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Thesis

Ownership effects on underpricing of Norwegian SEOs

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Abstract

This thesis examines how ownership concentration affects underpricing in seasoned equity offerings (SEOs) in the Norwegian equity market, looking at the difference in underpricing between rights issues and private placements. Our sample consists of 398 SEOs, 88 rights issues and 310 private placements, on Oslo Stock Exchange (OSE) between 2000 and 2010.

There is less extensive literature on SEO underpricing compared to IPOs, and ownership concentration is scarcely studied on the Norwegian equity market. We take the same approach as some U.S. studies, Corwin (2003) and Intintoli & Khale (2011) among others, to see if we can find similar evidence on the OSE.

We find that SEO underpricing is significantly higher in rights issues than in private placements with an average underpricing, between 2000 and 2010, of 18.9% and 12.5% correspondingly.

This thesis examines five hypotheses related to ownership concentration and information asymmetry. Interestingly, we find evidence that majority ownership is linked to more underpricing in rights issues. When looking at rights issues we also find that firm size has a negative effect on underpricing and that price pressure and underpricing have a positive relationship. These findings are somewhat similar to the U.S. findings we have based our thesis on. Additionally, our research finds no significant results on SEO underpricing and private placements.
Acknowledgements

As a result of our study we have increased our understanding of the dynamics in the Norwegian equity market, especially related to initial public offerings and seasoned equity offerings. We would like to direct sincere thanks to our supervisor Siv J. Staubo and are grateful for her insights and guidance that we received throughout the process of writing this thesis. We hope that our thesis will contribute to her further research on this topic.

Furthermore we would like to thank the Department of Financial Economics at the Norwegian Business School BI for providing us with an extensive and unique dataset.
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1 Introduction

An initial public offering (IPO) is a company's first sale of shares to the public. According to Eckbo, Masulis and Norli (2007) the most common reason for raising equity are capital expenditures and investment projects. Other reasons can be capital restructuring, inflated stock value or mergers and acquisitions (M&A) financing, to name a few. A well documented anomaly regarding IPOs are that they tend to be underpriced. Stoll and Curley (1970), Logue (1973), Reilly (1973), and Ibbotson (1975) were among the first to document a systematic increase from the offer price to the first day closing price, which is known as underpricing (Ritter and Welch 2002).

Underpricing results in "money left on the table", which essentially means, lost capital that could have been raised for the company had the stock been offered at a higher price. Jay Ritter (2012) states that; "this is the first-day profit received by investors who were allocated shares at the offers price". This creates opportunity cost for a company, in other words, the benefits the company could have received by taking an alternative action.

Similar but different, a seasoned equity offering (SEO) or secondary offering is a process where a company creates and issue new shares to raise new equity (Eckbo, Masulis, & Norli, 2007). SEOs are treated by underwriters in much the same way as IPOs. One of the main differences is that the market price of the outstanding shares is used as a base for the newly issued shares, meaning that the typical IPO price setting process is not necessary with SEOs, as the market price is already known.

Several books and articles have been written on underpricing of IPOs, and underpricing of SEOs has received much more attention during these past decades (Corwin 2003). Previous studies examine the determinants of underpricing mostly in the United States, with little focus on ownership variables. We examine if insider ownership, and/or majority ownership influences underpricing of SEOs on the Oslo Stock Exchange (OSE) and if, they are comparable to the findings made in the U.S.
Interestingly, we find evidence that majority ownership is linked to more underpricing in rights issues. When looking at rights issues alone we also find that firm size has a negative effect on underpricing and that price pressure and underpricing has a positive effect. These findings are somewhat similar to the U.S. findings we have based our thesis on.

We have organized our thesis in the following manner: In section 2 we provide definitions on SEOs, underpricing and the different theories of underpricing on SEOs relevant to our thesis. In section 3 we present and explain our five hypotheses. Our compilation and use of data is introduced and explained in section 4. In section 5 we present the various variables used in the regression, the relevant descriptive statistics, describe the methodology we have used and discuss multicollinearity among the variables through a correlation matrix. The empirical analysis, regression model and results are presented in section 6. Finally, we conclude our thesis under section 7.
2 Theoretical background

In the following section we first provide definitions of SEOs and how they compare to IPOs. Furthermore, we provide an overview of existing literature related to our topic.

2.1 Definitions

2.1.1 Seasoned equity offerings through rights issues and private placements

A seasoned equity offering (SEO) is when a company issues additional securities. This can be done through rights offers, which ensure existing shareholders a proportionate share of the new shares, the shareholder can also sell this right, if he/she does not wish to participate in the offer. The alternative to rights offers are private placements, which involves inviting certain investors to subscribe to the issue. SEOs are handled by underwriting firms in much the same way as initial public offerings (IPOs), except that the price of the offered shares are based on the market price of outstanding shares.

2.1.2 SEO Underpricing compared to IPO underpricing

Underpricing of an IPO occurs when the price is lower than the closing market price on the first-day of trading. The underpricing is a short run anomaly characterizing the IPO market. This phenomenon has – over decades - inspired large theoretical literature trying to give a relevant and a convincing explanation to this anomaly.

SEO underpricing is calculated differently than IPO underpricing. According to Corwin (2003), which we to a certain extent base our model on, underpricing is calculated as: 
\[ \text{-1 times the return from the previous day’s closing price to the offer.} \]

Simply put, an SEO is underpriced if the offer price is lower than the closing price the day prior to the offer.

2.2 Existing literature

In our thesis's we focus on the ownership concentration and its effect on underpricing of SEOs, and mainly focus our attention on existing literature related to this category. However, considering that the various theories are not mutually exclusive, we believe it is worth examining a few other relevant theories as well which are related to the underpricing phenomenon.
Underpricing of SEOs have increased considerably since the early 1980s and several empirical studies, starting with Smith (1977), have documented this effect in the United States. Smith (1977) reported from his sample of 328 exchange-listed firms, that the average close-to-offer returns\(^1\) were \(-0.54\%\) and the average offer-to-close returns\(^2\) were \(0.82\%\). The average daily return for the 260 days surrounding the offer date was \(0.05\%\) with a sample standard deviation of \(0.013\%\). This indicated that underpricing (the SEO discount) imposed an extra discount of \(0.5\%-0.8\%\) for the existing owners of the firm.

In a more recent paper, Corwin (2003) investigates five factors influencing SEO underpricing using multivariable models. These five factors are (i): Uncertainty and Asymmetric Information, (ii) Price Pressure, (iii) Preoffer Price Moves and Manipulative Trading, (iv) Transaction Cost Savings, and (v) Underwriter Pricing Practices. Corwin (2003) reported that the SEO discount was \(1.15\%\) for offers between 1980 and 1989, while the mean discount was \(2.92\%\) from 1990 to 1998, reaching a high of \(3.72\%\) in 1996.

