %	1.00 %	-17.42 %	Growth < Crisis
High/Low prob.	-12.37 %	-0.27 %	-12.10 %	-5.54 %	-0.88 %	-4.66 %	n/a	n/a	n/a	Low prob. <*/>** High prob.
More neg. CAAR	n/a	n/a	n/a	4.10 %	-5.46 %	9.56 %	n/a	n/a	n/a	Less neg. CAAR > More neg. CAAR

* on expectation
** on announcement

In Table 9.6, we have summarized the results from all t-tests conducted. Those not previously elaborated, can be reviewed in the appendix chapter 12.4.2. One interesting finding was that the relative size of the issue was significant at both event dates for dataset 1, and on the announcement date for dataset 2. In addition, we found that whether the firm was regarded as value or growth had no significant impact on the abnormal return on any event dates. Moreover, expected SEOs characterized by a high probability of being completed experienced a significantly more negative abnormal return on the expectation date. This is in line with our expectations. The same SEOs also experienced a more negative abnormal return on announcement. This is however not in line with what we expected if the offerings in fact were priced into the market. This might be explained by a possible relationship between the probability and the crisis variables.

9.2 Multiple regression

In order to examine how different variables vary with the observed abnormal return, we have conducted an OLS multiple regression analysis. The analysis was implemented for both dataset 1 and 2 (expected- and unexpected SEOs) on the announcement date. In order to compare the effects on the expectation- and the announcement date, we have for dataset 1 performed the same test on the expectation date. The analysis is carried out with respect to abnormal return for the event window (-10, 10).

The variables included are:

- *lnmcap*, which is the firm's market capitalization on the day prior to the expectation- or announcement date
- *rel*, is the relative size of the issue obtained by dividing the total amount raised through the equity issue by the firm's market capitalization prior to the event date
- *pp* is a dummy variable that is equal to 1 if the issue is a private placement, and 0 if it is a rights issue
- *PB* is the price to book ratio on the day prior to the event date
- *crisis* is a dummy variable that is equal to 1 when the issue is related to a crisis, and 0 if it is not
- *industry* is the industry that the firm operates within
- *low_asy,* is a dummy variable measuring the degree of asymmetrical information. If the last report published was less than 50 days prior to the expectation date, the dummy variable is equal to 1
- *L, M* and *H* are dummy variables presenting the strength of the indication to an near- or medium term SEO
- *last_seo,* is a dummy variable that equals 1 if the firm have executed a SEO within the last two years
- *expected* is a dummy variable equal to 1 if the SEO derives from dataset 1
- ε symbolizes the residual

9.2.1 Expectation date

By looking at the correlation matrix displayed in the appendix chapter 12.4.3, we observe a high degree of correlation between the variables representing market capitalization and the relative size of the issue. Including these variables may result in the effects not being attributed to the right variable. This is consistent with the weaknesses elaborated in chapter 6.3.4. Therefore, we decided to exclude the variable *rel* from the regression. The following equation was tested with respect to the expectation date:

$$\overline{CAR}(\tau_1, \tau_2) = \delta_1 + \delta_{lnmcap} + \delta_{pp} + \delta_{PB} + \delta_{crisis} + \delta_{industry} + \delta_{low\_asy} + \delta_{last\_seo} + \delta_L + \delta_M + \delta_H + \varepsilon$$

The results from the regression are presented in table 9.7.

Table 9.7

	Coefficient	t-value	p-value
Constant	-0.832	2.040	0.048
Market capitalization	0.041	2.250	0.030
Private placement	-0.068	-1.220	0.228
Price to book ratio	-0.024	-1.580	0.123
Crisis offering	-0.022	-0.480	0.631
Low asymmetric information	0.096	2.100	0.043
Industry	-0.023	-1.510	0.140
Low probability	0.056	0.760	0.452
Medium probability	0.015	0.260	0.799
Less than 2 years since last SEO	0.006	0.110	0.909

From the table we are able to conclude that the variables representing market capitalization and information asymmetry were significant at a 0.05 level. It is no surprise that the size of the firm has an impact on the abnormal return. The coefficient indicated that firms with larger market capitalization experienced a more positive announcement effect compared to smaller capitalized firms. Furthermore, it is surprising that the crisis variable did not show a lower p-value, as the equivalent t-test indicated some difference between SEOs characterized as growth and crisis. The same applies to the probability variables. The observed R^2, which is the explanatory parameter of the model, equals 0.29. This means that more than 70 % of the variation in the abnormal return was explained by other variables than those included.

9.2.2 Announcement date

For the analysis on the announcement date, we have conducted one regression on dataset 1 and 2 combined. In addition to the variables explained earlier, we have included three interaction variables. These are generated by multiplying the variable *expected* with variables representing market capitalization, price to book ratio and crisis issue. We included the three variables, as we found it interesting to examine the difference in the level of significance between the two datasets.

The equation with respect to the announcement date contains many of the same variables as the equation above:

$$\overline{CAR}(\tau_1, \tau_2) = \delta_1 + \delta_{lnmcap} + \delta_{pp} + \delta_{PB} + \delta_{crisis} + \delta_{industry} + \delta_{low\_asy} + \delta_{last\_seo} + \delta_{expected} + \delta_{m.cap*exp} + \delta_{crisis*exp} + \delta_{PB*exp} + \varepsilon$$

In the combined dataset, we found a high degree of correlation between some of the independent variables, see appendix 12.4.3. The variables that showed the highest degree of correlation, was the ones representing firm size and the relative size of the issue. For the same reasons as mentioned above, we have decided to exclude the variable *rel* from our analysis.

Table 9.8

	Coefficient	**t-value**	**p-value**
Constant	0.139	0.410	0.746
Market capitalization	-0.012	-0.850	0.398
Private placement	0.078	1.120	0.265
Price to book ratio	0.001	0.710	0.478
Crisis offering	-0.233	-2.440	0.017
Low asymmetric information	0.022	0.450	0.652
Industry	0.008	0.940	0.343
Expected	-1.204	-2.000	0.050
Less than 2 years since the last issue	0.024	0.460	0.648
Interaction(Market cap. * Expected)	0.061	2.120	0.038
Interaction(Crisis * Expected)	0.139	1.210	0.230
Interaction(P/B ratio * Expected)	-0.039	-2.690	0.009

From table 9.8 we observe that the variable describing crisis issues was significant at a 0.05 level. This was as expected, and in line with the results obtained on the equivalent t-test. We also found that the interaction variables describing market capitalization and the price to book ratio for expected SEOs, were significant. This may be interpreted as though the effect of the firms' market capitalization and price to book ratio on the abnormal return is greater for expected- than unexpected SEOs. The coefficients indicate that larger capitalized firms experienced a less negative announcement effect, and that a higher price to book ratio lead to a more negative abnormal return for expected SEOs compared to unexpected SEOs. Looking back at our previously conducted t-tests for growth- and value firms, it was surprising that the interaction variable containing the price to book ratio was significant. This may indicate that we in the t-tests did not manage to isolate the “real effect” of the variable.

