NTNU – Trondheim
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Stock Price Performance Following Equity Offerings at Oslo Stock Exchange

Is Investing in SEO Companies Hazardous to
Your Wealth?

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Preface

This Master thesis is written as the conclusion of the Master program in Industrial Economics and Technology Management at the Norwegian University of Science and Technology (NTNU) during the spring semester of 2012. The author is specializing in Financial Engineering and consequently saw this thesis as an excellent opportunity to indulge in one of the most interesting topics in modern finance, namely equity offerings.

Numerical analyses have been performed primarily in Microsoft Excel. The data foundation for the thesis is primarily obtained from the Oslo Stock Exchange and their webpage Newsweb. The supporting literature is selected from different acknowledged academic journals, primarily The Journal of Finance and The Journal of Financial Economics.

I would like to thank my supervisor Adjunct Associate Professor Einar Belsom at the department of Industrial Economics and Technology Management at the Norwegian University of Science and Technology (NTNU) for comments and guidance throughout my work with this paper.

Stock Price Performance Following Equity Offerings at Oslo Stock Exchange

Sammendrag

Jeg undersøker aksjekursens avkastning etter andregangsemisjoner på Oslo Børs. Gjennom en empirisk analyse finner jeg en umiddelbar negativ priseffekt knyttet til annonsering av emisjonene, samt en negativ avkastning i forhold til selskap som ikke gjør emisjoner. Jeg viser at disse effektene er gjeldene på det norske markedet på samme måte som det er påvist på samtlige internasjonale marked. Prisfallet ved annonsering kan i stor grad forklares av nivået av asymmetri i informasjon i markedet og varierer med ulike egenskaper og faktorer som sektor, emisjonsstørrelse og avkastning før annonsering. De langsiktige resultatene er mer motstridende. Ved å bruke tre-faktor modellen til Fama og French finner jeg at selskaper har en negativ avkastning over en treårs periode etter emisjonen i forhold til selskaper som ikke henter kapital gjennom emisjoner. Det er likevel en mistanke om at en slik langsiktig negativ avkastning i virkeligheten skyldes at modellen ikke fanger opp forskjellen i risiko mellom selskapene. Dette er i samsvar med hypotesen om et effektivt marked.

Nøkkelord: Annonseringseffekt, langsiktig negativ avkastning, informasjonsasymmetri, feilmåling av risiko, faktor regresjonsmodell

Stock price Performance Following Equity Offerings at Oslo Stock Exchange

Abstract

I examine the stock price performance following a seasoned equity offering at Oslo Stock Exchange. Through an empirical analysis I find that the existence of a negative announcement effect associated with issuing seasoned equity, as well as a long-run underperformance, is also applicable in the Norwegian market. The level of asymmetry can to a large extent explain the price drop and varies with characteristics like sector, offering size, floatation method, and pre-offer performance. The long-run performance results are more contradicting. By using a three-factor model based on the Fama and French model I find that issuing firms underperform in a three-year period following the issue. It is however argued that such a long-run underperformance is a result of mis-measurement between the issuing and non-issuing companies. This is in accordance to the market efficiency theory where the measured underperformance is only a result of the applied model not being able to price all risks.

Keywords: Announcement effect, long-run underperformance, information asymmetry, mis-measurement of risk, size, three-factor regression model

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1 Introduction

At Oslo Stock Exchange equity issues are an important source of financing and the total value of capital raised through SEOs amounted to more than NOK 40 billion in 2010. The increased interest around stock return patterns around seasoned equity offering (SEO) is therefore understandable. While SEOs seems to garner less public attention than initial public offerings (IPO), they occur far more frequently and accounts for a far larger proportion of the total equity raised at OSE. Over the period 2005 to 2010 IPOs amounted to NOK 55 billion while SEOs raising in total more than NOK 207 billion.

In this paper I will report results from an extensive analysis of issuing firms at OSE. The purpose of the analysis is to investigate the stock price performance following SEOs, investigate factors affecting this performance, and to what extent existing financial theories are able to explain the stock price effects. The international theories are extensive, but there are few analyses specifically studying OSE. The few studies typically focus on the time series properties, leaving out information about return differences across companies, time, sectors, and other characteristics. For this reason I believe that my paper is an important contribution in the search for a deeper understanding of price effects for SEO companies at OSE.

There are two main propositions of this paper. Firstly, I will investigate the price changes that occur at the announcement of SEOs. Secondly, I will try to measure the long-run performance of SEO companies compared to non-issuing firms at OSE. I do not develop new methodologies for evaluating abnormal performance. Instead, I identify the effect of different circumstances around the SEO and possible causes for the abnormal performance among issuing companies.

The tendency for issuing firm to experience negative returns at the day that the news of the offering is released is a well-known and well-documented phenomenon[1]. Financial economists generally accept the information asymmetry theory as the most plausible explanation for the negative abnormal return observed around most SEO announcements. Tests and detection of long-run underperformance by SEO firms have become increasingly common within the academic finance literature. The literature is not in complete agreement to

[1] The negative stock price effect has been recorded and measured in, among others, Masulis and Korwar (1986), Asquith and Mullins (1986), and Eckbo and Masulis (1992). For a comprehensive summary of equity offering research, see Eckbo, Masulis, and Norli (2007).

why such underperformances occur, but a common interpretation is to attribute this underperformance to investors systematically over-valuing the shares at the time of issue[2]. This is consistent with the windows of opportunity hypothesis where the over-optimism in the market can obscure the SEO's negative signal to such an extent that the price drops not only at announcement, but also in the longer perspective.

By performing a thorough event study of the abnormal return at SEO announcement I find that also firms at OSE experience a significant price drop. I investigate the effects of different issue methods, different issue size proportional to company size, pre-announcement performance, industry segments, and time periods and find that my results is consistent with much of the existing theories.

I further show that the shareholder wealth also decreases in the three-years subsequent to the offering. The indication of a systematically underperformance of issuing firms in the long run arises doubts about the market efficiency theory. A prime prediction of any finance model is that there is a relationship between risk and return, that more risky securities should require a higher return. This leads to the hypothesis that firms issuing equity have lower expected return than non-issuers as they have a lower risk exposure.

By utilizing the Fama and French factor model based on the three risk factors market, company size and liquidity, found to be important in pricing risk at the Norwegian stock market by Næs, Skjeltorp, and Ødegaard (2009) I hope to shed light on several important issues. Firstly, by finding the relevance and the feature of the risk factors company size and liquidity for SEO firms. Secondly, I exploit the differences in long-run performance of firms in different industry segments, issuing in periods of both favorable and poor market conditions with different levels of optimism and information asymmetry, and choosing private placement or rights offerings as issue method. Lastly, I exploit the distribution of the underperformance in the years following the SEO, finding that the underperformance is significantly greater for the first years.

[2] The long-run performance is among others discussed by Ritter (1993), Loughran and Ritter (1995), Brav, Geczy, and Gompers (2000), and Bayless & Chaplinsky (1996)

The rest of the paper is organized as follows. Chapter 2 is an introduction to Oslo Stock Exchange and the mechanics of a SEO. Chapter 3 is a review of theories trying to reason for and explain the causes and effects of the stock price dynamics subsequent to equity offerings. Chapter 4 introduce the data material, while chapter 5 and 6 present the methodology and results from my analysis of announcement effect and long-run effect respectively, as well as a discussion addressing the complexity in the measuring of stock price performance subsequent to SEOs. Chapter 7 contains my concluding remarks.

2 Equity offerings at Oslo Stock Exchange

This section will explain some of the features on OSE during the last time periods. Additionally, I will give an introduction to the most used floatation methods when issuing new equity.

2.1 Introduction to Oslo Stock Exchange

The OSE has been growing steadily since 1980 both measured by trading volume and values (Kvaal & Ødegaard, 2011). A few large firms have historically dominated OSE and the major values are concentrated within a few sectors. The industrial sector had the largest companies until the energy sector dominated by oil companies took over. In terms of number of companies the dominating sectors were up to 1990 industrials and financials. In recent years there has been an increase of IT companies and a decrease of industrials. Looking at the market value of each sector the pattern is different as the IT sector has a low market weight even though almost 20% of the companies are classified to this sector. The energy sector has increased in market weight over the last years. The listing of Statoil, the state oil company, and the reclassification of Norsk Hydro from industrials to energy sector increased the market weight of the energy sector from 10% in 2000 to 50% in 2005.

For many years Norsk Hydro represented the largest value on OSE, but through the listing of the state dominated companies Telenor and Statoil this changed. In 2006 the three large state-dominated companies Statoil, Norsk Hydro and Telenor accounted for more than 53% of the total market value of OSE.

2.1.1 Equity Offering and Market Cycles

The ability of managers to time the SEO to a favorable market varies through time is reflected by the volatility in SEO activity. Earlier research has found evidence of managers timing the market where it is more favorable to issue new equity (Loughran & Ritter, 1995; Baker & Wurgler, 2002). In these periods the general information asymmetry in the market is lower and the price drop is consequently lower both at announcement and in the long run. These periods are often referred to as *windows of opportunities*.

The American economy entered a financial recession in 2001 and the Norwegian market where quick to follow (Newson, 2010). Based on this I define the period January 2001 to December 2002 as a COLD issue market, and January 2003 to December 2007 as a HOT

issue market. The effects on the Norwegian market can be seen from the OSEBX index in Figure 1, while the SEO activity in the different periods is illustrated in
Figure 2. It is evident that as the SEO activity covaries with the OSEBX index.

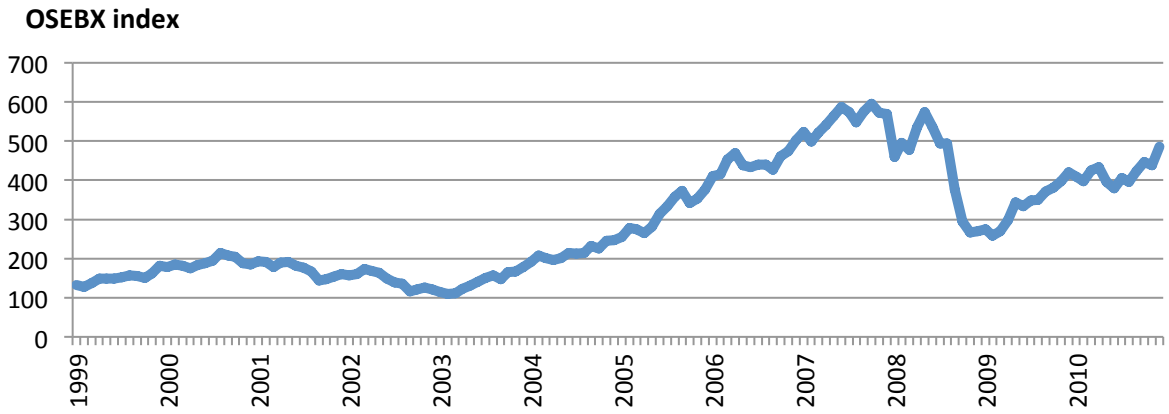

Figure 1 The OSEBX index showing the upturns and downturns of the economy in the period

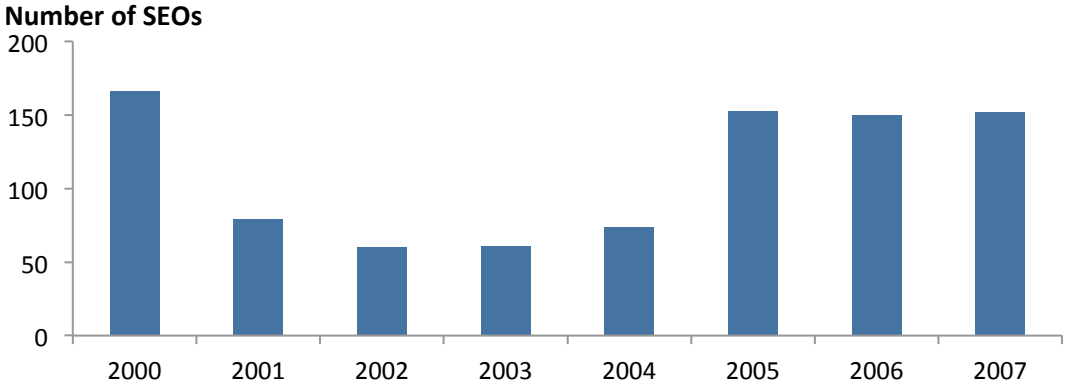

Figure 2 SEO activity in the sample period 2000 to 2007

2.2 Seasoned Equity Offerings

When a listed firm sells additional shares to the public, the new shares are perfect substitutes for the existing shares. For these transactions, the academic literature tends to use the term seasoned equity offering (SEO), as contrasted with an unseasoned equity offering, an IPO (Ritter J. R., 1993). Practitioners generally use the term follow-on offering, especially if the equity issue is within several years of the IPO.