In addition, Mola and Loughran (2004) examined the effect of clustering on offer-price, and reported that the average SEO discount between 1986 and 1989, was \(1.1\%\), while the average discount between 1986 and 1999 was \(3\%\) on closing price the day before an issue. According to these authors underpricing has showed an increasing trend in the past decades. Mola and Loughran (2004) emphasize that the increase in underpricing is consistent with firm's not trying to minimize the SEO cost, instead they focused on choosing an underwriter who aggressively talked up their stock. Previously, when several issuers were more focused on analyst coverage, more money could be left on the table for investment bankers favorite clients, Mola and Loughrans findinga are similar with Loughran and Ritter's (2004) report for IPOs during the 1990s.

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\(^1\) Close-to-offer returns refer to the previous day's closing transaction price to the offer price (Corwin 2003).

\(^2\) Offer-to-close returns refer to the return from buying at the offer price and selling at the close on the issue day (Loderer et al. 1991).
2.2.2 Information asymmetry

Several models of IPO underpricing include the asymmetric-information hypothesis. These models assume that one of the parties in the IPO has more information than the others. A factor that will lead to underpricing. This can be explained by the "winner's curse" problem, where the uninformed investors get allocated all the shares in the unprofitable IPOs, and few in the profitable IPOs. The reason being that the informed investors will bid more in the profitable IPOs causing the uninformed investors to be crowded out. The issuing firms wants to include all investors as they can not rely on the informed investors alone. One way to alleviate this is to offer a discount (underpricing) to attract the uninformed investors to participate in the stock issue. Rock (1986) examined exactly this, he developed a winner's curse model, where underpricing is used as a compensation for uninformed investors to ensure their participation in the issue.

According to Loderer, Sheehan, and Kadlec (1991) this method can also be applied on SEOs, as managers have limited knowledge of the investors demand for the issue.

Recent papers, suggest that this phenomenon is less present in SEOs than for IPOs. For instance, Corwin (2003) found that there was little evidence of information asymmetry between firm size and the bid-ask spread.

To summerize, prior studies concerning underpricing due to information asymmetry in SEOs is not as apparant as in IPOs.

2.2.3 Uncertainty surrounding Firm Value

Several papers measure uncertainty surrounding firm value as the stock return volatility, and some papers - such as Altinkilç and Hansen (2000) - used this measure to test for information asymmetry. However, economic effects beyond asymmetric information are likely to influence the stock return volatility, a fact that was later pointed out by Lee og Masulis (2009).

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3 The winner's curse refers to the fact that a winner's bid in an auction tend to exceed the intrinsic value of the item purchased. A known reason for this phenomenon is asymmetric information, the winning bid is the bid that has overestimated the items true value the most (Thaler, 1988).
The stock return volatility was employed by Corwin (2003) as the proxy for uncertainty surrounding firm value. His study suggests that even in the absence of asymmetric information, SEO underpricing is significantly related to uncertainty surrounding firm value. This suggests, all else equal, that firms with higher uncertainty will be more underpriced than other firms in SEOs. In addition, Altınkılıç and Hansen (2003) found evidence that greater stock return volatility increases SEO underpricing.

2.2.4 Price pressure

Researchers have for a long time been interested in the notion of price pressure and downward-sloping demand curves for stocks. The effects of additional outstanding shares are referred to as price pressure which can be either temporary or permanent. Price pressure is frequently calculated by the offer size or relative offer size. The relative offer size is defined by Corwin (2003) as the number of shares offered over the total number of shares outstanding prior to the offer.

Numerous studies investigate whether supply and demand-shifts in the volume of shares affect the stock prices. Scholes (1972) and Mikkelson and Partch (1985) investigate block trades and provide evidence of price effects related to block size, while other studies, such as Sheifer (1986) and Lynch and Mendenhall (1997), investigate the shifts in demand on the S&P index. They found that the price effects are correlated to change in intuitive demand.

Stocks with excess demand curves, are perfectly elastic in a perfect capital market. Which essentially means that investors can buy and/or sell limitless amount of shares at a market price that reflects all related information in that price. As a consequence, uninformed trading which leads to shifts in excess demand will have no impact on the stock price. There are however, mixed evidence whether SEO underpricing is caused by price pressure or downward-sloping demand curves. A comprehensive list of this mixed evidence is provided by Eckbo, Masulis, and Norli (2007).

Given the fact that information on share dilution on SEOs is known on the offer date, this information should, at the time of announcement, be included in the offered prices of the share. However, temporary price pressure may still occur
with the sale of new shares. Corwin (2003) found that prior to the offer; there was a significant price drop and a significant price recovery in the days following the offer. These results indicated that the relative offer size is positively related with the SEO underpricing, something which again is consistent with temporary price pressure.

2.2.5 Manipulative trading

To explain the underpricing of SEOs, a model of manipulative informed trading around SEOs was developed by Gerard and Nanda (1993). This model predicts that informed traders will sell off shares before an SEO, and thus manipulate the offering prices with the result that they later can acquire shares at lower prices to gain profits. Gerard and Nanda argue that this will increase underpricing as it may worsen the winner's curse problem for uninformed investors. Barclay and Litzenberger (1988) found that the stock prices fell prior the announcement, and recovered the days after, which is consistent with Gerard and Nanda findings. However, during a three-hour trading period, Barclay and Litzenberger found the average stock return of -2.4%, with no evidence of significant abnormal trading activity.

2.2.6 Theories on ownership variables

Signaling theory is often considered to be consistent with insider ownership in SEOs and originated with the studies of Leland and Pyle (1977), and Myers and Majluf (1984) (Hull, Kwak, and Walker, 2012). In these studies, the authors assume that insider ownership (50 percent of shares held by one shareholder) has private information advantage, and that insiders with more information take advantage of this. According to Myers and Majluf (1984) one of the influencing factors on the timing as to when firms decide to raise new equity, is when the firm's management perceives its shares to be overvalued.

Intintoli & Kahle (2010) examine various ownership variables, and how these variables relate to SEO underpricing. First they examine the insider ownership preceding the SEO with its effect on float, second the fraction of secondary shares to total shares sold in the SEO, and lastly the time since IPO. Intintoli and Kahle discovered that insider ownership reduces float (fraction of shares offered to non-insiders), which in turn increases underpricing however,
when controlled for the relationship between offer size and insider ownership, they also found that the relative offer size was insignificant to explain underpricing. In addition, they found that volume in itself was insignificant, but underpricing proved to be higher with high shares offered to float for low volume firms.

Furthermore, they discovered that insiders with their personal wealth at stake, would pressure banks to reduce underpricing. The effect of this type of pressure, is mitigated if the underwriter is prestigious, since they are better able to resist pressure from account managers.

