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A quantitative analysis of rights offerings on the Swedish market

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ABSTRACT

- Title:** A quantitative analysis of rights offerings on the Swedish market.
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- Authors:** David Hammar and Oscar Perman
- Advisor:** Maria Gårdängen
- Key words:** SEOs, issuing equity, cumulative abnormal returns, shareholders, rights offerings, event window, buy-and-hold abnormal returns,
- Purpose:** The main goal of this thesis is to examine the share price effects of conducting seasoned equity offerings. Is the information asymmetry still the main explanation of the abnormal returns around the announcement day of SEOs? Do the firms experience long-term negative returns?
- Theoretical perspective:** The study is based on previous research material applied on SEOs.
- Methodology** A quantitative analysis is conducted for examining the difference between our sample categories regarding information asymmetry, abnormal returns and buy-and-hold long term returns. Statistical tests as well as an event study are performed.
- Empirical foundation:** The analysis includes companies listed on the Swedish stock exchanges during the years 2006-2013.
- Conclusion:** The results are similar to previous study. It appears that firms announcing SEOs do experience negative abnormal returns and also perform poorer than the market in the post-event period. The results direct that information asymmetry is a potent explanation of the abnormal returns.

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1. Introduction

1.1 Background

Many of the publically traded corporations in today's ever-changing economic environment rely heavily on their ability to raise capital through the issuance of new equity. This is one of the advantages of being a listed company however the outcome of issuing equity is often regarded as a negative sign by the market. There are many different motives for issuing securities, among those being to raise cash for capital expenditures and new investments, refinance or replace existing or maturing securities, change the firm's capital structure, finance mergers and acquisitions, shift wealth and risk among bondholders and shareholders or simply to sustain the on-going operations of the firm. This information is stated in the prospectus that the firms build in connection to a seasoned equity offering (SEO). Nonetheless, when the news of the offering becomes public, issues of common stock on average generates negative abnormal return. The reasons behind these abnormal returns are well debated but popular explanations of the phenomena are based on information asymmetry. Researchers believe that management has a relatively higher level of private information prior to the announcement which leads to the price drop. In the United States, fully marketed traditional underwritten public offerings have been the most attractive SEO option among firms. But during the financial crisis in 2008 due to high level of market volatility, the public markets were closed to most issuers. When the economy later started to recover, firms in need of extra capital were advised to carefully raise funds through a variety of hybrid financing alternatives. Public equity transactions, registered direct offerings, at-the-market offerings and rights offerings being those hybrid alternatives. Rights offerings have existed for decades, but have never been a major source of external financing in the United States unlike in Europe and Asia, where it is a common procedure. From an issuer's perspective, rights offerings in contrast to public offerings, requires no shareholder approval and hence rights offerings can be quickly processed and allows the issuer to take advantage of a window of opportunity or to solve liquidity issues. The rights offering can be underwritten so that the proceeds are secured by the firm. In such a case, an investment bank agrees to buy the remainder of the shares that has been not taken up by existing shareholders. However this is not always a good and safe option. Blue Arrow financed the purchase of Manpower with a rights issue in the United Kingdom in 1987. The rights issue was taken up by merely 37% of the existing shareholders, leaving the underwriter, National Westminster Bank, forced to buy up the remaining shares at a loss of almost 100 million pounds. But rights offerings are a cheaper source of financing

compared to its counterparts. It is less time consuming, shareholder approval is not required and the offers needs less marketing since it is made to current shareholders and not to the public. In 1988, Hansen provided evidence on why U.S firms tend to prefer the underwritten public offerings to the underwritten rights offerings, quote: “...*public offerings may be preferable to rights offerings, despite the extra underwriting fees, because underwriters are able to sell new common stock at higher prices off the exchanges than stockholders can across exchanges.*”¹²

From a shareholder’s perspective, rights offerings allows existing shareholders to make further investment in the firm at a discounted price along with the ability to avoid being diluted. However, Tanya Jefferies wrote an article around rights issues stating: “*Shareholders don’t like rights issues. Any company that gives its investors the unwelcome choice between stumping up more cash or seeing their existing holding diluted can expect to take a significant hit to its stock*”. The reasons behind a rights issue can be fairly nonthreatening for example using the proceeds to finance promising investments, but can also be the last alternative to avoid bankruptcy. So what options does an investor have when the company announces a rights issue? In a general case, the shareholders are offered to buy shares in context of what number of shares they currently hold. For example, owning two shares allows one to buy one additional share. So one can take up all of the rights, or sell some of the rights and take up the rest, or one can sell all of the rights. The second alternative allows the investor to come out even on the deal if he or she sells enough rights to cover the costs of the ones he or she buys also called tail swallowing. The last option is to ignore the rights completely, and then the offer will run out on deadline.³

According to previous research by the well-known authors, Myer and Majluf, companies always prefer internal financing to security issues. When companies then do end up issuing securities the issuance of bond is preferable to the issuance of equity which could explain the negative reaction by the market. On the Swedish market, the dominant type of a SEO is a rights offering. This thesis will examine the announcement effect and the post-event

¹ Beck, Melissa, “Frequently asked questions about rights offerings”, Genus: Capital Markets Group of Morrison & Foerster LLP, 2010, pp. 1-8

² Hansen ,Robert S., “The demise of the rights issue”, Genus: The review of financial studies, no 3, 1988, pp. 289-309

³ Jefferies, Tanya, “How to survive a rights issue: As Barclays cash call deadline looms, what are investors’ options?”, Genus: This is MONEY.co.uk, 2013

effect of rights offerings on the Swedish market. The methods used will be comparable to previous research conducted on the U.S market.⁴

1.2 Problem discussion

The thesis explores the potential information asymmetry regarding the announcement of rights offerings and also explores the post-event effects of these issues. The infrequent use of rights offerings on the U.S market, where most of the existing literature originates, makes the authors uncertain whether the theories are representative, especially since different markets seem to observe different results. Information asymmetry appear to be the only consistent explanation of the abnormal returns around SEOs, however this study will also consider other potential explanations. Previous studies provide evidence for abnormal announcement day price drops for a SEO, and especially for rights offerings. Rights offerings, as aforementioned, give the shareholders the option to keep their stake in the company, usually with a discount compared to current market price. So when considering the market value of the company after a rights offering, V , when you have the original value, V' , and the subscription payments, S the new market value will be:

$$V = V' + S$$

The price per share will fall since you originally have n shares, and then add m shares that have been offered at discount:

$$\frac{(V' + S)}{(n + m)} < \frac{V'}{n}$$

This price drop should in a perfect world equal the market value of the rights and the effects in this world would be exactly the same as that of a stock split, and thus the shareholders wealth would be unaffected. So when observing share price effects of rights offerings, one should assume the prices to drop even without information asymmetry. However, this should affect the price directly after the actual issuance, not on the announcement day of the rights offerings, which instead should have a negative effect on the share price following the announcement of a rights offering.⁵

A right offering that is not fully subscribed leaves the shareholders that did not buy additional shares diluted. The dilution effect depending on how many additional shares for

⁴ Myers, Steve & Majluf Nicholas S., "Corporate financing and investment decisions when firms have information that investors do not have", *Genus: Journal of financial economics* 13, nr 1, 1984, pp.187-221

⁵ Smith Jr., Clifford W., "Alternative methods for raising capital", *Genus: Journal of financial economics* 5, no 1, 1977, pp. 273-307

every existing share offered. If the terms end up being very expensive for the shareholders they ought to not exercise their rights which potentially could affect the performance of the company. The relative size of the rights offering, (injected capital if fully subscribed/market capitalization) is also considered a potential explanatory variable because if the need of external capital is relatively large, and the proceeds is not used for new investment, one may well believe that the firm is close to financial distress which could therefore also affect the value of the company. Furthermore, categorizing the sample with small and large firms are a common feature of similar studies, and categorizing the companies through the use of the proceeds whether it is for growth opportunities or mainly for survival will enable supplementary conclusive results.

The previous research included in the thesis is relatively old. Although this is the case and to the authors knowledge, it is still the best suited comparative research material that exists. These studies have been examined, verified and some of them are being used in current student literature, which substantiates their importance. The methodology of the thesis is also based on these older studies. The analysis and conclusion of this paper will either support or reject the empirical evidence of the older data and determine if the economic environment has changed within the playing field of rights issues. Comparing the results in this study will also show the differences in information asymmetry between research done today and research done several years ago. This may perhaps explain whether the gap of information between management and shareholders has decreased given the superior flow of information in today's market.

1.3 Purpose of the thesis and research questions

The purpose of this study is to further examine the announcement effects and long-term effects of firms conducting rights offerings. As aforementioned, most of the previous research is done on the U.S. market and by applying a similar methodology on Swedish data we expect to bring some new angles related to rights offering theories. Most of the previous research only examines either the announcement effect or the long-term effect, this thesis will use a broader perspective and examine both of these. The announcement effect is examined to estimate the information asymmetry on the Swedish stock market and the long-term effect will show the performance of the stock which could be of interest from an investor's perspective. The three main questions this thesis will attempt to answer are the following:

- Do firms that conduct a SEO experience negative abnormal returns on and around the day the SEO is announced?
- Do firms that conduct a SEO suffer long-term negative returns over a one-year period post the announcement of the SEO?
- Which variables could explain these potential abnormal returns and to what magnitude?

1.4 Thesis outline

The thesis is divided into three different segments:

The first part examines the abnormal returns over the event window, using the market model to calculate the expected normal return. The event window starts three days prior to the event and ends three days following the event. In addition, the thesis examines shorter event windows for supplementary results and analysis.

The second part attempts to explain the abnormal returns using a multiple regression. Several hypotheses created the explanatory variables. The results will show the effects of these variables and how significantly they explain the abnormal returns.

The third part observes the post-issue stock price performance during a one-year period past the announcement of the SEO, the abnormal return will be calculated using the buy-and-hold abnormal return (BHAR) approach.

Chapter two will describe the important theories in corporate finance regarding seasoned equity offerings as well as describe the previous research within the subject. Chapter three will go through the methodology, explaining the different calculations, metrics and tests. The chapter will also thoroughly describe why some of the data was excluded and how it was treated. In chapter four we will present our results and discuss these results in context of the theories and previous research described in chapter two. Finally chapter five will consist of our final thoughts, conclusions and will also present suggestions for further research.

1.5 Delimitation of thesis

This thesis will cover SEOs conducted by companies listed in Sweden during the period November 2006 to December 2013. Selection criteria's for the sample will be presented in the methodology chapter.

2. Literature review and development of hypotheses

2.1 Process of security offerings

IPOs and SEOs, public offers and private placements, regular shares and preferred shares, domestic issues and global issues, stock options and convertible debt, all of which are part of the exciting world of security offerings. These different types of security offerings have different outcomes and theoretical background and are issued for different reasons. A short description of the different methods of seasoned equity offerings will be described further in detail:⁶

General public offerings

In a general public offering of seasoned equity, a publicly traded firm sells additional shares to the public, i.e. all investors in the market are welcomed to participate in the SEO. The firm hires investment bankers to underwrite the issue, the underwriter is chosen by the firm's manager either by negotiation or competitive bidding. The underwriter then examines the financial status of the firm, also called the due diligence process, registers the issue with national financial supervisory authority, and presents key investors and clients to an introductory prospectus. When the financial inspection has approved the issue, the underwriter sets the final offer price and the following day, bidding starts. This is historically a common SEO option often applied in the U.S. and is called a fully-marketed offer. There is also another form of a public offering that is called an accelerated offer. *Accelerated bookbuild offers* and *bought deal offers* are two subcategories of accelerated offers. The key difference of the subcategories and a fully-marketed offer is that the process of the accelerated offers are far less time consuming and the trading begins within 48 hours of the announcement. In the European market, the accelerated offers are today far more common than fully-marketed offers.⁷

Private placement

In a private placement the firm sells all the shares to one single investor or a small group of investors (smaller than the total number of shareholders). In 1989, K.H. Wruck analyzes how private placements affect firm value. She concludes that in her sample, the announcement of a private sale of equity increases shareholder wealth by on average 4.5%. Wruck argues that the

⁶ Ogden, Joseph P., Jen ,Frank C. & O'Connor, Philip F., *Advanced Corporate Finance* (1), Prentice Hall, 2002

⁷ Eckbo, B. Espen, Masulis, Ronald W. & Norli, Oyvind, "Security offerings", *Genus: Handbook of Corporate finance* vol 1, 2007, Ch. 6

increase in wealth (which is significantly higher in her study compared to studies made on general public offerings) depends on the ownership concentration, since private sale generally increases the ownership concentration of a firm. She further finds that dominant blockholders increases their voting power while management reduces their voting power on average following a private placement. The offers are, like public offerings, discounted however Herzel and Smith found in their study that private placements are sold at a 20% discount compared to public offering.⁸⁹

Rights offering

In a rights offering the current shareholders of the firm are given (issued) so called preemptive rights, these rights are short-term warrants that can be exercised to buy new stocks in the SEO. The exercise price is generally set to a discount of the current market price of the stock, which is done to make it costly for the current shareholder not to exercise their rights. The rights offering method gives the current shareholders an opportunity to prevent the dilution effect, i.e. the reduction in their proportional stake of the company which would occur if there was a general public offering. If the shareholder does not wish to participate in the SEO he or she can sell the rights in a secondary market.¹⁰

Stock and stock option grants

The SEO might include different types of securities; it could include primary shares, secondary shares, preferred share or units. Preferred shares are shares that have other features than the common shares, a preferred stock might for example have preference in dividends and preference in assets if the company would be liquidated. A unit offering gives the investor the opportunity to buy one unit, the unit include a number of shares and some number of options/warrants, the unit offering might mitigate the free cash flow problem since the included options might be exercised later and therefore contribute capital at some later stage in time.¹¹

⁸ Wruck, Karen Hopper, "Equity ownership concentration and firm value, evidence from private equity financings", *Genus: Journal of financial economics* 23,nr 1, 1989, pp. 3-28

⁹ Ogden et. Al. (2002)

¹⁰ Ogden et. Al. (2002)

¹¹ Ogden et. Al. (2002)

2.2 Why issue equity?

There are several different reasons for a firm to conduct a seasoned equity offering (SEO). Let us say that the management of a firm has decided to finance a new capital investment program with a mix of debt and equity. In this situation, the probability of undertaking a SEO depends on the company's ability to generate healthy internal cash flow through existing projects that can finance new investments. Because if the internal equity funds are insufficient, the firm has to either withdraw from the new capital investment program or raise external funding. Therefore one should expect a positive correlation between the number of investment opportunities of a firm and the profitability of its existing projects. However, there are some exceptions to this rule; firms that has profitable existing projects does not necessarily have profitable investment opportunities; firms that has profitable existing projects and profitable investment opportunities might have investment outlays that exceeds the internal funds; and also firms might have no existing projects but have plenty of profitable investment opportunities.