From chapter 7.2 we know that the composition of sectors are very different between the two datasets. This could have affected our results. However, we observe from the table above that the industry variable was far from significant. This implies that the different composition of sectors between our datasets, have close to no impact on our results. In addition, the variable for expected SEOs proved to be significant. The observed coefficient indicates that expected SEOs experienced a more negative announcement effect. This is equivalent to what the results from the event study indicated, although the difference was far from significant. It is worth mentioning that because dataset 1 was composed by 60 % crisis issues, while the equivalent number for dataset 2 was just below 20 %, the variables *expected* and *crisis* are correlated. This may explain why the variable *expected* proved to be significant in this analysis. Although the variables were correlated, we chose not to exclude any of them, as we perceive both essential to our analysis.

10. Conclusion

In this thesis, we have analyzed SEOs completed by Norwegian firms in the period between January 2011 and August 2015. The focus has been on the short-term performance of firms issuing equity. By dividing our selection of firms into two groups, one composed by firms were the SEO was expected, and the other of firms unexpectedly executing an SEO, we were able to examine the abnormal return for both groups on announcement. In addition, for the group consisting of expected SEOs we were able to identify the stock price reaction on the expectation date.

Around the selected expectation date, we found that the group of firms with expected SEOs experienced a large negative abnormal return. However, by observing the development in the abnormal return in the event window (-20, 20), the effect seemed to correct itself. This result made us question if we have managed to locate the date where the SEOs was expected by the market. On the other hand, our rebased analysis suggested that the same group of firms experienced a lasting negative momentum throughout the year prior to the issue.

We would predict the firms, where the market already expected an SEO, to experience a less profound stock price reaction on the announcement date. Our predictions were not supported by the results obtained through several analyses. The group of firms composed by expected SEOs showed a slightly higher negative average abnormal return in all event windows. However, the effect was not statistically significant. From the multiple regression analysis, we found that the variable for expected SEOs had a significant impact on the announcement effect, where expected SEOs experienced a more negative announcement effect. On the other hand, this variable was highly correlated with crisis offerings, and the result should be interpreted with caution.

From the cross-sectional analysis, we found for both datasets a difference in abnormal return depending on the firm’s size. For the group of firms with expected SEOs, larger firms experienced a significant lower negative abnormal return on both the expectation- and announcement date. This coincides with our findings for unexpected SEOs on announcement. From the multiple regression, we observed that large capitalized firms with expected SEOs experienced a significantly lower average abnormal return on announcement compared to firms where the SEO was unexpected. In addition, firms with large price to book ratios (growth firms) from the same group experienced a significantly greater negative abnormal return relative to the firms conducting unexpected SEOs.

Another interesting variable from the cross-sectional analyses was whether growth or crisis characterized the SEO. Firms with expected crisis issues experienced a larger negative abnormal return on both the expectation- and announcement date. This result corresponded with the announcement effect for unexpected SEOs. Although the graphs showed an unambiguous trend, the difference was not significant at a 0.05 level. In our multiple regression model, the same variable proved to be highly significant. Based on these results, we infer that the abnormal return is affected by whether the issue is connected to a crisis or growth opportunities. At last, we found that firms experiencing a large negative abnormal return on the expectation date also experienced a more negative announcement effect. Although the effect was not significant, it strengthens our belief that we may not have identified the right expectation date or that our dataset contains firms with negative momentum.

As our results were somewhat surprising, it is relevant to mention the factors that may have affected our results the most. Of the expected SEOs, 60 % were regarded as crisis issues, whereas the equivalent number for unexpected SEOs was only 20 %. The results may be caused by the bias of crisis issues, which most likely also were amplified by the small sample size. Furthermore, looking at the key words applied to identify most of the expected SEOs, they are clearly composed of a majority of words indicating liquidity problems. Consequently, we may have identified firms experiencing negative momentum, which would have an impact on our results.

Although our sample size was small, we obtained interesting results. However, in order to draw conclusions on behalf of the entire population, we recommend doing the study on a larger sample with a more even distribution of crisis offerings between expected- and unexpected SEOs. We find the topic highly relevant for investors, and our results should at least provide some insights into the issue of expected SEOs.

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12. Appendix

12.1 Theory

12.1.1 Interaction (market timing and pecking order)

Dong et. al. (2012) conducted an interesting study about the interaction between the market-timing hypothesis and the pecking order theory in the financing decision of firms. In the study, they found evidence indicating that firms are more likely to issue equity when their shares are overvalued and repurchase when undervalued. However, this was only the case when firms were not financially constrained. In addition, post-announcement long-run returns were lower for overvalued firms. These findings are closer related to the market-timing hypothesis than rational financing theories such as the pecking order theory. The study also showed findings consistent with the pecking order theory. Their findings supports the theoretical foundation stating that firms prefer debt to equity financing. This was, as above, only true when the firm was not under financial pressure. The results was only significant for firms that were not overvalued.

12.2 Methodology

12.2.1 Modeling the normal return

Several approaches could be applied while estimating the normal return for a given stock. These can again be separated into two superior categories: statistical and economic. The economic models are reliant on assumptions regarding investor's behavior, and are not solely based on statistical assumptions. This means that economic models are restricted statistically, which could in fact give a more precise measure of the normal return. The downside however, is that results estimated using economic models are said to be very sensitive to these statistical restrictions. Based on this we will focus on statistical models, which are based only on statistical assumptions and thus avoiding the sensitivity that can occur using economic models. The most common statistical models are the mean return model and the market model, for these the distribution assumption is sufficient. Statistical models assume that asset returns are jointly multivariate normal and independently and identically distributed through time. Even though this is a strong assumption to make, empirically it does not seem to create any difficulties.

According to Brown and Warner (1985), the market model provides the best results, and MacKinlay states that the market model represents a potential improvement over the constant mean return model. The improvement involves that the variance of the abnormal return is reduced. This makes it easier to detect any abnormal return, and in turn the event effects. Due to this, we have decided to apply the market model to estimate normal returns and thus abnormal returns.

The market model relates the return of any given stock to the return of the market portfolio, and based on the assumed joint normality it is a linear specification. For any security, *i,* the market model can be expressed as followed:

$$R_{i\tau} = \alpha_i + \beta_i R_{m\tau} + \varepsilon_{i\tau}$$

$$(\varepsilon_{i\tau} = 0) \qquad var(\varepsilon_{i\tau}) = \sigma^2_{\varepsilon_i}$$

where R_{it} is the return for security *i*, which is measured based on the estimation window defined in chapter 6.1.4. R_{mt} are the returns in the same estimation window, but for the market portfolio. The expression ε_{it} are representing the zero mean disturbance, and the parameters representing the market model are respectively α_I, β_i and $\sigma^2\varepsilon_i$. Furthermore, as MacKinlay (1997) and Bartholdy et al. (2007) recommended using a broad stock index to measure the return of the market portfolio.