Kvaal & Ødegaard (2011) has – back to the 1980’s - conducted research on SEO data on the Oslo Stock Exchange (OSE). They found that underpricing on rights offers, is comparable with the level of underpricing in New York Stock Exchange (NYSE) and Frankfurt, and that the difference in underpricing between small- and large-cap firms are unsubstantial on OSE, while small-cap firms on all other exchanges in their sample had lower underpricing than large-cap firms. In addition, Kvaal & Ødegaard found that underpricing for private placements on OSE are lower than in London and higher than NYSE, compared at the same level as Stockholm, Copenhagen and Frankfurt. Stock market liquidity can be one explanation why firms on NYSE, which is considered to be the most liquid stock market in the world, are able to raise new capital with less underpricing than firms on OSE or anywhere else. Furthermore, for private placements, Kvaal & Ødegaard found that large-cap firms has slightly lower underpricing on SEOs, which in turn also is comparable to most of the other markets in their sample. These findings are consistent with theories on asymmetric information, that larger firms are more transparent than smaller firms and therefore are easier to evaluate. According to Kvaal & Ødegaard (2011) underpricing is often as high as 7% for private placements, and 18% for rights offers of Norwegian listed firms on the OSE.
3 Hypotheses

The hypotheses in our thesis are primarily based on Intintoli and Kahle (2010) and Corwin (2003), who conducted research on the U.S. equity market. Our hypotheses are based on the authors’ findings, and we will apply their models to the Norwegian equity market. How ownership effects underpricing are our primary focus. However, we will also include proxies for uncertainty, price pressure and market manipulation. Based on the research from the U.S. these proxies may have significant impact on underpricing and are therefore important to include in the analysis.

3.1.1 Insider ownership

Intintoli and Kahle (2010) found evidence that insider ownership increases price pressure, and thereby increases underpricing. However, they also suggest that large issues with high managerial participation incentivize the managers to apply pressure to reduce the underpricing, and thereby protecting their own personal wealth. Last but least, the level of underpricing may also be dependent on the level of prestige of the underwriter; however we will not include this in our analysis, but rather focus on the price pressure effect.

(H1): Underpricing is higher when insider ownership prior to the SEO is high

To test for this effect, we use the ratio of shares owned by insiders to the total amount of outstanding shares. Insiders in our analysis are defined as persons with access to information not available to the public, namely board members and executives.

3.1.2 Majority ownership

To the best of our knowledge, there have so far been no studies on whether majority ownership affects underpricing of SEO’s. We define a majority owner as an owner who holds more than 50 percent (>50%) of the voting shares in a company. We expect these firms to be less liquid, and thereby already be underpriced before the offer. Hauser et al. (2003), suggest that majority owners will participate in SEO’s to avoid dilution of their own share holdings because they are motivated by long term control of the firm. Based on this assumption we expect that there is no causal relationship between majority ownership and the winner’s curse problem for less informed investors. This also means that other
participants pay only to maintain cash flow rights and not control rights, which should be reflected in the price they are willing to pay to participate. Based on these arguments we form a hypothesis of a positive relationship between majority ownership and underpricing.

\( (H2): \text{Underpricing is higher when there is a majority shareholder} \)

We use a dummy variable equal to 1 if the company has a majority owner, and zero otherwise.

3.1.3 Price pressure

Several papers have studied the price pressure effect on SEO’s. Altınkılıç and Hansen (2003), find unusual negative return the week prior to the offer and a small positive return the following week. Corwin (2003) finds a positive relationship between relative offer size and underpricing. Eckbo, Masulis and Norli (2007) support the findings that depict how offer size has a significant impact on underpricing. We base our analysis on the assumption that a sudden positive shift in the supply of shares in a market should cause the price to go down, thereby causing a downward sloping demand curve in the market. Given the nature of an SEO, the issuer or underwriter have to predict what price the market will be willing to give for the new shares. If the issue price is too high, the offering will fail or the company will be sued. As a proxy for price pressure, inspired by Corwin (2003) we use the relative offer size, defined as the ratio of new shares to existing shares.

\( (H3): \text{Underpricing is higher when the relative offer size is higher} \)

3.1.4 Uncertainty

Uncertainty and asymmetric information, can lead to a winner's curse problem for uninformed investors and consequently leading them to withholding their participation in the share issue. Compensation in form of a discount is necessary to ensure their participation in the offer (Rock 1986). Uncertainty is also relevant in the time lag between the pricing of the offer and the issue (Corwin 2003). The issuer must take any possible fluctuations into consideration to avoid overpricing. This suggests that firms with high levels of uncertainty, either in form of asymmetric information or high price volatility, will be more underpriced than other firms, all else being equal. To proxy for uncertainty, we use the standard deviation of the share price in the 20 day period prior to the offer.
To control for asymmetric information we consider the firm size, as it is a common belief that there are less information asymmetries between the capital market and the insiders in large firms compared to small firms. Reasons for this might be that high focus from media and large institutional investors are forcing the insiders to run the company with more transparency.

\( (H4): \text{Underpricing is higher when uncertainty and asymmetric information is high} \)

3.1.5 Market manipulation

Previous studies have shown significant temporary price declines the days prior to the seasoned offers. Gerard and Nanda (1993), argue that these pre-offer returns may reflect manipulative trading. Informed investors sell off heavily right before the offer to depress the price. This leads to more asymmetric information in the share prices, which again can accelerate the winner's curse problem for the uninformed investors.

\( (H5): \text{Underpricing is higher when pre-offer moves are high} \)

We measure pre-offer by calculating the cumulative abnormal return (CAR) in the 5-day period around to the offer. We will especially look at significant price drops in the preceding period.
4 Data

In this section, we introduce the data set used in our analysis and how we have gathered and filtered our findings relative to previous work by Kvaal & Ødegaard (2011) who conducted a similar analysis on the Norwegian equity market.

4.1 Sample selection

We identified our sample of seasoned equity offerings through private placements and rights issues on OSE, using Oslo Stock Exchange's issues statistics. These statistics contain all issues on OSE between 2000 and 2010. The list contains information surrounding the offer, such as; number of shares issued and offer price. The initial sample size was 2081, including IPOs and employee placements. As our research focuses on SEOs on the Norwegian equity market in the time period between 2000 and 2010, we exclude all initial public offerings, employee placements, exchange traded funds (ETFs) and issues with a price of 0. This leaves us with 961 private placements and 219 rights issues, a total sample of 1180, illustrated by a yearly split in exhibit 1 below.

Exhibit 1 - SEOs on OSE between 2000 and 2010 - Initial sample

Ownership- and accounting data for the companies in our sample have been collected from the Centre for Corporate Governance Research (CCGR). Furthermore, stock price, total number of shares and shares owned by free float for each company, are collected from DataStream.

Looking at our initial sample, issues with missing data and extreme values are removed. We take the same approach as Kvaal & Ødegaard (2011) and remove issues where the stock price is extremely different from the issue price. Kvaal &
Ødegaard emphasize that this phenomenon is caused by mispricing at OSE, as there are several reports where the offer price is several hundred percent larger or smaller than the stock price. We therefore take the same approach as Kvaal and Ødegaard (2011), and remove cases where the difference between the stock price and the offer price account for more than 90 percent of the stock price the day before the offer. Out of all underpriced SEOs, 77.29 percent are underpriced by 90 percent or more. To avoid a skewed distribution, we also remove 77.29 percent of the largest values of all overpriced and underpriced SEOs.