When the need of external financing is identified by the management of a firm a proposal is presented to the directors of the board who must approve of the issuance. If the security offering involves authorized shares, the shareholders must also approve before moving forward in the process.¹²

2.3 Information asymmetry

In a perfect world, the flow of information related to all company activities would be transferred instantly from managers to the market. In economic environment, companies would be accurately priced. However, this is rarely the case for any companies. In a world of information asymmetry, managers and the market are only assumed to be equally well informed about market-wide information, which means that both groups are exposed to market-wide uncertainty. But around all kinds of firm-specific information, managers know more than the market. This level of information asymmetry is high when managers receive a relatively high flow of such information. In the end, such information will be transferred to the public, either through a press release or simply through the passage of time, which consequently lowers the information asymmetry between management and the market. Nathalie Dierkens studied the subject and related it to equity issue announcements. She found that equity issue announcements are favored by managers when information asymmetry is

¹² Ogden et. Al. (2002)

low. Her results showed that an increased information asymmetry prior to the issue announcement lead to an increased price-drop at the issue date. Myers and Majluf published their paper in 1984 and determined that if managers have superior information and the firm is issuing stock to finance an investment, stock price will fall all other things equal.¹³¹⁴

2.4 The Pecking order hypothesis

Stewart C. Myers (1984) provided a modified version of the pecking order theory in 1980, which was originally developed by Gordon Donaldson in 1960, that examines and explains the financial behavior of managers which is an important aspect to contemplate when analyzing equity issues. In his paper, Myers examines the static tradeoff story and asserts that the theory does work to some extent, but that the empirical results have unacceptably low r-squared values. To improve the model, Myers bases the theory on asymmetric information. Then, by adding the empirically supported elements from the static tradeoff story, the modified pecking order is created. Even though Myers himself says that his modified version is grossly oversimplified and underqualified, the theory has come to play a vital part in the subject of corporate finance.

In his theory, Myers argues that managers seem to prefer internal financing to external financing that is using retained earnings instead of funds raised from the debt- or equity-market. When firms do raise external capital the managers prefer the least risky alternative which is the security that is the closest to the default risk-free rate. Therefore, issuing debt is preferable to issuing equity since issuing debt is closer to the default risk-free rate. Firms' pecking order in terms of financing can be found below.¹⁵

¹³ Myers, Steve & Majluf Nicholas S., "Corporate financing and investment decisions when firms have information that investors do not have", *Genus: Journal of financial economics* 13, nr 1, 1984, pp.187-221

¹⁴ Dierkens, Nathalie, "Information asymmetry and quantitative analysis", *Genus: The journal of financial and quantitative analysis*, No 2, 1991, pp. 181-199

¹⁵ Myers, Stewart C., "Capital structure puzzle", *Genus: Journal of finance* vol. 39, 1984, pp. 575-592

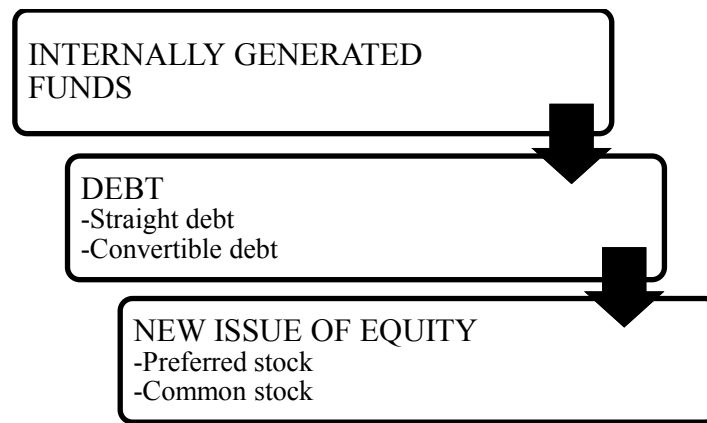


Figure 1- Pecking order hypothesis

Myers modified version of the pecking order was later formulated into a theoretical model by Myers and Majluf in 1984 where the corporate financing behavior was explained as a consequence of asymmetric information. Myers and Majluf enlighten the common tendency that firms that announce a SEO typically receive a negative reaction from the market. One important finding is that firms are better off going to the bond market for external capital than financing by issuing equity, which is consistent with Myers argument in the previous section. A firm that have investment opportunities with positive net present values but that does not have enough internally generated funds, and that have no possibility of using low-risk debt, should give up the investment rather than to issue equity according to their conclusion. They argue that the expected decline in firm value increases with the size of the equity issue, however simulations indicates that the decline in firm value is reduced when the uncertainty of the value of the firm's assets is reduced.¹⁶

2.5 Efficient market hypothesis

The efficient-market hypothesis (EMH), developed by Eugene Fama, addresses the effects of competition in financial markets on security prices. The EMH assumes that the ideal capital market exists which assumes that the following assumptions are met¹⁷:

- Assumption 1: Capital markets are frictionless
- Assumption 2: All market participants share homogenous expectations
- Assumption 3: All market participants are atomistic
- Assumption 4: The firm's investment program is fixed and known
- Assumption 5: The firm's financing is fixed

¹⁶ Myers, Steve & Majluf Nicholas S., "Corporate financing and investment decisions when firms have information that investors do not have", *Genus:Journal of financial economics* 13, nr 1, 1984, pp.187-221

¹⁷ Ogden et. Al. (2002)

The efficient market hypothesis claims that a security's market price, at all times reflect the true value of the security, meaning that the security is fairly priced. Rational investors use all the available information that is value-relevant to determine the following points:

- The security's expected future cash flows
- The riskiness of these cash flows
- The appropriate discount rate to apply to the security's expected cash flows

Fama specified three different forms of market efficiency, *weak form*, *semi strong form* and *strong form*.

Weak form efficiency

Securities reflect the information contained in historical price patterns, i.e. an investor would not be able to base the investment decision by analyzing graphs of historical prices (technical analysis would not work if the market was weak).

Semi-strong-form efficiency

If the market is semi strong, a security's price would reflect all the publicly available information, thus the share price of a company is reflected by the annual reports, quarterly reports, SEO announcement, macroeconomic news etcetera and the information is discounted in the share price instantly. In the semi strong form of market efficiency all the criterions of the weak form are met.

Strong-form efficiency

If the market is strong form efficient, the prices are reflected by all information, both public news and inside information (privately held information). Consequently it is not possible to earn any excess returns even by using inside information. In the strong form of market efficiency all the criterions of the weak- and semi-strong-form are met.¹⁸

2.6 Signaling theory

In a world where all information is available to everyone there is no reason for managers to send signals to existing and future investors. However opposed to Eugene Fama and other fans of the efficient market hypothesis, the signaling theory believes that information asymmetry exists. Barclay and Litzenberger describe three different signaling hypotheses related to the issuance of equity.¹⁹

¹⁸ Fama, Eugene F., "Efficient capital markets: A review of theory and empirical work", Genus: The journal of finance vol. 25, Nr 2, 1970, pp. 383-417

¹⁹ Barclay, Michael J. & Litzenberger, Robert H., "Announcement of new equity issues and the use of intraday price data", Genus: Journal of financial economics 21, nr 1, 1988, pp. 71-99

The existing asset value signaling hypothesis

The existing asset value signaling hypothesis is roughly based on Myers and Majluf article from 1984, mentioned earlier in this chapter. The hypothesis is built on the idea that insiders in a firm have more and better information regarding the value of the firm's and of the value of its assets compared to the shareholders. When firms have investment opportunities and lacks sufficient working capital, the management of the firm should conduct a SEO only if they believe that the current market value of the company exceeds its intrinsic value. Thus if a firm conduct a SEO it has a negative impact on the stock price and vice versa for debt. The intended use of the injected capital, whether it is for a positive-net present value investment or for survival has no impact on the magnitude of the price drop for the stock.

The cash flow signaling hypothesis

The cash flow signaling hypothesis is obtained from Miller and Rock (1985)²⁰. The hypothesis assumes that the current internal cash flow for a firm is not known for all investors but that the value of the firm's assets is known to all, conditional on the current cash flow, thus asymmetric information regarding the current cash flow but symmetric regarding the value on the assets given a special level of the cash flow. An unexpected announcement of the need for external capital would therefore send negative signals since the markets interpretation would be that the firm lacks the ability to generate sufficient internal cash flow. In this hypothesis it would not matter whether the firm issued debt or equity, the signal would be the same and thus the negative reaction would be the same, the size of the reaction would be related to the size of the issue.

The wasteful investment hypothesis

The hypothesis is related to the work of Berle and Means (1932) and Jensen (1986) and his free cash flow hypothesis. It is based on agency theory and more specifically that managers have a tendency to overinvest and accept non-positive net present value investments (NPV). If firms announce the need for external capital the signal to the market would be a higher level of planned investments. If the NPV of this investment is negative the stock price will fall, regardless if the firm issues debt or equity.²¹

²⁰ Miller, Merton H. & Rock, Kevin, "Dividend policy under asymmetric information", *Genus: The journal of finance* 40, no 4, 1985, pp. 1031-1051

²¹ Barclay, Michael J. & Litzenberger, Robert H., "Announcement of new equity issues and the use of intraday price data", *Genus: Journal of financial economics* 21, nr 1, 1988, pp. 71-99

2.7 Previous studies

Hansen (1988) investigates the differences between underwritten public offerings and underwritten/non-underwritten rights offerings. In the article Hansen presents direct evidence on why firms in the U.S. tend to prefer the underwritten public offering to rights offerings. He found that rights offerings clearly have lower floatation costs than underwritten public offerings, but are also associated with a price drop prior to the sale, and then a price recovery thereafter. The rights offerings had statistically significant abnormal returns during the announcement day, 20 days presubscription period and 20 days post subscription period for both utility and industrial companies. Although the abnormal returns during the post-subscription period was positive.²²

Ngatuni, Capstaff and Marshall in 2007 examined the long-run stock performance following rights offerings in the UK for the period 1986-1995 and a smaller sample of open offers in the period 1991-1995. The performance is measured in 1,3 and 5-year periods using a buy-and-hold abnormal return (BHAR) model where the issuing firm is matched with a non-issuing firm. They found that in their sample more than 63% of the issuing firms' experienced negative post-announcement abnormal returns. Their hypothesis of zero post-announcement abnormal return was rejected at the 1%-level.²³

In 1977, Smith examined the choice of method for raising equity capital where he compares rights offerings and underwritten public offerings. Smith concludes that if the rights offering is properly constructed the proceeds is equivalent to the underwritten public offering. Estimations of the expenses however indicate that the out-of-pocket costs are lower for the rights offering method.²⁴

Tim Loughran and Jay R. Ritter published an article in 1995 that studied initial public offerings and seasoned equity offerings between the years of 1970 to 1990 and found that the companies significantly underperform relative to nonissuing firms for five years after the date of event. The companies that had done a SEO performed slightly better than the "IPO-companies", reaching annual returns of 7% compared to 5%.²⁵

²² Hansen ,Robert S., "The demise of the rights issue", *Genus: The review of financial studies*, no 3, 1988, pp. 289-309

²³ Ngatuni, Proches, Capstaff, John & Marshall, Andrew, "Long-term performance following rights issues and open offers in the UK", *Genus: Journal of Business & Accounting* 34, no 1, 2007, pp. 33-64

²⁴ Smith Jr., Clifford W., "Alternative methods for raising capital", *Genus: Journal of financial economics* 5, no 1, 1977, pp. 273-307

²⁵ Loughran, Tim & Ritter, Jay R., "The New Issues Puzzle", *Genus: The journal of finance*, no 1, 1995, pp. 23-51

Paul Asquith and David W. Mullins, Jr investigated the effect of equity issue on stock prices and published their article in 1986. They found out that the announcement of common equity offerings, in fact, 80% of their sample of industrial issues have abnormal negative announcement day returns. Two years prior to the issue the sample companies outperform the market by an average of 33%, but following the event the firms underperform the market by 6%.²⁶

Mark D. Walker and Keven Yost published an article in 2008 about SEO's. They divided the issues into groups depending on what the management's stated intentions were for the expected inflow of capital. They found that providing specific information related to the SEO matters and increases value at the announcement day. In contrast to previous sentence, firms that provide vague information related to the SEO have losses at the announcement day. Their finding therefore supported the view that agency issues have a significant impact on SEOs.²⁷

Nathalie Dierkens examined in 1991 the relevance of information asymmetry for the equity issue process. The sample data comprised 197 industrial firms that had done seasoned primary equity issues between 1980 and 1983. Her results also supported the view that information asymmetry have significant negative impact at the announcement day of the issue, 80% of the samples abnormal returns were negative.²⁸

²⁶ Asquith, Paul & Mullins Jr, David W., "Equity issues and offering dilution", *Genus Journal of financial economics* 15, no 1, 1986, pp. 61-89

²⁷ Walker, Mark D. & Yost, Keven, "Seasoned equity offerings: What firms say, do, and how market reacts", *Genus: Journal of corporate finance* vol. 14, no 1, 2008, pp. 376-386

²⁸ Dierkens, Nathalie, "Information asymmetry and quantitative analysis", *Genus: The journal of financial and quantitative analysis*, No 2, 1991, pp. 181-199

Writer(s)	Year	Type of SEO	Sample	Result
Robert S. Hansen	1963-1985	Rights Offering	102 firms	Negative statistically significant abnormal returns 20 days prior to the issue, however significantly positive returns 20 days postsubscription period.
Proches Ngatuni, John Capstaff & Andrew Marshall	1986-1995	Rights Offering	589 firms	Substantial negative abnormal returns for 1,3 and 5-year periods
Tim Loughran & Jay R. Ritter	1970-1990	IPO/SEO	3702 SEO's	Significantly underperforming relative to nonissuing firms for 5-year post-issue
Paul Asquith & David W. Mullins, Jr	1963-1981	Public Offerings	531 Public offerings	Significant abnormal negative announcement day returns. Underperform the market by 6% two years post-issue
Mark D. Walker & Keven Yost	1997, 2000	Public Offerings	438 firms	Abnormal negative two-day announcement returns for the sample. Firms that issue for investment opportunities have less negative reaction than other issues.
Nathalie Dierkens	1980-1983	Public Offerings	197 firms	80% of the sample had abnormal negative two-day announcement returns. Results shows that firms announce equity issue when information assymetry is low.

Table 1- Previous studies

2.8 Critique against the literature

Theories within business administration and economics are not scientific facts, we cannot say that the pecking order theory is the true theory that describes the behavior of firms with the same certainty as that the earth is round or that one plus one equals two. But as the time passes by and the theories are being tested and fail to be rejected they become some kind of consensus. However there is a great divergence between researchers which is described by Leary and Roberts (2009), as they write in their article:

*“Shyam-Sunder and Myers (1999) conclude that the pecking order is a good descriptor of broad financing patterns; Frank and Goyal (2003) conclude the opposite. Lemmon and Zender (2004) conclude that a “modified” pecking order—which takes into account financial distress costs—is a good descriptor of financing behavior; Fama and French (2005) conclude the opposite. Frank and Goyal (2003) conclude that the pecking order better describes the behavior of large firms, as opposed to small firms; Fama and French (2005) conclude the opposite.”*²⁹

²⁹ Leary, Mark T. & Roberts, Michael R., “The pecking order, debt capacity, and information asymmetry”, *Genus: Journal of financial economics* 95, no 1, 2010, pp. 332-355

Most of the previous research is done in the US where public offerings are the most common issuing method compared to our study that will consist only of firms using the rights offering method. This might affect the results which must be carefully analyzed before drawing any conclusions. Most of the previous research included in this paper consists of considerably older data most of which are done between the years 1960-2000. Comparing the market in the 1960's to the market today one ought to believe that the information asymmetry was greater in 1970 because of the today's greater flow of information.