In the following I will discuss the most used floatation methods and the associated costs. It is obvious that the choice between RO and PP is essential in a SEO process.

2.2.1 Floatation Method

SEOs at OSE are performed either by a rights offer (RO) or a private placement (PP). In a RO existing shareholders receive subscription rights to be able to buy the new shares and thereby keep their existing proportion of the shares. According to the Companies Act existing shareholders have the first right to buy the new shares in an equity issue. If existing shareholders do not want to participate in the equity offering by exercising the subscription rights, they can sell their rights.

In a PP the new shares are sold to one or more shareholders directly. They may emanate from the old shareholders, but just as often they are new shareholders. To perform a PP existing shareholders must approve through resolutions at a general meeting. A typical decision is that the Board of Directors is authorized to expand the company's equity up to a given percentage.

Both PPs and ROs are generally performed by one of three major flotation methods: *uninsured rights* (short-lived warrants issued to current shareholders on a pro rata basis), *standby underwriting* (the underwriter guarantees to purchase all unsubscribed shares), or *firm commitment underwritten offer* (the entire issue is sold directly to the underwriter) (Eckbo & Masulis, 1992).

The more costly procedure of standby rights is an increasing trend in the American market (Eckbo & Masulis, 1992), and also at OSE most SEOs now take place through use of the relatively expensive standby underwriting method rather than uninsured rights (Næs, Skjeltorp, & Ødegaard, 2009). Traditionally this has been most common for PPs, but also at OSE it is an increasing trend favoring ROs. From this it appears that the more costly issuing methods, standby (guaranteed) PPs, are preferred to uninsured ROs so it could be beneficial to highlight the costs associated with each of these floatation methods.

Even though PPs are now the most used method for SEOs measured in number, ROs are normally larger in size relative to company size. Kvaal and Ødegaard (2011) show that most of the ROs at OSE between 1980 and 2006 are large, representing more that 5% of the total share value. PPs tend to be smaller with less than 5% of the total share capital. In my sample

from 2000 to 2007 the average size of RO is 22% and 12% for PPs, measured by number of shares in the offerings proportional to total number of outstanding shares before the offering. Figure 3 shows the total value in NOK million of the SEOs at Oslo Stock Exchange between 1997 and 2012.

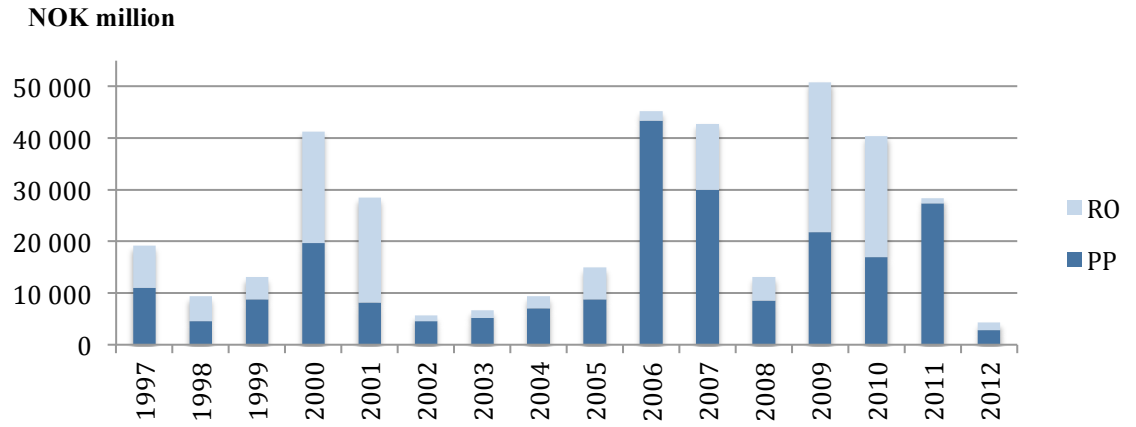

Figure 3 Total values of SEOs at Oslo Stock Exchange showing the distribution of value between rights offerings (RO) and private placements (PP) in NOK millions

2.2.2 Costs Associated With the Issuing Methods

When choosing issuing method it is crucial to take into account not only the direct costs, but also the indirect costs. The indirect costs include adverse selection in the market, which becomes the basis for a theoretical framework for explaining flotation method choice.

The total cost of guaranteed ROs includes issue underpricing, in addition to underwriter fees. While it is well established in previous studies (Ibbotson & Jaffe, 1975; Ritter J. , 1984) that initial public offerings (IPOs) of stock are underpriced, the existing evidence for SEO discounts is somewhat contradictory. Smith (1977) documents significant discounts on average, Bhagat and Frost (1986) find significant premiums for utility issuers, while Eckbo and Masulis (1992) find no statistically evidence that firm commitment offers of SEOs are systematically priced below the corresponding transaction price. Consequently, current shareholders capture the value of underpricing, either by subscribing to the offer or by selling the right. The literature further agrees that controlling for underwriting fees and other offering characteristics, ROs has the lowest direct floatation costs, both for utilities and for industrial firms (Eckbo & Masulis, 1992, ss. 10-12).

2.2.3 The Floatation Method Choice

The evidence on control considerations and SEO method choices is related to several strings of the corporate finance literature. Despite a growing corporate finance literature on SEOs, there is a surprising lack of evidence on how firms choose between different equity issue methods. This choice has shown to be driven by the determinants corporate control, moral hazard, and adverse selection (Cronqvista & Nilsson, 2005). The question remains as to why so many public firms choose PPs as issue method, in which direct costs are higher than for ROs. One explanation is that PPs can be used to reduce moral hazard and adverse selection costs, thereby offsetting their high issue costs. In addition PPs can reduce the risk of low demand as well as increase management efficiency. The decrease in ROs might be a result of an underestimation of the costs consisting of capital gains taxes (Smith, 1977), transaction costs (Hansen, 1988), and wealth transfer from dilution, which all vary substantially across issue type.

As a last resort to illuminate the decreasing use of ROs, the theories regarding adverse selection is proposed (Myers & Majluf, 1984). It is a common perception that the market cannot distinguish between over- and undervalued issuers but understand offering strategies and incentives of managers. The propensity to use standby underwriting increases as expected shareholder take-up decreases, that the market reaction to uninsured rights offers is significantly positive, and that standbys elicit the least favorable market reaction to the SEO announcement (Bohren, Eckbo, & Michals, 1997).

The above statements have implications for the SEO firms' performance subsequent to the offering not only at announcement but also in the long run. For uninsured rights the announcement stock price effect is expected to be negligible on average. The market reaction to standby guaranteed ROs should further be on average more negative than those for a PP.

3 Financial Theories of Stock Price Performance Post Equity Offerings

Research has shown that issuing firms experience low stock returns not only immediately following the announcement, but also in the years following the equity issue, and there are an extensive literature trying to explain this relationship. To provide a deeper understanding of the factors affecting a SEO this chapter will summarize theories of the firm's investment decision and the resulting empirical implications. As it is not evident that the same theories apply to the long-term underperformance I will introduce them separately as for were they fit best, even though the theories might be somewhat overlapping.

3.1 Fundamental Financial Theories

The capital structure forms the basis for all the firm's financial decisions and is therefore a powerful tool to explain the motivations for various firm decisions. Most theoretical explanations for the market reaction to equity offerings focus on the negative information conveyed to the market by the announcement of a new equity issue, while long-term explanations include taking advantage of windows of opportunities and the mis-measurement of risk.

The *trade-off theory* asserts that a firm's security issuance decisions move its capital structure towards an optimum determined by a trade-off between the marginal costs of financial distress and benefits of debt. Thus, an increase in a firm's stock price, effectively lowering its leverage ratio, should lead to debt issuance. The evidence suggests the opposite is true.

Pecking order theory assumes that since managers are better informed than investors this generates adverse selection costs that could dominate the costs and benefits embedded in the trade-off theory. Myers (1984) suggests that the costs of issuing risky debt or equity surpass the forces that determine optimal leverage in the tradeoff theory. The result is the pecking order stating that to minimize asymmetric information and other financing costs, firms prefer to finance investments primarily with retained earnings, then with safe and risky debt, and only as a last resort with new equity.

The pecking order and the trade-off theory fail to explain the high frequency of SEOs and the empirical evidence of a negative stock price reaction. This suggests that the stock price

dynamics reflect more than just the changes in capital structure and leads to the next section discussing theories trying to explain stock price dynamics following SEOs.

3.2 Explanations for the Announcement Effect

Equity issues by public firms are of growing interest to financial economists as studies has uncovered an average drop of approximately 3% in the market value of the equity at the announcement of SEOs. Figure 4 illustrates the average market reaction to SEO announcement in the US by flotation method (Eckbo E. B., 2008).

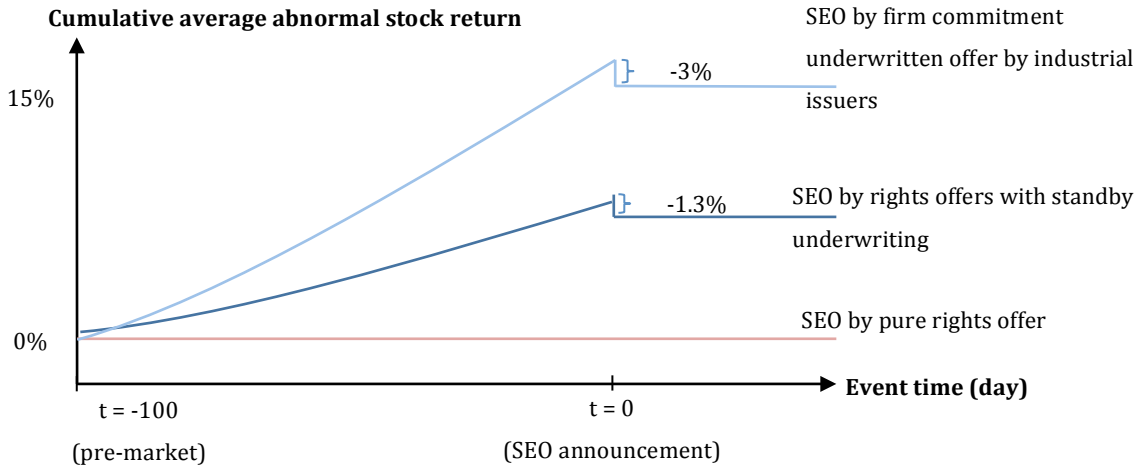

Figure 4 Representation of the average market reaction to SEO announcement in the US, classified by flotation method

This section summarizes theories trying to explain the average drop in the market value of equity at SEO announcement. The concentrated efforts contained in studies to explain this unfavorable reaction have resulted in more than one explanation. I will in the following present behavioral theory, information asymmetry, price-pressure, wealth distribution, and timing theories that are all well discussed theories.