This leaves us with the final sample of 310 private placements and 88 rights issues, a total sample of 398 SEOs, as illustrated by a yearly split in exhibit 2 below.

Exhibit 2 - SEOs on OSE between 2000 and 2010 - Final Sample

<table>
<thead>
<tr>
<th>Year</th>
<th>Private placements</th>
<th>Rights issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>24</td>
<td>14</td>
</tr>
<tr>
<td>2009</td>
<td>36</td>
<td>15</td>
</tr>
<tr>
<td>2008</td>
<td>20</td>
<td>4</td>
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<tr>
<td>2007</td>
<td>54</td>
<td>10</td>
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<td>2006</td>
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<td>2001</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td>2000</td>
<td>9</td>
<td>6</td>
</tr>
</tbody>
</table>

4.2 Sampling bias

We have moved from an initial sample of 1180 SEOs to an adjusted final sample of 398 SEOs on the OSE. Removing data due to missing values may cause a sampling bias if the values in question are not random. Considering that we have removed two-thirds of the initial sample, we are concerned that the final sample will not accurately represent the target population. However, we are confident that the data provided and collected from the Norwegian Business School BI, Oslo Stock Exchange and DataStream are representative for our thesis.
5 Methodology

The variables used in our regression model, are presented in this section. First, we introduce the dependent variable "UNDERPRICING", we then move on to explain the respective independent and control variables which are required to test the hypothesis outlined under section 3.

5.1 Dependent-, independent and control variables

5.1.1 Underpricing

The dependent variable in our analysis is "UNDERPRICING". As mentioned earlier under section 2, underpricing refers to the fact that shares are offered at a lower price than the market price of the same shares. This is clearly demonstrated the day after the offer, where prices adjust accordingly. We calculate underpricing the same way as Corwin (2003); 

\[-1 \times \text{the return from the previous day's closing price to the offer.}\]

5.1.2 Relative offer size

Our independent variables offer size "REL_OFFER" is measured as the number of new shares offered, divided by total outstanding shares before the offer. "REL_OFFER_FF" refers to the relative offer size to the free float, measured as 

\[(1 - \text{INS\_OWN}) \times \text{REL\_OFFER}.\]

5.1.3 Firm size

As a proxy for firm size, we use the market cap of the firm on the day preceding the offer. This is calculated using the stock price the day before the offer multiplied with the number of total outstanding shares the day before the offer. We have described this as "MARKET\_CAP" in our model.

5.1.4 Volatility

We define volatility as the standard deviation of the share price in the 20’Th day period prior to the offer. This variable can, unlike IPOs, be measured prior to the SEO. According to Corwin (2003), the variable reflects the uncertainty before the event related with the value of the issuing firm.
5.1.5  *Cumulative abnormal returns (CAR)*

We used an event study methodology to find the control variable, "CAR". According to MacKinlay (1997), this method is an effective way to measure the effects of an economic event, such as an SEO. Considering that the effects of an SEO will immediately be reflected in the security prices, a relatively short time period has to be observed. In this section, we observe the stock prices five days prior to the SEO, and we separate positive and negative "CAR" into "CAR_POS" and "CAR_NEG" for positive and negative "CAR" respectively. "CAR_POS" is "CAR" if "CAR" is a positive number, and zero otherwise. "CAR_NEG" is "CAR" if "CAR" is a negative number and zero otherwise.

5.1.6  *Insider ownership*

Insider ownership is denoted "INS_OWN", and is the percentage of shares owned by executives and directors. This data is low frequency data, so the variable is the insider ownership after the SEO, something we assume to be similar to the ownership prior to the SEO.

5.1.7  *Majority shareholder*

Firms with a majority shareholder will have a dummy variable MAJ_OWN_D equal to 1, while this will be zero for other firms. We construct this variable using data on the rank 1 owner of each firm. The reason we are using a dummy variable, is because it is only interesting to see which firms have a majority owner and not the measure the relationship between underpricing and the highest controlling share. As INS_OWN, this is also low frequency data, so the majority ownership is measured after the SEO. However, based on the argumentation from Hauser et al. (2003), this ratio is most likely very similar to the one prior to the SEO.

5.2  *Descriptive statistics*

The descriptive statistics for the variables in our thesis are presented below in table 1. From the table we can read that the average underpricing of SEOs on OSE between 2000 and 2010, are 13.9 percent, while the median underpricing is 4.9 percent. The median is a more accurate estimate as it is not affected by excessively high or low figures, hence it will not display an arbitrarily large result as the mean. This is well documented in our sample, and ranges from 88.9 percent underpricing to 4.9 percent overpricing. On average, 44.2 percent of all firms in
our sample are insider owners (INS_OWN) and 8.5 percent has a majority owner (MAJ_OWN_D).

Table 1 - Descriptive statistics - summary

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Std.Dev.</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNDERPRICING</td>
<td>-.139</td>
<td>-.049</td>
<td>.200</td>
<td>-.889</td>
<td>.049</td>
</tr>
<tr>
<td>INS_OWN</td>
<td>.442</td>
<td>.400</td>
<td>.323</td>
<td>.000</td>
<td>1.000</td>
</tr>
<tr>
<td>MAJ_OWN</td>
<td>27.719</td>
<td>19.140</td>
<td>23.977</td>
<td>4.990</td>
<td>100.000</td>
</tr>
<tr>
<td>MAJ_OWN_D</td>
<td>.085</td>
<td>.000</td>
<td>.280</td>
<td>.000</td>
<td>1.000</td>
</tr>
<tr>
<td>STDEV</td>
<td>1.489</td>
<td>.531</td>
<td>3.343</td>
<td>.000</td>
<td>33.301</td>
</tr>
<tr>
<td>REL_OFFER</td>
<td>.358</td>
<td>.093</td>
<td>1.124</td>
<td>.000</td>
<td>11.326</td>
</tr>
<tr>
<td>REL_OFFER_FF</td>
<td>.224</td>
<td>.037</td>
<td>.826</td>
<td>.000</td>
<td>7.560</td>
</tr>
<tr>
<td>CAR_-1</td>
<td>-.002</td>
<td>.000</td>
<td>.190</td>
<td>-.145</td>
<td>1.034</td>
</tr>
</tbody>
</table>

Table 2 below; show that offering type plays a significant role in SEO underpricing. On average, rights issues and private placements are underpriced by 18.9 and 12.5 percent respectively and the median difference shows an even larger gap, 12.3 against 3.4 percent underpriced for the rights issues compared to private placements. This is similar to Kvaal & Ødegaard (2011) findings, which was more or less the same for the different types in the time period between 2000 and 2009 on OSE.