To estimate the parameters of the market model, which are mentioned above, it is suitable to use the ordinary least squares (OLS) regression. This method assumes no autocorrelation and a constant variance over time. The method accumulates the following estimators on the market model parameters for firm *i* in the event window:

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

$$\hat{\alpha}_i = \hat{\mu}_i - \hat{\beta}_i \hat{\mu}_m$$

$$\hat{\sigma}^2_{\varepsilon_i} = \frac{1}{L_1 - 2} \sum_{\tau = T_0+1}^{T_1} (R_{i\tau} - \hat{\alpha}_i - \hat{\beta}_i R_{m\tau})^2$$

where

$\hat{\mu}_i = \frac{1}{L_1} \sum_{\tau = T_0+1}^{T_1} R_{i\tau}$ and $\hat{\mu}_m = \frac{1}{L_1} \sum_{\tau = T_0+1}^{T_1} R_{m\tau}$

R_{it} and R_{mt} are the return in event period t for stock *i* and the market respectively.

12.2.2 Abnormal return

Based on the obtained estimates of the market model we are able to calculate the abnormal returns. The abnormal return is attained by measuring the difference between the actual return and the normal return based on the estimation window. The formula for abnormal return is given by:

$$\widehat{AR}_{i\tau} = R_{i\tau} - \hat{\alpha}_i - \hat{\beta}_i R_{m\tau}$$

where the abnormal return is equal to the difference between the observed return for security i at time t ($R_{i\tau}$), and the parameters of the market model in addition to the return on the market portfolio at time t ($\hat{\alpha}_i - \hat{\beta}_i R_{m\tau}$).

Due to the null hypothesis, which is conditional on the event window market return, the abnormal return will be normally distributed with an expected value equal to zero and variance equal to:

$$\sigma^2 \left(\widehat{AR}_{i\tau}\right) = \sigma^2_{\varepsilon_i} + \frac{1}{L_1}\left[1 + \frac{(R_{m\tau} - \hat{\mu}_m)^2}{\hat{\sigma}^2_m}\right]$$

By looking at the equation above, we see that the conditional variance consists of two components. The first term of the equation, $\sigma^2_{\varepsilon i}$, is the disturbance variance. Whereas the second term is the additional variance, which is a result of the sampling error in α_i and β_i. This sampling error can be diminishing and the second term can approach zero if the length of the estimation window L_1 becomes large. If the estimation window is large enough the variance of the abnormal return will be equal to $\sigma^2_{\varepsilon i}$ and the observations of the abnormal return will be independent through time. Under the null hypothesis, H_0, the abnormal return can be used to draw presumptions over any period within the event window. This can be expressed as:

$$\widehat{AR}_{i\tau} \sim N(0, \sigma^2(\widehat{AR}_{i\tau}))$$

However, before any overall conclusions regarding the event can be drawn, the abnormal return observations must be aggregated across both time and securities. This two dimensional process consists of firstly aggregating abnormal return through time for each individual security, and then secondly aggregating the abnormal return both through securities and time. This process is a necessity to be able to measure the cumulative abnormal return in a multiple period event window. For security, I, the cumulative abnormal return is specified as:

$$CAR_i(\tau_1, \tau_2) = \sum_{\tau = \tau_1}^{\tau_2} AR_{it}$$

where τ_1 to τ_2 is the event window, further characterized by $T_1 < \tau_1 \leq \tau_2 \leq T_2$. Furthermore, if L_1 is large enough, the variance of $\widehat{CAR}_i$ is represented as:

$$\sigma_i^2(\tau_1, \tau_2) = (\tau_2 - \tau_1 + 1)\sigma_{\varepsilon_i}^2$$

Under H_0, the distribution of the cumulative abnormal return are expressed by:

$$\widehat{CAR}_i(\tau_1, \tau_2) \sim N(0, \sigma_i^2(\tau_1, \tau_2))$$

Since one event observation will not give any significant conclusion on how the market has responded in the past, it is necessary to aggregate the abnormal return observations for the event window and through observations of the event. This will more likely give inferences of what has happened in the past and what we can expect to happen when an SEO are expected in the future. It is important to note that in this aggregation it is assumed no overlaps, also called clustering, in the event window of the selected securities. With no clustering the abnormal and cumulative returns across securities will have no correlation, and returns would be independent across stocks. The average aggregated abnormal returns for period τ, given the number of events, N, is given by:

$$\overline{AR}_\tau = \frac{1}{N}\sum_{i=1}^{N}\sigma_{\varepsilon_i}^2$$

with a variance of

$$var(\overline{AR}_\tau) = \frac{1}{N^2}\sum_{i=1}^{N}\sigma_{\varepsilon_i}^2$$

given a large L_1.

This gives the ability to analyze any abnormal return for any event period. However, we are taking it a step further by aggregating the abnormal return over the event window, which will present the cumulative average abnormal return. By estimating the cumulative average abnormal return, we are eventually able to test our null hypothesis that the abnormal returns are zero when an SEO are presumed expected. The cumulative average abnormal return for any interval in the event window using the approach to aggregate $\overline{AR}_\tau$ is:

$$\overline{CAR}(\tau_1,\tau_2) = \sum_{\tau=\tau_1}^{\tau_2}\overline{AR}_\tau$$

$$var\left(\overline{CAR}(\tau_1,\tau_2)\right) = \sum\nolimits_{\tau=\tau_1}^{\tau_2} var(\overline{AR}_\tau)$$

A second approach to retrieve the cumulative average abnormal return is to form the CAR's security by security and aggregate these through time:

$$\overline{CAR}(\tau_1,\tau_2) = \frac{1}{N}\sum_{i=1}^{N}\widehat{CAR}_i(\tau_1,\tau_2)$$

$$var\left(\overline{CAR}(\tau_1,\tau_2)\right) = \sum_{N^2}^{1}\sigma_i^2(\tau_1,\tau_2)$$

The covariance component is set to zero due to the assumption of no clustering. Eventually, to taking conclusions concerning the cumulative average abnormal return and test the hypothesis, the below expression can be used:

$$\overline{CAR}(\tau_1,\tau_2) \backsim N[0, var(\overline{CAR}(\tau_1,\tau_2))]$$