3.2.1 Behavioral Theory

Behavioral models are based on research finding that individuals tend to be overconfident about their own abilities, where individuals tend to overweight evidence confirming their prior beliefs, and underweight contradictory evidence. The leading behavioral descriptions of

SEO underperformance include the *windows of opportunity* and *market timing theories* of Loughran and Ritter (1995) and Baker and Wurgler (2002).

For my purpose, the important fact about behavioral explanations is that they relate return movements to factors other than priced risk.

3.2.2 Information Based Theories

Most information-based theories presume that managers (or existing shareholders) know more about the value of the firm than potential new investors, the market. This information asymmetry creates an adverse selection problem that can explain the existence of a price drop when equity issues are announced to the market. Myers and Majluf (1984) apply this idea to security issues and creates a framework used in much of the subsequent literature. They assume that managers know more about the firm's true value than what outside investors do and that managers act in the interest of existing shareholders, providing an incentive to issue new equity when shares are overvalued. Thus, issuing new equity on average conveys negative information about the firm, and the stock price drops at SEO announcement.

Lucas and McDonald (1990) demonstrate an explanation for the extended high performance preceding the equity issue, the drop at announcement, and the clustering of issues following a market rise. Their key assumptions include Myers and Majluf's information asymmetry theory as well as that it is costly to delay equity issues, as the net present value will decrease. Based on this overvalued firms will issue equity immediately as an investment opportunity arises, and their price path pre-offering will on average be flat. Undervalued firms will wait until their stock price rises before they issue, and their pre-issue price path will be upward sloping. As such, on average the pre-issue stock price path will be upward sloping.

There are other information-based models on financing behavior (Leland and Pyle, 1977; Ross, 1977; Miller and Rock, 1985), but they all share with Myers and Majluf (1984) the idea that equity issues convey bad news for the firm.

3.2.3 Timing Theories

Information asymmetries may also be related to the business cycle. The level of SEO activity in the market has shown an increasing trend over the last centuries with clustering around specific periods. Several empirical studies try to connect this financing frequency to *windows of opportunity* in which capital can be raised at more favorable terms in so called HOT

markets. The definition of HOT and COLD markets is debated and the literature uses different definitions. The timing hypothesis (windows of opportunity) builds on the notion that investors are overly optimistic about the prospects of issuing firms, and as a consequence prices do not fully incorporate managerial incentives to time equity issues.

The evident advantage of issuing in a HOT versus a COLD market provides a strong motivation for timing equity issues. This is consistent with time-varying asymmetric information and supports the existence of windows of opportunities for SEOs.

3.2.4 Price-pressure Hypothesis

The price-pressure hypothesis is a more rational explanation to why the stock price tends to fall at announcement. The price pressure hypotheses, by Scholes (1972), states that the firm's shares are faced with a downward sloping demand curve. Announcing an increase in shares outstanding by issuing new equity will therefore decrease the price of outstanding shares. The hypotheses can be categorized as the downward sloping demand curve hypothesis and the transaction cost hypothesis.

The downward sloping demand curve hypothesis states that in an incomplete capital market with restricted short sales there is no perfect substitutes for the firm's stock, and as a result the firm face a downward-sloping demand curve for their shares when the quantity of outstanding shares increase.

The transaction cost hypotheses predicts a temporary price-pressure effect associated with new issues of common stock even if substitutes exist. Under these hypotheses, the stock price decline reflects the discount that must be offered to investors to compensate for the transaction costs they bear in adjusting their portfolios to absorb the new shares.

Consistent with both the information-based and the wealth-redistribution explanations Asquith and Mullins (1986), for example, find greater negative abnormal return at announcement for larger issues. The issue size can be interpreted as a proxy for the amount of negative information released. However, neither Masulis and Korwar (1986) or Baghat and Frost (1986) find a relationship between the announcement effect and the issue size. The empirical evidence on the nature of the demand curve for the stocks is therefore inconclusive.

3.2.5 Wealth-redistribution Hypothesis

This theory states that the price drop at announcement, and therefore a decrease in market value of outstanding equity, is accompanied by an equivalent increase in market value of outstanding debt. A reduction in leverage ratio makes the debt less risky, and consequently the market value of the debt increases. In other words, bondholders gain at the expense of shareholders.

The empirical evidence on this hypothesis is also inconclusive. Masulis and Korwar (1986) find a negative relationship between abnormal return at announcement and the leverage change. Both Masulis and Korwar (1986) and Asquith and Mullins (1986) find that this relationship disappears together with issue size. Since leverage change and issue size are highly correlated, it is difficult to determine which of them affects the abnormal returns around the announcement day.

3.3 Theories on Long-run Performance

Research has shown that issuing firms experience low stock returns not only immediately following the announcement, and I will in this section comment on theories directly related to the long-run performance.

3.3.1 The Window of Opportunity Rationale

The window of opportunity rationale is a behavioral explanation also used to explain the long-term performance (Bayless & Chaplinsky, 1996; Korajczyk, Lucas, & McDonald, 1992; Choe, Masulis, & Nanda, 1993). Over certain periods, windows of opportunity might be so pervasive that the market as a whole is overly optimistic about the issuing firm's future performance. This over-optimism can obscure a SEO's negative signal to such an extent that the price drops not only at the announcement, but also in a longer perspective.

3.3.2 The Earnings Management Hypothesis

The earnings management hypothesis suggests that managers actively deceive the market by managing earnings upwards before a SEO (Teoh, Welch, & Wong, 1998). This leads investors to be overly optimistic about the issuer's prospects and the stock price will consequently be artificially high at the offering. When high pre-issue earnings are not sustained, disappointed investors subsequently revalue the firm down to a level justified by fundamentals.

3.3.3 Real Investment Based hypothesis

The real investment hypothesis argues that the long-run underperformance arises from the negative association between capital investment and expected returns (Carlson, Fisher, & Giammarino, 2006; Lucas & McDonald, 1990). There are two main forces driving this hypothesis. First, that the association between capital investment and expected returns should be negative. Secondly, if issuing new equity finances investment, then issuers should have lower expected returns than non-issuers.

Intuitively, investment increases with the value of positive net present value (NPV) projects. The NPVs of new projects decrease as the cost of capital goes up. Hence, the SEO underperformance follows from the negative relation between investment and expected returns. Two different approaches have been used to develop the negative relation between investment and returns; the real option theory and the Tobin's q-theory.

Real option approach

The real option theory predicts that by issuing equity you are converting investment options to assets in place which should cause the risk to decrease (2006). This makes the issuer's initial matching firms too risky in the post-issue period and the long-term performance is consequently biased downward. Fama and French (1993) argue that firms that decide to issue equity and invest are likely to be in a different economic state and at a different stage of their life cycle than firms that either do not invest, or use internal equity or debt to finance investment, making the matching technique less credible.

Tobin's q-theory approach

Zhang (2005) derives the negative relation between investment and future average returns by using the Tobin's q-theory. A firm's q is defined as the ratio of the market value of its existing shares to the replacement cost of its physical assets. Zhang argues that firms invest more when their marginal q is high which again is associated with lower cost of capital or expected return. He finds that issuing firms conduct disproportionately high investments.

3.3.4 Leverage-based Hypothesis

Eckbo, Masulis, and Norli (2000) argue that issuer performance reflect lower systematic risk exposure for issuing firms relative to the matched non-issuers. As equity issuers lower leverage, their exposures to unexpected inflation and default risks decrease, thus decreasing

their stocks' expected returns relative to non-issuing firms. Equity issues also significantly increase stock liquidity, again lowering expected returns relative to non-issuers.

Previous research (Asquith & Mullins, 1986; Korwar, 1984) has shown that the significance of changes in financial leverage disappears when size is included as an explanatory variable as they are highly correlated. There are several arguments for why changes in leverage ratio are not a suitable explanation for the stock price effect. First, equity offerings mostly represent a relatively small percentage of the total capital. Secondly, changes in leverage caused by equity offerings may be interim. Finally, leverage changes cannot explain the stock price effect of SEOs of only secondary shares, which do not affect corporate capital structures. For this reason I will not analyze this any further.

4 Data and sample set

In this chapter I present the data for my analysis and restrictions I have applied on these. Additionally I discuss potential biases that may obscure my results both in connection to the samples as the basis for my study, but also in connection to the methodology used.

4.1 Sample construction

The sample consists of seasoned equity offerings (SEO) from 2000 to 2010 of companies listed on OSE. The original sample of SEOs consisted of 2,501 PPs and 274 ROs. For my study I have applied the following selection criteria to the original SEO sample:

1. The issuer of common stock is listed on Oslo Stock Exchange (OSE) at the time of the offering announcement and through the public offering date. This precludes IPOs from entering the sample.
2. The offerings are publicly announced prior to the offering date, and Newsweb publications are used to determine the announcement date of the offering.
3. All offerings are made publicly in the Norwegian market. There are no debt issues (e.g. obligations or convertibles) included in the sample.
4. I exclude financial institution from the sample because they often have extremely high leverage ratios that are not representative for other industries (reduces sample by 33 ROs and 360 PPs).
5. If no subscription price is reported the offering is excluded form the sample (reduces sample by 868 PPs). These are for example a result of cancelled offers. Some offerings only present the offering price in a foreign currency. These will not be included in the sample (reduces sample by 8 ROs and 50 PPs).

After applying the above criteria I am left with 906 PPs and 181 ROs between 2000 and 2010. I will further operate with two separate samples, (1) one for analyzing the stock price effect at announcement of SEO and (2) one for measuring long-run performance following a SEO.

The announcement effect sample consists of a random selection[3] of 145 of 627 SEOs between 2005 and 2010, with 517 PPs and 110 ROs. The resulting sample consists of 30 ROs and 115

[3] Generated by applying the random selection function in excel on the 517 PPs and 110 ROs between 2005-2010 as a whole.

PPs where the distribution of SEOs between the years is approximately the same before and after the selection.

The second sample is to measure the long-run stock price performance and consists of all SEOs between 2000 and 2007 remaining after applying the criteria to allow for up to three-years data for the issuing companies. This period uncovers 220 ROs and 2,224 PPs in total and yield a usable sample of 107 ROs and 781 PPs. This is after removing 75 SEOs that did not appear to have enough observations for the three-factor regression model.

Table 1 shows the annual distribution of the SEOs in the two samples. They reveal a clustering of SEOs before 2008 and a significant decrease in activity during the financial recession.

Table 1 Frequency of equity offerings used in announcement sample on OSE from 2005 to 2010

	Total	**Long-run performance**			**Announcement effect**		
	SEOs	SEOs	PPs	ROs	SEOs	PPs	ROs
2000	197	165	145	20	-	-	-
2001	90	79	65	14	-	-	-
2002	66	60	45	15	-	-	-
2003	66	61	61	0	-	-	-
2004	77	74	65	9	-	-	-
2005	163	153	139	14	32	28	4
2006	155	148	136	12	21	20	1
2007	156	148	125	23	26	21	5
2008	46	-	-	-	12	10	2
2009	114	-	-	-	37	25	12
2010	60	-	-	-	17	11	6
Total	**1 190**	**888**	**781**	**107**	**145**	**115**	**30**

OSE are split into 10 different industry sectors, whereas the energy and industry sector contains the largest values. The GICS[4] standard group the listed firms on OSE into 10 industry sectors. Each firm is placed in the GICS category that represents its most important business activity.

