Asymmetric Information and Investor Reactions to SEOs:
An Empirical Study of the Swedish Stock Market

Alexander Engel Tom Thambert

21376@live.hhs.se 21187@live.hhs.se

Info

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Stockholm School of Economics

Tutor: Håkan Thorsell

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Abstract

We test to see if prior stock return and measures of growth opportunities can explain abnormal returns of firms announcing a seasoned equity offering, as indicated by theories of asymmetric information. Announcing the SEO in connection with an acquisition is found to have a significant positive impact on announcement day returns. The stock return of the firm preceding the announcement is also found to have a significant positive impact, contrary to the negative impact predicted, while dividend yield and price to book ratio of equity do not have a significant correlation with the abnormal returns. The contradictive results imply that the study can not corroborate, neither reject, the importance of growth opportunities and prior stock return in announcement day abnormal returns.

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Problem Area

Previous research on investor reactions to the announcement of a seasoned equity offering ("SEO") has almost unanimously documented a negative reaction in the market value of the offering firm's equity (e.g. Asquith and Mullins (1986); Barclay and Litzenberg (1987); Dierkens (1991); Mikkelson and Partch (1986)). In a survey of literature, Eckbo and Masulis (1992) documented an average abnormal return of -3.1% for industrial firms announcing SEO's. In a more recent study, Aggarwal and Zhao (2008) document a mean abnormal return of -2.59% for US firms announcing equity issues between the years 1983 to 2003. Financial theory provides no straightforward explanation as to why these announcement date abnormal returns occur. According to Modigliani and Miller's (1958) classic proposition, the value of a firm does not depend on its capital structure. Although this is only valid under the assumption of *perfect capital markets*, even if we relax the condition of no taxes, there would be no disadvantageous tax effect from raising equity if the company uses the same ratio of debt to fund its new investments, by also raising debt. In this case, the value of the firm should not be negatively affected either. It is reasonable to assume that not all issuers of equity change their long term leverage ratio goal as they decide on the issuance of equity.

Another condition of perfect capital markets is that investors are aware of the present value of firms' future cash flows. If we further relax the assumption of perfect capital markets, since we know that investors seldom have this knowledge, a reaction in the market value of a firm could instead be induced by investors' view of the profitability of the investment opportunities, and the assets in place, of the firm. This state of *asymmetric information* is the basis for several theories of how markets react to the issuance of securities (e.g. Myers and Majluf, 1984; Miller and Rock, 1985; Ambarish, John and Williams, 1987; Jensen, 1986). These theories, and alternative ones, intend to predict the market reaction to the issuance, but empirical research has so far been unable to reach a consensus as to what is the correct explanation.

Aim of the Study

The intention of this thesis is to investigate empirically the role of information asymmetry in announcement day abnormal returns. Specifically, we test the effect of growth opportunities and prior stock return on announcement day returns. We believe increased knowledge in this area is valuable to several stakeholders. It is in the best interest of the firm to minimize the negative reaction in the market value of its equity. It is also in the interest of the investor to be informed of how firm-specific properties will affect the market value of equity at the announcement of a SEO.

In order to do this, we derive testable measures from theories of asymmetric information that intend to predict the market reaction to the issuance of securities. The measures are such that can be calculated for each specific sample. Through regression analysis, these measures are then tested against abnormal returns following the announcement of a seasoned equity offering. The specific goal of the study is to see whether these firm-specific measures have any significant ability to explain abnormal returns on announcement days.

Scope of the Study

This study is not intended to explain why the abnormal return exists. Our approach is rather to study, specifically, the effect of information asymmetry within this phenomenon. Because of this delimitation, we choose not to study alternative theories unrelated to information asymmetry, although the reader should be aware of their existence.

This study uses data from the Swedish stock market between the years 2000 to 2008. The Swedish OMX stock exchange offers good data on a mature and liquid market, and we therefore find it suitable for a study such as this one. Objections could be made as to the ability to generalize results from a relatively small exchange such as the Swedish one, but we believe that the ongoing globalization of capital markets and harmonization of regulations and standards renders our findings quite reasonable also from an international perspective.

The rest of this thesis have the following structure: An initial literature review presents the theories that this study aims to investigate empirically. A brief section presents what empirical studies have been able to find so far about the role of information asymmetry in announcement day abnormal returns. This marks the relevant backdrop and starting point of our study. We go on to present our dataset, our methodology and then the results of our statistical tests. After the statistical qualities of the tests have been confirmed, the results are analyzed and conclusions are drawn.