Table 2 - Descriptive statistics - private placements and rights issues

<table>
<thead>
<tr>
<th>Descriptive statistics</th>
<th>N</th>
<th>Mean</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rights issue</td>
<td>88</td>
<td>-.189</td>
<td>-.123</td>
</tr>
<tr>
<td>Private placements</td>
<td>310</td>
<td>-.125</td>
<td>-.034</td>
</tr>
</tbody>
</table>

In table 3 we test whether there are any significant differences in underpricing between rights issues and private placements. We can see by the reported significance number of 0.008, that there is a significant difference, on the 1% level, in underpricing between rights issues and private placements. In all probability, the difference in underpricing by offering type is statistically significant.

Table 3 - Independent samples t-test

<table>
<thead>
<tr>
<th>Independent Samples Test</th>
<th>t</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data</td>
<td>-2.669</td>
<td>396.000</td>
<td>.008</td>
</tr>
</tbody>
</table>
The underpricing each year from 2000 to 2010, are presented in table 4. Exhibit 3 shows the average underpricing yearly in the same period illustrated in a graph.

As we can see from table 4, the number of SEOs varies a lot in the different years, from 15 in 2000 to 64 in 2005 and 2007. Prudence must be applied when interpreting the numbers in table 4, as various factors which we are not examining in this thesis can affect the results. The average underpricing is highest in 2002 with 22.2 percent underpricing, closely followed by 21.8 percent in 2005. If we take a look at the median we can see that the year with the highest underpricing is 2010 with 16 percent.

**Table 4 - Underpricing each year**

<table>
<thead>
<tr>
<th>Year</th>
<th>N</th>
<th>Mean</th>
<th>Median</th>
<th>Std.Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>15</td>
<td>-0.135</td>
<td>-0.100</td>
<td>0.168</td>
<td>-0.522</td>
<td>0.040</td>
</tr>
<tr>
<td>2001</td>
<td>18</td>
<td>-0.222</td>
<td>-0.105</td>
<td>0.264</td>
<td>-0.820</td>
<td>0.038</td>
</tr>
<tr>
<td>2002</td>
<td>20</td>
<td>-0.112</td>
<td>-0.065</td>
<td>0.122</td>
<td>-0.328</td>
<td>0.043</td>
</tr>
<tr>
<td>2003</td>
<td>21</td>
<td>-0.077</td>
<td>-0.036</td>
<td>0.122</td>
<td>-0.394</td>
<td>0.046</td>
</tr>
<tr>
<td>2004</td>
<td>25</td>
<td>-0.081</td>
<td>-0.024</td>
<td>0.163</td>
<td>-0.600</td>
<td>0.046</td>
</tr>
<tr>
<td>2005</td>
<td>64</td>
<td>-0.218</td>
<td>-0.102</td>
<td>0.251</td>
<td>-0.889</td>
<td>0.036</td>
</tr>
<tr>
<td>2006</td>
<td>58</td>
<td>-0.093</td>
<td>-0.024</td>
<td>0.166</td>
<td>-0.753</td>
<td>0.047</td>
</tr>
<tr>
<td>2007</td>
<td>64</td>
<td>-0.056</td>
<td>-0.018</td>
<td>0.130</td>
<td>-0.704</td>
<td>0.049</td>
</tr>
<tr>
<td>2008</td>
<td>24</td>
<td>-0.181</td>
<td>-0.071</td>
<td>0.237</td>
<td>-0.818</td>
<td>0.038</td>
</tr>
<tr>
<td>2009</td>
<td>51</td>
<td>-0.170</td>
<td>-0.063</td>
<td>0.222</td>
<td>-0.759</td>
<td>0.049</td>
</tr>
<tr>
<td>2010</td>
<td>38</td>
<td>-0.196</td>
<td>-0.160</td>
<td>0.182</td>
<td>-0.880</td>
<td>0.044</td>
</tr>
<tr>
<td>Total</td>
<td>398</td>
<td>-0.139</td>
<td>-0.049</td>
<td>0.200</td>
<td>-0.889</td>
<td>0.049</td>
</tr>
</tbody>
</table>

**Exhibit 3 - Average underpricing from 2000 to 2010**
5.3 Correlation analysis and multicollinearity

Since we are using a multiple OLS model, it is important to identify whether any of the variables have strong correlation, something that may affect the strength of our model. No correlation between two independent variables is virtually impossible to obtain, so we classify relationships with a correlation below |0.3| as low and assume that it will not inflate our results.

Looking at the correlation between the independent variables, we find a significant correlation between "MARKET_CAP" and "REL_OFFER" of -0.369. This is expected because of the nature of the variables, and will be taken into consideration when studying the results of the regression. "REL_OFFER_FF" is naturally also correlated with "MARKET_CAP", but we see a somewhat weaker correlation between these two variables. The strong correlation between "REL_OFFER" and "REL_OFFER_FF", will pose no problem as we do not include both variables in the same regression.

The correlation between the dependent and the independent variables in our sample, gives us an indication of relationships between the variables. As mentioned in the literature review, Corwin (2003) and Intintoli and Kahle (2010) found evidence that firm size and price pressure where significant determinants of underpricing with positive and negative effects respectively. We see a small indication of the same relationships in our sample. In addition, there is a minor but significant negative correlation between underpricing and positive cumulative abnormal return. This gives us an indication that positive pre-offer price movements, and underpricing, correlates positively which was hypothesized in the hypothesis section.
Table 5 – Correlation analysis

Table 5 contains the Pearson’s correlation between all the variables. Correlation coefficients which are significant with a value over 0.3 are highlighted in bold and followed by *, ** or *** depending on level of significant on a 10%, 5% or 1% level.
6 Empirical results

6.1 Multivariate results

We form our model based on OLS and with underpricing as the dependent variable supported by several explanatory variables. For more explanatory power, we divide the model into two alternative models. We separate relative offer and relative offer to free float, three categories or sub samples where we separate offering method and last but least, relative offer and relative offer to free float. We define the models below;

Model 1: \[ \text{UNDERPRICING} = \beta_0 + \beta_1 \text{INS}_\text{OWN} + \beta_2 \text{MAJ}_\text{OWN}_D + \beta_3 \text{MARKET}_\text{CAP} + \beta_4 \text{STDEV} + \beta_5 \text{CAR}_\text{POS} + \beta_6 \text{CAR}_\text{NEG} + \beta_7 \text{REL}_\text{OFFER} \]

Model 2: \[ \text{UNDERPRICING} = \beta_0 + \beta_1 \text{INS}_\text{OWN} + \beta_2 \text{MAJ}_\text{OWN}_D + \beta_3 \text{MARKET}_\text{CAP} + \beta_4 \text{STDEV} + \beta_5 \text{CAR}_\text{POS} + \beta_6 \text{CAR}_\text{NEG} + \beta_7 \text{REL}_\text{OFFER}_\text{FF} \]
We present the OLS regression results in the table above. Negative coefficients mean that there is a positive effect on underpricing. Significant coefficients are marked in bold and have a grey background, indicating the level of significance. T-stats and level of significance are also presented directly under each coefficient. Model 1 and 2 in the column “All” estimates the relationship based on the entire sample. We then split this sample into sub samples based on offering method and apply the same models on these sub samples.