[4] GICS (Global Industry Classification Standard) was developed by Morgan Stanley Capital International (MSCI) and Standard & Poors (S&P)

Table 2 shows the distribution of SEO activity within the industries from 2000 to 2010 after applying the five selection criteria above. It is evident that the segments energy, industry, and IT are not only the largest segments, but also have the highest frequencies of SEOs in this time period.

Table 2 Distribution of SEOs during 2000-2010 within 9 different segments at OSE (the 10th segment financials are excluded)

	SEOs	ROs	PPs
Consumable goods	65	14	51
Consumables	56	23	33
Energy	349	46	303
Health care	58	17	41
Industry	167	36	131
IT	327	32	295
Material	41	10	31
Supply	1	0	1
Telecom	23	3	20
Total	**1087**	**181**	**906**

4.1.1 Potential Biases in Data Sample

The restrictions I have enforced might introduce additional sample biases. My restrictions might leave me with a distorted picture of the real world of SEOs at OSE. However, I believe the precautions I have taken have helped me to avoid severe pitfalls and maintain a fairly representative sample. My restrictions are chosen by benchmarking SEO event studies and should as such represent best practice in the financial literature.

The selection criterion I have introduced that has the greatest effect on the data is to neglect the SEOs that have no reported subscription price, as well as cancellations. This cancellation bias will nevertheless most likely not affect my conclusions, as I would expect that if these issues had been completed they would show an even more negative return on average both at announcement and in the long run.

My samples consist of observations from 2000-2007 and 2005-2010 and, as such, both samples cover the rise and fall of the issuing market during good and poor financial times. Consequently, I believe that my samples should not be biased towards covering years with

only low or high profitability. Nevertheless, the financial crisis of 2008 might obscure my results for long-run performance to some degree.

Other matters that might induce biases to my results are the fact that I do not separate offerings of secondary and primary shares, and that I do not introduce any selection criteria regarding those firms that have made more than one SEO during the sample period.

All in all, I consider the sample in this study to be fairly representative of the corresponding SEO activity at OSE, and I cannot see that there has been introduced any biases so severe that it invalidate the results and conclusions derived from it.

5 Announcement Effect

In this chapter I will present the framework for the methodologies used in my analysis of the SEO announcement effect. I will try to find the connection between abnormal return at announcement and the size of the SEO and the pre-announcement performance of the issuing company.

5.1 Methodology

To compute the abnormal stock return around announcement of SEOs I employ a conventional event-study methodology, which is the most commonly used methodology to measure the announcement effect of a SEO (Heron & Lie, 2004). Event studies explore the market's assessment of the equity offering by measuring the abnormal returns around the announcement date of an event. The information is aggregated across a larger sample to achieve desirable statistical properties for hypothesis testing. The initial task is to define the *event* of interest and identify the period over which the stock prices of the firms involved in the event study will be examined, *the event window*. The classical event study explores a relatively short time horizon in order to isolate the effects of the event in question. However, it is normal to let the event window be larger than the specific time of interest to make sure to capture the whole effect of the event.

The event of interest in this study is the SEO announcement and the event window includes up to two days surrounding the event. The effect of the equity announcement is measured as the abnormal return over the event window, defined as

$$AR_{i\tau} = R_{i\tau} - E(R_{i\tau} \mid X_{\tau})$$

The *market model* described by MacKinlay (1997) is a widely used method to estimate the expected return over the announcement period. The market model is a statistical model that relates to the return of any stock to the return of the market portfolio. The market model assumes joint normality of stock returns and is defined as

$$R_{it} = \alpha_i + \beta_i R_{mt} + e_i$$
$$E(e_i) = 0$$
$$var(e_i) = \sigma_e^2$$

As the normal return I use the OSEBX return that comprises the most traded shares listed at OSE, and the OSEBX index is adjusted for dividend payments. For the calculation of the market beta I use data for up to 250 trading days prior to the SEO announcement to make sure that no information about the offer has already reached the market.

The announcement period return is defined as the cumulative abnormal return over the two-day announcement period (CAR (-1,0)) from the day before through the day of the announcement to control for the ambiguity of whether a given announcement took place prior to or after the market closed on that day. As the date for the announcement I use the date that the SEO is announced to the market at Oslo Stock Exchange's *Newsweb*. Throughout this chapter I will refer to CAR (-1,0) as abnormal return.

5.1.1 Features of Abnormal Return

After finding these abnormal returns for the SEOs, I want to find the significance of different deal and firm characteristics to be able to assess what influence the stock price at announcement. This study proposes two separate techniques for testing hypotheses concerning the stock price reaction at SEO announcement. Firstly, I will use regression analysis to determine whether different factors have statistically explanatory power. Second, I propose to augment this analysis by also studying the mean and median abnormal return in subsamples (Asquith, Bruner, & Mullins, 1990). A subsample is a subset of the total SEO sample where the offerings share one or several characteristics. By testing the differences in these subsample means, I can indirectly determine the effect of the factors that separate the samples.

5.2 Previous Research

There is an extensive financial literature trying to find the causes and effects of the identified price drop at SEO announcement. The average finding of 22 empirical papers studying this effect at the US stock markets is a mean abnormal returns -2.3%. Figure 5 shows the mean abnormal stock price drop at announcement for some of these studies.

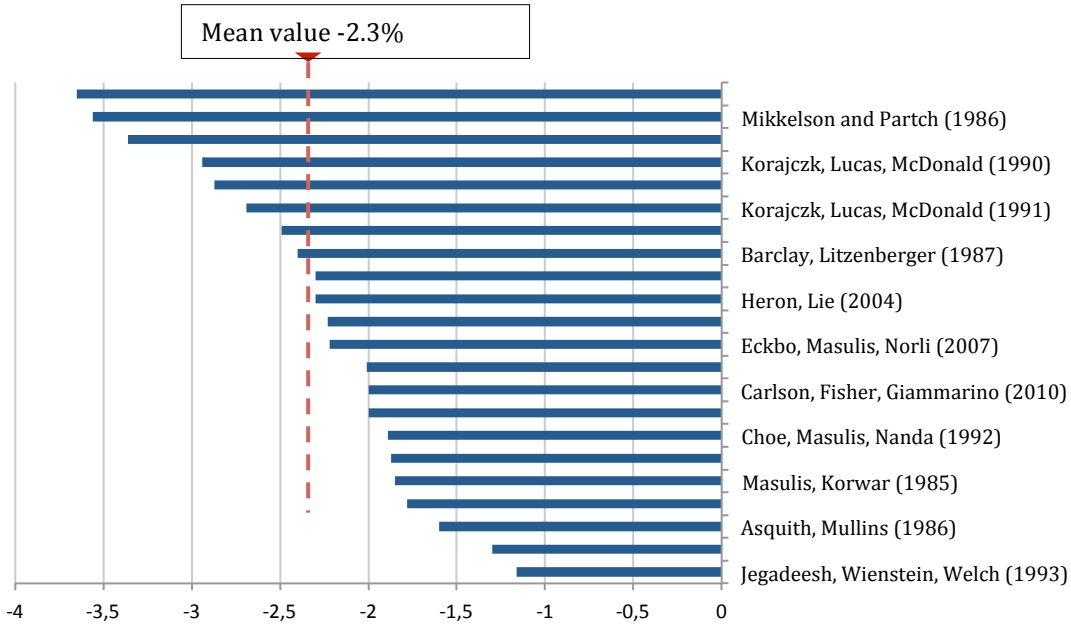

Figure 5 Mean abnormal returns (%) measured over a three-day window

The size of the SEO is commonly believed to have a negative impact on the announcement of SEOs, and Asquith and Mullins (1986) are among them who found such an effect. Their findings are consistent with the strongly held belief by managers and investment bankers that large equity issues depress stock prices because it signals overvaluation. This result of a size effect is consistent with both the price-pressure hypothesis and explanations based on asymmetric information. In addition to this size effect Hansen and Crutchley (1990) found a positive relationship between the return at announcement and the stock price performance prior to the offering. They also show that these two variables are correlated as the better performance pre-announcement the more equity will be issued.

5.3 Announcement Effect Results

The mean abnormal returns surrounding the announcement day are reported in Table 3 for the 145 offerings in my sample from 2005-2010. The average two-day abnormal return for the total sample is – 2.55% with a p-value of 1%. The average two-day abnormal return is -1.19% for PPs and -7.79% for ROs with p-values of respectively 17% and zero. These abnormal returns are not a result of a few extreme values, and more than 68% of the observations are negative.

Table 3 Average two-day abnormal returns for the total sample as well as per year from 2005-2010

CAR (-1,0)	Total	2005	2006	2007	2008	2009	2010
Mean (%)	-2.55	0.66	2.43	-4.38	-17.85	-1.20	-4.39
Median (%)	-1.04	-1.04	2.73	-0.38	-5.95	-1.05	-3.12
p-value	0.01	0.68	0.87	0.12	0.02	0.23	0.01
Min (%)	-89.2	-14.3	-17.3	-89.2	-76.9	-21.6	-21.7
Max (%)	37.8	35.5	31.9	7.3	5.3	37.8	3.3
Count	145	33	21	25	12	37	17
% Negative	64 %	67 %	38 %	60 %	83 %	68 %	76 %

While these price reductions may appear small the effect of such a value dilution is equivalent to the firm donating the newly issued shares to new shareholders. Consequently, a substantial portion of the proceeds of an equity issue comes out of the pockets of old shareholders (Asquith & Mullins, 1986).

In interpreting the dilution effect important issue is whether the price reductions associated with SEOs actually harm existing shareholders. It can be argued that if the price reductions were caused by negative signals, this negative information would eventually be released to the market anyway. Even if this argument were true, it would be beneficial for the shareholder to postpone such a value drop (Greenwald, Stiglitz, & Weiss, 1984). Further, it is difficult for correctly priced firms to distinguish themselves from underpriced companies when announcing equity offerings. Even if the misinterpretation of the 'good' company will be corrected at a later stage, the shareholders will already be harmed as shares was sold to new shareholders at a discount.

Myers and Majluf (1984) emphasize that the price drop for correctly priced firms can be avoided or minimized as the magnitude of the adverse selection problem varies through time. They suggests that firms should invest in financial slack (e.g. cash reserves by equity issue) in good times where the price reductions are small, and thereby prevent from the need to issue new equity in periods of high price reductions.

5.3.1 Categorized by Different Characteristics

To analyze the causes and effects of primary stock offerings, the sample is separated by issue method and by segment. Table 4 presents the mean and median abnormal return at announcement, percentage of stocks in a portfolio having negative announcement period returns, p-values for various classifications of the sample, and number of observations in each subsample. The average stock price reaction is consistently negative and most at low levels of significance.