That is why we need to have a critical view on the theories and test whether these theories actually can be applied to our set of data. This leads us in to our hypotheses.

2.9 Development of hypotheses

Previous studies established evidence of significant abnormal returns around the announcement day of the SEOs. There are many different possible factors that could explain the results, overvaluation of firms conducting SEOs, the size of the company or information asymmetry between shareholders and management to name a few. Although most of these studies examined public offerings on the U.S market, the research expects similar results for rights offerings on the Swedish market. Consequently the following hypothesis is created:

Hypothesis 1

- H_0 : Rights offerings do not have negative abnormal returns around the announcement day
- H_1 : Rights offerings have negative abnormal returns around the announcement day

As aforementioned, Ngatuni's paper and Loughter and Ritters paper examined the post-issue performance for their sample of firms. The results pointed out that a large portion of their firms performed significantly worse than non-issuing firms for up to five years after the issuance. These finding leads to the formulation of the following hypothesis:

Hypothesis 2

- H_0 : Rights offerings do not have negative abnormal returns in the post-issue period.
- H_1 : Rights offerings have negative abnormal returns in the post-issue period.

The importance of information asymmetry regarding the process of issuing new equity is known and previously studied. Managers generally have more information and therefore an advantage over the market in predicting firm-specific events. Theories predict that an announcement of a SEO reveals negative information about a company and will therefore result in a drop in market value of a company. Empirical evidence supports these theories, indicating that information asymmetry is the cause of the stock price reactions in connection to the announcement of a SEO. Furthermore, information asymmetry seems to fluctuate over time and Nathalie Dierkens concluded that the greater the information asymmetry is the greater will the drop in share price be at the equity issue announcement.³⁰ Assuming that larger firms are more analysed by banks and investors the information asymmetry should be less for larger firms than smaller. As a result of the above evidence and assumptions the third hypothesis is:

Hypothesis 3

- H_0 : Small firms do not perform worse than large firms around the announcement day of a rights offering.
- H_1 : Small firms perform worse than large firms around the announcement day of a rights offering.

The flotation costs of issuing new shares are made up of direct costs and indirect costs. The direct costs include underwriter compensation, registration and listing fees, legal, accounting and printing expenses etc. The underwriters' main compensation is the difference between the public offering price and the underwriter purchase price, but they also get reimbursed if there is an overallotment option. Overallotment option is when the underwriters allow the issuing firm to issue more shares than what was intended initially and can be exercised within 30 days of the offering. The indirect costs is typically the underpricing costs as the security often is sold at a discount relative to its prior trading day's closing price and its closing market price immediately following the public offering. However this thesis mainly focuses on rights offerings and therefore is the underpricing costs irrelevant because only the existing shareholders are offered the new shares. Another indirect cost that is considered significant yet hard to quantify are the costs of management time devoted to the offering process. As mentioned, C.W Smith Jr conducted a study in 1977 comparing the costs of

³⁰ Dierkens, Nathalie, "Information asymmetry and quantitative analysis", Genus: The journal of financial and quantitative analysis, No 2, 1991, pp. 181-199

public offerings versus rights offering and found that rights offerings are significantly cheaper and perform overall better than public offerings. Robert S. Hansen studied rights issues between 1963-1983 on the U.S. market and found that these firms had very low costs associated with the rights issues but argued that the benefit of using the more expensive underwriters exceeded the cost difference. This thesis examines whether the cheaper rights offerings perform better than the more expensive rights offerings, which generated the following hypothesis.³¹³²

Hypothesis 4

H_0 : Companies with low issuance costs do not perform better than those with high issuance costs.

H_1 : Companies with low issuance costs perform better than those with high issuance costs.

Among the different firms of the data set there is a wide range of different ownership dilution effects that comes with the issuance. If existing shareholder does not exercise his or her rights, their company stake will be diluted, the size of the dilution depending on how many shares the company is issuing. This paper examines whether these dilution effects have an impact on the outcome of the post-event period that lead to the development of the following hypotheses:

Hypothesis 5

H_0 : Companies with issuances that have minor dilution impacts do not perform better than those with major dilution impacts.

H_1 : Companies with issuances that have minor dilution impacts perform better than those with major dilution impacts.

In the prospects of the rights offerings the reasons behind the need of new capital was stated. Firms tend to not explain these reasons in a specific way but it is always stated if the cash proceedings were not sufficient enough for the on-going operations over the next twelve months. These issues are reckoned as survival issues, which mean that without the injected

³¹ Smith Jr., Clifford W., "Alternative methods for raising capital", *Genus: Journal of financial economics* 5, no 1, 1977, pp. 273-307

³² Hansen, Robert S., "The demise of the rights issue", *Genus: The review of financial studies*, no 3, 1988, pp. 289-309

capital the company would eventually go bankrupt. However, the companies that declared that the proceedings were being used for new investment projects such as buying new technology or acquisitions was categorized as growth opportunity issues. The following hypothesis is used for distinguishing any difference in the performance between the two categories.

Hypothesis 6

H_0 : Companies that made issues mainly for growth opportunities do not perform better than those that made issues mainly for survival.

H_1 : Companies that made issues mainly for growth opportunities perform better than those that made issues mainly for survival

3. Methodology

3.1 Data

3.1.1 Data collection

To find the relevant information for the thesis, the primary data is collected from the firm's own prospects retrieved from Finansinspektionens prospect register. This is a digital newsroom that contains, among other things, information about equity issuances on the Swedish market. In the procedure to get the SEOs all prospects had to be reviewed in order to find the prospects needed for this study. Once all the issuances were quantified, additional information regarding the SEOs and firms were retrieved from the prospects..

The financial information about the companies that made issues is collected from Thomson Reuters Datastream. The study comprises 100 days share prices prior to the event window, 7 days share prices during the event window and 252 share prices following the event. Market capitalization for each of the companies is also collected through Thomson Reuters Datastream.

The data consists of 253 SEOs from companies listed on the Swedish stock exchanges in the period 1st of November 2006 to 31st of December 2013, the timespan is chosen since the study need ± 1 year of data post/prior the announcement day and the prospectus register at Finansinspektionen contains prospectus from November 2006. This time-period is applicable because it covers both up- and downswings in the economic environment. During the recession in 2008 and 2009 a lot of companies were under financial distress which influenced the issuance of equity during this period of time.

The SEO's is classified into different categories, type of SEO, injected capital if fully subscribed, costs, dilution and then whether the issuance was made for growth opportunities or simply for survival. Most of the SEOs on the Stockholm Stock Exchange are rights offerings where existing shareholders have the right to buy additional shares to be able to maintain their proportionate stake in the company.

3.1.2 Data sources

The respective data is retrieved from the following sources:

- Thomson Reuters – Datastream: *Share Prices (P) and Market capitalization*
- Finansinspektionen: *Security equity offerings prospects*
- Avanza: *Company press releases*

The thesis primarily uses literatures covered in courses taught at Lund University, for previous empirical studies, relevant journal articles and e-books the authors found the Lund University Library database very resourceful.

3.1.3 Selection criteria's and sample

Going through all the prospects at finansinspektionens prospect register where all different kind of prospects is found, a total of 253 SEOs were done in the period November 2006 to December 2013. Selection criteria's were set up to get SEOs and firms that were as close as possible to previous research. The selection criteria's are:

1. By the time of the issuance the company has to be listed on NASDAQ OMX Stockholm or at Aktietorget.
2. The issuing company has to be listed at least one year prior to the event and one year following the event, in addition to this the company are only allowed to conduct one SEO within the 2-year period.
3. Daily share price information needs to be available on Thomson Reuters Datastream for the whole period of interest.
4. The firm needs to receive cash in context of the issuance.
5. The motive of the issuance needs to be stated.
6. The SEO must be a common stock-only offering, SEOs offering preferred shares or units are excluded.
7. Market capitalization threshold of 100MSEK, firms with lower market cap is not included.

The market capitalization requirement is set to eliminate data with unusual share price behavior since smaller companies share prices usually fluctuate differently because of less liquidity and larger spreads. The requirement for only one SEO within the 2-year period is set to avoid any estimation biases in the estimation of the normal return, if this requirement is violated the expected normal return would be biased due to unusual share price behavior in the estimation window and thus give incorrect estimates of the abnormal returns.

Applying the selection criteria's to the 253 SEOs left a total of 99 SEOs in the sample, 56 of the SEOs was not included due to a market cap lower than 100 MSEK and 98 was not included due to the other reasons in the criteria's mentioned earlier.

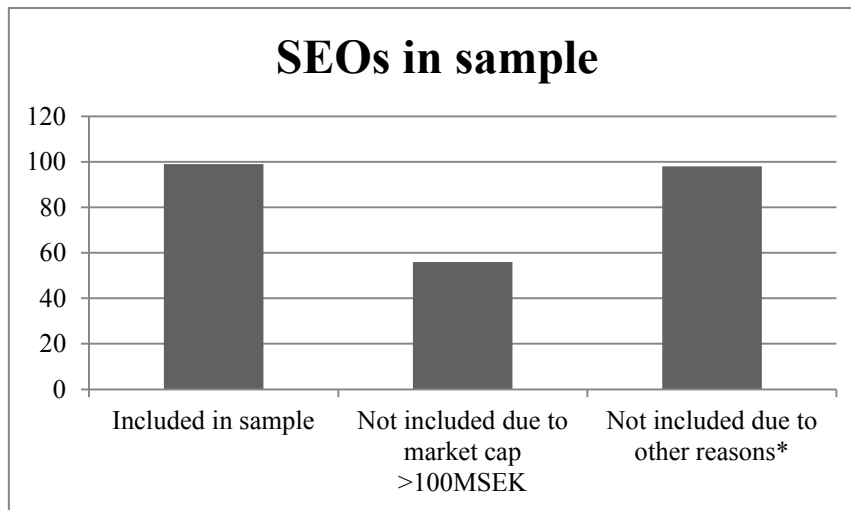


Figure 2- Sample of SEOs

3.1.4 Selectivity bias

Analysis based on data where a big share of the total sample is not included in the final sample is known as selectivity bias. Think of a survey where 50% answer the survey and 50% do not, the analysis on the answer from the 50% may not fully reflect the behavior of the last 50% that did not answer the questions.³³ In this thesis the selectivity bias might occur due to a number of SEOs that is not included in the final sample, the firms not included could possibly behave differently than those included and thus the final results might have been different if these were included. However the reason to set up the criteria's on which SEOs should be included is done to get a sample that is as close as possible to the previous research within the subject.

3.1.5 Survivorship bias

Criterion two in the sample section says that firms that aren't listed on a stock exchange ± 1 year from the announcement day are not included in the final sample. This criterion might induce a survivorship bias in the results. Survivorship bias might occur when stocks, mutual funds or other securities are excluded in a sample due to the lack of data during the period of interest. This bias can create problems when doing a research, mutual funds that disappears tend to do so because of poor performance and stocks that disappear usually do this because of bankruptcy. Therefore excluding these tend to lead to an overestimation of the

³³ Gujarati, Damodar N., Basic Econometrics (4), McGraw-Hill Higher Education, 2003, pp. 29

performance.³⁴ In this study there are some SEOs excluded due to missing data, however the vast majority of the SEOs not included are due to other reasons and therefore the survivorship bias is not expected to be a significant problem.

3.2 Event study

In order to check for the effect on stock price regarding firms that announces that they will conduct an SEO, the event study method will be used. To conduct an event study the following steps are followed, as suggested by MacKinlay in 1997.³⁵

3.2.1 Define the event of interest and identify the event window

The event of interest is the announcement day of the seasoned equity offering, the event window is defined as ± 3 days before/after the announcement day, i.e. the event window is seven days.

3.2.2 Determine the selection criteria of a given firm

The selection criteria's can be found in chapter 3.1.3.

3.2.3 Event impact – Measurement of the normal return

There are a number of ways to calculate the normal return, both statistical and economic approaches. Perhaps two of the most common models are the constant mean return model which assumes that the normal return is the mean and a disturbance term and the market model.

The market model is a statistical model, which compare the returns of a security to the return of the market portfolio and is chosen as measurement of the abnormal returns. The model is potentially better than the constant mean return model since by excluding part of the return that is related to the variation in the markets return, the variance of the excess return is reduced. The benchmark chosen for the estimations of the normal return is the OMXSPI which is a weighted index among the 298 listed companies on the Stockholm stock exchange.³⁶

³⁴ Elton, Edwin J., Gruber Martin J. & Blake Christopher R., "Survivorship bias and mutual fund performance", *Genus: The review of financial studies* vol. 9, no 4, 1996, pp. 1097-1120

³⁵ A. Craig MacKinlay, "Event studies in economics and finance", *Genus: Journal of Economic Literature* 35, nr 1, 1997, pp. 13-39

³⁶ https://www.quandl.com/data/NASDAQOMX/OMXSPI-OMX-Stockholm_PI-OMXSPI

Ordinary least squares are a reliable estimation technique for the market model parameters. The OLS estimators for the market model parameters in this event study are as follows:

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

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

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

where

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

and

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

$R_{i\tau}$ and $R_{m\tau}$ are the return in the event period τ for security i and the market separately.³⁷

3.2.4 Define estimation window

Before measuring and analysing the abnormal returns one first has to define the event time. Defining $\tau = 0$ as the event day, $\tau = T_1 + 1$ to $\tau = T_2$ is the event window, and $\tau = T_0 + 1$ to $\tau = T_1$ constitutes the estimation window. Let $L_1 = T_1 - T_0$ and $L_2 = T_2 - T_1$ be the length of the estimation window and the event window. It is common that the length of the event window is larger than one day since you then absorb the abnormal returns that can occur around the actual event date. The post-event window is then $\tau = T_2 + 1$ to $\tau = T_3$ and the length $L_3 = T_3 - T_2$. The estimation window and the event window should not overlap since the parameters of the normal return model would in that case be influenced by the event. The model wants to capture the event effects only with the abnormal returns since the model is built around that assumption.³⁸

³⁷ MacKinlay, Craig, "Event studies in economics and finance", Genus: Journal of Economic Literature 35, nr 1, 1997, pp. 13-39

³⁸ MacKinlay, Craig, "Event studies in economics and finance", Genus: Journal of Economic Literature 35, nr 1, 1997, pp. 13-39

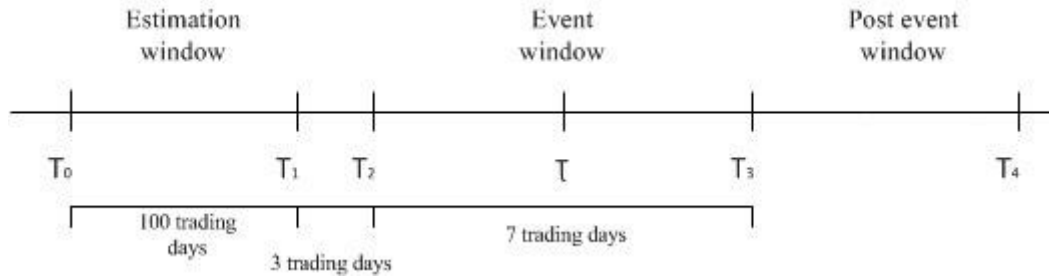


Figure 3- Event study

3.2.5 Calculate the abnormal returns

Using the market model parameters estimates one can now estimate and analyse the abnormal returns:

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

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

To draw any conclusion for the event one has to aggregate the abnormal return observations through all securities:

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

Which is the average abnormal return (AAR) on day τ , with the variance:

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

The AAR can then be aggregated over any interval within the event window to get the average cumulative abnormal return (CAAR) by summing the average abnormal returns over a chosen amount of days.