Literature Review

Theories of Asymmetric Information

The following three models of asymmetric information have a large impact on the research area of abnormal announcement day returns. These are the theories that are investigated empirically in this study and, as such, it is necessary to have a basic understanding of them in order to understand our results.

In their 1984 article, “Corporate financing and investment decisions when firms have information that investors do not have”, Myers and Majluf develop a model of how firms decide on financing. They assume that the firm, or rather its managers, have information that investors do not have, and that both managers and investors are aware of this. They also assume that managers act in the best interest of current shareholders. In relation to a potential equity offering, these shareholders can be referred to as “old” shareholders. The firm has one existing asset and one investment opportunity that requires investment. For our study, this investment would require an issue of shares for funding. When the managers are to decide whether to issue equity or not they are aware of the actual value of assets in place and the investment opportunity. Investors are only aware of the distribution of potential values, and their expected value is their valuation of the firm. Simplified, acting in the best interest of old shareholders, the management would only decide to issue equity if the actual value is below the expected value, since this would increase the value for old shareholders. If the actual value is above investors’ expected value, a share issue would dilute the value for old shareholders. Rational investors are aware of this situation, which creates a “lemons” problem – only overvalued firms will decide to issue new equity – and thus, the announcement of an equity issue would cause the share price to drop. Interestingly, this can also make firms forgo positive NPV investments, since the cost of selling shares at a too low price can offset the benefits. With this model, Myers and Majluf predict a negative reaction to the announcement of an equity issue. An important exception occurs, however, when the potential value (distribution) of the investment opportunity is so great that it would increase the value for the shareholders in any situation. In this case, the decision to issue equity does not convey any new information and the reaction is nonnegative. This model implies for our study that a variable measuring the magnitude of the overvaluation that is signalled to investors should be added in order to capture the effect of asymmetric information on abnormal announcement day returns.

In Miller and Rock (1985), the authors develop a model with similar assumptions as that of Myers and Majluf (1984). In their model, managers have full information on the earnings of the company, whereas investors are only aware of the expected earnings. In this model, as well as in the one presented above, investors are aware of this situation. Miller and Rock build their model on the fact that the use of a firm's capital must equal its sources of it. Since investors do not know the earnings of the firm's assets, they look to the sources of capital creating it. Keeping the assets and investment opportunities fixed, investors interpret an unexpected change in the firm's *net* dividend (dividend minus financing) as a signal that earnings have changed from their expectation. If internal sources of funds (earnings) have decreased, the management must increase the external financing in order to fund their operations, thereby signalling the decrease in earnings to investors. Consequently, the market value of the firm will fall. This model works under the assumption that investors are aware of all investment opportunities of the firm, delimitating the uncertainty to the earnings of the firm's assets. However, if one adds uncertainty of investment opportunities to the model, as previous researchers have done (e.g. Pilotte, 1992), the unexpected new financing can occur due to either earnings shortfall, as in the original model, or due to unexpected new investment opportunities. In this case, the reaction in the market value of the firm will depend on investors' assessment of the investment opportunities of the firm, telling us that measures of this might influence the reaction in the specific case. This model implies for our study that a variable measuring the growth opportunities of the firm should be added in order to capture the effect of asymmetric information.

Ambarish, John and Williams (1987) build upon the models of Myers and Majluf (1984) and Miller and Rock (1995), using similar assumptions. In their model, the authors allow for investor uncertainty of both the firm's value of assets in place and the value of investment opportunities. The dividend and financing decisions of the firm can, in this model, give signals to the investors regarding either, or both, of these values. The model creates a division of firms into either mature firms or growth firms. Investors get most of their information of mature firms from assets in place, generating a relatively larger portion of information asymmetry from investment opportunities. This translates into a negative announcement effect when issuing new shares. The opposite effect is predicted for growth firms, where the main source of investor information is the growth opportunities. Ambarish, John and Williams are thereby saying that high growth firms could even experience positive announcement effects, something that has rarely been documented in empirical studies. This model implies for our study that a variable measuring the maturity of the firm should be added in order to capture the effect of asymmetric information.

All of these models have in common that investors are unaware of the true value of the firm until an event gives them additional information. Logically, the more "off" the expectations of investors are shown to be, the greater should the correction be in the market value of the firm. The magnitude of this correction should therefore be proportional to the extent of information asymmetry.