Table 4 Abnormal return at SEO announcement for the different issue types and within the different segments

CAR (-1,0)	Mean	Median	p-value	Count	% Negative
Issue type					
PP	-1.19 %	-0.48%	0.17	115	59 %
RO	-7.79 %	-4.43%	0.00	30	83 %
Segment					
Energy	-0.28%	-0.48%	0.41	59	56 %
IT	-5.27%	-1.05%	0.08	31	68 %
Industry	-5.51%	-0.93%	0.08	24	71 %
Consumable Goods	-1.56%	-2.32%	0.19	11	55 %
Health care	-0.61%	-0.52%	0.44	9	78 %
Materials	-2.21%	-3.41%	0.17	9	78 %
Consumables	-7.75%	-7.75%	0.25	2	50 %
Total Sample	-2.55%	-1.04%	0.01	145	64 %

The difference in industry and utility sector is a well-discussed area. The main argument is that public utility's investment and financing decisions are highly regulated. The knowledge of current regulatory policy and the tendency of utilities to make repeated equity offerings suggest greater market anticipation of utility offerings and thus a less severe price drop at SEO announcement. Since utilities are poorly presented at OSE I will instead check for significant differences in abnormal return between the three most presented segments *energy*, *IT*, and *industry*.

Table 5 shows the distribution of abnormal return within these groups. It is evident that the complexity and specific characteristics within each segment contribute to a significantly

higher level of dilution and/or information asymmetry for firms in both the industry and IT segment and thereby promote a larger stock price reaction at announcement. There are no significant difference in the mean abnormal return between the industry and IT segment.

Table 5 Two-sample tests for finding differences in mean abnormal return at SEO announcement within the three largest industries. Mean 1 and Mean 2 refers respectively to the means of the two subsamples testes.

	Mean 1	Mean 2	Difference in mean	p-value
Issue type				
RO – PP	-7.79%	-1.19%	-6.60%	0.02
Segment				
Industry – Energy	-5.51%	-0.28%	-5.22%	0.10
IT – Energy	-5.27%	-0.28%	-4.98%	0.10
Industry – IT	-5.51%	-5.27%	-0.24%	0.48
Time period				
(COLD – HOT market)				
Post 2008 – Pre 2008	-5.05%	-0.47%	-4.58%	0.03

Table 5 further shows that ROs underperform PPs with abnormal returns of respectively -1.2% and -7.8% with p-values 17% and zero. The differences in the means between these two floatation methods are statistically significant with p-value 2%.

5.4 Regression With Issue Size and Pre-offer Performance

While it is tempting to draw inferences from a comparison of the abnormal return at announcement for these subsamples, a linear regression model is calculated for individual announcement period stock returns in order to fully assess the potential causes for the stock price reactions. For all subsamples the abnormal return are regressed against the two explanatory variables:

1. Offering size as number of shares issued divided by the total number of outstanding shares (SIZE).

2. The previous eleven-month cumulative excess return ending one month before the offering *(*CAR (-240, -20)).

$$CAR_i(-1,0) = \alpha + \beta_1 SIZE_i + \beta_2 CAR_i(-240,-20) + e_i$$

The basis for inclusion of these variables in the regression model follows. The first variable is predicted by existing theoretical literature to affect the magnitude of the stock price reaction at announcement. The percentage increase in shares outstanding is found by several studies (Asquith & Mullins, 1986; Hansen & Crutchley, 1990) to have a negative impact on firm value according to both the Jensen and Meckling's (1976) agency theory and the Leland and Pyle (1977) signaling theory. This implies that the larger the percentage rise in shares outstanding, the greater the negative stock price reaction.

The CAR variable tests whether the announcement day price effects are related to the recent performance of the firm's stock. For high performance firms, equity offering announcements should be less anticipated, which would cause larger negative stock reactions. This follows because the high CAR on average is associated with a significant lowering of firm leverage and as a result decrease the likelihood that firms find it optimal to further decrease their leverage ratios by selling additional equity.

The regression results for my sample of 145 SEOs between 2005 and 2010 is presented in Table 6 to provide additional insight into the price effects at SEO announcement. The results indicate that the abnormal return is inversely related to the size of equity issue and positively related to the stock price performance (CAR) preceding the announcement.

Table 6 Regression estimates for stock price reaction at SEO announcement (p-values in parentheses)

Total sample	Alpha	Offering Size	CAR (-240, -20)
Full model	-0.01	-0.08	0.04
	(0.45)	(0.28)	(0.04)
Offering Size	-0.01	-0.13	-
	(0.67)	(0.04)	-
CAR (-240, -20)	-0.02	-	0.04
	(0.08)	-	(0.01)

The major implication of the regression results is that abnormal returns are significantly and inversely related to the size of SEOs. This finding is consistent with the strongly held belief by executives and investment bankers that large equity issues depress stock prices. The magnitude of the coefficients also indicates that the size variable will affect the stock price at SEO announcement the most. However, this result does not distinguish between the price-pressure hypothesis and explanations based on asymmetric information since a size effect is consistent with both hypotheses.

The size variable has a p-value of 28% for the full regression, but without CAR in the regression size is significant with a p-value of 4%. This might be a result of the high correlation factor between the two explanatory variables of 30%, indicating that they account for some of the same risks. This makes it difficult to distinguish were the effect on the return is coming from. Hence, from the regression result size seems to contribute more to the abnormal return in magnitude and could be interpreted as a more important risk factor.

The pre-announcement performance is according to my results positively related to the price drop at announcement. This provides insight into the timing of equity issues. Firms tend to issue equity following an increase in stock prices, and after such a pre-announcement stock price increase the announcement day price reduction tends to be smaller. This is consistent with the contention by Myers and Majluf that firms time equity issues to minimize the adverse impact on stock prices.

Asquith and Mullins (1986) also finds that the greater the abnormal return pre-issue, the lower the price drop at announcement, and underpin this with the fact that information asymmetry

reduces as the price increases. The problem is that Masulis and Korwar (1986) find the opposite result.

5.5 Discussion of the Announcement Effect

The results of this study demonstrate that announcement of SEOs has a negative effect on the stock price also in the Norwegian market. This finding is trustworthy as over 68% of the sample offerings show negative abnormal return at announcement. As presented earlier I found the mean abnormal return at announcement day for the whole sample to be -2.55% with a p-value of 1%. As mentioned above, this price reduction might appear as a small one-off but the reduction in value for existing shareholders might be of a considerable magnitude. The average SEO at OSE during 2000 to 2007 constitutes 14% of the issuing firm's total equity, and the corresponding average value of these SEOs is more than NOK 250 million. A fall in the share price of 2.55% is therefore the same as existing shareholders giving approximately NOK 5.5 million, on average, to new shareholders.

One of the most used explanations for the announcement effect is the information based theories. These are either related to information asymmetry between managers and investors, or to business cycles where the general level of information asymmetry in the market varies. Both of these theories are consistent with my findings. I find that the SEO activity is higher in periods of low information asymmetry, in a HOT issue market. I also find that the announcement effect is significantly less negative in these periods. These results strongly indicate that managers take advantage of these *windows of opportunities* in the market by timing the SEOs. The SEO activity in the years before the financial crisis of 2008 is approximately doubled compared to the activity in the years following the recession.

It is also evident that the market reacts different to the announcement of the different issuing methods, PPs and ROs. The corresponding announcement effects are -1.2% and -7.8%. PPs are by far the most commonly used method for SEOs at OSE, representing almost 80% of the SEOs in my sample. PPs can be interpreted as less risky as you place the new shares with specified investors directly rather then selling them openly in the market, as for ROs. As mentioned in Chapter 2 the costs of ROs often exceed costs of a PP, so this result was expected from the transaction cost theory.

The negative relationship between the issue size and the price drop at announcement gives an extra understanding of the larger abnormal return for ROs, as they represent on average almost twice as much of the total outstanding shares as PPs. The issue size is respectively 22% and 12% for my sample period. It is also consistent with the price-pressure hypothesis since an increase in the amount of outstanding shares contributes to lowering the shares' value resulting in a price fall at announcement, not entirely due to bad news, but due to oversupply of the company's shares.

As a last explanation for the large price drop at announcement of ROs is the rational behind insider lists and information leakage. OSE is a small stock market with a limited number of professional financial players where many are located within a limited geographical area. A result of this might be a more transparent market where it is difficult to keep information away from investors, despite strict regulations. In a PP there is a bigger chance that information has, to a certain amount, leaked to the market. This would give investors a better perception of the firm's real value and the lowered information asymmetry will result in a lower price drop at SEO announcement.

Another just as important observation is the differences in abnormal return between the industry segments. The energy segment is together with IT and industry the most represented segments. There are many similarities between these three segments, among them cyclical businesses, highly international, dependent on investments to follow the technological development, as well as they all have large players. Despite this, there are just as many differences that may be the cause of the difference in market reaction. I find that energy has a significantly lower abnormal return than the two others with a price drop of only -0.3%. Both IT and industry has price drops of more than -5%.

There are no clear distinction between utilities and industrials at OSE but I believe that the energy sector bear some of the same features as utilities that might reflect the low abnormal return. Energy firms are often large companies partly owned by the government and thus induce a lower information asymmetry.

For the last 10 years the Norwegian oil industry has experienced extremely high profits. This might further reduce the negative signal conveyed through SEO announcement. The oil

segment is in high growth, which might induce the market to perceive SEOs as necessary to follow the market and to carry out profitable growth strategies.

To illustrate the importance of the differences between the segments I want to comment on reasons for the low price drop for consumable goods. This segment is highly represented by relatively large and well-known seafood companies. It is a highly cyclical segment that is well understood and well covered by professional investors in Norway. This gives a lower information asymmetry reflected in the low price drop. In addition my sample period includes several years of high demand and historically high prices for the seafood companies that probably resulted in SEOs associated with aggressive growth strategies, as for the energy companies. This is consistent with investors being overly optimistic in a HOT market and investors consequently fail to incorporate manager's intention of timing equity offerings.

These price drops is clearly a cost for the SEO company, mainly its shareholders, and the fact that managers persistently continues to use SEO as an important financing source, not only as a last resort, suggests that the overall value and benefits connected to SEOs more than offsets this negative price reaction at announcement. The results from this analysis further highlight important and thriving driving forces and explanations for the SEO announcement effect.

6 Long-run Performance

Research has shown that issuing firms experience low stock returns not only at announcement but also for several years following the issue. I have investigated this phenomenon on OSE by calculating the three-year abnormal return for issuing firms with a version of the Fama and French regression model. In this chapter I will first introduce the methodology used before I present and discuss the three-year stock price performance results of firms issuing seasoned equity at OSE.

6.1 Methodology

Various methods can be applied to measure long-run underperformance. A well-known method is comparing buy-and-hold return (BHR) of the issuing firm to some benchmark. Previous studies of the American equity market have found substantial long-run underperformance by using this method. Nevertheless, it is argued that this method does not reflect the different risk of levels of issuing and non-issuing firms. A method argued to give a more comprehensive measure is factor models (time-series regressions). Fama (1998a) argues that factor-based approaches to performance evaluation as documented in Fama and French (1993) are potentially useful in capturing systematic patterns in average returns, although he acknowledges that both factor-based approaches and corresponding BHR-based approaches likely suffer from model misspecification.

In this paper I will use the factor model approach to measure long-run performance of SEOs on OSE. The factors typically used internationally for these purposes are the local stock marked and the empirically motivated Fama and French factors related to firm size, book values, and momentum. Næs, Skjeltorp and Ødegaard (2008) investigated these and other factors' relevance on the Norwegian market and found that in addition to the local market, factors linked to firm size and stock liquidity seemed to be the only factors demanding risk compensation at OSE. I will base my analysis on these three risk factors market, size, and liquidity.

6.1.1 Factor Model Estimation

In a theoretical factor model one will assume that the expected return for a stock in excess of the risk-free return in equilibrium can be expressed as

$$E[er^i] = \sum_j \lambda_j \beta_j^i$$

where $E[er^i]$ is expected excess return for stock i, j ∈ {1,..,J} the number of factors affecting returns, β_j^i is the exposure to risk factor j for stock i and λ_j is the risk premium for risk factor j common to the whole market.