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

And the variance for the CAAR is obtained by summing the variance of the AAR:

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

To test the null hypothesis that the (cumulative) abnormal returns are zero the following test is used:

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

These tests will be done in excel by calculating t-stat and probability values, if the p-value is lower than chosen significance (α) the null hypothesis will be rejected.³⁹

3.2.6 Presentation of the empirical results

Once all the tests are done the results are evaluated. One important aspect to considering when assessing the results is the number of observation. If there is, as in this case, a limited number of observations in the data set a single observation could have a major impact on the outcome.

3.2.7 Analysing the results

The final step of the event study is to analyse the empirical results and draw conclusions.

3.3 Welch's t-test to test difference between subgroups

In some of the hypotheses the study wants to analyse differences between different subgroups of the sample. To see whether there is a difference in mean between different groups the Welch's t-test will be used. This test is used when you want to examine differences in mean between two groups with unequal sample sizes and unequal variances (or rather when you don't know whether the variances are equal or not). To test the hypothesis of difference in mean the following test statistic is calculated:

$$t = \frac{\overline{X}_1 - \overline{X}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}$$

Where S_i^2 is the unbiased estimator of the variance for group i and n_i is the sample size of group i. To determine whether there is a significant difference one needs to calculate the degrees of freedom and look up the p-value in a student t-distribution table, however these tests will be conducted in Excel using the analysis tool pack where the p-value is attached. The p-value is then compared to a chosen significant level to decide if the difference is significant.⁴⁰

³⁹ MacKinlay, Craig, "Event studies in economics and finance", Genus: Journal of Economic Literature 35, nr 1, 1997, pp. 13-39

⁴⁰ Körner, Svante & Wahlgren, Lars, Statistisk dataanalys (4). Studentlitteratur AB. 2006. pp. 220

3.4 Multiple regression (source: introductory econometrics for finance)

To get a view of what variables might affect the abnormal return and with what magnitude, a multiple regression model will be used. The result of the regression model will also be used in analysing some of the hypotheses that will be stated later in this chapter. The formula for a multiple linear regression model is:

$$y = \beta_1 + \beta_2x_2 + \beta_3x_3 + \dots + \beta_kX_k + u_t$$

Where the variables x_2, x_3, \dots, x_k are a set of $k-1$ explanatory variables that might influence y and $\beta_1, \beta_2, \dots, \beta_k$ are the parameters that quantify the effect of each of the x -variables on the explained variable y and u_t is the disturbance term.⁴¹

3.4.1 Description of the explanatory variables used in regression

Relative size of SEO variable is defined as the injected capital (the amount of cash added to the company before costs) divided by total market cap at the announcement day.

The variable *dilution* is a measure on how much the existing owner's share of the company will be diluted (reduced) if they don't exercise their rights to participate in the SEO. Defined as total number of new shares/(total number of new shares+total number of old shares).

The *relative cost of the SEO* variable is defined as the cost of the SEO divided by the injected capital.

The *market capitalization* variable is the value in MSEK at the announcement day.

The *growth firms* variable is a dummy-variable where firms conducting the SEO with the reason to carry growth opportunities (for example NPV-positive investments) get the number one and if not gets the number zero.

The *injected capital* variable is also measured in MSEK and is the amount of cash the issuing firm receives.

⁴¹ Brooks, Chris, Introductory econometrics for finance (2). Cambridge University Press. 2002. pp. 88-120

3.5 Post-issue abnormal returns

3.5.1 Calculating the BHAR

To examine the long-term effect for the firms that have conducted an SEO, buy-and-hold abnormal return (BHAR) will be calculated for the firms on a one-year horizon after the announcement day. The one-year BHAR is calculated in monthly steps, dividing the 252 trading days with twelve months gives 21 observations in each monthly buy-and-hold return for each security in the sample. The technique represents a real investor's return on an investment from time t to $t + 1$.

The buy-and-hold returns on firm i is calculated the following way:

$$BHR_{i,\tau,T} = \left[\prod_{t=\tau}^T (1 + R_{i,t}) - 1 \right] * 100\%$$

τ to T is the holding period of the security and $R_{i,t}$ is the return on security i in month t .

To determine the buy-and-hold abnormal return for firm i , the BHAR for a matching firm or index has to be subtracted. The number of companies listed in Stockholm is obviously less than on many other markets, e.g. London and New York where most of the earlier studies been made. Therefore it is more difficult to find matching-firms with the desired properties such as similar size and industry, hence the decision is made to use the OMXSPI as the matching portfolio for all companies. OMXSPI is a weighted index, containing the 298 companies listed on the Stockholm stock exchange. The expected BHR of the firm is the buy-and-hold return on the market portfolio.

$$E(BHR_{i,\tau,T}) = \left[\prod_{t=\tau}^T (1 + R_{m,t}) - 1 \right] * 100\%$$

The buy-and-hold abnormal return on firm I over the holding period is therefore the difference between the actual return and the expected:

$$BHAR_{i,\tau,T} = \prod_{t=\tau}^T (1 + R_{i,t}) - \prod_{t=\tau}^T (1 + E(R_{i,t}))$$

To get the average BHAR over all firms you simply aggregate all BHAR and divide it by the number of firms N :

$$ABHAR_{\tau,T} = \frac{1}{N} \sum_{i=1}^N BHAR_{i,\tau,T}$$

3.5.2 Testing the significance of ABHAR

To test the significance of the average buy-and-hold abnormal return the following test statistic is calculated:

$$t_{ABHAR_{\tau,T}} = \frac{ABHAR_{\tau,T} * \sqrt{N}}{\sigma_{BHAR_{i,\tau,T}}}$$

Where $ABHAR_{\tau,T}$ and $\sigma_{BHAR_{i,\tau,T}}$ is the cross-sectional mean and standard deviation. The central limit theorem guarantees that the mean abnormal return converges to normality as the sample increases. In addition to test the significance of the ABHAR, the fraction of firms with negative ABHAR will be tested. In this test you check whether the fraction of firms with negative ABHAR is statistically larger than 0,5, i.e. you want to find out if more than 50% of the firms get negative BHAR after one year. This is tested for significance as:

$$z = \frac{\hat{p} - p}{\sqrt{p(1-p)/N}}$$

Where \hat{p} is the fraction of the firms with negative BHAR observed in the sample and p is test level, 50% in this case. For Np and $N(1-p)$ greater than 5 the test statistics is approximately normally distributed. ⁴²

⁴² Ngatuni, Proches, Capstaff, John & Marshall, Andrew, "Long-term performance following rights issues and open offers in the UK", *Genus: Journal of Business & Accounting* 34, no 1, 2007, pp. 33-64

4. Results and discussion

4.1 Descriptive statistics

Descriptive statistics									
	AR(-3)	AR(-2)	AR(-1)	AR(0)	AR(1)	AR(2)	AR(3)	CAR(-3:3)	CAR(0:1)
N	99	99	99	99	99	99	99	99	99
Mean	0,609%	1,236%	0,464%	-1,557%	-0,469%	0,716%	0,505%	1,505%	-2,004%
Median	0,212%	0,416%	0,182%	-0,521%	0,386%	-0,190%	-0,569%	3,050%	0,081%
Max	14,018%	19,146%	27,954%	25,052%	13,586%	30,328%	31,448%	48,525%	22,537%
Min	-8,556%	-10,797%	-14,698%	-47,525%	-28,463%	-19,000%	-28,909%	-63,296%	-63,370%
Std. Dev.	0,037763701	0,043388423	0,048814476	0,094751641	0,072348965	0,057768682	0,072640186	0,172691475	0,136228
	Market cap	Injected capital	Costs	Dilution	Relative size of SEO	Cost of SEO/Total size	BHAR	BHAR6M	
N	99	99	99	99	99	99	99	99	
Mean	4210,311717	1104,913773	37,13330822	0,37166311	0,476419065	0,063804626	-0,090130521	-0,095835978	
Median	370,97	125	7,5	0,329	0,277273532	0,062368506	-0,135546669	-0,119442233	
Max	142745,9	29634,66851	974,4475138	0,975609756	7,396032207	0,16064257	3,468259954	1,372383964	
Min	101,38	8,832	0,7	0,058823529	0,050390527	0,005564388	-1,140480818	-0,867891028	
Std. Dev.	15865,06154	3709,303163	119,229062	0,223725446	0,823902269	0,035355748	0,589453701	0,377963132	

Table 2- Descriptive statistics

The table above shows the descriptive statistics for the abnormal returns as well as the variables included in the multiple regression model. As we can see in the table the sample consists of a wide variety of companies in terms of market value, the biggest company Nordea had a market capitalization of more than 140 billion SEK at the time they announced their SEO while the smallest company had a value of 101 million SEK. This is obviously a huge difference but since the abnormal returns are not value-weighted these companies abnormal return will affect the results with equal importance. The mean market cap in the sample is around 4,2 billion SEK but the median, which we believe gives a better view of the distribution, is roughly 371 million SEK. There is a big difference between these numbers and that is because a couple of the largest companies listed in Sweden conducted SEOs during the financial crisis, especially large banks as Swedbank, Nordea and SEB which increased the mean market capitalization. The median also suggests that it is primarily “smaller” companies that conducted SEOs in our period of interest. The same pattern can be seen in the injected capital which usually goes hand in hand with the market cap, where the largest SEO issued equity for more than 14 billion SEK compared to the smallest issuing coming in at 8,8 million SEK. The big differences is not surprising, the need for external capital is bigger for small, young companies while larger and more mature companies can rely on its ability to generate internal capital in general, yet this is off course not always the case. The abnormal returns will be further described and analyzed in the subsequent subchapters.

4.1 Abnormal returns in the estimation window

The table below shows the results of the event study performed on the 99 firms in the sample. The AAR is the average abnormal return for each day in the event window and consequently the CAAR is the cumulative average abnormal return over a specified number of days during the event window. A total of 10 tests (one for each day within the event window and 3 different CAAR-tests) were conducted, with the method described in the previous chapter. As can be seen in the table, two of the tests resulted in significant abnormal returns, the abnormal return on the announcement day and the cumulative abnormal return over the announcement day and the day after. Apart from the significant results we can see that all the other tests get high p-values, far from being significant except for the day after the announcement. Especially the days prior the announcement day shows relatively high returns and if we would test the opposite hypothesis, i.e. test if AAR is larger than zero we would actually find that the AAR two days prior to the announcement day has a statistically significant positive abnormal returns.

<i>TEST</i>	<i>(C)AAR(t)</i>	<i>Variance</i>	<i>t-stat</i>	<i>P-value</i>	<i>Significant</i>	<i>Significance</i>
Mean (AR(-3))	0,006079957	1,72432E-05	1,464172039	0,928426526	NO	-
Mean (AR(-2))	0,012363558	1,72432E-05	2,977385762	0,99854641	NO	-
Mean (AR(-1))	0,00483213	1,72432E-05	1,163671022	0,877721321	NO	-
Mean (AR(0))	-0,015455352	1,72432E-05	-3,721949874	9,88451E-05	YES	***
Mean (AR(1))	-0,004581232	1,72432E-05	-1,103249818	0,134959346	NO	-
Mean (AR(2))	0,006228881	1,72432E-05	1,500035952	0,933197455	NO	-
Mean (AR(3))	0,004962226	1,72432E-05	1,19500079	0,883956639	NO	-
Mean(CAR(-3;3))	0,014430169	0,000120702	1,313451441	0,905484563	NO	-
Mean (CAR(-1;3))	-0,004013346	8,62158E-05	-0,43222833	0,332787735	NO	-
Mean (CAR(0;1))	-0,020036584	3,44863E-05	-3,411931423	0,000322522	YES	***

Significance test for negative CAAR and AAR

$H_0: AAR = 0, H_1: AAR < 0$

Source: Calculations done in Excel with data from Thomson Datasatream

Table 3- (C)AAR's test for significance

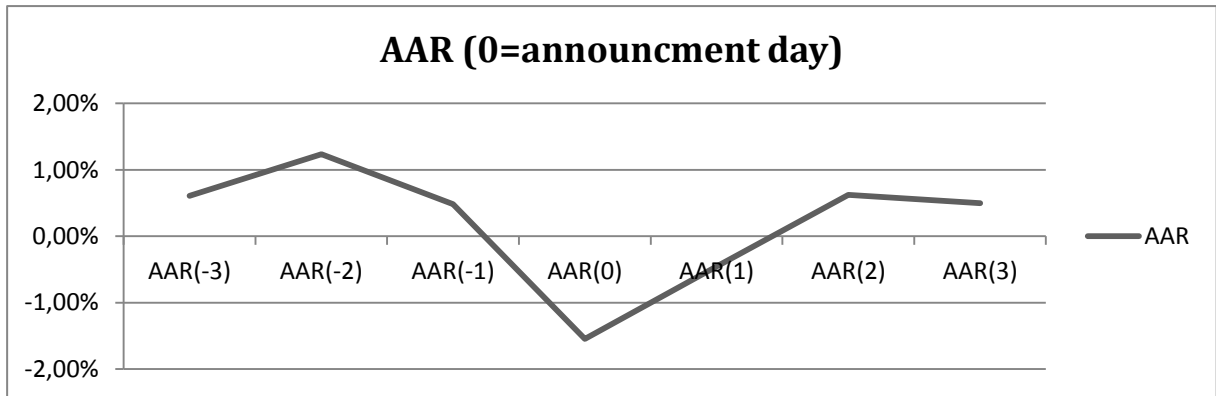


Figure 4 - Average abnormal returns over event window

4.2 BHAR long term

The figure below confirms the prediction that the issuing firms would perform worse than the index which is in line with previous studies. The issuing firms share price experience significant drops during the eight months following the event and then make a sound recovery at the end of the year as the benchmark firms are on steady growth throughout the year. However, the firms' performance was not significantly different from the benchmark for the 12 months abnormal returns, but by only examining the first 6 months the results were different. The average BHAR is about the same for the 6-months respectively 12-months period but since the standard deviations is smaller for the 6-months period we find it to be statistically significant. The results from these tests can be found in the appendix.