As we see from the results, model 1 and 2 under “All” are significant on a 5% level, while model 1 and 2 under “Rights offers” are significant on a 1% level.
Model 1 and 2 under “Private placements” does not explain underpricing in private placements.

Our main research variables are "INS_OWN" and "MAJ_OWN_D". Intintoli and Kahle (2010), found evidence that insider ownership increases price pressure because it reduces float, and thereby increases underpricing. We were not able to find a direct effect from insider ownership on SEO underpricing in the Norwegian stock market as insider ownership is an insignificant explanatory variable in our models. However, we do find that the coefficient on relative offer size to float (REL_OFFER_FF) is higher and more significant than relative offer size (REL_OFFER) when considering the whole sample, and opposite when considering only rights offers. However, these findings are consistent with Intintoli and Kahle’s findings, and implicates that insider ownership has an indirect effect on price pressure. This indirect effect occurs because insider ownership reduces float, which in turn increases price pressure. When just looking at the rights offers, we see that only "REL_OFFER" is significant at a 5% level. This implicates that the price pressure caused by high insider ownership (relative offer to free float) is less certain to explain underpricing than the price pressure caused by relative offer size. We find that price pressure has a positive effect on underpricing in the cases where we consider the entire sample, and just the rights offers, meaning that H3 is consistent for these samples.

Interestingly we find that "MAJ_OWN_D" is significant in rights offerings, but not in private placements or when considering the entire sample. The coefficient is negative, implicating that firms with a majority owner have more SEO underpricing than firms without, which is consistent with H2. This effect is significant on a 10% level when considering "REL_OFFER", and on a 5% level when considering "REL_OFFER_FF". This implies that firms with a majority owner might suffer the same price pressure effect as firms with high insider ownership, but since we are using a dummy variable we cannot say this for sure. We also find that firm size, measured by "MARKET_CAP", is significant in both the subsamples however strangely not in the entire sample, meaning that size has a negative effect on underpricing, which is consistent with H4 although we do not find any significant results on standard deviation (STD_DEV) in these subsamples prior to the SEO. Our study does not find any significant results on manipulative
trading and underpricing measured by the positive and negative cumulative abnormal returns the days prior to the offering (CAR_POS and CAR_NEG).

6.2 Robustness tests

6.2.1 Separation of offering types

The removal of missing values and extreme observations result in a final sample with different descriptive statistics than the initial sample. This leaves the possibility that the final sample becomes somewhat biased. Separating the offering types, allows us to evaluate the whole sample and question whether one or the other offering type affects the explanatory power of the models.

If we look at the adjusted R-squared from the analysis, we see that by excluding private placements from the sample, the explanatory power and significance increase. This leads us to conclude that private placements might overall reduce the robustness of our analysis.

6.2.2 Replacing variables

We are worried that some firms can cause the relative effect of "MARKET_CAP" to be skewed because of large differences between industries, e.g. the IT-industry versus the retail industry. We try replacing the size variable, "MARKET_CAP" with a new variable measuring size. We call the new variable "ln_ASSETS", a variable that represents the natural logarithm of the book value of total assets. The "ln_ASSETS" will be different from market cap in growth firms, but should be relative similar to market value in the majority of firms.
Table 7 – Robustness test

<table>
<thead>
<tr>
<th></th>
<th>Coefficients</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ln_ASSETS</td>
<td>Rights offers</td>
</tr>
<tr>
<td>(Constant)</td>
<td>0.526</td>
<td>0.544</td>
</tr>
<tr>
<td>sig.</td>
<td>0.057</td>
<td>0.029</td>
</tr>
<tr>
<td>INS_OWN</td>
<td>-0.041</td>
<td>-0.033</td>
</tr>
<tr>
<td>sig.</td>
<td>0.552</td>
<td>0.551</td>
</tr>
<tr>
<td>STDEV</td>
<td>0.028</td>
<td>0.023</td>
</tr>
<tr>
<td>sig.</td>
<td>0.093</td>
<td>0.133</td>
</tr>
<tr>
<td>MARKET_CAP</td>
<td></td>
<td>-0.034</td>
</tr>
<tr>
<td>sig.</td>
<td></td>
<td>0.005</td>
</tr>
<tr>
<td>MAJ_OWN_D</td>
<td>-0.134</td>
<td>-0.121</td>
</tr>
<tr>
<td>sig.</td>
<td>0.059</td>
<td>0.058</td>
</tr>
<tr>
<td>CAR_POS</td>
<td>-0.237</td>
<td>-0.141</td>
</tr>
<tr>
<td>sig.</td>
<td>0.277</td>
<td>0.482</td>
</tr>
<tr>
<td>CAR_NEG</td>
<td>-0.070</td>
<td>-0.008</td>
</tr>
<tr>
<td>sig.</td>
<td>0.480</td>
<td>0.934</td>
</tr>
<tr>
<td>REL_OFFER</td>
<td>-0.019</td>
<td>-0.040</td>
</tr>
<tr>
<td>sig.</td>
<td>0.213</td>
<td>0.011</td>
</tr>
<tr>
<td>ln_ASSETS</td>
<td>-0.033</td>
<td></td>
</tr>
<tr>
<td>sig.</td>
<td>0.009</td>
<td></td>
</tr>
</tbody>
</table>

From the table we see that by replacing the size variable "MARKET_CAP" with "ln_ASSETS", little changes occur in the other variables. The changes are small both in the coefficients and in the level of significance. We can therefore conclude that "MARKET_CAP" is a robust variable in the initial model.
7 Conclusion

We find that SEO underpricing is higher in rights issues than in private placements. This underpricing leads to a lot of money left on the table, money that equals an opportunity cost for the existing shareholders. We use a multiple regression analysis to test our model. We split our analysis into two sub models where we test the effects on underpricing in general, and the two different types in particular. Our analysis shows evidence that majority ownership is linked to more underpricing in rights issues something which we expected from our hypothesis. To the best of our knowledge, this is new to literature and is subject for further research. We also find that price pressure and underpricing has a positive relationship, when looking at all SEO’s and only rights issues, and that firm size has a negative effect on underpricing in rights issues. Both these findings are somewhat consistent with U.S. research, keeping in mind that private placements are rare in that market. Finally, we find no significant results on SEO underpricing in private placements.
8 Bibliography


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Introduction

Seasoned equity offerings (SEOs) are one way for a firm to raise new equity. It is when a firm, who already trades securities in the secondary market, issues additional securities. SEOs are treated by underwriters much in the same way as initial public offerings (IPOs), the main difference being that the market price of the outstanding shares is used as a base for the newly issued shares, thus the price-setting process is not necessary as with IPOs.