Earlier Empirical Work

Some of the most cited empirical works on negative announcement effects were published in 1986 when Mikkelson and Partch (1986), Asquith and Mullins (1986) and Masulis and Korwar (1986) all empirically tested the implications of the signalling models of Myers and Majluf (1984) and Miller and Rock (1985). The latter predicts that a larger issue signals a larger earnings shortfall which consequently results in a larger drop in the share price. All of the empirical models mentioned above test this variable for explanatory power, but only Asquith and Mullins (1986) manages to find a significant effect. Mikkelson and Partch find that the only significant variable is the type of security issued (equity or debt), where the effect is more negative for equity issues. Both Asquith and Mullins (1986) and Masulis and Korwar (1986) argue that the stock price run up in the period before the announcement should be related to the announcement day return, relating to the theory of overvaluation by Myers and Majluf (1984). Indeed, both studies find a significant negative relationship between prior stock return and announcement day return. Masulis and Korwar (1986) also find a significant negative relationship between announcement day return and a dummy variable measuring whether the management of the firm sell shares in the issue, further strengthening the idea that investors are sensitive to signals of overvaluation within the announcement.

Barclay and Litzenberger (1987) tests if investors' beliefs about the firm's investment opportunities affect announcement day returns, as Ambarish, John and Williams (1987) predicts. Barclay and Litzentberger argues that Tobin's Q reflects the investment opportunities that investors believe will create future cash flows for the firm, and test this measure against abnormal announcement day returns. The authors conclude that Tobin's Q and issue size does not significantly explain the abnormal return.

In Dierkens (1991), the author tests the price/book ratio of equity – a very similar variable to Tobin's Q – for explanatory power and finds a significant positive effect. This points towards a role for growth opportunities in the explanation of the abnormal return. Examining this is also the specific goal in Pilotte (1992). In the study, the author tests a wide range of proxies for investment opportunities, such as the R&D to sales ratio, the capital expenditure to total assets ratio, the dividend yield, the price to earnings ratio, Tobin's Q and the ex post growth rates for sales, net operating income, market value of common equity and total assets. Significant positive relationships are found for all these variables at significance levels ranging between 1 to 10 percent, consistent with the prediction of Ambarish, John and Williams (1987). However, Denis (1994) expands on Pilotte's (1992) study with a larger sample and rejects all ex post measures of growth opportunities and the capital expenditure ratio, while reconfirming the rest.

In D'Mello and Ferris (2000) it is argued that analysts are important information intermediates in markets, and that they have the ability to reduce the information asymmetry perceived by investors. Their study show a significant positive relationship between announcement day returns and the number of analysts following the firm, further pointing towards an important role of information asymmetry in the explanation of the phenomenon that is the subject of this paper.

In 2008, Aggarwal and Zhao (2008) examined the tendency of stock prices to fall on the issuance date as well as on the announcement date. They conclude that it is an effect of the decreased option value of equity resulting from lower volatility after the issuance. They also reaffirm the conclusion that the stock return prior to the announcement is negatively related to the announcement day return, consistent with Myers and Majluf (1984).

From the review above we draw the conclusion that the mixed results in previous studies warrants further research into the role of information asymmetry in abnormal announcement day returns. In order to ensure comparability, we will use measures that have been tested in the prior research presented above. We also test a new variable not presented above in order to broaden the research area.

Empirical Data

Sampling Procedure and Description of Sample

An initial sample of realized equity issues on the Stockholm OMX stock exchange (Small, Mid and Large Cap)[1] over the period of 2000-2008 is identified from Nasdaq OMX's New Issue Database. A primary cleansing is performed whereby the sample is reduced to 195 observations containing seasoned issues of common stock. Secondly, company press releases are reviewed manually from either company homepage, Cision Wire[2] or Hugin Online[3] to identify the date when investors first learned a SEO was to occur. As a third step, financial data and stock return relating to the date of the press release is collected from COMPUSTAT.

Choice of Time Period

To ensure a large yet reliable and consistent dataset, the period 2000-2008 is chosen. Due to the ongoing changes of the financial market we believe this rather current period is best suited to explain today's investor reaction to any given SEO.

Choice of Market Exchange

This thesis exclusively studies investor reactions to SEOs at the Stockholm OMX stock exchange (Small, Mid and Large Cap). It is a mature market with the highest trading liquidity in Sweden. To a larger extent than smaller markets, it ensures financial and accounting information availability and accuracy due to legislative requirements.