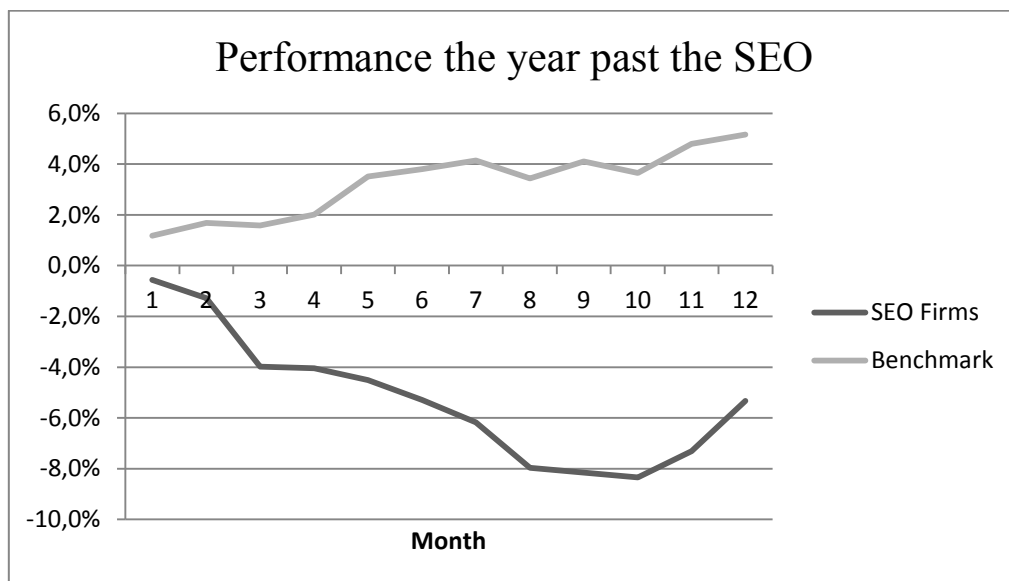


Figure 5- Performance during 1 year past the announcement

4.3 Large vs small firms

As we stated earlier in hypothesis 3 we wanted to see if we could find any differences between large and small firms. We define large firms as firms with a market cap larger than 500 MSEK and the other firms in our sample were considered small. The graphs below show the abnormal returns in the event window. In the first graph you can observe the average abnormal returns for the different days. The returns of the two subgroups are here positive prior to day zero, negative for the small firms and positive for the large firms during day zero and day one, and positive for the small firms and negative for the large firms for day two and day three. The largest different between the subgroups is during the announcement day where the average abnormal return is about -3% for the small firms compared to slightly above 0% for the larger firms. In the second graph we observe the cumulative average abnormal returns. The largest difference between the subgroups is for the day after the announcement day where small firms have a cumulative abnormal return of -1.0% compared to 1.8% for large firms. We ran tests for both the large and the small firms. There are no significant average abnormal returns or significant cumulative average abnormal returns for the large firms. However, for the smaller firms, the negative average abnormal return was significant for the announcement day. We also tested a shorter event window consisting of day zero and day one and found significant cumulative average abnormal returns, also for the smaller firms. A Welch test was conducted to test if there is a significant difference between the groups. The test shows that there is a significant difference between the groups on the announcement day. All of the material can be found in the appendix.

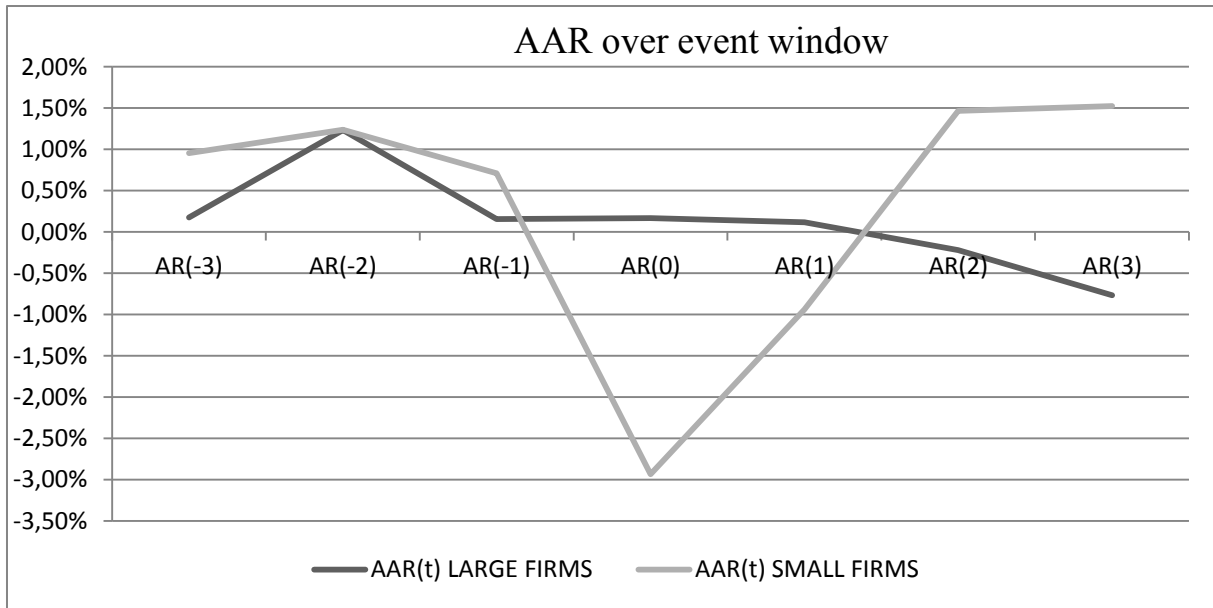


Figure 6- AAR over event window small vs large firms

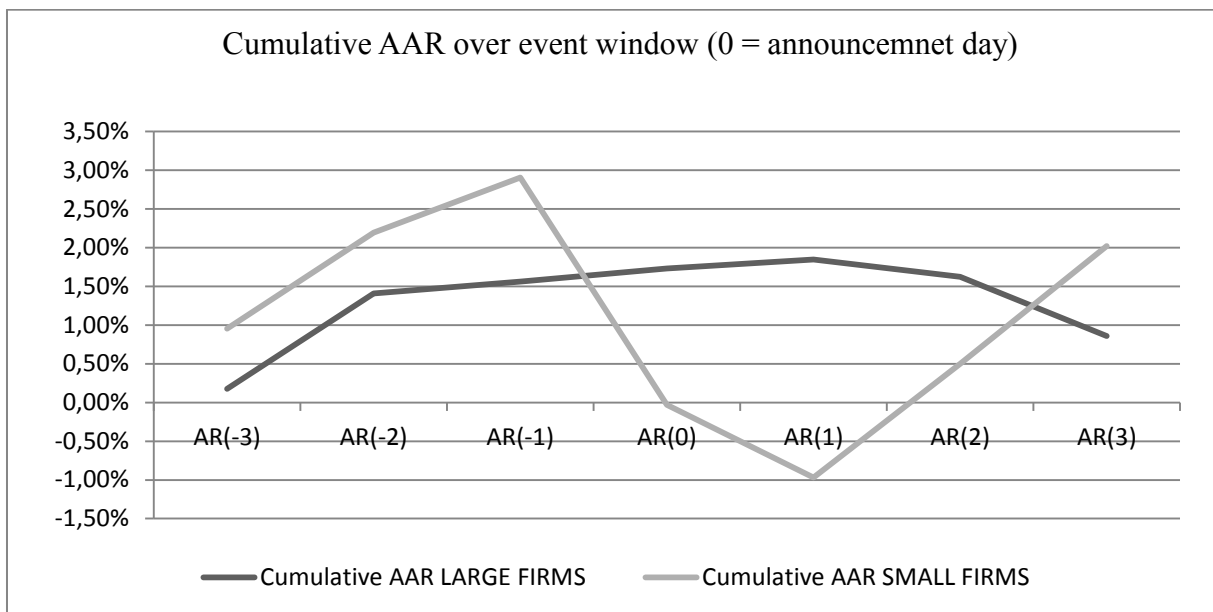


Figure 7- CAAR over event window small vs large firms

4.4 Effect of dilution and cost of SEO

To investigate hypothesis 4 and 5 a multiple regression model has been conducted, the results of these models can be found in the appendix. Model number one had the best results in terms of explaining the BHAR for the 6-month period past the announcement, however this model suffers from multicollinearity (due to high correlation between market cap and injected

capital), and thus we will not use this model. Instead model 4 was preferred, the residuals has been checked for normality and heteroskedasticity with the Jarque-Bera test respectively the Breusch-Pagan test and passed booth.

In the hypothesis-section we described that we wanted to find out whether the cost associated with the SEO and the dilution has an impact on the firm's stock return. The regression shows that the cost of the SEO and the dilution effect has a negative impact on the BHAR, however neither of these two was statistically significant and thus one should be careful in draw any conclusions from these results.

4.5 Growth vs Survival

The two graphs below present the results of the abnormal returns during the event window for growth firms and survival firms. The first graph show that for both subgroups, the average abnormal returns are positive for the days prior to the event and negative for day zero. The growth firms average abnormal returns then continue to be negative following the event whereas the survival firms average abnormal returns are positive. The results are only significant for the announcement day of growth firms. This contradicts the hypothesis and instead suggests that firms that issue capital for growth opportunities have a larger negative abnormal return at the announcement day than firms that issued capital mainly for survival. However there was no statistical difference between the two subgroups.

The second graph shows the cumulative abnormal returns over the event window. The growth firms have a negative cumulative abnormal return and the survival firms have a positive cumulative abnormal return, however none of them showing statistical significance. We also tested the shorter event window consisting of day zero and day one, and found significant negative cumulative abnormal returns for both groups. The significance level was higher for the growth firms which also contradict the hypothesis but a t-test proved no statistical difference between the subgroups. The tests can be found in the appendix.

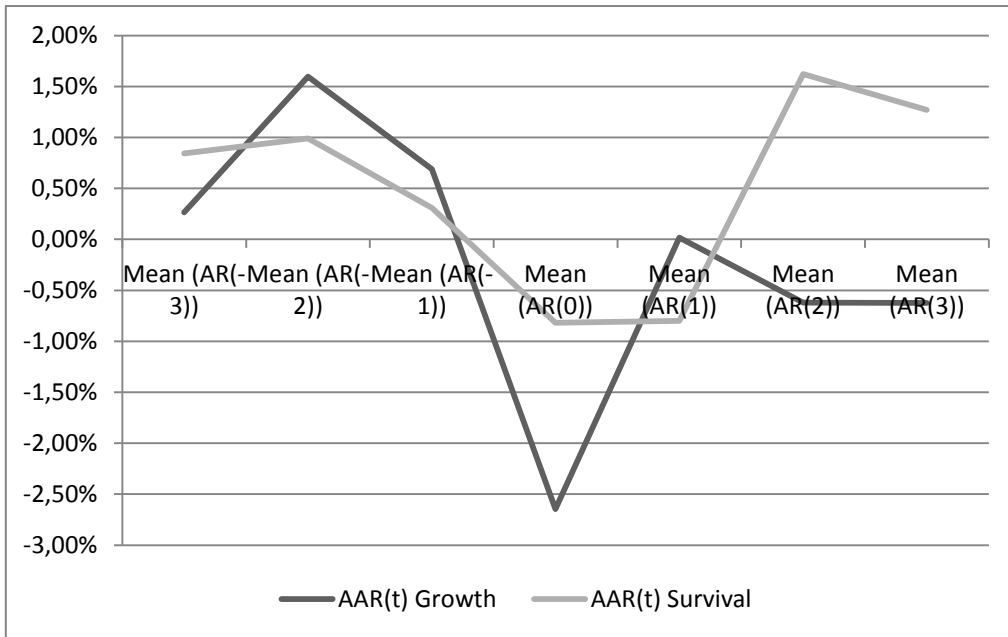


Figure 8- Average abnormal returns Growth vs Survival

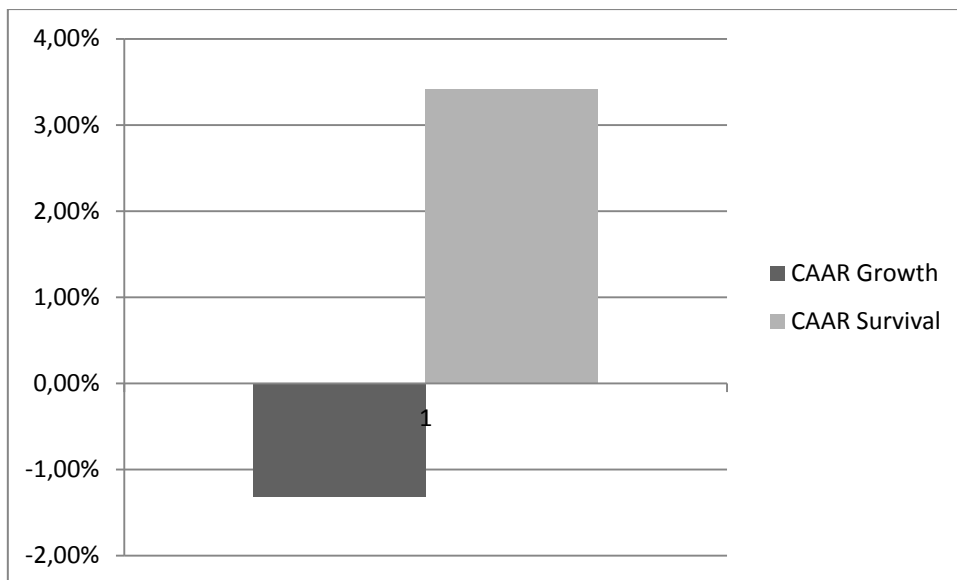


Figure 9- cumulative abnormal return Growth vs Survival

4.6 Discussion

Our expectations before we got the results of the abnormal returns, was that firms that conduct a SEO would suffer from negative abnormal return on the announcement day. This assumption was based on previous research made by other authors, looking at the table in the theory chapter we see that both Walker&Yost (2008) and Asquith&Mullins (1986) found negative AAR's at the announcement day. As we have mentioned before and which can be seen in table 3 we can now confirm our assumptions, we found statistically significant negative AAR on the announcement day and cumulated over two days, which is consistent with previous research. Even though there is a negative AAR over day zero and day one it's important to point out that the overall performance over the event window actually is positive, however not significant.

It seems like the stock price perform better than it should during the three days prior the announcement and the last two days within the event window, but none of these days gives any significant result and therefore we shouldn't draw any conclusions based on that. So how can these findings be described theoretically? Well according to the literature, these findings are expected. The pecking order theory says that if a company needs external financing issuing new equity is the least preferred method and if the firm has any other alternatives that alternative should be chosen. When the firms announces a SEO they show weakness, even though the proceedings may be used to finance NPV-positive investment opportunities, issuing equity for this purpose signals the market that the firm is unable to generate sufficient internal capital. These findings also support the cash flow signaling hypothesis, since it states that an unexpected announcement of the need for new issued equity send negative signals to the market and thus lead to negative abnormal returns.