Underpricing of SEOs is in general the most significant flotation costs in security offerings; it is the difference between issue price of a new share and the first trading price on the secondary market. Measuring underpricing can be done in numerous ways, but generally concerns the opportunity cost connected to mispricing of new shares.

Previous studies examine the determinants of underpricing on SEOs with its main focus on firms listed in the United States. In our thesis we are going to examine various factors which may influence underpricing in SEOs of listed firms on Oslo stock exchange (OSE). We will investigate whether insider ownership, and/or majority ownership influences underpricing in SEOs.

It is written extensively on the topic of underpricing for IPOs, and SEO underpricing has been given a lot more attention in the past decades. While the level of SEO underpricing is lower than observed for IPOs, it represents a significant cost for issuing firms. We will address this phenomenon further under the literature review section.
Literature review

Underpricing of Seasoned equity offering (SEO) has increased considerably since the early 1980s and several empirical studies, starting with Smith (1977), have documented this effect in the United States. Smith (1977) reported from his sample of 328 exchange-listed firms that the average close-to-offer returns were -0.54% and the average offer-to-close returns were 0.82%. The average daily return for the 260 days surrounding the offer date was 0.05% with a sample standard deviation of 0.013%. This indicated that underpricing (SEO discount) imposed an extra cost of 0.5-0.8% of the proceeds of the issue for owners of the firm.

To put this in perspective with more recent data, Corwin (2003) reported that the SEO discount was 1.15% for offers between 1980 and 1989, while the mean discount was 2.92% from 1990 to 1998, reaching a high of 3.72% in 1996. In addition, Mola and Loughran (2004) examined the effect of clustering on offer-price, and reported that the average SEO discount between 1986 and 1989, was 1.1%, while the average discount between 1986 and 1999 was 3% on closing price the day before an issue. So underpricing has showed an increasing trend in the past decades. Mola and Loughran (2004) emphasize that the increase in underpricing is consistent with firm's not trying to minimize the SEO cost, they are instead focused on choosing an underwriter who will aggressively talk up their stock. Previously when several issuers were more focused on analyst coverage, more money could be left on the table for investment bankers favorite clients, this finding is similar with Loughran and Ritter's (2004) report for IPOs during the 1990s.

We will in the following sections briefly introduce several important studies that are related to SEO underpricing, which in turn grant an overall picture of the existing research.

Flotation costs is a economically essential part of gross proceeds in SEOs, where direct and indirect flotation costs are included (Eckbo, Masulis and Norli 2007). Direct flotation costs are directly related with the issue, such as underwriter-, legal-, registration-, and listing fees and syndication, while indirect flotation costs
is related to three elements, underpricing, probability of withdrawal from issue and effects surrounding the announcement.

There are fewer theoretical models for SEO underpricing compared with IPO models, and three important models are briefly highlighted in this section. The first model for SEO underpricing was provided by Parsons & Raviv (1985), which assumes that a given firm will raise funds for an investment in the future with uncertain value. Second, to explain the underpricing of SEOs, a model of manipulative informed trading around SEOs was developed by Gerard and Nanda (1993). This model predicts that informed traders will sell off shares before an SEO, and thus manipulate the offering prices so they can acquire shares at lower prices to gain profits. They argue that this will increase underpricing as it may worsen the winner's curse problem for uninformed investors. Barclay and Litzenberger (1988) found that the stock prices fell prior the announcement, and recovered the days after, which is consistent with Gerard and Nanda findings. Surrounding the announcement, during a three-hour period, Barclay and Litzenberger found the average stock return of -2.4%, with no evidence of significant abnormal trading activity.

The third model was developed by Chemmanur and Jiao (2011) which emphasizes the role of institutional investors and their information gathering in the SEO process, from announcement to the offering itself.

Eckbo and Masulis (1992) examine the mean and median underpricing by flotation methods for U.S. exchange listed firms between 1963 and 1981. They documented an average underpricing of 0.44% on industrial and utility issuers for this period.

In addition, numerous studies investigate whether supply and demand-shifts in the volume of shares affect the stock prices. Scholes (1972) and Mikkelson and Partch (1985) investigate block trades and provide evidence of price effects related to block size, while other studies, such as Sheifer (1986) and Lynch and Mendenhall (1997), investigate the shifts in demand on the S&P index. They found that the price effects are correlated to change in intuitional demand.
There is mixed evidence whether SEO underpricing is caused by price pressure or downward-sloping demand curves. A comprehensive list of this mixed evidence is provided by Eckbo, Masulis, and Norli (2007).

Given the fact that information on share dilution on SEOs is known on the offer date, this information should, at the time of announcement, be impounded in the prices of the share. However, temporary price pressure may still occur with the sale of new shares. Recent papers, e.g. by Corwin (2003), who documented significant underpricing for SEOs in the United States, found that the relative offer size is positively related with SEO underpricing, which is consistent with temporary price pressure.

Furthermore, Corwin (2003) found that SEO underpricing is positively related to uncertainty regarding firm value. He finds little evidence of a relation between underpricing and proxies for bid-ask spread and firm size. His findings suggest that asymmetric information has little effect on the offer price for seasoned firms.

More recently, Gao and Ritter (2010) investigated a firm's choice to make use of a fully marketed SEO offers against an accelerated SEO offer method. They found that the demand curve and offer size of the pre-issue elasticity of the issuing firm are significant determinants for a firm's marketing choice, and that issuers conducting fully marketed SEOs demonstrate a large momentary increase in the elasticity of demand. Ownership control is not included in these papers.

As described, several papers examine the phenomenon of underpricing of SEOs. However, there has been less focus on ownership variables or firm float (fraction of shares offered to non-insiders). Intintoli & Kahle (2010) examine various variables with regards to these variables, and how they relate to SEO underpricing:

1. The insider ownership preceding the SEO with its effect on float
2. Fraction of secondary shares to total shares sold in the SEO
3. The time since IPO

They discovered that insider ownership reduces float, which in turn increases underpricing, and when controlled for the relationship between offer size and insider ownership, the relative offer size was insignificant to explain underpricing.
In addition, they found that volume was in itself insignificant but underpricing proved to be higher with high shares offered to float for low volume firms. Furthermore, they found that insiders with their personal wealth at stake would pressure banks to reduce underpricing. This effect is mitigated if the underwriter is prestigious, since they are better able to resist pressure from managers.

Signaling theory is often considered to be consistent with insider ownership in SEOs and originated with Leland and Pyle (1977), and Myers and Majluf (1984) (Hull, Kwak, and Walker, 2012). Both theories assume that insider ownership has private information advantage, and that insiders with more information take advantage of this.