Other Criteria

Several data restrictions are used in this study. The criteria used to determine what events to be used are based on previous studies such as Asquith and Mullins (1986), Dierkens (1991), Denise (1994), Spiess and Affleck-Graves (1995), Loughran and Ritter (1997) and Aggarwal and Zhao (2008) in order to ensure comparability. The criteria are as follows:

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1 Previously named the A- and O-lists.
2 Cision's news portal.
3 A news portal part of Thomson Reuters.
4 See Loughran and Ritter (1997) for an example on this.
5 See methodology section for information on the independent variables used.

(1) The common stock must be listed on the Stockholm OMX stock exchange at the offering announcement date and remain listed for the following trading day, (2) the date of the initial public announcement is unambiguously identified, (3) no simultaneous announcements of other offerings occur, (4) financial data - including historic stock return - is available for the relevant time period. The resulting process is presented in Exhibit 1.

Summary of criteria for selecting the empirical data

		Sample	Excluded
1.	The common stock is listed on the Stockholm stock exchange at the offering announcement date and remains listed for the following trading day	195	
2.	The date of the initial public announcement is unambiguously identified	195	4
3.	No simultaneous announcements of other offerings occur	191	12
4.	Financial data - including historic stock return - is available for the relevant time period	179	71
5.	**Final sample to be included**	**108**	

Exhibit 1 showing selection criteria and the number of observations excluded by each criterion

The Data Set

Descriptive measures of seasoned equity offerings

	Mean	Median	Standard Deviation	Range Max	Range Min
Market value of common stock (SEKm)	4972	385	21621	205063	16
Size of Issue (SEKm)	755	105	3250	30100	4
Size of Issue / Market value of common stock	0,42	0,28	0,44	3,36	0,01
Number of outstanding shares (NOSH) (m)	85	32	180	1582	0,11
Number of shares in new equity issue (NONSH) (m)	53	20	164	1582	0,09
NOSH/NONSH	0,76	0,50	0,87	6,00	0,06
Market-to-book ratio	4,36	2,30	5,79	28,29	0,29
Total Assets (SEKm)	4331	308	23816	242028	22
Total Sales (SEKm)	3439	200	20801	210837	1

Exhibit 2 showing descriptive measures of the sample

Industry representation

Sector	Number	Average Fdar	Standard deviation Fdar	Range Max	Min
Materials	2	2,09%	9,35%	8,71%	-4,52%
Industrials	15	-2,82%	5,07%	4,68%	-12,93%
Consumer Discretionary	12	-10,94%	9,82%	3,94%	-25,46%
Consumer staples	3	-0,76%	1,24%	0,60%	-1,81%
Health Care	35	-2,18%	10,86%	20,81%	-41,08%
Financials	8	-8,29%	11,44%	1,86%	-26,60%
Information Technology	33	-6,72%	9,72%	15,95%	-29,22%

Exhibit 3 showing industry representation in the total sample. For each industry, average first day abnormal return (fdar) is presented, along with its standard deviation and range. The classification is based on the Global Industry Classification Standard

Distribution of events through time

Year	Number of new share issues	Percent of total number
2008	15	13,89%
2007	5	4,63%
2006	15	13,89%
2005	19	17,59%
2004	13	12,04%
2003	12	11,11%
2002	13	12,04%
2001	10	9,26%
2000	6	5,56%
Total	108	100%

Exhibit 4 showing the distribution of events throughout our sample period

Distribution of offerings among firms

Number of conducted SEOs among sample firms in the time period 2000-2008	Number of firms conducting each amount	Total number of SEOs
1	42	42
2	8	16
3	9	27
4	3	12
5	1	5
6	1	6
Total		108

Exhibit 5 showing the number of equity issues during the sample period for each unique firm

A common approach in SEO-event studies where one or more independent variable is calculated with data from more than one year is to exclude firms that within a given time-frame have conducted more than one SEO[4]. This is done since the same data might otherwise be included more than one time and increase dependency in the statistical test. Since we have no such variables, and since no firm in our sample conducts more than one SEO in any single year, there is no need for such exclusion[5]. This is an approach consistent with previous studies such as Aggarwal and Zhao (2008).

Quality of the Material

We choose sources of data that we believe ensures high quality, consistency and comparability.

In identifying the date investors first learned a SEO was to occur, the following three sources are used: the company homepage, Cision Wire and Hugin Online. Cision Wire and Hugin Online are services provided by Cision AB and Thomson Reuters, respectively, through which companies distribute financial information. It is important to note that when press releases were available at all three sources neither date nor content differed. We use multiple sources since no source covers each of our observations at different points in time. These sources are commonly used by professionals and are considered to be of high quality.