This also suggests that the world of information asymmetry is real and many researchers believe that it is the main explanation of the abnormal returns around announcement days. Assuming that the information asymmetry is larger between management and shareholders for smaller firms, the results also give further evidence of this explanation. The explanation for that the smaller firms' experience a larger negative reaction in the share price might be that they are simply less analyzed by the market, and thus the market has not discounted the SEO in the share price until it is actually announced. For larger firms on the other hand the market already knows the financial status of the company and opposed to the small firms it is already discounted, and the negative reaction does not appear in the same magnitude. In this sample, smaller firms have larger negative abnormal returns around the announcement day than the

larger firms which prove this point. These findings reject the efficient market hypothesis, it seems like the market fails to accurately value smaller companies.

The post-announcement-day results showed that the sample firms performed significantly worse than matching portfolio for a six months period of time following the announcement day. About 67% of the firms displayed negative BHAR's in the 12-months period post the announcement which is close to the 63% that Ngatuni et.al found in their study from 2006 on firms from the United Kingdom.

In hypothesis six we wanted to analyze whether firms that issues equity primarily for growth reasons performed significantly better than those made for survival of the firm. When creating this hypothesis our first thought was that growth-firms should perform better, but analyzing the results we found that growth-firms actually performed worse than the others, however no significant difference between the groups can be statistically proved. This rather unexpected result gives support to *The existing asset value signaling hypothesis* based on the article by Myers&Majluf in 1984 that says that the announcement of a SEO gives a negative reaction, and the purpose of the injected capital does not affect the magnitude of the reaction.

Neither dilution effects nor injected capital can explain the buy-and-hold abnormal returns for the six months periods or the twelve months period. These results point toward that whether the company issues large amounts of shares or have large floatation costs around the issue does not matter in terms of performance in the post-announcement-day-period. Having in mind that we are researching rights issues could also be explaining the insignificant results regarding the dilution, since rights offering gives the stockholder the right to defend his share in the company, and thus will not have his total share of the company diluted if he participate in the SEO.

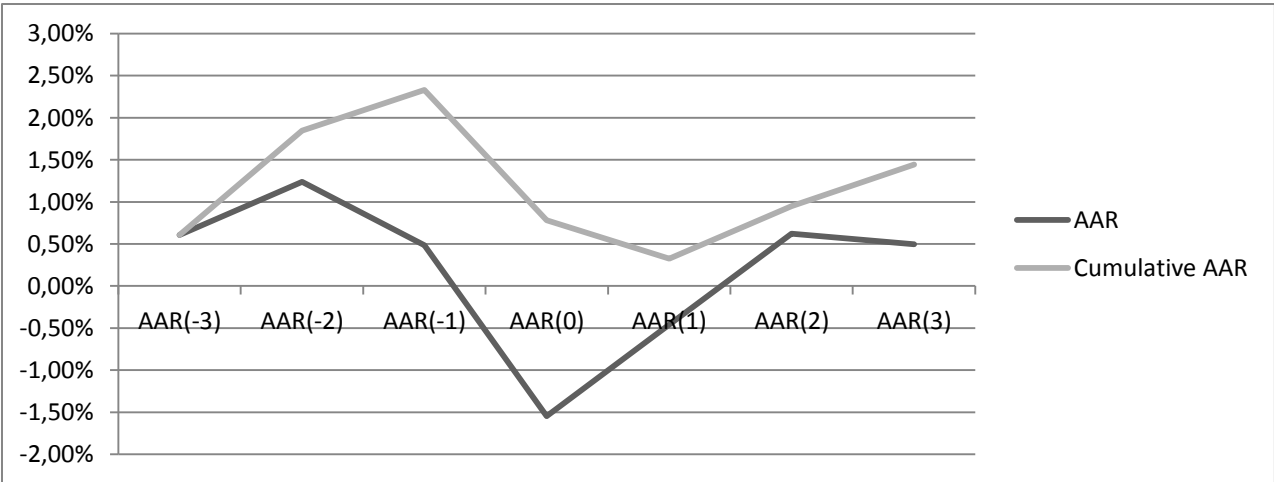


Figure 10- AAR and CAAR over event window all firms

5. Conclusion

In this thesis we examined rights offerings on the Swedish market between the years of 2007-2013. We hypothesized that rights offerings will have a negative impact around the announcement day and consequently lead to lower the share price. We found support for this view, the smaller companies in the sample showed significant abnormal returns during the announcement day and the day after. We also found support for our second hypothesis, the sample performed significantly worse than the benchmark firms for six months following the event. We did not find support for our explanatory variables issue costs, dilution, growth and survival but found a relationship between the injected capital and the BHAR.

That we observed abnormal returns for the smaller companies was with respect to the literature a satisfying result and gives further evidence to the theories and literature described earlier. We argue that these firms have relatively higher information asymmetry and therefore the market adjust accordingly to the given information about issuing equity. The negative long run effects was in line with previous research however they could also be explained by the fact that rights offerings should lower the share price all other things equal. Whether there was a share price drop exactly when the equity was issued was not investigated, but the abnormal returns continue for at least six months after the announcement, indicating that the share price is in a negative trend.

From an investor's point of view the rational behavior would be to short the small firms at the announcement day, however without having inside information it is obviously impossible to know what day the SEO will be announced. What we can say and what investors can use in their investment strategy, is that a significant proportion of the firms experience an abnormal negative return the months after a SEO announcement and therefore investing in these stocks would not be recommended.

To conclude, the purpose with this thesis was to analyze the behavior of firm value for Swedish firms conducting SEOs and to compare it to previous research done in other countries. What we found was nothing that deviates a lot from what has already been shown before and therefore our results confirms the prevailing consensus, that the firms announcing a SEO does on average experience a negative abnormal return. Our findings do also support the most well-known theories and literature that cover equity offerings.

In a corporate finance view, the capital restructure along with an issuance have a damaging effect on the share price in the Swedish market. However, since we only investigated twelve months following the event, we cannot discourage companies to forego

with such plans. The firms could be on the verge of producing first class services or finding great new investments yet to be discovered by the market, also due to high levels of information asymmetry. Using the share price as a proxy for success is not necessarily always the case.

6. Additional comments

Further research in the subject of SEOs on the Swedish market is necessary for one to draw decisive conclusions. We investigated in the abnormal returns around the announcement day of the SEO, however previous studies have also focused on the subscription period of SEOs, this period might have significant effects on our post-announcement-day period returns since the subscription event is included in that period. The abnormal returns could also be recalculated and corrected for the expected drop in share price that involves in rights issues. The results from such research would give additional depth to conclude what actually happens when a firm decides to issue new shares.

We tested a number of explanatory variables but of no significant value. Other explanatory variables such as market-to-book, price/earnings-ratios or other key figures might have a greater influence on the expectations of the market.

We would also like to advise further researchers to categorize the companies to a greater extent, through industry type and maybe even within the industry depending on the company specific qualities.

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8. Appendix

8.1 Buy-and-hold abnormal returns

Testing the average buy-and-hold abnormal return (1year)

<i>ABHAR</i>	<i>St.Dev.</i>	<i>N</i>	<i>t-stat</i>	<i>P-value</i>	<i>Significant</i>
-9,01%	0,589454	99	-1,52139	6,41%	No

H0: ABHAR = 0, H1: ABHAR < 0

$\alpha=5\%$

Testing the average buy-and-hold abnormal return (6 months)

<i>ABHAR</i>	<i>St.Dev.</i>	<i>N</i>	<i>t-stat</i>	<i>P-value</i>	<i>Significant</i>
-0,09584	0,377963	99	-2,52288	0,58%	Yes

H0: ABHAR = 0, H1: ABHAR < 0

$\alpha=5\%$

Testing if number of negative BHAR exceed 50%

<i>Negative BHAR</i>	<i>N</i>	<i>t-stat</i>	<i>P-value</i>	<i>Significant</i>
66,67%	99	3,316625	0,05%	Yes

H0: # of BHAR = 50%, H1: # of BHAR > 50%

$\alpha=5\%$

8.2 Large vs. Small firms

LARGE FIRMS

<i>DAY</i>	<i>(C)AAR(t)</i>	<i>Variance</i>	<i>T-stat</i>	<i>P-value</i>	<i>Significant</i>	<i>Significance</i>
Mean (AR(-3))	0,001761	0,000025	0,353785	63,83%	NO	-
Mean (AR(-2))	0,012325	0,000025	2,476201	99,34%	NO	-
Mean (AR(-1))	0,001548	0,000025	0,310944	62,21%	NO	-
Mean (AR(0))	0,001669	0,000025	0,335385	63,13%	NO	-
Mean (AR(1))	0,001159	0,000025	0,232764	59,20%	NO	-
Mean (AR(2))	-0,002214	0,000025	-0,444811	32,82%	NO	-
Mean (AR(3))	-0,007664	0,000025	-1,539706	6,18%	NO	-
Mean(CAR(-3;3))	0,008584	0,000173	0,651823	74,27%	NO	-
Mean (CAR(0;1))	-0,006837741	4,95475E-05	-0,971408299	0,165672499	NO	-

$H_0: (C)AAR = 0, H_1: (C)AAR < 0$

$N = 44$

Source: Calculations done in Excel with data from Thomson Datasatream

SMALL FIRMS

<i>DAY</i>	<i>(C)AAR(t)</i>	<i>Variance</i>	<i>T-stat</i>	<i>P-value</i>	<i>Significant</i>	<i>Significance</i>
Mean (AR(-3))	0,009561	0,000040	1,511412	93,47%	NO	-
Mean (AR(-2))	0,012394	0,000040	1,959388	97,50%	NO	-
Mean (AR(-1))	0,007106	0,000040	1,123446	86,94%	NO	-
Mean (AR(0))	-0,029360	0,000040	-4,641540	0,00%	YES	***
Mean (AR(1))	-0,009377	0,000040	-1,482415	6,91%	NO	-
Mean (AR(2))	0,014664	0,000040	2,318214	98,98%	NO	-
Mean (AR(3))	0,015226	0,000040	2,407116	99,20%	NO	-
Mean(CAR(-3;3))	0,020214	0,000280	1,207831	88,64%	NO	-
Mean (CAR(0;1))	-0,030595658	8,00253E-05	-3,420158634	0,03%	YES	***

$H_0: (C)AAR = 0, H_1: (C)AAR < 0$

$N = 55$

Source: Calculations done in Excel with data from Thomson Datasatream

8.3 Growth vs. Survival

GROWTH FIRMS

<i>DAY</i>	<i>(C)AAR(t)</i>	<i>Variance</i>	<i>T-stat</i>	<i>P-value</i>	<i>Significant</i>	<i>Significance</i>
Mean (AR(-3))	0,002634764	2,972E-05	0,4832783	0,6855509	NO	-
Mean (AR(-2))	0,015973501	2,972E-05	2,9299197	0,9983048	NO	-
Mean (AR(-1))	0,006896185	2,972E-05	1,2649242	0,8970508	NO	-
Mean (AR(0))	-0,026451748	2,972E-05	-4,8518791	6,115E-07	YES	***
Mean (AR(1))	0,000163407	2,972E-05	0,0299728	0,5119556	NO	-
Mean (AR(2))	-0,006195	2,972E-05	-1,1363102	0,1279134	NO	-
Mean (AR(3))	-0,006235208	2,972E-05	-1,1436852	0,1263771	NO	-
Mean(CAR(-3;3))	-0,013214098	0,0002081	-0,9161025	0,1798066	NO	-
Mean (CAR(0;1))	-0,02808259	5,945E-05	-3,6423171	0,0001351	YES	***

$H_0: (C)AAR = 0, H_1: (C)AAR < 0$

$N = 40$

Source: Calculations done in Excel with data from Thomson Datasatream

SURVIVAL FIRMS

<i>DAY</i>	<i>(C)AAR(t)</i>	<i>Variance</i>	<i>T-stat</i>	<i>P-value</i>	<i>Significant</i>	<i>Significance</i>
Mean (AR(-3))	0,008439281	3,489E-05	1,4287946	0,9234684	NO	-
Mean (AR(-2))	0,009915854	3,489E-05	1,6787827	0,9534028	NO	-
Mean (AR(-1))	0,003103438	3,489E-05	0,5254209	0,7003547	NO	-
Mean (AR(0))	-0,008191478	3,489E-05	-1,3868408	0,0827452	NO	-
Mean (AR(1))	-0,007988147	3,489E-05	-1,3524162	0,0881211	NO	-
Mean (AR(2))	0,016218723	3,489E-05	2,7458766	0,9969825	NO	-
Mean (AR(3))	0,012706072	3,489E-05	2,1511746	0,9842688	NO	-
Mean(CAR(-3;3))	0,034203744	0,0002442	2,1887138	0,9856912	NO	-
Mean (CAR(0;1))	-0,014581664	6,978E-05	-1,7456471	0,0404361	YES	*