Kvaal & Ødegaard (2011) has conducted research on SEO data, back to 1980, on Oslo Stock Exchange (OSE). They found that underpricing on rights offers is comparable with the level of underpricing in NYSE and Frankfurt, and that the difference in underpricing between small- and large-cap firms are unsubstantial on OSE, while small-cap firms on all other exchanges in their sample had lower underpricing than large-cap firms. In addition, they found that underpricing for private placements on OSE are lower than in London and higher than NYSE, comparably at the same level as Stockholm, Copenhagen and Frankfurt. Furthermore, for private placements, they found that large-cap firms has slightly lower underpricing on SEOs, which is also comparable to most of the other markets in their sample. Underpricing is often as high as 7% for private placements, and 18% for rights offers of Norwegian listed firms.
Hypothesis

As mentioned, Corwin (2003) finds evidence of underpricing being affected by relative offer size in U.S. listed firms due to the shift in supply, which is revisited by Intintoli and Kahle (2010) who investigates this result further to test for the effect of insider ownership. The findings suggested that high insider ownership prevents underpricing as the insiders wish to keep as much ownership and control as possible, and not dilute these by issuing discounted shares to the masses. We expect to find some evidence of the same relationship between insider ownership and SEO underpricing as Intintoli and Kahle (2010) at OSE, as the incentives should be the same on the different stock exchange’s, which lead to the next hypothesis:

(H1) SEO underpricing increases with insider ownership

A similar, yet (to the best of our knowledge) unexplored factor that may affect underpricing, may be ownership concentration. When a company has a majority owner, this owner essentially controls everything. As we hypothesize with insider ownership, we also believe that majority owners will oppose to dilution and have a negative effect on underpricing. Since we expect high insider ownership to have a dampening effect on underpricing, we also hypothesize that majority ownership will do the same, for the same reasons.

(H2) SEO underpricing is lower when there is a majority owner

Proxies for uncertainty

As Corwin (2003) and Intintoli and Kahle (2010), we include proxy-variables for uncertainty, which based on previous research on SEO underpricing might be able to offer additional explanation for the underpricing.

As mentioned, Kvaal and Ødegaard (2011) suggest that there are insignificant differences between large- and small-cap companies underpricing of SEO’s. We want to perform the same investigation on our sample, and form the following
hypothesis based on findings from studies in other countries. We base our expectation on Intintoli and Kahle (2010), who describe an a priori expectation that underpricing and firm size have a negative relationship because of more asymmetric information in small firms.

(P1) SEO underpricing decreases with company market capitalization at the day of the issue

Uncertainty can be an important factor when setting the price for a future transaction. In the short time-interval between time of offering and time of distribution, it may arise a relation between uncertainty and underpricing. The issuer must take this uncertainty of future price changes into consideration, and set a price which is low enough for the SEO to be successful. The more time between the offer and the distribution, the more uncertainty there is, which in turn may lead to more underpricing.

(P2) SEO underpricing increases with time between day of offer and day of distribution

Another uncertainty factor is the volatility of the stock, meaning the standard deviation of the stock 30 days before the offer. This adds to uncertainty which we, based on Corwin (2003), believe will contribute to increased volatility.

(P3) SEO underpricing increases with pre-offer volatility

**Proxy for price pressure**

Given that the market has a decreasing demand curve, a sudden positive shift in supply should also cause a decrease in price. This effect might be temporary or permanent given certain assumptions. However, to adjust for this effect we include a proxy for the price pressure. Corwin (2003) used relative offer size (offered shares/total shares) in his study. This was later developed by Intintoli and Kahle (2010) to account for insider ownership. This proxy should be the relative offer size, which we expect to have a positive relationship with underpricing. We
will also look at the relative offer to float, i.e. non-insider owners, and based on Intintoli and Kahle (2010), we expect to see a negative relationship between relative offer size offered to float and underpricing.

(P4) SEO underpricing increases with relative offer size

**Proxy for price manipulation**

The Norwegian Securities Act (Verdipapirhandeloven) of 1997 is intended to pave the way for a safe, orderly and efficient trading in financial instruments, but there can still be occurrences of unfair trading and price manipulation (http://www.na24.no/article3514224.ece - accessed 05.01.2013).

According to Gerard and Nanda (1993), this might be reflected in pre-offer returns. To proxy for this, we use the cumulative abnormal return (CAR) for the last week (5 days) of trading before the offer. The CAR will be calculated as the sum of daily returns minus the Oslo Stock Exchange benchmark index (OSEBX), which is a value weighted index of 59 companies on OSE. Corwin (2003) found in his study that both positive and negative CAR had a positive relationship with underpricing. We form our hypothesis based on these results.

(P5) SEO underpricing increases with a high absolute value of CAR
Methodology

In order to test our main hypotheses H1 and H2, and our proxy hypotheses P1, P2, P3, P4 and P5, we will first find and collect all relevant descriptive statistics to gather a better understanding of the data. When it comes to testing, we will use all variables in a multiple regression analysis to see the relationship between the dependent variable underpricing, and all the independent variables. The dependent variable underpricing will be calculated as minus 1 times the return of the closing price the previous day to the offer price, meaning underpricing is a positive number when offer price is lower than previous day’s closing price.

Insider ownership will be measured as the total fraction of shares held by insiders. We also might add a dummy variable equal to one when insider ownership is larger than the median.

Ownership concentration will be a dummy variable equal to 1 when there is a majority owner.

Market capitalization the day prior to the offer will be the number itself, optionally the natural logarithm of this number. The variable time between offer and distribution will be the number of days between these two points in time. Pre-offer volatility will be the standard deviation of the 30 days, or approximately 20 trading days preceding the offer. Relative offer size will be measured as the ratio of new shares to total existing shares prior to the offer. In addition, we will adjust for the relative offer to insiders to see if there is a relationship between offer to float and underpricing. CAR will be measured as the sum of abnormal returns the 7 days, or 5 trading days prior to the offer.

$$ Underpricing = \alpha + \beta_1 \times (Insider\ ownership) \times D_1 + \beta_2 \times D_{2(majority\ owner)} + \beta_3 \times ln(market\ cap) + \beta_4 \times (days\ between\ offer\ and\ distribution) + \beta_5 \times (Std.\ dev.\ pre - offer\ period) + \beta_6 \times \left( \frac{offer}{existing\ shares} \right) + \beta_7 \times \left( \frac{offer}{existing\ shares} \right) \times (fraction\ of\ shares\ owned\ by\ float) + \beta_8 \times (CAR) $$
Data

In our thesis we will investigate data from Norwegian SEO’s between 2000 and 2010. We aim to empirically test some of the theoretical explanations behind SEO underpricing elaborated under the hypotheses section above.

We have chosen to take a quantitative approach by focusing on using secondary data from OSE, collecting all SEOs performed in Norway between 2000 and 2010, as well as the OSEBX for variable calculation. In addition, we intend to extract information on underpricing and the ownership data from the Corporate Governance Data Base (CGDB).
Bibliography