There are various methods for estimating risk premia for one or more factors, and testing whether a model can price a collection of assets. The traditional method uses two steps where step one is the time series regression developed by Black, Jensen, and Scholes (1972)

$$er_t^i = a^i + \sum_j \lambda_j \beta_j^i + \varepsilon^i$$

where a^i is a constant term, and β_j^i is the estimated exposure to factor j of stock i. The estimated factor exposures measure the sensitivity of the return of an asset to movements in the respective factors. When a factor is expressed as a return series, for example as the return on a portfolio of large companies less the return on a portfolio of small companies, the factor model can be tested by testing the restriction that all the constant terms, a^i, equal zero. If this is rejected the model is rejected.

The next step is to estimate factor risk premia by a cross- sectional regression

$$\mathrm{er}^i = \lambda_0 + \sum_j \lambda_j \beta_j^i + \varepsilon^i$$

where λ_0 is a constant term, and λ_j is the risk premium of factor j.

6.1.2 Multi Factor Models

The capital asset pricing model (CAPM) formalizes the idea that the expected return on an asset should be higher the more risky the asset is. The model is based on very simplified assumptions where the market portfolio is the only relevant risk factor. Næs, Kjeltorp, and Ødegaard (2009) estimate the CAPM using the market index at OSE as a proxy for the market portfolio. Their

results show that CAPM does not seem able to price neither size portfolios nor the liquidity portfolios. This indicates a size effect in the Norwegian market, also related to liquidity. In the framework of a multi-factor model this can be explained by size and liquidity being risk factors for which investors demand compensation to be exposed to, but which are not expressed in the market portfolio.

In the three-factor model of Fama and French (1993) the first factor is the excess return on the value weighted market portfolio ($R_{mt} - R_{ft}$). The second factor, called SMB_t (small-minus-big), is the return on a zero investment portfolio formed by subtracting the return on a large firm portfolio from the return on a small firm portfolio. Similarly, the third factor is the return of another mimicking portfolio, named HML_t (high-minus-low), defined as the return on a portfolio of high book-to-market stocks. The dependent variable used in the regressions is either the portfolio excess return $R_{pt} - R_{ft}$ or the difference in returns between portfolios of issuing and non-issuing firms

$$R_{pt} - R_{ft} = a + b\left(R_{mt} - R_{ft}\right) + s * SMB_t + h * HML_t + e_t$$

In my study, I will use the results of Næs, Skjeltorp, and Ødegaard (2009) which imply that the factors relevant for explaining the risk at OSE is the market effect, the size effect, and the liquidity effect

$$R_{pt} - R_{ft} = a + b\left(R_{mt} - R_{ft}\right) + s * SMB_t + l * LIQ_t + e_t$$

The intercept in the regression can be interpreted as a measure of average abnormal performance. This measure has a role analogous to Jensen's alpha in the CAPM framework. R_{pt} is the simple average monthly return for a firm at time t. R_{ft} is the one moth NIBOR in month t.

b is the three-year average market coefficient measured as the slope between the return of OSEBX and the issuing firm. R_{mt} and R_{ft} is respectively the three-year average market return and NIBOR. *s* and *l* is the size and liquidity coefficient. The first variable SMB_t is the proxy

for company size at time t measured by the market capitalization of the issuing firm. The second variable LIQ_t is the proxy for the issuing firm's liquidity measured by the widely used bid-ask spread divided by their midpoint.

A desirable feature of factor models is that by forming portfolios, the cross-sectional dependence problem is eliminated. However, by forming portfolios power is sacrificed. Another disadvantage is that to the degree that the portfolios are correlated with omitted factors, the intercepts can embody factors other than what is explicitly being controlled for.

Asset pricing models from Sharpe (1964), Lintner (1965), and Black (1972) has long been used to describe average returns and risk. The central prediction of the model is that the market portfolio of invested wealth is mean-variance efficient in the sense of Markowitz (1959). Nevertheless, the empirical contradictions to the model are prominent as it is obvious that the average returns are dependent of the level of other factors.

When underpinning long-run performance tests both implicit and explicit assumptions are made. One important component in the long-run stock performance tests is the choice of portfolios for measurement. Fama (1970) points out that any performance test must have some notion of what normal returns are.

6.1.3 Methodology Biases

There are some additional biases connected to using a factor regression model. There are different measuring methods for determining long-run performance of issuing firms, but the controversy of many of these starts when the assumption that the two firms have identical risk exposures is questioned. By applying factor model regression it is possible to account for some of the different risk exposures for issuing and non-issuing firms. Hence, as a three-factor model requires at least five observations of monthly returns over the entire three-year period a survivorship bias is created.

Some studies use extended versions of the Fama-French model by adding more factors to measure the abnormal return. Eckbo, Masulis, and Norli (2007) use an extended model adding two factors, a momentum factor and a turnover factor. Lyandres, Sun, and Zhang (2007) add an investment factor to the model. Their results show that the Fama-French model tends to produce larger alphas than these extended models, which may indicate that the Fama-French

model fails to account for all the risk factors associated with issuing firms. Hence, the inclusion and omission of additional factors presents an important bias. Another bias induced by the method is the assumption that the regression estimates (e.g. size and liquidity) are stable over the estimation period.

6.2 Previous Research

In previous research, the factor regression approach has produced ambiguous results of abnormal stock returns after SEOs. Figure 6 presents the result of nine previous research studies using the three-factor model of Fama and French (1993) to estimate the post-issue abnormal performance. Their results are reported as average monthly abnormal equal-weighted return (α) for a three- to five-year holding period following the SEO. A much shared finding in this research is that the difference between using a three-year and a five-year holding-period does not significantly affect the abnormal return results, and the results are therefore somewhat comparable. The overall average monthly abnormal return of these studies is -0.30% and the returns vary from a minimal value of -0.54% to a least negative value of -0.14%.

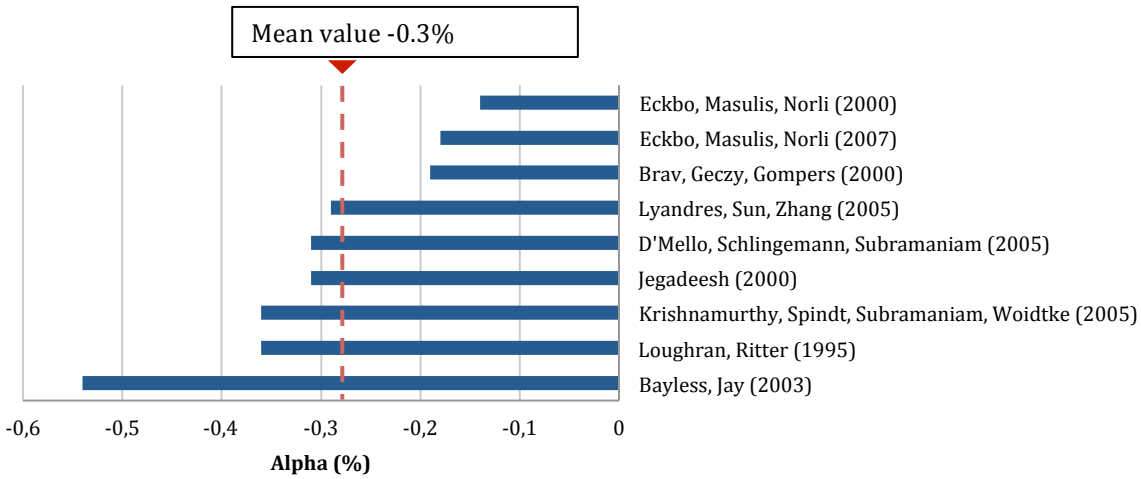

Figure 6 Mean monthly abnormal returns using Fama and French 3-factor model over a 3- to 5-year holding period

The literature is not in complete agreement when it comes to long-run performance of SEO firms. The dominant explanation presented in these studies is that the stocks are mispriced at the time of issue. This is consistent with the windows of opportunities rational, which argues

that during periods of exceptional favorable market conditions with large information asymmetry, and where the shares are overvalued, managers take advantage of a window of opportunity by issuing shares. These market conditions lead to a general over-optimism in the market that can obscure negative signal of a SEO to such an extent that the price drops in a longer perspective.

Jegadeesh (2000) finds evidence that the underperformance is related to this over-optimism about the firm's future prospects. He finds that SEOs underperform the benchmark by 4.3% around earnings announcements in the 20 quarters after the equity issues. This estimate implies that the SEOs underperform twice as much within earnings announcement windows as they do outside these windows. This evidence supports the argument that SEO underperformance is attributable to biased market expectations and that managers take advantage of windows of opportunity where shares are mispriced.

The dominant explanation for the underperformance presented in the papers using the Fama French factor model is consistent with the real investment based theories presented in Chapter 3.3.

6.3 Risk Factors

Knowledge of which risk factors are important for stock prices at OSE, the magnitude of realized risk-premia, and to what extent the cross-section of returns at OSE is different from other stock markets is obviously of interest to investor, and companies raising capital through OSE. Næs, Skjeltorp, and Ødegaard (2009) show that both level and variation of risk-premia at OSE have been high. Internationally, newer research suggests that variation in risk-premia, both over time and in the cross-section, can be used to predict economic cycles. Improved understanding of the Norwegian stock market is therefore also important for government work on financial stability and monetary policy.

Their main findings are that the return at OSE can be explained reasonably well by a multi-factor model consisting of the market, size, and liquidity index. The macro variables, and specially the oil price, are by most believed to be an important factor. However, several macro variables affect different industry sectors but it is not a priced risk factor in the Norwegian market. The weak signs of these variables being priced in the market underpin that it is

reasonable to believe that the main effect on returns is from the market and the variables firm size and liquidity.

Company Size

The size effect is an empirical regularity showing that investments in small companies on average have had a risk-adjusted return premium relative to investments in small companies. The size effect was first documented by using US data, by Banz (1981). Later the size effect has been documented in similar studies in different countries, and according to Dimson and Marsh (1999) the size effect is the most documented stock market anomaly in the world.

Brav, Geczy, and Gompers (2000) found larger underperformance for small-firm high market-to-book SEOs than for large-firm SEOs when performance is measured against factor-model benchmarks. They suggest two explanations for why small firms in general have poor returns. First, smaller firms may generate less internal cash and thus issue equity to finance expansion. Second, smaller firms are growth firms and may have many good investment opportunities for which they need to raise cash.

Næs, Skjeltorp, and Ødegaard (2009) investigated the historical size effect in Norway and found that the smallest companies have had the highest returns, and returns are falling almost monotonically with size in the time-period 1980-2006. This indicates that there seems to be an opposite size effect in the Norwegian stock market.

Liquidity

Liquidity is a characteristic that is often related to CAPM anomalies. Level and variation in companies' liquidity has been suggested as explanations of the size effect, book-to-market effect and momentum effect (Acharyaa & Pedersen, 2005; Liu, 2006; Sadka, 2006).

Although the evidence shows that liquidity risk plays an important role in explaining asset returns, few studies incorporate a liquidity risk factor into an asset pricing model, and those that do observe limited success in explaining cross-sectional variation in asset returns. Næs, Skjeltorp, and Ødegaard (2009) however found that liquidity is a priced risk factor leading to abnormal returns at OSE.