Accounting and financial data on our sample firms are collected from COMPUSTAT, accessed through Factset. To best reflect the accounting data available to investors at the identified announcement date, we consistently collect data for the different financial measures from either the annual report from the fiscal year prior to the announcement date or the (at the time) latest available quarterly report. Income Statement items - Sales and Dividend Per Share - are collected from the preceding annual report while Balance Sheet items - equity and assets - are collected from the latest available quarterly report prior to the announcement. We believe this best reflects practice among the actors in the markets. COMPUSTAT is widely used in academic research, further enhancing comparability with previous research.

[4] See Laughran and Ritter (1997) for an example on this.
[5] See methodology section for information on the independent variables used.

The quality of our results can be impeded by measures that are not representative for all observations. However, since we test no industry specific measure we should observe no distortion of the data and the results because of this.

Adjusting for Outliers

We adjust for extreme values that disproportionally influence the sample in accordance with Skogsvik (2002) by replacing them with the closest non-extreme value in the sample. This replacement is done in order to avoid reducing an already limited data set. A generous definition of an extreme value is applied where an observation outside five standard deviations from the mean is classified as extreme. This criterion ensures that not too many observations are considered extreme, since accounting measures tend not to have a normal distribution (Skogsvik, 2002).

Methodology

Average Abnormal Return

In order to examine the effect of a SEO announcement on the market value of the firm's equity, we compare the stock return on the announcement date with a predicted return. According to Brown and Warner (1985) and MacKinlay (1997), this predicted return should be calculated by the market model. This method is also consistent with several previous studies of announcement effects (e.g. Pilotte, 1992; Aggarwal & Zhao, 2008).

$$\hat{r}_{it} = \hat{\alpha}_i + \hat{\beta}_i r_{mt}$$

Exhibit 6 the market model

In the model above, $\hat{r}_{it}$ is the day t stock return on a firm engaging in event i, and r_{mt} is the day t return on the OMX Stockholm PI index, which is used as a proxy for the market portfolio. The remaining parameters, $\hat{\alpha}_i$ and $\hat{\beta}_i$, are ordinary least squares estimates of the market model parameters. Consistent with Aggarwal & Zhao (2008), the parameters are estimated on daily stock returns of the 125 days preceding the announcement. The predicted return in each event is deducted from the actual return in order to calculate the abnormal return:

$$AR_{it} = r_{it} - \hat{r}_{it} = r_{it} - (\hat{\alpha}_i + \hat{\beta}_i r_{mt})$$

Exhibit 7 calculation of abnormal returns

where AR_{it} is the abnormal return on day t of the firm engaging in event i and r_{it} is the actual return. In the choice of event window, there is a trade off between the risk of excluding significant data (1 day event window) and the risk of including irrelevant data, or noise (2 day event window). We performed all tests with both event windows, but the results did not materially differ. In the remainder of the text, a one day event window is used.

In a first test, we examine the magnitude and the statistical significance of the announcement effect. We define the hypotheses:

H0: The announcement of a SEO does not have an impact on the market value of equity
H1: The announcement of a SEO have an impact on the market value of equity

A portfolio is created from our observations with the announcement day as date 0. The hypotheses are then tested with a one-sample T test, where the average abnormal return is tested against a mean of 0.

Regression Analysis

In order to examine the effect of asymmetric information on announcement day returns, we derive a number of measures from the theories of asymmetric information presented above. These measures are then tested to see whether the predictions made by the theories hold true for our sample.

The first independent variable is the stock return of the firm's equity for the 125 days preceding the announcement. According to the model developed by Myers and Majluf (1984), managers acting in the best interest of current shareholders should only issue equity when the firm is overvalued. A high stock price run-up followed by an announcement of equity issuance can signal to investors that the management is taking advantage of a temporary overvaluation. This should cause a greater stock price decline in our test. Stock price run-up of varying lengths has been tested in several studies with the majority of the studies showing a negative correlation (e.g. Masulis and Korwar, 1985; Pilotte, 1992; Denis, 1994; D'Mello and Ferris, 2000; Aggarwal and Zhao, 2008). We choose to be consistent with the latest study on the subject and use the 125 day period.

The second independent variable is the price to book ratio of the issuing firm's equity. The models of Miller and Rock (1985) and Ambarish, John and Williams (1987), point towards the importance of investment and growth opportunities in the market response to equity issuance. According to their theories, firms with larger growth opportunities should experience a less negative, or even positive, return on the announcement date. A high price to book ratio indicates that investors value things other than what can be found on the balance sheet. In order to justify a high ratio, investors must expect future growth in the value of the firm. If the theories of Miller and Rock and Ambarish et al are correct, our test should indicate that firms with a high price to book ratio have less negative, or positive, returns on the announcement day. Earlier studies of the price to book ratio have produced mixed results, although several have showed a positive correlation with announcement day returns (e.g. Dierkens, 1991; Denis, 1994; D'mello and Ferris, 2000). We define the price to book ratio as the stock price of the day prior to the announcement divided by the book value of equity per share of the last fiscal quarter.