At last, it is necessary to mention that in practice an estimator must be used to calculate the variance of the abnormal returns. This is due to the fact that $\sigma^2_{\varepsilon i}$ is unknown. The appropriate choice of $\sigma^2_{\varepsilon i}$ according to MacKinlay (1997) is the sample variance measure of $\sigma^2_{\varepsilon i}$ from the market model regression in the estimation window. By doing this the distributional result will be asymptotic with respect to N and L_1. Thus, if the choice falls upon using this to calculate the average aggregated abnormal return, $\overline{AR}_\tau$, the following expression can test the hypothesis:

$$\theta_1 = \frac{\overline{CAR}(\tau_1,\tau_2)}{Var(\overline{CAR}(\tau_1,\tau_2))^{1/2}} \sim N(0,1)$$

12.2.3 Wilcoxon Rank Sum Test

The test is a nonparametric test where the null hypothesis is that two samples are from the same population. The test ranks the observations, and sums the rank for each sample. The observed rank sum for the smallest sample, W, is then tested against an expected rank sum, μ, which is based on the number of observations. For large samples, the test-statistic is approximately normally distributed. (Keller, 2009). The test statistic,

$$\mu = \frac{n_1(n_1+n_2+1)}{2}$$

with

$$\sigma = \sqrt{\frac{n_1 * n_2(n_1 + n_2 + 1)}{12}}$$

can then be tested with a z-test:

$$z = \frac{W - \mu}{\sigma}$$

12.2.4 Independent two-sample t-test

In order to examine whether the average performance between two groups are significantly different or if it is due to chance, it is possible to apply a two-sample t-test. In the two-sample t-test, the observations are divided into groups based on different characteristics. This makes it possible to measure the group's performance against each other, and make inferences about whether the groups' different characteristics resulted in a significant difference. Note, the procedure is based on the t-distribution, and for small samples, it is more sufficient if the data are drawn from distributions that are normal or close. The independent t-value can be calculated as following:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{S_{X_1X_2} \cdot \sqrt{\frac{1}{n}}}$$

where

$$S_{X_1X_2} = \sqrt{S_{X_1}^2 + S_{X_2}^2}$$

is defined as the pooled standard deviation, which is a method for estimating the standard deviation for several different groups while the performance of each group may be different. *1* and *2* are respectively representing group one and group two, *n* are equal to the number of observation, and at last, $\bar{X}$ are the average performance.

(Keller, 2009)

12.2.5 Multiple regression

In order to examine the relationship between independent variables and one dependent variable, it is possible to employ a cross-sectional regression. In order to test if other characteristics than those specific to the event have an impact on the dependent variable, a cross-sectional regression can be used.

The regression model are expressed by:

$$AR_j = \delta_0 + \delta_1 X_{1j} + \cdots + + \delta_M X_{MJ} + \eta_j$$

$$E(\eta_j) = 0$$

where AR_j is the j number value of the dependent variable observation, X_{mj},m = 1,.., M, are M characteristics for the j number of observations and (n_j) is the zero mean disturbance term that is uncorrelated with the x's. δ_m, m = 0,…,M are the regression coefficients. The regression model can be estimated by adopting the ordinary least squares regression (OLS).

The OLS regression estimates the dependent variable through a linear model. The aim of the model is to minimize the difference between the observations and the linear predication conducted by the model. By doing this the test returns a descriptive statistic, R^2, explaining the predictive power of the model. In addition, each characteristic will receive a p-value indicating whether the independent variable has significant impact on the dependent variable. (MacKinley, 1997)

12.3 Datasets

Table 12.1

Dataset 1

Company	Announced
Archer	31.01.2013
Asetek	24.02.2015
Bridge Energy	19.01.2012
Deep Sea Supply	02.06.2014
Det Norske Oljeselskap	30.08.2011
Det Norske Oljeselskap	04.12.2012
Det Norske Oljeselskap	02.06.2014
DNO	09.03.2015
DOF	12.09.2011
Dolphin Group	21.04.2015
Eitzen Chemical	15.04.2011
Frontline	06.06.2013
Havila Shipping	27.06.2011
Havila Shipping	10.12.2012
Höegh LNG Holdings	09.09.2015
Interoil Exploration and Production	11.02.2013
Marine Harvest	17.12.2012
Sparebank 1 SMN	01.02.2012
Sparebanken Møre	13.06.2013
Northland Resources	02.02.2012
Norse Energy Corp.	24.03.2011
Norse Energy Corp.	26.01.2012
Sparebank 1 Nord-Norge	13.08.2013
Sparebank 1 Nord-Norge	01.03.2011
Norwegian Energy Company	28.09.2012
Norwegian Energy Company	21.10.2013
North Energy	09.02.2012
Polarcus	06.10.2014
Polarcus	11.10.2011
Polarcus	13.03.2012
Prospector Offshore Drilling	17.09.2012
Prosafe	14.03.2013
Questerre Energy Corporation	20.11.2013
Q-Free	02.11.2011
Renewable Energy Corporation	22.06.2012
Renewble Energy Cooperation	14.05.2013
REC Silicon	15.07.2015
Rocksource	01.02.2011
Rocksource	12.01.2015
Salmar	29.02.2012
Scana Industrier	04.05.2015
Scana Industrier	15.12.2011
Sevan Drilling	14.01.2013
SinOceanic Shipping	15.05.2013
Sparebank 1 Østfold Akershus	21.05.2015
Songa Offshore	25.11.2013
Songa Offshore	19.04.2012
Spectrum	29.07.2011
Sparebank 1 SR-Bank	17.04.2012
Wentworth Resources	28.10.2013

Dataset 2

Company	Announced
AF Gruppen	08.07.2011
Algeta	13.02.2012
Archer	23.08.2011
BWG Homes	14.02.2012
Copeinca	05.04.2013
Dockwise	30.04.2012
Doplhin Group	13.02.2013
EMAS Offshore	10.07.2014
Nio Inc.	30.04.2012
Gaming Innovation Group	16.02.2015
Idex	26.03.2015
Idex	03.01.2014
NEL	03.06.2015
NEL	08.09.2014
Norsk Hydro	03.05.2010
Norwegian Car Carriers	10.02.2011
Norwegian Car Carriers	13.02.2012
North Energy	21.01.2014
Norwegian Property	05.11.2012
Opera Software	07.11.2013
Opera Software	26.06.2014
Reach Subsea	03.05.2013
Siem Offshore	11.06.2015
Spectrum	01.06.2015
Thin Film Electronics	18.06.2015
Thin Film Electronics	02.10.2013
Thin Film Electronics	30.10.2013
Vardia Insurance	02.03.2015
Clavis Pharma	17.01.2012
Weifa	09.09.2014
Weifa	17.06.2014

12.4 Analysis

12.4.1 CAAR excluding observations

The results obtained from the analysis completed on dataset 1 and 2 excluding observations above and below +/- 30 %, are presented in the following. The exclusion was based on the event window (-10, 10) on announcement.