$H_0: (C)AAR = 0, H_1: (C)AAR < 0$

$N = 40$

Source: Calculations done in Excel with data from Thomson Datasatream

Companies included in the sample

Company	Announcement date	Type of SEO	Market Cap.(MSEK)	Injected capital if fully subscribed (MSEK)	Costs (MSEK) if fully subscribed (MSEK)	Dilution (if fully subscribed)*	Growth/Survival	Cost of SEO/Total size of SEO	Relative size of SEO
ZENTERTAIN AB	23-11-2009	Rights Offering	193,09	57,399	6	39,14%	Growth	0,104531438	0,297265524
AEROCRINE AK TIEBOLAG	15-03-2012	Rights offering	1095,11	260	11,4	20,00%	Growth	0,043846154	0,237419072
AEROCRINE AK TIEBOLAG	10-11-2008	Rights Offering	206,86	98	4,5	33,33%	Survival	0,045918367	0,473750363
AKTIEBOLAGET GEVEKO	31-03-2010	Rights Offering	217,85	165	14,1	75,00%	Survival	0,085454545	0,757401882
ALPHAHELIX MOLECULAR DIAGNOSTICS AB	26-03-2007	Rights offering	109,96	30	2,5	42,90%	Survival	0,083333333	0,272826482
ANOTO GROUP AB	03-02-2013	Rights Offering	446,74	93	7,5	28,57%	Growth	0,080645161	0,208174777
ASCAM AK TIEBOLAG	08-06-2009	Rights Offering	101,38	29,57	2,4	57,00%	Survival	0,081163341	0,291674887
ASPIRO AB	29-06-2012	Rights offering	253,7	103	3	40,00%	Growth	0,029126214	0,405991328
BILLERUD AK TIEBOLAG	14-09-2012	Rights offering	6368,7	1996	15	33,33%	Growth	0,00751503	0,31340776
BILLERUD AK TIEBOLAG	27-08-2009	Rights Offering	2443,11	978	50	49,00%	Survival	0,051124744	0,400309442
BIOINVENT INTERNATIONAL AB	14-02-2012	Rights offering	1088,73	104,8	7,5	9,09%	Growth	0,071564885	0,096258944
BIOINVENT INTERNATIONAL AB	05-07-2007	Rights offering	759,29	125	5	15,30%	Survival	0,04	0,164627481
BIOLIN AB	22-11-2006	Rights Offering	112,35	95,618	5	50,00%	Growth	0,05229141	0,851072541
BIOLIN SCIENTIFIC AB	29-10-2009	Rights Offering	175,71	24,1	2	17,00%	Survival	0,082987552	0,137157817
BIOPHAUSIA AB	04-08-2008	Rights Offering	445,22	300	14	67,00%	Growth	0,046666667	0,673824177
BOTNIA EXPLORATION HOLDING AB	29-10-2010	Rights Offering	129,06	31	4	30,00%	Survival	0,129032258	0,240198357
BRINGWELL AB	09-05-2007	Rights Offering	355,09	118	7	20,00%	Growth	0,059322034	0,332310119
CISION AB	17-03-2010	Rights Offering	618,72	253	16	50,00%	Survival	0,063241107	0,408908715
CLINICAL LASERTHERMIA SYSTEMS AB	19-09-2013	Rights offering	269,43	23,8	2,9	14,29%	Survival	0,121848739	0,088334632
CLOETTA AB	15-02-2012	Rights offering	758,85	1065	10	80,00%	Growth	0,009389671	1,403439415
COREM PROPERTY GROUP AB	01-11-2010	Rights Offering	1576,13	227	2,8	17,00%	Growth	0,012334802	0,144022653
C-RAD AB	26-02-2013	Rights offering	238,68	31,7	3	14,29%	Growth	0,094637224	0,132813809
C-RAD AB	15-09-2011	Rights offering	184,91	22,1	1,5	16,67%	Growth	0,067873303	0,119517603
C-RAD AB	25-08-2008	Rights Offering	120,09	20	1	20,00%	Survival	0,05	0,16654176
CTI SYSTEMS AB	15-11-2007	Rights Offering	326,2	41,6	3	16,67%	Survival	0,072115385	0,127529123
CYBERCOM GROUP AB	30-08-2012	Rights offering	151,57	125,5	9,4	80,00%	Survival	0,074900398	0,828000264
DANNEMORA MINERAL AB	15-02-2013	Rights offering	219,49	211	25	42,30%	Survival	0,118483412	0,961319422
DIOS FASTIGHETER AB	02-11-2011	Rights offering	1184,46	1120	30	50,00%	Survival	0,026785714	0,945578576
ELANDERS AB	23-08-2010	Rights Offering	202	215	7	50,00%	Survival	0,03255814	1,064356436
ELANDERS AB	15-03-2007	Rights Offering	1606,8	153	6,8	14,30%	Growth	0,095220314	0,095220314
ENRO AB	24-10-2010	Rights offering	1042,2	2500	12,5	96,77%	Survival	0,044444444	2,39871829
EOLUS VIND AB	10-11-2009	Rights Offering	780,82	158,5	3,4	20,00%	Growth	0,021451104	0,202991727
EUROKINE VACCINES AB	14-12-2010	Rights offering	217,84	21,1	2,1	11,11%	Survival	0,099526066	0,096860081
EUROKINE VACCINES AB	13-09-2007	Rights offering	125,47	27,1	3,5	20,00%	Survival	0,129151292	0,215987886
FINGERPRINT CARDS AB	04-10-2006	Rights Offering	370,97	70,1	6,6	30,00%	Survival	0,094151213	0,188964067
FORPIPE SOFTWARE AB	06-05-2012	Rights offering	180,45	125	13	75,00%	Growth	0,104	0,692712663
GETINGE AB	25-02-2008	Rights Offering	3004,533	1514	22	5,88%	Growth	0,014531044	0,050390527
GINGER OIL AB	13-05-2007	Rights Offering	356,26	24,9	4	9,09%	Survival	0,16064257	0,069892775
GUNNEBO AKTIEBOLAG	24-11-2009	Rights Offering	1806,88	501	10	40,00%	Survival	0,01996008	0,277273532
HALDEX AKTIEBOLAG	24-11-2009	Rights Offering	1727,94	504,154	15,2	50,00%	Survival	0,030149518	0,291765918
HEMTEX AB	17-03-2011	Rights offering	420,99	328,6	5,5	57,14%	Survival	0,016737675	0,780541105
HEMTEX AB	21-04-2009	Rights Offering	806,78	164,289	7	28,57%	Survival	0,042607843	0,20363544
HEXAGON AKTIEBOLAG	24-11-2010	Rights offering	3709,199	6521	107	25,00%	Growth	0,016408526	0,175806151
HEXPOL AB	07-02-2011	Rights offering	4148,11	551	11	20,00%	Growth	0,019963702	0,132831579
HOMEMAJD HEMSERVICE AB	22-05-2007	Rights Offering	103,16	17,8	1,8	33,33%	Survival	0,101123596	0,101123596
HQ AB	12-10-2011	Rights offering	111,7	31,4	2,6	60,00%	Survival	0,082802548	0,281110116
HUSQVARNA AKTIEBOLAG	9-3-2009	Rights Offering	8631,38	3059	100	33,33%	Survival	0,037690422	0,35440451
ICAGRUPPEN	28-04-2013	Rights offering	13388,65	5032	28	20,00%	Growth	0,005564388	0,375840731

* Dilution if existing shareholder do not exercise their rights to participate in the SEO

Companies included in the sample

Company	Announcement date	Type of SFO	Market Cap(MSEK)	Injected capital if fully subscribed (MSEK)	Costs (MSEK)	Dilution (if fully subscribed)*	Growth/Survival	Cost of SFO/Total size of SFO	Relative size of SFO	OK
IMPACT COATINGS AB	19-02-2010	Rights Offering	551,3	77,8	3,8	20,00%	Growth	0,048843188	0,141120987	OK
IMPACT COATINGS AB	18-10-2007	Rights Offering	1326,53	70	3,5	9,09%	Growth	0,052769255	0,052769255	OK
INVISIO COMMUNICATIONS AB	21-10-2011	Rights offering	173,2	43,1	4,5	25,00%	Survival	0,104408353	0,248485266	OK
KAPPAHL AB	30-09-2011	Rights offering	1043,06	600,3	18	66,67%	Survival	0,029985007	0,575518187	OK
KARO BIO AKTIEBOLAG	19-11-2012	Rights offering	123,86	38,7	3,7	25,00%	Survival	0,095607235	0,31244954	OK
KARO BIO AKTIEBOLAG	12-04-2007	Rights offering	1463,1	406,4	20	33,00%	Survival	0,049212598	0,27766386	OK
LAPPLAND GOLDFINERS AB	20-05-2011	Rights offering	231,65	77,8	8	40,00%	Survival	0,102827763	0,3358515	OK
MEDA AKTIEBOLAG	31-10-2008	Rights Offering	1282,73	1511	55	14,29%	Growth	0,036399735	0,117828432	OK
MEDA AKTIEBOLAG	09-11-2009	Rights Offering	21574,91	1857,5	12,5	11,10%	Growth	0,066729475	0,086095377	OK
MEDVIR AKTIEBOLAG	26-04-2010	Rights Offering	2368,66	325	22	20,00%	Growth	0,067692308	0,137208379	OK
MOBERG PHARMA AB	02-07-2013	Rights Offering	373,03	36	2,4	9,10%	Growth	0,066666667	0,096506983	OK
NEUROVIVE PHARMACEUTICAL AB	15-03-2012	Rights offering	2271,3	64,7	7,5	25,00%	Survival	0,115919629	0,284858891	OK
NORDEA BANK AB	12-03-2009	Rights Offering	142745,9	29634,66881	974,4475138	35,50%	Survival	0,032882012	0,207604341	OK
NORDIC MINES AB	22-05-2012	Rights offering	1089,74	236	20	50,00%	Survival	0,084745763	0,216565419	OK
NORDIC MINES AB	11-01-2010	Rights Offering	707,45	240,506	15	28,40%	Survival	0,062368506	0,339961835	OK
NOTE AB	07-04-2010	Rights Offering	198,26	86,618	7	66,70%	Survival	0,0808114611	0,436890951	OK
NOVACAST TECHNOLOGIES AB	24-02-2010	Rights Offering	105,94	40	0,7	32,90%	Survival	0,0175	0,377572211	OK
OASMA PHARMACEUTICAL AB	29-09-2012	Rights offering	386,37	123	5	30,00%	Growth	0,040650407	0,318347698	OK
OASMA PHARMACEUTICAL AB	18-10-2010	Rights Offering	827,48	238,7	20	28,00%	Survival	0,083578181	0,288466186	OK
OPCON AKTIEBOLAG	06-10-2011	Rights offering	139,28	130	10,8	80,00%	Survival	0,083076923	0,933771626	OK
OPCON AKTIEBOLAG	30-09-2008	Rights Offering	540,38	73,4	5	20,00%	Survival	0,068119891	0,135830342	OK
OPUS GROUP AB	06-09-2012	Rights offering	345,58	50,1	7	16,67%	Growth	0,139720559	0,144976667	OK
OPUS PRODOX AB	04-05-2008	Rights Offering	168,16	105	7	45,45%	Growth	0,066666667	0,624405328	OK
OREXO AB	27-05-2011	Rights offering	889,68	245	12	27,50%	Growth	0,048979592	0,275379912	OK
PA RESOURCES AKTIEBOLAG	05-07-2013	Rights offering	120,47	891	90	75,00%	Survival	0,101010101	0,796032207	OK
PA RESOURCES AKTIEBOLAG	24-05-2010	Rights Offering	2071,76	1761	110	73,68%	Survival	0,062464509	0,850001931	OK
PANAXIA SECURITY AB	23-04-2009	Rights Offering	265,14	74,5	3,3	33,30%	Growth	0,044295302	0,280983631	OK
PRECISE BIOMETRICS AB	27-04-2011	Rights offering	222,69	54	5,3	28,50%	Growth	0,098148148	0,242489559	OK
PRECISE BIOMETRICS AB	13-11-2006	Rights Offering	265,41	85	10	25,00%	Growth	0,117647059	0,117647059	OK
PV ENTERPRISE SWEDEN AB	07-11-2010	Rights Offering	135,57	32,9	4,3	33,33%	Growth	0,130699088	0,242679059	OK
QUIRO GROUP AB	16-04-2013	Rights offering	2401,58	514	15	33,33%	Growth	0,029182879	0,214025766	OK
RNB RETAIL AND BRANDS AB	22-02-2013	Rights offering	178,66	463	31	97,56%	Survival	0,066954644	2,591514609	OK
RNB RETAIL AND BRANDS AB	10-09-2009	Rights offering	696,36	315	8,5	31,00%	Survival	0,026984127	0,452325232	OK
RUFORST AB	8/10/2010	Rights Offering	281,75	437	15	66,70%	Survival	0,034324943	1,551020408	OK
RORVIK TIMBER AB	16-03-2010	Rights Offering	169,55	249,543	34,2	97,30%	Survival	0,137050528	1,47179593	OK
SAS AB	01-04-2010	Rights Offering	14212,79	4960	220	75,00%	Survival	0,044354839	0,348981446	OK
SBC SVERIGES BOSTADSRÄTTSCENTRUM AB	23-03-2009	Rights Offering	107,12	100,1	4	58,30%	Survival	0,03996004	0,934466019	OK
SEAMLESS DISTRIBUTION AB	23-11-2012	Rights offering	614,88	102,4	7	20,00%	Growth	0,068359375	0,16653656	OK
SENSODETECT AB	21-01-2011	Rights offering	191,3	17,05	1,7	16,67%	Survival	0,099706745	0,089127026	OK
SENSYS TRAFFIC AKTIEBOLAG	28-10-2010	Rights Offering	194,33	50,4	2	25,00%	Survival	0,03968254	0,259352648	OK
SKANDINAVISKA ENSKILDA BANKEN AB	06-03-2009	Rights Offering	22409,52	15070	470	69,00%	Survival	0,03118779	0,672482052	OK
STILLE AB	25-06-2007	Rights Offering	155,69	36,186	1	25,00%	Survival	0,027634997	0,232423405	OK
STORMFÄGELN AB	14-02-2007	Rights Offering	8,832	8,832	0,75	10,00%	Survival	0,084918478	0,058105263	OK
SWEDBANK AB	15-09-2009	Rights Offering	44827,28	15100	475	33,33%	Survival	0,031456954	0,336848455	OK
SWEDISH ORPHAN BIOVITRUM AB	26-04-2011	Rights offering	5219,65	637	42,5	20,00%	Growth	0,066718995	0,122038834	OK
TELECA AB	07-03-2008	Rights Offering	709,81	165	13	18,18%	Growth	0,078787879	0,232423405	OK
TRACTECHOLOGY AB	22-02-2007	Rights offering	121,06	27,7	3	40,00%	Survival	0,108303249	0,228812159	OK
TRADEOUBLER AKTIEBOLAG	04-12-2009	Rights Offering	1629,15	356	11,9	33,33%	Survival	0,033426966	0,21851886	OK
TRELLBERG AKTIEBOLAG	23-04-2009	Rights Offering	5275,93	2169	95	66,67%	Survival	0,043798986	0,411112354	OK
WAFINDER SYSTEMS AKTIEBOLAG	22-05-2007	Rights Offering	153,87	74,75	7,5	37,50%	Survival	0,100334448	0,485799701	OK
VICTORIA PARK AB	17-02-2010	Rights Offering	296,96	55,68	3,4	50,00%	Growth	0,061063218	0,1875	OK

* Dilution if existing shareholder do not exercise their rights to participate in the SFO

8.4 Not included companies

Companies not included due to low market cap at announcement day (>100MSEK)

CHERRYFÖRETAGEN AB	ALLENEX AB
PANAXIA AB	KOPY GOLDFIELDS AB
VINOVO AB	EXINI DIAGNOSTICS AKTIEBOLAG
PILUM AB	POLYPLANK AKTIEBOLAG
AXLON GROUP	MIRIS HOLDING AB
CREATIVE ANTIBIOTICS SWEDEN AB	RW CAPITAL AKTIEBOLAG
ALLTELE ALLMÄNNA SVENSKA TELEFONAKTIEBOL	SEANET MARITIME COMMUNICATIONS AKTIEBOLA
ACCELERATOR I LINKÖPING AB	IDL BIOTECH AB
EPISURF MEDICAL AB	MULTIQ INTERNATIONAL AB
BIOSENSOR APPLICATIONS SWEDEN AB	CRYPTZONE GROUP AB
PAYNOVA AB	GENOVIS AB
ARTIMPLANT AB	SWITCHCORE AB
MINERAL INVEST INTERNATIONAL MII AB	SEANET MARITIME COMMUNICATIONS AKTIEBOLA
SMARTEQ AB	PARADOX ENTERTAINMENT AB
HEART OF BRANDS AB	ORASOLV AB
STARBREEZE AB	CONFIDENCE INTERNATIONAL AKTIEBOLAG
CYBAERO AB	CYBAERO AB
DEFLAMO AB	ORASOLV AB
RAYCLINIC AB	IMAGE SYSTEMS AB
WESC AB	CONFIDENCE INTERNATIONAL AKTIEBOLAG
ISCONOVA AKTIEBOLAG	AIK FOTBOLL AB
PILUM AB	NGS GROUP AKTIEBOLAG
BERGS TIMBER AB	NGS GROUP AKTIEBOLAG
BREDBAND2 I SKANDINAVIEN AB	ECO SUPPLIES EUROPE AB
DIGITAL VISION AKTIEBOLAG	CHALLENGER MOBILE AB
TAGMASTER AKTIEBOLAG	AVTECH SWEDEN AB
SMARTEQ AB	Forestlight Studio AB (publ)
HANSA MEDICAL AB	BIOLIGHT INTERNATIONAL AKTIEBOLAG

8.5 Excluded companies

Excluded companies due to other reasons (offering type, data missing, 2 years between SEO's etc.)