Our third independent variable is the dividend yield of the announcing firm. Similar to the price to book ratio, it aims to capture the growth opportunities of the firm. The theory developed by Ambarish, John and Williams (1987) divides firms into mature and growth firms. Pilotte (1992) argues that a high dividend yield is typical of a mature firm with fewer opportunities to invest the excess cash in profitable projects. A low dividend yield, on the other hand, corresponds to a growth firm with better investment opportunities. If Ambarish et al are correct in their predictions our test should show a less negative, or positive, return on the announcement date for firms with lower dividend yield. We define the dividend yield as the dividend per share for the last fiscal year divided by the stock price of the day prior to the announcement.

Our fourth independent variable is a dummy indicating whether the SEO is made in connection with an acquisition or not. We have not found previous research on the impact of a combination of a SEO and an acquisition on announcement day returns, but we believe there is a theoretical rationale for a positive impact. This, once again, goes back to the importance of growth opportunities predicted by Miller and Rock and Ambarish et al. The most obvious explanation for a predicted positive impact is that the acquisition of other firms is a growth strategy. This can also be viewed in more technical terms. We argue that, viewed in isolation, the acquisition of another firm should always create a better stock return than using the received funds to repay debt or uphold a certain dividend level. The repayment of debt or the upholding of a dividend level does not by itself create growth. The acquisition of another firm, on the other hand, holds the possibility of both growth and loss. If we view the equity of the firm as a call option on the assets of the firm as done in, for example, Black and Scholes (1973), only the latter use of funds will increase the option value of equity. This should translate into a better stock return than if the motive for the SEO was debt repayment or upholding of a dividend level. This theory is partly corroborated by Aggarwal and Zhao (2008), who find that negative issuance date returns can be explained by lower option value of equity resulting from lower volatility post-issuance.

In the more general case, the received cash can also be used to fund internal growth opportunities. The announcement of a SEO with this motive can have both higher and lower announcement day returns than that of a SEO with the motive of acquiring another company, depending on investors' assessment of growth opportunities. Nevertheless, if the acquisition effect that we argue for above exists, we should be able to find it in a population with a mix of motives for announcing SEOs.

In order to test these measures for explanatory power, we use multiple regression analysis. The model is presented below.

$$AR_{it} = \alpha_i + \beta_1 AcqDUMMY_i + \beta_2 RUNUP_i + \beta_3 PBR_i + \beta_4 DivY_i + \varepsilon_i \qquad \boxed{\textbf{Regression 1}}$$

where the dependent variable, AR_{it}, is the abnormal return on the announcement day, $AcqDUMMY_i$ is a dummy variable signifying whether the SEO is announced in connection with an acquisition, $RUNUP_i$ is the 125 day stock price run up prior to the announcement, PBR_i is the price to book ratio of equity of the announcing firm, $DivY_i$ is the dividend yield of the announcing firm and ε_i is the error term.

Results

Average Abnormal Return

Consistent with previous studies, our results show a significant negative average announcement day reaction in the market value of equity. We obtain significant coefficients for the acquisition and stock price run-up variables, although the direction of the stock price run-up effect is contrary to the one predicted. Dividend yield and price to book ratio are not found to have a significant effect on announcement day abnormal returns.

Results for the one-sample T test of average abnormal returns are shown in Exhibit 8.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
AR	108	-,0496032	,09938220	,00956306

One-Sample Test

	Test Value = 0					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
AR	-5,187	107	,000	-,04960324	-,0685609	-,0306456

Exhibit 8 showing results from a one-sample T-test testing whether the average announcement day abnormal return in our sample is significantly different from zero. *AR* is the variable for abnormal returns on the announcement day and *Sig.* is the p-value of the test.

Our sample has a mean abnormal announcement day return of -4,96% that is significantly different from zero at significance levels below 1% (t = -5,187). This is in line with previous studies (e.g. Barclay and Litzenberg (1987); Dierkens (1991); Mikkelson and Partch (1986)) and confirms that the negative abnormal return phenomenon also exist on the Swedish market.