Expected SEOs on the expectation date

Table 12.2

Event window (τ_1, τ_2)	(-20, 20)	(-10, 10)	(-5, 5)	(-2, 2)	(-1, 1)	(-1, 5)	(-1, 10)
$\overline{CAR}(\tau_1, \tau_2)$	-0.25 %	-5.55 %	-2.25 %	-1.13 %	-0.04 %	-0.61 %	-1.68 %
Median	-0.18 %	-1.01 %	-1.36 %	0.06 %	0.05 %	-1.63 %	-1.97 %
t-value	-0.060	-2.040	-1.170	-0.700	-0.300	-0.400	-0.940
p-value	0.953	0.048	0.247	0.486	0.765	0.689	0.35
Std. Dev.	0.042	0.027	0.019	0.016	0.013	0.015	0.018
Skewness	-0.550	-0.593	-0.585	-0.923	-1.239	0.152	-0.538
Excess kurtosis	3.209	0.444	1.531	2.964	2.843	0.351	1.110
N	41	41	41	41	41	41	41

Expected SEOs on the announcement date

Table 12.3

Event window (τ_1, τ_2)	(-20, 20)	(-10, 10)	(-5, 5)	(-2, 2)	(-1, 1)	(-1, 5)	(-1, 10)
$\overline{CAR}(\tau_1, \tau_2)$	-4.41 %	-2.87 %	-3.73 %	-3.78 %	-6.27 %	-3.78 %	-3.89 %
Median	-5.92 %	-0.04 %	-2.88 %	-2.49 %	-4.15 %	-6.23 %	-3.90 %
t-value	-1.400	-1.500	-1.850	-1.830	-2.650	-1.890	-2.080
p-value	0.171	0.142	0.072	0.075	0.011	0.066	0.044
Std. Dev.	0.032	0.019	0.020	0.021	0.024	0.020	0.019
Skewness	0.552	-0.027	-0.417	-1.680	-2.731	-0.202	-0.275
Excess kurtosis	0.824	-0.232	1.444	6.882	11.333	1.603	0.956
N	41	41	41	41	41	41	41

Unexpected SEO on the announcement date

Table 12.4

Event window (τ_1, τ_2)	(-20, 20)	(-10, 10)	(-5, 5)	(-2, 2)	(-1, 1)	(-1, 5)	(-1, 10)
$\overline{CAR}(\tau_1, \tau_2)$	-0.83 %	-3.47 %	0.61 %	2.30 %	1.68 %	-0.49 %	-2.16 %
Median	-1.12 %	-3.94 %	0.23 %	-1.12 %	-0.22 %	-2.60 %	-3.53 %
t-value	-0.24	-1.960	0.370	1.330	1.180	-0.380	-1.39
p-value	0.809	0.062	0.712	0.198	0.249	0.707	0.178
Std. Dev.	0.034	0.018	0.016	0.017	0.014	0.013	0.016
Skewness	-0.137	-0.470	0.398	0.650	0.682	0.498	-0.032
Excess kurtosis	1.471	-0.106	0.380	-0.437	0.104	0.740	1.087
N	24	24	24	24	24	24	24

12.4.2 Rebased analysis

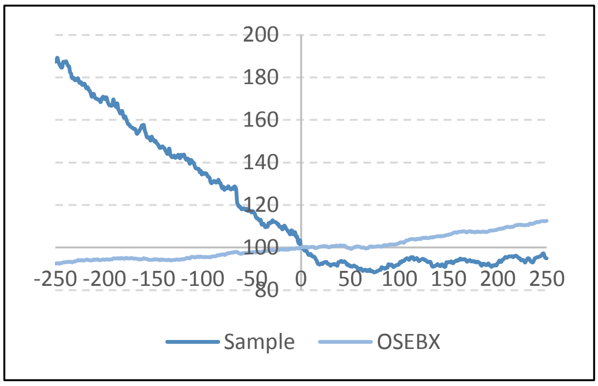

Figure 12.1

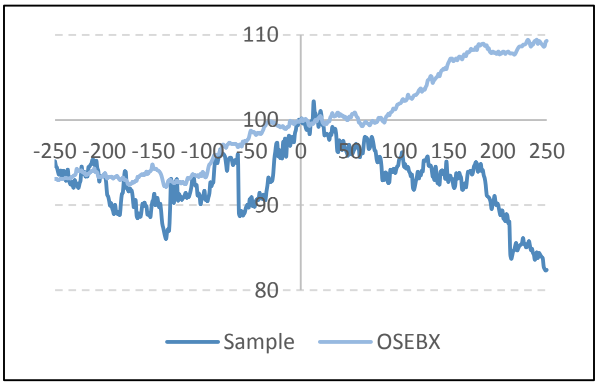

Figure 12.2

12.4.3 Independent two-sample t-tests

Value or growth company

Based on the price to book ratio (P/B), we are going to test whether or not the value of the firm has a significant influence on the stock price reaction. If a firm has a (P/B) of 1, we may say that the expected growth is equal to investor's required return. Firms with a low P/B are often viewed as mature firms with stable growth and cash flows. Hence, higher P/B can be justified by higher growth prospects. Defining firms as growth or value based on the P/B ratio is consistent with previous studies conducted by Capaul et. al. (1993) and D`Mello et. al. (2003). Our hypothesis is that firms with relatively high P/B (growth) will experience a smaller stock price reaction. This is consistent with the Wasteful Investment Hypothesis explained in 5.2.1. It is also worth mentioning that firms currently in some sort of crisis may have artificially low P/B. One explanation for this is that their stock price has dropped significantly, yet the firm has not taken sufficient write down on their books. A good example of this is the current situation (2015) in the offshore sector. The following represents our hypotheses:

$$H0: \mu(0) - \mu(1) \geq 0$$

$$H1: \mu(0) - \mu(1) < 0$$

Where μ(0) and μ(1) are expressions for respectively firms with high P/B (growth) and low P/B (value).

Expected SEOs on the expectation date

By conducting the two-sample t-test on expected SEOs with respect to the expectation date we obtained the following results:

Table 12.5

	Growth (0)	**Value (1)**	**0-1**
$\overline{\text{CAR}}(\tau_1, \tau_2)$	-8.06 %	-1.77 %	-6.29 %
Median	-4.36 %	-1.95 %	-2.41 %
t-value			-1.195
p-value			0.120
N	20	20	40

To our surprise, we found the opposite of what we predicted. From the table, we observe that growth firms had a higher CAAR in comparison with value firms. However, with a p-value of 0.120, the difference in CAAR of -6.29 % was not statistically significant at a 0.05 level, and we are not able to reject our null hypothesis. Referring to the figure, we see that the development in CAAR is equal prior to day 0, and quite different after.