Liquidity is generally described as the ability to trade large quantities quickly at low costs with little price impact. This description highlights four dimensions to liquidity, namely,

trading quantity, trading speed, trading cost, and price impact. Since liquidity is multidimensional, existing measures of liquidity inevitably demonstrate a limited ability to capture liquidity risk fully. This has led to a diversion of liquidity measures in the literature, with little agreement about which to prefer. A much used measure for liquidity is the relative spread, calculated as the difference between the closing bid and ask prices, relative to the midpoint price. This proxy is the one I have chosen to use in my analysis.

6.4 Factor Regression Results

In Table 7 I report the time-series regression results of monthly abnormal returns using the three risk factors market, size, and liquidity as described above. The results show that 56% of the total sample experiences a negative three-year return on average. If the poor performance of issuing firms is merely from confounding effects such as differences in beta, in size, and in liquidity, then the regression results should be statistically and economically indistinguishable from zero. Hence, my results prove that the long-run abnormal return for issuing firms is in fact significantly different from zero.

Table 7 Regression of three-year monthly abnormal returns on market, size, and liquidity of issuing and non-issuing firms between January 2000 and December 2007

Alpha	Mean	p-value	Median	Min	Max
Issuers	-1.20%	0.00	-0.85%	-38.7%	46.1%
Non-issuers	-0.09%	0.31	-0.04%	-15.9%	9.8%
Abnormal return difference	-1.11%	0.00	-	-	-

The abnormal return is presented for both issuing and non-issuing firms. Issuing firms has a mean three-year abnormal return of -1.22%, while non-issuing firms has a mean abnormal return of -0.09% during the same period. The p-values are respectively zero and 31%. By performing double t-tests I find that issuing firms underperform non-issuing firms with a mean three-year monthly abnormal return of 1.11%, with a p-value of approximately zero. This is strong evidence for the fact that issuing firms underperforms non-issuing firms in the long run also at the Norwegian market.

This result shows a poor long-run performance for issuing firms amounting to a annual average of -13.7%, which again amounts to an abnormal return of more than 40% for a period of three years. I believe that some of the magnitude of these negative returns comes from the market's extreme up- and downturns during the sample period, as illustrated by the OSEBX index in Figure 2. By removing extreme values more than two standard deviations away from the mean (52 observations) the abnormal monthly return decreases to -0.95%. Hence, I believe that it is important to account for the great variability, as it is an important feature about the Norwegian market. This is reflected in, among other, a great diversity in sectors, company sizes, and other firm characteristics.

The abnormal return for issuing firms range from a maximum of 46.1% to a minimum of -38.7%. This shows a great diversity, but with a kurtosis of 17.5 it is evident that the distribution of returns has an extremely high peak with a considerable amount of observations around the mean of -1.20%. The high kurtosis confirms that the high variance will affect the regression results. The sample distribution for issuing firms also shows a skewness of 0.19 indicating that a small bulk of values lies on the left side of the mean.

The p-values are for testing the hypothesis that the monthly returns are significantly different from zero. Because the p-values are calculated assuming independence of the observations while the three-year returns are skewed and has a high level of kurtosis, the p-values should be viewed as only suggestive.

6.4.1 Investigating the Size and Liquidity Effect

The regression results for the variables market, company size, and equity are reported in Table 8. Consistent with most of the previous financial research presented in section 6.2 I find that the subsequent abnormal return of the SEO firms is positively and significantly related to market performance with a mean p-vale of zero. It is also noteworthy that equity issuers have betas slightly above firms not issuing equity. To the degree that the market factor is a priced risk this would indicate that issuers should experience a higher return.

Table 8 Mean three-year monthly abnormal returns from the three-factor regression for issuers and non-issuers

	Alpha	Mrk	SMB	LIQ
Issuers	-1.20%	1.40	0.28	-0.23
	(0.00)	(0.00)	(0.00)	(0.00)
Non-issuers	-0.09%	0.86	-0.10	0.14
	(0.31)	(0.00)	(0.05)	(0.03)

To investigate whether the company size and share liquidity are relevant for issuing firms at the Norwegian market, I establish two portfolios of the issuing companies' with the 10% lowest and 10% highest market value at the end of the issuing year. I do the same with issuing firms with the 10% lowest and 10% highest liquidity. Table 9 and 10 show the abnormal returns for these portfolios for the whole sample as well as for the time periods of HOT and COLD market.

Table 9 Three-year monthly abnormal returns for SEO companies sorted on company size (p-value in parentheses)

	Small firms	**Large firms**	**Difference in mean**	**p-value difference**
2000-2007	-2.35%	-1.63%	-0.72%	0.19
	(0.00)	(0.00)		
Pre 2003	-3.92%	-5.16%	1.24%	0.23
	(0.00)	(0.00)		
Post 2003	-1.51%	0.31%	-1.81%	0.00
	(0.00)	(0.85)		

I find that the smallest firms have the most negative abnormal return, indicating that the negative returns falls monotonically with size. The period's average differential return between the smallest and the largest companies is more than 0.7% per month. It seems to be a size effect also in the Norwegian market, however by performing tests for the differences in mean returns between small and large companies only the HOT issue market shows significant differences. I further find no significant result for large firms in the period post

2003, indicating that the ability of the pricing model to explain all portfolios is somewhat limited. The last column of the table shows the test results for whether the differential returns between the portfolios are significantly different from zero. For the sub-period post 2003 I do not find support for a significant difference between large and small companies.

Table 10 Three-year monthly abnormal returns for SEO companies sorted on company liquidity level (p-value in parentheses)

	Low Liquidity	High Liquidity	Difference in mean	p-value difference
2000-2007	0.51%	-4.61%	5.12%	0.00
	(0.97)	(0.00)		
Pre 2003	-1.31%	-3.70%	2.39%	0.14
	(0.04)	(0.04)		
Post 2003	0.49%	-4.19%	4.68%	0.00
	(0.97)	(0.00)		

From Table 10 it is evident that the model has problems pricing the low liquidity companies, as the abnormal returns are only significant for the sub-period Pre 2003. The significant results show that it is a negative liquidity effect. The inability of the model to price the companies with low liquidity implies that any group of companies which strongly covaries with the return these may also display underperformance even if the negative alphas is due to the model misspecification problem. The tests between the differences in mean shows that the significant results of a negative price effect in the sub-period Pre 2003 has a p-value of 14%. This indicates that the risk factor liquidity might not be that important for issuing firms.

My results are interestingly consistent with international findings of SEO firms (Loughran & Ritter, 1995; Brav, Geczy, & Gompers, 2000) but contradict somewhat the results of Næs, Skjeltorp, and Ødegaard (2009) investigating risk factors affecting firms at OSE. They find that return is on average related negatively to firm size and positively to liquidity. However, by looking at the results for non-issuing firms over the same period I find exactly this, namely that return is negatively related to size and positively related to liquidity. They also find that the size effect is time sensitive and I find that the size effect is positive prior to 2003, in the COLD issue market

6.4.2 Windows of Opportunities

Table 11 shows that the mean three-year monthly abnormal returns of firms issuing in the HOT and COLD issue market, defined in chapter 2.3, is respectively -0.83% and -1.92%. The difference might not seem to be large, but by testing the differences in mean abnormal return I find that firms issuing in COLD markets significantly underperform firms issuing in HOT markets with a p-value of approximately zero. The theory of HOT and COLD issue markets is consistent with my results also on mean monthly abnormal return in that SEO firms show a greater underperformance in the years of COLD issue market.

Table 11 Three-year monthly abnormal returns on market, size, and liquidity of issuing firms in HOT and COLD markets

	Mean	p-value	Median	Min	Max
Cold market (2001-2002)	-1.92%	0.00	-0.76%	-14.7%	46.1%
Hot market (2003-2007)	-0.83%	0.00	-0.96%	-38.7%	12.4%
Return difference	-1.08%	0.01	-	-	-

During the HOT market period the SEO firms show a slightly negative abnormal return of -0.83% whereas the non-issuing firms show a slightly positive of 0.19% with corresponding p-values of zero and 75%. During the COLD market period the SEO firms show a more negative abnormal return of -1.92% whereas the issuing firms show an abnormal return of -0.40%. The corresponding p-values are zero and 5%. By performing tests of the differences in abnormal return between issuing and non-issuing firms within the COLD and the HOT issue market, it is evident that SEO firms significantly underperform non-issue firms in both COLD and HOT markets with p-values close to zero.

This result shows a poor performance by issuing firms with a negative abnormal three-year return both in HOT and COLD issue markets, however by studying the performance separately for each year it is obvious that the majority of the negative abnormal return is allocated to specific years. Table 12 shows the results for each issuing year separately.

Table 12 Three-year monthly abnormal returns of SEO firms per issuing year

	Mean	p-value	Median	Min	Max	Count
2000	-2.15%	0.00	-0.61%	-38.7%	12.5%	165
2001	-1.91%	0.00	-1.77%	-12.3%	4.8%	79
2002	-1.33%	0.03	-0.85%	-24.6%	10.5%	60
2003	-2.41%	0.00	-2.66%	-12.7%	16.5%	61
2004	-1.23%	0.00	-1.23%	-6.9%	10.6%	74
2005	0.26%	0.72	-0.05%	-12.1%	46.1%	153
2006	0.09%	0.61	0.26%	-12.0%	19.9%	148
2007	-2.02%	0.00	-1.35%	-14.7%	4.1%	148

The abnormal returns range from -2.41% in 2003 to a peak of 0.24% in 2006. The abnormal return of 2005 and 2006 are on average positive but they are not statistically significant. This is a result of the variation in my sample but does not undermine the result of an overall negative return on average. The results further show that the mean return was -2.02% in 2007 even though this was in reality a good financial year, so maybe the effect of the financial crisis of 2008 infects these results.

6.4.3 Categorized by Industry

The risk dimensions within the different segments are also potential explanations for the underperformance of SEO firms. Dimson and Marsh (1999) found empirical support for the view that differences in abnormal return due to company size was because of differences in industry sectors, and Vassalou and Xing (2004) find that the size effect is only present in industry segments with high business cycle risk. Table 13 presents the mean three-year abnormal return for issuing companies for the different segments at OSE.

Table 13 Mean three-year monthly abnormal returns for the different segments in my sample between January 2000 and December 2010

Segment	Mean	P-value	Median	Count
Energy	-1.08%	0.00	0.00%	255
Industry	-0.8%	0.00	-0.79%	140
IT	-1.17%	0.00	-1.37%	326
Consumables	0.31%	0.75	0.27%	34
Consumable Goods	-2.30%	0.00	-1.20%	51
Health Care	-2.15%	0.00	-1.79%	29
Materials	-1.92%	0.01	-1.51%	35
Supply	3.94%	0.74	3.94%	1
Telecom	-3.89%	0.04	0.01%	17

The telecom segment shows the most negative results with an abnormal return of -3.9%, and consumables show a positive abnormal return of 0.3%. The firms with the least negative significant result is the industry segment with an abnormal return of -0.8%. The energy, industry, and IT segments have the least negative statistically significant results, and both the energy and IT segment perform better than the average abnormal return of the whole sample of -1.2%. The p-values indicate that all the results, except for consumables, are statistically significant at levels below 5% so the results are to be trusted. Hence, statistical tests show no statistically significant difference between the three most presented segments IT, energy, and industry.

6.4.4 Categorized by Floatation Method

As discussed in section 2.2 ROs are expected to outperform PPs also in the long-run perspective despite the increasing activity of PPs in the market. Table 14 shows that monthly abnormal return of PPs only slightly underperform ROs with respectively -1.22% and 1.20%. Both ROs and PPs underperform non-issuing firms with lower mean abnormal return and a p-value of 1%. Statistical tests show no significant difference between the mean return for PPs and ROs with a one-sided p-value of 48%.