Regression Analysis

Results for Regression 1 are shown in Exhibit 9.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,490[a]	,240	,211	,08829817

a. Predictors: (Constant), PBR, AcqDUMMY, DivY, RUNUP

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,254	4	,063	8,137	,000[a]
	Residual	,803	103	,008		
	Total	1,057	107			

a. Predictors: (Constant), PBR, AcqDUMMY, DivY, RUNUP

b. Dependent Variable: AR

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,081	,013		-6,448	,000
	AcqDUMMY	,088	,021	,384	4,079	,000
	RUNUP	,029	,017	,154	1,659	,100
	DivY	,170	,204	,075	,836	,405
	PBR	,002	,001	,110	1,236	,219

a. Dependent Variable: AR

Exhibit 9 showing results from running Regression 1 in SPSS. *AcqDUMMY* is a dummy variable identifying whether the SEO is made in connection with an acquisition, *RUNUP* measures the firm stock return of the 125 days prior to the announcement, *DivY* is the dividend yield of the announcing firm and *PRB* is the price to book ratio of the announcing firm's equity.

Our results show that announcing the SEO in connection with an acquisition has a positive impact on announcement day abnormal returns that is significant at significance levels below 1% (t = 4,079). We also find a positive impact of the stock price run-up of the 125 days preceding the announcement on announcement day abnormal returns, which is opposite to the predicted negative impact. This impact is significant at the 10% level (t = 1,659). The dividend yield and price to book ratio do not have a significant correlation with announcement day abnormal returns. The adjusted R square for the regression is 0,211, which is in line with what can be expected from this kind of test.

Before we analyze these results, we perform a number of tests to ensure the quality of them.

Testing the Model

Test of Heteroscedasticity

An underlying assumption in a regression model is that the variance of the error term is constant and independent of the explanatory variables. This must be true in order for the regression to be reliable. If that is not the case the error term is said to be heteroscedastic and ordinary *t*- and *F*-tests are no longer valid (Edlund 1997). We therefore test for heteroscedasticity. We begin by studying our sample graphically in a scatterplot, where one can observe whether the variance of the estimated unstandardized residuals tends to increase or decrease as a function of the predicted value. In a next step we determine the significance of such tendencies using White's general heteroscedasticity test.

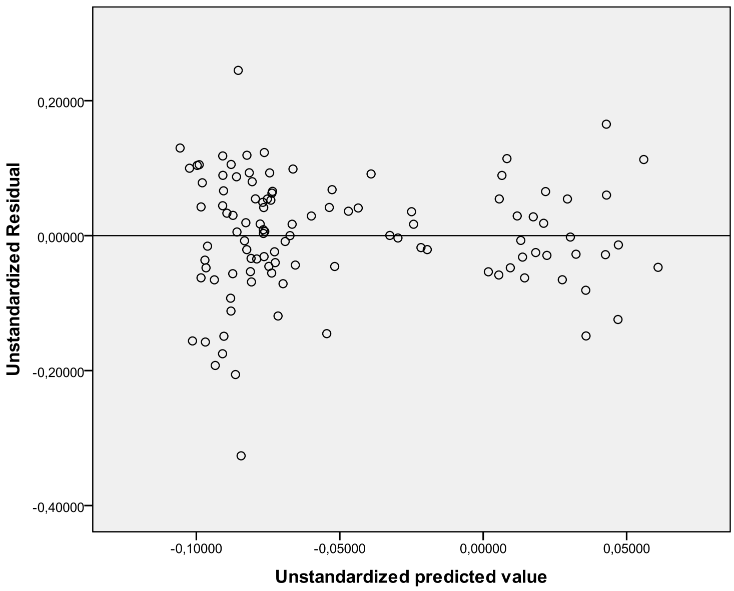

Exhibit 10
showing the distribution of unstandardized variables on the unstandardized predicted values

As can be seen in Exhibit 10 there are no tendencies for heteroscedasticity since the scatterplot does not show a systematic pattern between the unstandardized residual and the predicted value.

To confirm above findings, White's general heteroscedasticity test is performed where the following hypotheses is defined:

H_0: The variance of the error term is homoscedastic

H_1: The variance of the error term is not homoscedastic

As a first step the residuals $\hat{u}_{it}$ and the squared residuals $\hat{u}_{it}^2$ from the original regression are saved. Secondly, a regression model is estimated with the squared residuals as a dependent variable and the variables from our original regression, their squared values and the cross products as independent variables.