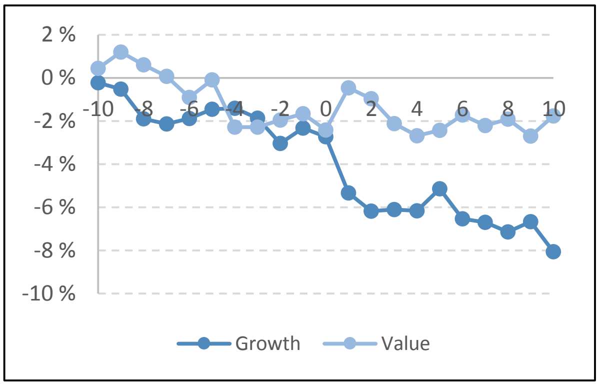

Figure 12.3

Expected- and unexpected SEOs on the announcement date

By applying the same test as above on the announcement date for both expected- and unexpected SEOs, we obtained the results presented in table 12.6.

Table 12.6

	Expected			Unexpected		
	Growth (0)	**Value (1)**	**0-1**	**Growth (0)**	**Value (1)**	**0-1**
$\overline{CAR}(\tau_1,\tau_2)$	-3.82 %	-1.62 %	-2.20 %	-3.74 %	0.08 %	-3.81 %
Median	-5.26 %	-9.31 %	4.05 %	-5.26 %	-0.48 %	-4.79 %
t-value			-0.311			-0.489
p-value			0.379			0.316
N	20	20	40	14	14	28

Looking at expected SEOs, we found that the difference in CAAR of -2.20 % was not statistically significant, with a p-value of 0.379. The same result applied for unexpected SEOs, with a difference in CAAR of -3.81 % and a p-value of 0.316. Based on expected SEOs on the announcement date we observe less difference between growth- and value firms in comparison to expected SEOs on the expectation date. Figure 12.4 and 12.5 visualizes the CAAR for growth- and value firms when SEOs are expected and unexpected during the event window (-10, 10). The graph containing the development for unexpected SEOs displays a more different development in the abnormal return between growth and value firms. This may be caused by the different composition of the two datasets.

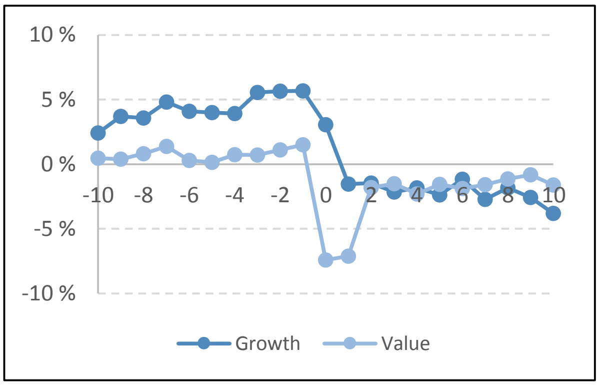

Figure 12.4 – Expected

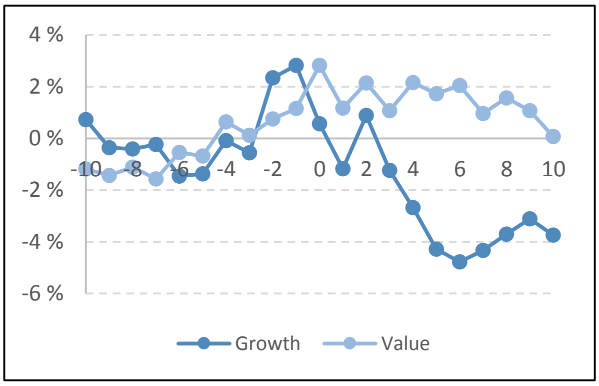

Figure 12.5 – Unexpected

Probability of execution

Depending on which and how rapidly the key words used to define SEOs as expected occur, we have given each of the expected SEOs a probability of being executed. Each of the observed SEOs are either given the value 0 or 1, respectively representing high- and low probability. We predict that firms characterized by high probability of completing the SEO would experience a larger negative stock price reaction on the expectation date compared to SEOs characterized by low probability. For the announcement date, we predict the opposite.

Expected SEOs on the expectation date

We have the following hypothesis for expected SEOs on the expectation date:

$$H0: \mu(0) - \mu(1) \geq 0$$

$$H1: \mu(0) - \mu(1) < 0$$

By grouping the firms with respect to high- and low probability, we located 24 firms belonging to the group of high probability and 26 to the group of low probability. The table shows the obtained results:

Table 12.7

	High prob. (0)	Low prob. (1)	0-1
$\overline{\text{CAR}}(\tau_1, \tau_2)$	-12.37 %	-0.27 %	-12.10 %
Median	-8.01 %	-0.20 %	-7.82 %
t-value			-2.775
p-value			0.004
N	24	26	50

As indicated from the results we observe indications on a less profound negative market reaction for firms having a lower probability of implementing the SEO. We found high- and low probability firms to have a CAAR equal to -12.37 % and -0.27 %, constituting a significant difference in CAAR of -12.10 %. The development in CAAR is illustrated in the figure below. The difference is as expected large, and seems to gradually evolve throughout the event window.

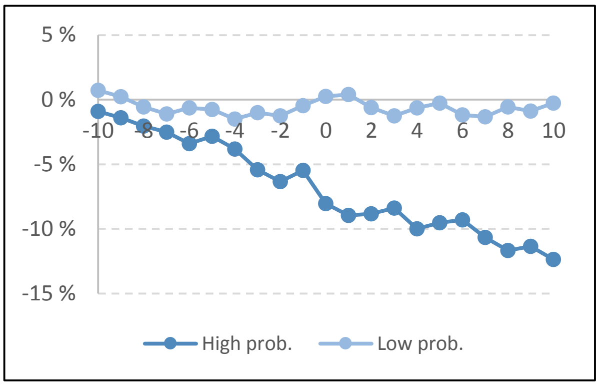

Figure 12.6

Expected SEOs on the announcement date

In accordance with our prediction that SEOs with high probability of being executed will experience a more profound negative stock price reaction around the expectation date, we found it reasonable to believe that the same SEOs will have a less negative announcement effect. Consequently, our hypotheses are as followed:

$$H0\colon \mu(0) - \mu(1) \leq 0$$

$$H1\colon \mu(0) - \mu(1) > 0$$

The descriptive statistics obtained:

Table 12.8

	High prob. (0)	Low prob. (1)	0-1
$\overline{CAR}(\tau_1, \tau_2)$	-5.54 %	-0.88 %	-4.66 %
Median	-4.30 %	-5.26 %	0.97 %
t-value			-0.727
p-value			0.236
N	24	26	50

From the descriptive statistics, we found a similar tendency as for the expectation date. However, we observe a smaller difference in CAAR on the announcement date, where high- and low probability have CAARs of respectively -5.54 % and -0.88 %, constituting a difference in CAAR of -4.66 %. The results is opposite of what we expected to find, as we predicted the high probability issues to be object to less value destruction than those with low probability. This may be due to some other factors driving the observed abnormal return for the two groups, or that our probability predictions are uncertain. By looking at the obtained p-value, we found the difference in CAAR not to be statistically significant at a 0.05 level, and we are not able to reject our null hypothesis.