Table 14 Mean three-year abnormal returns on market, size, and liquidity of issuing firms using PP and RO from 2000 to 2007

	Mean	p-value	Median	Min	Max
PP issuers	-1.22%	0.00	-0.77%	-38.7%	46.1%
RO Issuers	-1.20%	0.01	-0.95%	-24.1%	18.2%
Return difference	0.02%	0.48	-	-	-

I find no statistically significant evidence of differences in mean abnormal return between PPs and ROs in neither COLD nor HOT markets. It is evident that the SEO activity is approximately doubled for both RO and PP during the HOT issue market compared to the COLD issue market.

6.4.5 Annualized Returns

While the mean three-year monthly abnormal return for SEO firms for the three-year period following a SEO is found to be -1.20%, it is convenient to report the distribution of the mean returns for each year. Table 15 presents the monthly abnormal returns both for issuers and non-issuers for each of the three year following the equity issue.

Table 15 Mean three-year monthly abnormal returns for issuing and non-issuing firms for the different time-periods within the three year period subsequent to a SEO where month zero represents the issuing month (with p-values in paranthes)

	SEO firms		Non-issuing firms	
	Alpha	% Negative	Alpha	% Negative
0-36 month (post 3 years)	-1.22% (0.00)	60 %	-0.09% (0.31)	59%
0-24 month (post 2 years)	-1.34% (0.00)	59%	-0.15% (0.24)	54%
0-12 month (year 1)	-1.34% (0.00)	59%	-0.38% (0.18)	55%
12-24 month (year 2)	-1.09% (0.00)	56%	-	
24-36 month (year 3)	-0.81% (0.00)	55%	-	

For issuers, abnormal returns are lower during each of the periods compared to the non-issuing firms. By comparing the abnormal return for each of the three years for issuing firms, it is evident that the abnormal performance is at a peak in the first period and decline in the following years, whereas the percentage of negative observations are approximately stable through the entire three-year period. By the third year (24-36 month) the mean return for issuing firms is narrowing noticeable to less than -1%. The statistical tests for difference between the years are not reported here, but the abnormal return for issuing firms are diverging for the three periods with p-values of 5%, for difference in mean between year 1 and 2, and 25% for difference in mean between year 2 and 3. The abnormal return for issuing firms is -13.7% per year compared to -1.1% for non-issuing firms, an underperformance effect of 12.6% per year.

6.5 Discussion of the Long-run Performance

The findings of poor long-run performance in SEO firms started in some of the academic literature from 1960 (Stigler, 1964; Friend & Longstreet, 1967), but have recently attracted increasing attention from researchers (Eckbo, Masulis, & Norli, 2000; Jegadeesh, 2000; Brav, Geczy, & Gompers, 2000) examining samples of SEOs' abnormal performance subsequent to the equity offering.

I find that the average three-year returns are negative for all firms in my sample period 2000 to 2010, and that SEO firms significantly underperform non-issuing firms subsequent to the offering. The dominant explanation in financial literature for this underperformance is that the stocks are mispriced at the time of SEOs. This is consistent with the windows of opportunities rationale, arguing that during periods of exceptional favorable market conditions with low level of information asymmetry, and where the shares are overvalued, managers take advantage of a window of opportunity by issuing shares. These market conditions lead to a general over-optimism in the market that can obscure a SEO's negative signal to such an extent that the price drops not only at announcement, but also in a longer perspective.

I have tried to identify potential explanations for and factors influencing this long-run underperformance, as well as understand why SEOs continue to be an important source of capital when research show an underperformance among these firms. I will in the following discuss my results in the context of the financial theories and hypothesis presented in chapter 3.

6.5.1 Consistency with Financial Theories

At odds with the pecking order theory, SEO firms typically are financially healthy companies with substantial cash balances, low leverage, and additional debt capacity. In contrast to the trade-off theory, SEOs often move firms away from, rather than closer to, their target leverage ratio. Inconsistent with the market timing theory, SEOs appear to be driven by capital needs associated with large investment projects rather than by market-timing considerations. None of these arguments seem to be able to account for the continuing negative long-run performance of issuing firms subsequent to SEOs.

I believe that the three-factor regression model I have used in this study reflects the priced risks issuing firms face at OSE. As for the announcement effect, information-based explanations for the long-run performance are prominent. Both the decrease in SEO activity during COLD issue markets with high information asymmetry and an even more negative return, acknowledge the windows of opportunity rational of an over optimism in HOT markets obscuring the real firm value.

During the years of HOT issue markets the SEO firms show only a slightly negative long-run abnormal return. And as SEO firms underperform non-issuing firms in all periods, the results can be interpreted in two ways. That underperformance is not unique to issuers, but that in fact the returns of SEO firms co-vary with the return of non-issuing firms. Or that the measures of underperformance of issuing firms are due to the model not being able to catch hidden risk factors.

A verification of such a long-run underperformance for SEO firms, and especially that there exists *windows of opportunities*, indicate that that managers strive to issue seasoned equity when the firm is grossly overvalued, that an announcement will not revalue the firm adequately, and the new shares will be sold when the firm is still overvalued. A rational belief would be that since undervalued firms will postpone their equity offering (Lucas & McDonald, 1990) as SEO announcement would revalue the firm, on average it will no longer be under- or overvalued. This would result in no long-run underperformance of issuing firms, and thus when believing that my results are real, the market does not fully comprehend and adjust for the firm's real value at announcement.

The theory about information asymmetry between managers and investors could explain how PPs has gradually become the most popular floatation method at OSE. At the same time it is evident that ROs are more frequent for larger SEOs. It is evident by the largest price drop at SEO announcement that the market reacts more negative to ROs, hence I do not find that ROs underperformance PPs in the long run. This strengthen my belief that the large price drop at announcement for ROs reflects the larger underwriting costs and that ROs are on average almost twice the proportion of total equity value for the issuing firm compared to PP.

When the level of asymmetric information about firm value increases, as in a COLD market, firms tend to choose an equity issue method involving certification by an underwriter or an investor (Eckbo & Masulis, 1992). There are a growing number of papers that find information asymmetries to be an important determinant in the choice between private and public capital markets. Hence, they find no differences in the preference of using PPs and ROs.

By using a three-factor regression model to measure abnormal returns I account for the different risk exposure for issuing firms. One of my goals with this study was to provide an empirical relation between the average stock return of issuing firms and the variables market, company size (measured by market value of equity), and liquidity. This is guided by the hypotheses mentioned in Chapter 3 for long-run underperformance by SEO firms, as well as by the results of Næs, Skjeltorp, and Ødegaard (2009). I find that these variables are all significantly related to abnormal long-run return. This is in accordance with rational pricing hypothesis, the leading theory among research applying the Fama and French model. This leads to a strong presumption that the three explanatory variables in my model are all proxies for risk factors capturing variation in long-run return for issuing firms.

One of my most intriguing findings is the overall positive size effect related to long-run abnormal return where large firms experience a less negative abnormal return. However, consistent with the findings of Næs, Skjeltorp, and Ødegaard I find that the SMB-factor for non-issuing firms is negative, and such my result does not completely disagree with theirs.

The size effect has turned out to be very sensitive to choice of time period, and I find that in the COLD issue market large firms underperforms small firms, but with a p-value of 23%. This indicates that the decrease in the riskiness of a firm's equity is higher for larger firms in

poor financial markets. Another attempt to find an explanation for this relationship is Dimson and Marsh's (1999) findings that differences in return due to company size was because of differences in industry sectors, as well as Vassalou and Xing (2004) finding that the size effect are only present in industry segments with high business cycle risk (energy, industry, it).

I find a similar conspicuous result for the risk factor liquidity with a slightly negative relationship to the long-run performance, and also this is only found for SEO firms. It seems that my model is not adequately able to price low liquidity companies. The high correlation between the liquidity factor and size factor, meaning that they are capturing much of the same risks, might illuminate why I find a liquidity discount while the size factor gives a return premium. A better, and maybe different result could be found if the liquidity factor was constructed so that it is less correlated to the size factor. It is worth noting that the relationship between the two risk factors are opposite both for issuing and for non-issuing. This could be argued to be a sign of imperfect measures of liquidity and size and to obscure the validity of my three-factor model. However, I believe that the positive size effect could be a result of many large and optimistic SEOs performed by well-established companies with a good reputation for high growth especially in the energy sector.

6.5.2 Existence of Long-run Underperformance

In my analysis all firm shows a mean monthly abnormal return of -1.2% for the three-years subsequent to the SEO, and a yearly mean return of -13.7%. This is a rather poor performance, which I suspect is amplified by the relatively short time period for my sample and for specific characteristics (e.g. financial crisis of 2008) during these years. This suspicion is strengthened by the fact that the return ranges between -2.4% in 2003 to a positive result in 2006. Nevertheless, I believe that the identified underperformance of issuing firms is a reality, and it should be questioned why firms continue to frequently issue new equity. The answer might be that issuing equity is the last resort when there is a need for capital, or that managers believe that investors' views about project payoffs are likely to be aligned with theirs, thus maximizing the likelihood of agreement (correctly valued shares) with investors.

However, my results should not be interpreted as clear evidence of long-run underperformance for SEOs, as the ability to capture the correct risk factors for issuing and

non-issuing firms might obscure and mislead the results to some degree. The analysis gives valuable insights about what factors influence SEO firms' performance subsequent to equity issues. As Fama and French (1996) point out, their three-factor model may not be able to explain all asset returns, and they advise further work to search for a richer model. The success of the size and liquidity augmented three-factor model suggests that company size and liquidity risk is an especially promising direction in this continued search.

The systematic underperformance of issuing firms in periods of both high and low information asymmetry contradicts the efficient market hypothesis. Even though I find underperformance to be decreasing in the years following the SEO, the market efficiency theory is doubtful. I feel that my results are strong enough to put a question mark to the market efficiency theory, as it is clear that underperformance systematically occur for a majority of issuing firms in all subsamples both across industry, time, and issue type.

7 Conclusion

Investing in SEO companies is hazardous to your wealth. Through a comprehensive study of the stock price dynamics at Oslo Stock Exchange I find that seasoned equity offerings on average show a price drop at announcement in addition to a negative abnormal return in the long run. Companies issuing seasoned equity during 2000 to 2010 have been poor long-run investments for investors. I find an average price drop at announcement of -2.6% and a mean annual abnormal return during the three years following the offering of -13.7%. The annual abnormal return for non-issuing firms for the same three-year period is -1.1%. The magnitude of the underperformance by SEO companies is large, indicating that 38% more money would need to be invested in the issuer than in the non-issuers to be left with the same wealth three years later. My evidence is consistent with a market in which companies announce SEOs when their shares are grossly overvalued, the market does not revalue the shares appropriately, and the shares is still substantially overvalued when the issue occurs.

If investors are to receive the same returns from issuers as from non-issuers the average announcement effect should also incorporate the long-run underperformance and thus be much larger. If there exists such a systematical and continuing underperformance of SEO companies the market efficiency theory does not longer hold. It could be argued that the market only adjusts slowly to the negative information, but a delay of several years would still not be consistent with market efficiency.

My factor model estimation of a rather large average annual underperformance is evident. Hence, the divergent results of the risk factors for issuers and non-issuers raises suspicion to these factors' credibility as risk measures. To strengthen my results it would be necessary to explore how other risk factor influence the abnormal return. The relationship between price drop at announcement and in the long run is probably the most obvious extension of my analysis. This and other interesting questions are left to future work.

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