FORTNOX INTERNATIONAL AB	GUIDELINE OIL DRILLING TECHNOLOGY AB
GETUPDATED INTERNET MARKETING AB	GENOVIS AB
GETUPDATED INTERNET MARKETING AB	COUNTERMINE TECHNOLOGIES AB
CHEMEL AKTIEBOLAG	FINGERPRINT CARDS AB
MOBYSON AB	GENOVIS AB
CHEMEL AKTIEBOLAG	LIFEASSAYS AB
CHEMEL AKTIEBOLAG	LIGHTLAB SWEDEN AB
TRIPEP AB	CHRONTECH PHARMA AB
GETUPDATED INTERNET MARKETING AB	SMARTEQ AB
GETUPDATED INTERNET MARKETING AB	FOLLOWIT HOLDING AKTIEBOLAG
SHARPVUE AB	HQ AB
Forestlight Studio AB (publ)	LIFEASSAYS AB
LIGHTLAB SWEDEN AB	CHRONTECH PHARMA AB
TELIGENT AKTIEBOLAG	A-COM AB
NORDIC MINES AB	LIGHTLAB SWEDEN AB
SAS AB	GENOVIS AB
ENIRO AB	A-COM AB
ACTIVE BIOTECH AB	CRYPTZONE AB
ACTIVE BIOTECH AB	PILUM AB
ACTIVE BIOTECH AB	LABS2 GROUP AB
OASMIA PHARMACEUTICAL AB	LIGHTLAB SWEDEN AB
KAPPAHL AB	BOTNIA EXPLORATION HOLDING AB
RNB RETAIL AND BRANDS AB	FOLLOWIT HOLDING AKTIEBOLAG
CYBERCOM GROUP EUROPE AB	CHEMEL AKTIEBOLAG
KARO BIO AKTIEBOLAG	COUNTERMINE TECHNOLOGIES AB
NEUROVIVE PHARMACEUTICAL AB	PRECOMP SOLUTIONS AKTIEBOLAG
NORDIC MINES AB	LIFEASSAYS AB
KARO BIO AKTIEBOLAG	LIFEASSAYS AB
CYBERCOM GROUP EUROPE AB	CONFIDENCE INTERNATIONAL AKTIEBOLAG
PRECISE BIOMETRICS AB	CRYPTZONE AB
ACCELERATOR NORDIC AB	CRYPTZONE AB
RUSFOREST AB	PRECOMP SOLUTIONS AKTIEBOLAG
BIOSENSOR APPLICATIONS SWEDEN AB	BIOSENSOR APPLICATIONS SWEDEN AB
PRECISE BIOMETRICS AB	OPCON AKTIEBOLAG
PRECISE BIOMETRICS AB	LIFEASSAYS AB
INVISIO COMMUNICATIONS AB	Flästa Källa AB
GUIDELINE OIL DRILLING TECHNOLOGY AB	GENOVIS AB
BIOINVENT INTERNATIONAL AB	GETUPDATED INTERNET MARKETING AB
OPCON AKTIEBOLAG	FASTIGHETS AB BALDER
RUSFOREST AB	COT-CLEAN OIL TECHNOLOGY AB
ACCELERATOR NORDIC AB	REDERI AB TRANSATLANTIC
FINGERPRINT CARDS AB	KILSTA METALLVÄRDEN AB
BIOSENSOR APPLICATIONS SWEDEN AB	Trigon Agri A/S
ELLEN AKTIEBOLAG	PAYNOVA AB
LIFEASSAYS AB	TAURUS ENERGY AKTIEBOLAG
GENOVIS AB	DIAMYD MEDICAL AKTIEBOLAG
ELLEN AKTIEBOLAG	MORPHIC TECHNOLOGIES AB
LABS2 GROUP AB	COUNTERMINE TECHNOLOGIES AB
LIFEASSAYS AB	SMARTEQ AB

8.6 Welch's test for difference between Growth and Survival

Test Difference in CAAR between Growth and Survival

t-Test: Two-Sample Assuming Unequal Variances

	<i>Growth</i>	<i>Survival</i>
Mean	-0,0132141	0,034204
Variance	0,01370214	0,040252
Observations	40	59
Hypothesized Mean Difference	0	
df	95	
t Stat	-1,48123764	
P(T<=t) one-tail	0,070926249	
t Critical one-tail	1,661051817	
P(T<=t) two-tail	0,141852498	
t Critical two-tail	1,985251004	

H0: No difference in mean

Test: Difference in CAAR(0;1) between Growth and Survival

t-Test: Two-Sample Assuming Unequal Variances

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	-0,02808259	-0,01458
Variance	0,014914116	0,021253
Observations	40	59
Hypothesized Mean Difference	0	
df	93	
t Stat	-0,49864079	
P(T<=t) one-tail	0,309604903	
t Critical one-tail	1,661403674	
P(T<=t) two-tail	0,619209806	
t Critical two-tail	1,985801814	

H0: No difference in mean

Test: Difference in AAR(0) between Growth and Survival
t-Test: Two-Sample Assuming Unequal Variances

	<i>Growth</i>	<i>Survival</i>
Mean	-0,02645175	-0,00819
Variance	0,007880617	0,009733
Observations	40	59
Hypothesized Mean Difference	0	
df	89	
t Stat	-0,95975334	
P(T<=t) one-tail	0,169889752	
t Critical one-tail	1,662155326	
P(T<=t) two-tail	0,339779504	
t Critical two-tail	1,9869787	

H0: No difference in mean

8.7 Welch's test for difference between Large and Small firms

Test for differences in AAR(0) between large and small firms
t-Test: Two-Sample Assuming Unequal Variances

	<i>Large firms</i>	<i>Small Firms</i>
Mean	0,001669318	-0,02936031
Variance	0,00458947	0,012202747
Observations	44	55
Hypothesized Mea	0	
df	91	
t Stat	1,718113039	
P(T<=t) one-tail	0,044588426	
t Critical one-tail	1,661771155	
P(T<=t) two-tail	0,089176853	
t Critical two-tail	1,986377154	

H0: No difference in mean

Test for differences in CAAR between large and small firms
t-Test: Two-Sample Assuming Unequal Variances

	<i>Large firms</i>	<i>Small firms</i>
Mean	0,008583705	0,020214073
Variance	0,023910709	0,035020795
Observations	44	55
Hypothesized Mea	0	
df	97	
t Stat	-0,33854916	
P(T<=t) one-tail	0,367840556	
t Critical one-tail	1,66071461	
P(T<=t) two-tail	0,735681111	
t Critical two-tail	1,984723186	

H0: No difference in mean

Test for differences in CAAR(0;1) between large and small firms
t-Test: Two-Sample Assuming Unequal Variances

	<i>Large firms</i>	<i>Small firms</i>
Mean	-0,006837741	-0,03059566
Variance	0,012589671	0,023398892
Observations	44	55
Hypothesized Mea	0	
df	96	
t Stat	0,890638774	
P(T<=t) one-tail	0,187674833	
t Critical one-tail	1,66088144	
P(T<=t) two-tail	0,375349666	
t Critical two-tail	1,984984312	

H0: No difference in mean

8.8 Multiple regression

	Model 1	Model 2	Model 3	Model 4
Dependent variable	BHAR6M	BHAR6M	BHAR6M	BHAR6M
Independent variables				
Variable	Constant	Constant	Constant	Constant
Coef (P-value)	0.097352 (0,4356)	0,061409 (0,6270)	0.088681 (0,3873)	0.096275 (0,3335)
Variable	Cost of SEO/Size of SEO	Cost of SEO/Size of SEO	Cost of SEO/Size of SEO	Cost of SEO/Size of SEO
Coef (P-value)	-1.953745 (0,0735)	-1.9187 (0,0850)	-2.022732 (0,0595)	-2.049710 (0,0547)
Variable	Dilution	Dilution	Dilution	Dilution
Coef (P-value)	-0.294185 (0,1599)	-0,176357 (0,3922)	-0.198278 (0,3128)	-0.241317 (0,1383)
Variable	Injected capital	Injected capital	Injected capital	Injected capital
Coef (P-value)	8.35E-05 (0,0032**)	2.61E-05 (0,0129*)	2.55E-05 (0,0134*)	2.57E-05 (0,0125*)
Variable	Relative size of SEO	Relative size of SEO	Relative size of SEO	
Coef (P-value)	-0.021104 (0,6863)	-0,021238 (0,6906)	-0.020914 (0,6937)	
Variable	Dummy Growth	Dummy Growth		
Coef (P-value)	0.046545 (0,5603)	0,029790 (0,7138)		
Variable	Market cap			
Coef (P-value)	-1.43E-05 (0,0274)			
R2:	0.185373	0.140903	0.139652	0.138224
Adj R2:	0.132246	0.094715	0.103042	0.111010
Prob(F-stat)	0.003743	0.013545	0.006433	0.002639

Correlation matrix

	DILUTION	INJECTED_CAPITAL	MARKET_CAP	RELATIVE_SIZE_OF_SEO	COST_OF_SEO_TOTAL_SIZE	DUMMY_GROWTH
DILUTION	1,0000					
INJECTED_CAPITAL	0,0832	1,0000				
MARKET_CAP	-0,0496	0,9269	1,0000			
RELATIVE_SIZE_OF_SEO	0,5550	0,0012	-0,0696	1,0000		
COST_OF_SEO_TOTAL_SIZE	-0,0223	-0,2570	-0,2517	0,0509	1,0000	
DUMMY_GROWTH	-0,3297	-0,1028	-0,0208	-0,1800	-0,2060	1,0000

Heteroskedasticity test for model 4

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	2.022136	Prob. F(3,95)	0.1160
Obs*R-squared	5.942373	Prob. Chi-Square(3)	0.1144
Scaled explained SS	7.266530	Prob. Chi-Square(3)	0.0639

Test Equation:

Dependent Variable: RESID^2

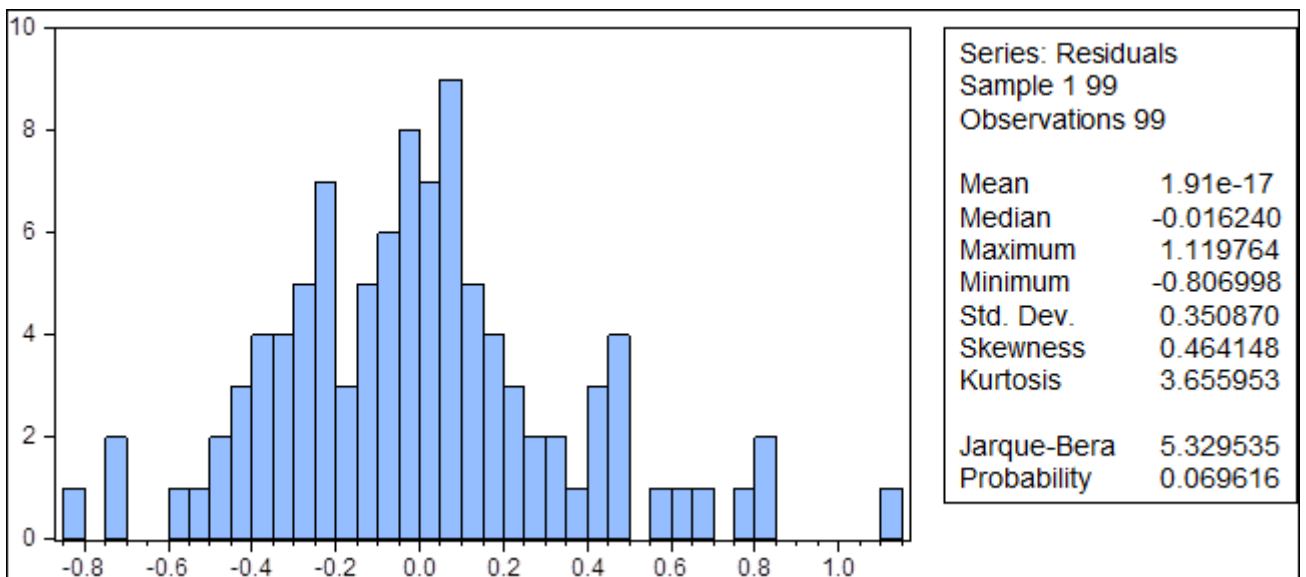
Method: Least Squares

Date: 05/21/15 Time: 16:57

Sample: 1 99

Included observations: 99

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.107537	0.054632	1.968366	0.0519
COST_OF_SEO_TOTA	-0.372874	0.581132	-0.641634	0.5227
DILUTION	0.070667	0.089061	0.793468	0.4295
INJECTED_CAPITAL	1.07E-05	5.56E-06	1.930973	0.0565
R-squared	0.060024	Mean dependent var	0.121866	
Adjusted R-squared	0.030341	S.D. dependent var	0.199618	
S.E. of regression	0.196566	Akaike info criterion	-0.376072	
Sum squared resid	3.670626	Schwarz criterion	-0.271219	
Log likelihood	22.61558	Hannan-Quinn criter.	-0.333649	
F-statistic	2.022136	Durbin-Watson stat	1.270365	
Prob(F-statistic)	0.116009			



8.9 Descriptive statistics for variables

<u>Relative size of SEO</u>					
<i>N</i>	<i>Mean</i>	<i>Median</i>	<i>St. Dev.</i>	<i>Min</i>	<i>Max</i>
99	0,4764191	0,2772735	0,8239023	0,0503905	7,3960322

<u>Market cap</u>					
<i>N</i>	<i>Mean</i>	<i>Median</i>	<i>St. Dev.</i>	<i>Min</i>	<i>Max</i>
99	4210,3117	370,97	15865,062	101,38	142745,9

<u>Dilution</u>					
<i>N</i>	<i>Mean</i>	<i>Median</i>	<i>St. Dev.</i>	<i>Min</i>	<i>Max</i>
99	0,3716631	0,329	0,2237254	0,0588235	0,9756098

<u>Relative cost of SEO</u>					
<i>N</i>	<i>Mean</i>	<i>Median</i>	<i>St. Dev.</i>	<i>Min</i>	<i>Max</i>
99	0,0638046	0,0623685	0,0353557	0,0055644	0,1606426