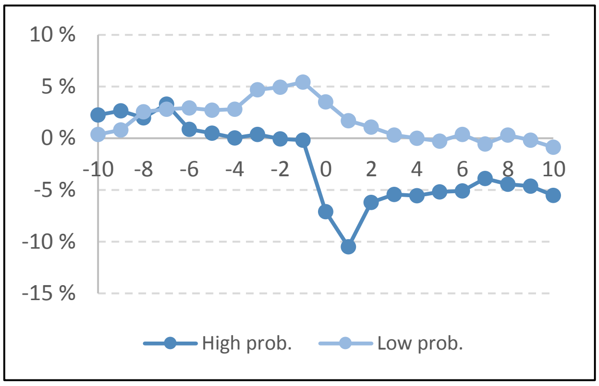

Figure 12.7

Presenting a visual overview of the development in CAAR for the event window (-10, 10) we observed the largest difference between the two groups on day 0. From day 1, the development in CAAR is quite different. This indicates that there is a difference in abnormal return, although it is not significant.

The size of the issue relative to market capitalization

In the following, we examine whether the size of the SEO relative to the firm's market capitalization constitutes a significant difference on the stock price reaction. We obtain the relative size by dividing the capital raised on the firm's market capitalization on the date prior to the expectation and announcement date. As a relative large issue will be more dilutive for the firm's investors, it is reasonable to assume that the negative stock price reaction will be larger for those issuing a SEO whose size is large relative to their current market capitalization. This is equivalent with the wasteful investment hypothesis (Barklay & Litzenberg, 1988) and research done by Asquith and Mullins (1986, 1). Mikkelson and Parch (1986), did however not find any relationship between the size of the issue and the firm's value destruction. Although these are studies of the absolute size of the issue, we find their results relevant. The hypotheses tested are:

$$H0{:}\, \mu(0) - \mu(1) \geq 0$$

$$H0{:}\, \mu(0) - \mu(1) < 0$$

Where μ(0) and μ(1) represent respectively firms with a relatively larger and smaller SEO.

Expected SEOs on the expectation date

Although the size of the issue is not publicly known prior to announcement, we believe that the approximate size of an expected SEO are assimilated by the market. The results obtained with respect to dataset 1 (expected SEOs) on the expectation date are presented in table 12.9.

Table 12.9

	Big size (0)	Small size (1)	0-1
$\overline{\text{CAR}}(\tau_1, \tau_2)$	-10.85 %	-0.32 %	-10.54 %
Median	-6.81 %	-0.49 %	-6.32 %
t-value			-2.238
p-value			0.016
N	20	20	40

With a p-value of 0.016, we found that the relative size of the issue had a significantly impact on the firm's stock price. This indicates, as predicted, that the size of the issue is expected and factored in by the market. This is confirmed by the figure showing a gradually more negative abnormal return for relatively large expected SEOs.

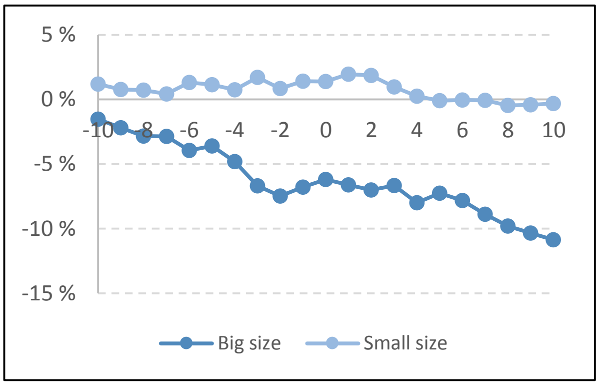

Figure 12.8

Expected- and unexpected SEOs on the announcement date

The results concerning the impact of the relative size on announcement date for both expected and unexpected SEOs are presented in table 12.10.

Table 12.10

	Expected			Unexpected		
	Big size (0)	Small size (1)	0-1	Big size (0)	Small size (1)	0-1
$\overline{CAR}(\tau_1, \tau_2)$	-7.71 %	6.23 %	-13.94 %	-10.71 %	1.58 %	-12.29 %
Median	-4.16 %	1.61 %	-5.77 %	-3.96 %	-1.56 %	-2.40 %
t-value			-1.981			-1.685
p-value			0.027			0.052
N	20	20	40	14	14	28

Also on the announcement date, the difference between large and small expected SEOs had a significant impact on the abnormal return. The effect was equivalent for unexpected SEOs, however the effect was not significant. In addition, larger unexpected SEOs experienced a more negative abnormal return in comparison with large expected SEOs. From the figures we observe a similar trend within both datasets, but the trend are developing more differently for unexpected SEOs.

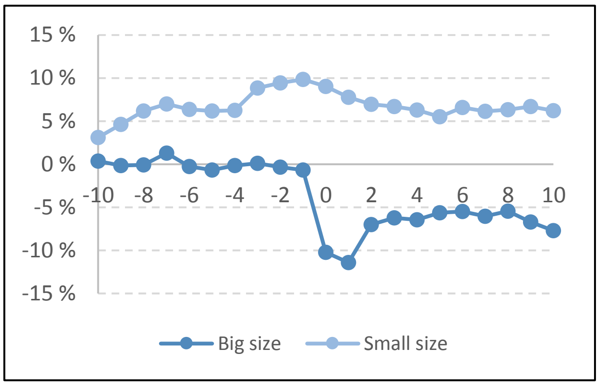

Figure 12.9 – Expected

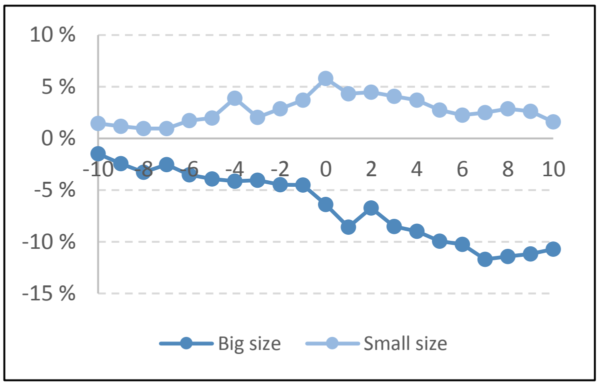

Figure 12.10 – Unexpected

Information asymmetry

Referring back to the theory related to asymmetrical information in chapter 4.2, we know from the market-timing hypothesis that firms will prefer to issue equity when their stocks are overvalued. However, due to the existence of asymmetrical information, investors may interpret the issue as a signal of the firm being overvalued and therefore value the new equity accordingly. This is one of the reasons for why Bayless and Chaplinsky (1996) suggest that it is optimal to conduct a SEO in periods with low asymmetrical information. This would enable firms to signal their true value, and thus diminishing the negative stock price reaction. Based on this we assume that higher asymmetry, will lead to larger abnormal return.

As a measure of asymmetry, we are applying the time since the last quarterly- or annual report. Firms that presented their last report less than 50 days prior to the event dates are characterized by having a low degree of asymmetry. Whereas firms presenting their last report more than 50 days prior to the event dates are characterized by high information asymmetry. Our hypoteses are given by:

$$H0: \mu(0) - \mu(1) \leq 0$$

$$H0: \mu(0) - \mu(1) > 0$$

Where μ(0) and μ(1) represent respectively firms with low and high asymmetry.

Expected SEOs on the expectation date

The results for expected SEOs on the expectation date are presented in table 12.11.

Table 12.11

	Low asy. (0)	High asy. (1)	0-1
$\overline{CAR}(\tau_1, \tau_2)$	-1.36 %	-10.80 %	9.44 %
Median	-0.74 %	-8.95 %	8.21 %
t-value			2.117
p-value			0.020
N	25	25	41

The descriptive statistics suggests that firms with high asymmetry experiences a significantly higher negative abnormal return in the event window (-10, 10). This is as expected, and the development in CAAR stipulated below confirms this result.

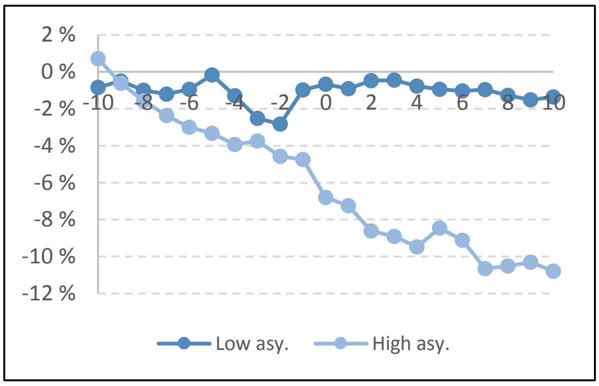

Figure 12.11

Expected and unexpected SEOs on Announcement date

The descriptive statistics for both datasets on the announcement date are shown in table 12.12.

Table 12.12

	Expected			Unexpected		
	Low asy. (0)	High asy. (1)	0-1	Low asy. (0)	High asy. (1)	0-1
$\overline{CAR}(\tau_1, \tau_2)$	-4.56 %	-8.77 %	4.22 %	0.90 %	-5.86 %	6.76 %
Median	-3.31 %	-6.56 %	3.25 %	-5.14 %	1.20 %	-6.34 %
t-value			0.989			0.902
p-value			0.164			0.187
N	23	27	50	16	15	31

From the results, we observed that firms from both datasets with a higher degree of information asymmetry experienced a smaller price reduction on the announcement date. However, the difference was larger for the firms consisting of unexpected SEOs. Looking at the p-values, the differences were not found statistically significant at a 0.05 level. Figure 12.12 and 12.13 gives a visual overview of the development in CAAR for both expected and unexpected SEOs in the event window (-10, 10). The two different groups, high- and low asymmetry, of expected SEOs experienced a more similar development in CAAR, than equivalent unexpected SEOs.

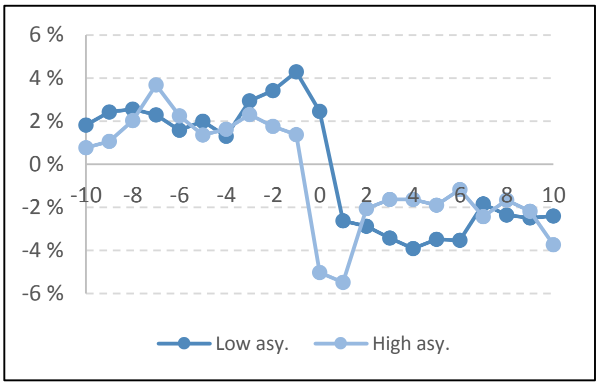

Figure 12.12 – Expected

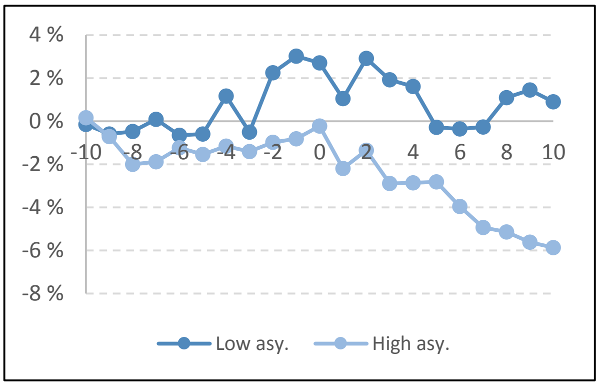

Figure 12.13 – Unexpected

12.4.4 Correlation matrixes

Table 12.13 – The expectation date

	lnmcap	*rel*	*pp*	*sector*	*crisis*	*PB*	*low_asy.*	*last_SEO*	*H*	*M*	*L*
lnmcap	1										
rel	-0.5439	1									
pp	-0.0728	0.0376	1								
sector	-0.0621	0.0819	-0.5399	1							
crisis	-0.0194	-0.1815	0.2004	-0.1955	1						
PB	0.0624	-0.1839	-0.0510	-0.1681	0.0302	1					
low_asy.	-0.0286	0.0731	-0.1091	0.1895	-0.3266	-0.0463	1				
last_SEO	-0.2661	0.2250	-0.0528	-0.1294	0.1480	-0.0866	-0.0806	1			
H	-0.3119	0.2502	0.1667	-0.0501	0.1782	0.0383	-0.1309	0.2110	1		
M	-0.0123	-0.0293	-0.1273	-0.2153	0.0170	0.1239	0.0000	0.2585	-0.4910	1	
L	0.3142	-0.2124	-0.0322	0.2666	-0.1896	-0.1609	0.1267	-0.4661	-0.4699	-0.5383	1

Table 12.14 – The announcement date

	lnmcap	*rel*	*pp*	*sector*	*crisis*	*PB*	*low_asy.*	*expected*	*last _SEO*
lnmcap	1								
rel	-0.6286	1							
pp	0.0010	-0.0869	1						
sector	-0.0005	0.0009	-0.1941	1					
crisis	-0.1603	0.0001	-0.0081	-0.0683	1				
PB	0.0857	-0.1471	0.0812	-0.0967	-0.1827	1			
low_asy.	0.1217	0.0183	-0.1229	0.1333	-0.2155	3.7E-05	1		
expected	-0.0273	0.0218	-0.0897	-0.2071	0.3976	-2.7E-01	-0.0546	1	
last_SEO	-0.0876	0.0814	0.0935	-0.0958	-0.0166	1.6E-01	-0.0385	-0.1054	1