$\hat{u}_i^2 = \alpha_1 + \alpha_2 AcqDUMMY_i + \alpha_3 RUNUP_i + \alpha_4 PBR_i + \alpha_5 DivY_i + \alpha_6 AcqDUMMY_i^2 + \alpha_7 RUNUP_i^2 + \alpha_8 PBR_i^2 + \alpha_9 DivY_i^2 + \alpha_{10}(AcqDUMMY_i \times RUNUP_i) + \alpha_{11}(AcqDUMMY_i \times PBR_i) + \alpha_{12}(AcqDUMMY_i \times DivY_i) + \alpha_{13}(RUNUP_i \times PBR_i) + \alpha_{14}(RUNUP_i \times DivY_i) + \alpha_{15}(DivY_i \times PBR_i) + \varepsilon_i$

Regression 2

Under the null hypothesis that the variance of the error term is homoscedastic, the sample size (n) × R^2 (obtained from Regression 2) follows an asymptotic χ^2 – distribution where the number degrees of freedom equals the number of estimated coefficients in Regression 2 less 1. If $\chi^2_{observed} > \chi^2_{critical}$ the null hypothesis is rejected. The test results are summarized below, for full test details see Appendix 1.1.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,316[a]	,100	-,024	,01378

a. Predictors: (Constant), A15, A13, A11, PBR, A10, RUNUP2, A14, DivY2, AcqDUMMY2, RUNUP, A12, PBR2, DivY

Exhibit 11 displaying results from running Regression 2. The A-variables refers to the variables in Regression 2 with the corresponding number

$\chi^2_{observed} = 108 \times 0{,}100 = 10{,}8$ and the 10 % critical value for $\chi^2_{df=14}$ is 21,064.

Since $\chi^2_{observed} < \chi^2_{critical}$ the null hypothesis cannot be rejected. Conclusively, there is no evidence for heteroscedasticity in the data according to White's test.

Test of Multicollinearity

To ensure that the variables' explanatory power, presented in Exhibit 9, are reliable, we test for inter-sample linear correlation between two or more independent variables – multicollinearity.

According to Edlund (1997), multiple correlations greater than 0,5 and single correlations greater than 0,8 (in absolute terms) between independent variables might indicate respectively indicates multicollinearity. A Pearson correlation test (see

Appendix 1.2) showed that no variable satisfy those conditions and our sample is accordingly not to be considered multicollinear.

Another assessment is to use the Variance Inflation Factor (VIF). The rule is to classify an independent variable as highly multicollinear if its VIF is greater than 10 (Edlund 1997)[6]. The greatest VIF in our sample is 1,2 (see Appendix 1.3) and consequently – and in line with the previous test - no variable is classified as multicollinear.

A final third test is conducted where an observed Condition Index (CI) between 10 and 30 is considered multicollinear (Edlund 1997). The highest CI in our data equals 2,768 (see Appendix 1.4), not indicating the existence of multicollinearity in our test.

Test of Autocorrelation

Another underlying assumption of a linear regression model is that there is no correlation between members of series of observations ordered in time (as in time series data) or space (as in cross-sectional data) (Gujarati 2003, page 442). Our data is sorted according to the year of the announcement. Because the model assumes that the disturbance term relating to any observation is not influenced by the disturbance term relating to any other observation (Gujarati 2003, page 442), we must know that there is no correlation between the samples over the time series created. This is tested for using estimated residuals in a Durbin-Watson *d* statistic test. The null hypothesis that there is no autocorrelation, positive or negative is not rejected at a 1 % significance level[7].

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,490[a]	,240	,211	,08829817	2,339

a. Predictors: (Constant), PBR, AcqDUMMY, DivY, RUNUP

b. Dependent Variable: AR

Exhibit 12 displaying the Durbin-Watson *d*-statistic of Regression 1

Pre- and Post-Event Windows

Our tests rely on the assumption that we have successfully identified the date investors first learned a SEO was to occur. In order to test this assumption we extend the event window and search for abnormal returns the preceding (t-1) and following day (t+1) of

[6] VIF shows how the variance on an estimator is inflated by the presence of multicollinarity (Gujarati 2003).

[7] The null hypothesis is rejected if $d_u<d<4-d_u$. D_u (u is short for upper bound) =1,625. Since our observed d-value lies in the interval 1,625<d<2,375 we cannot reject the null hypothesis.

our identified announcement date. If information regarding a SEO had already leaked and investors traded on that information an abnormal return would be present the day preceding our identified announcement date. There is also the possibility that investors do not react until the following day, in which case an abnormal second day return would occur.

Exhibit 13 illustrates our findings which support our chosen method to exclusively study first day abnormal returns.

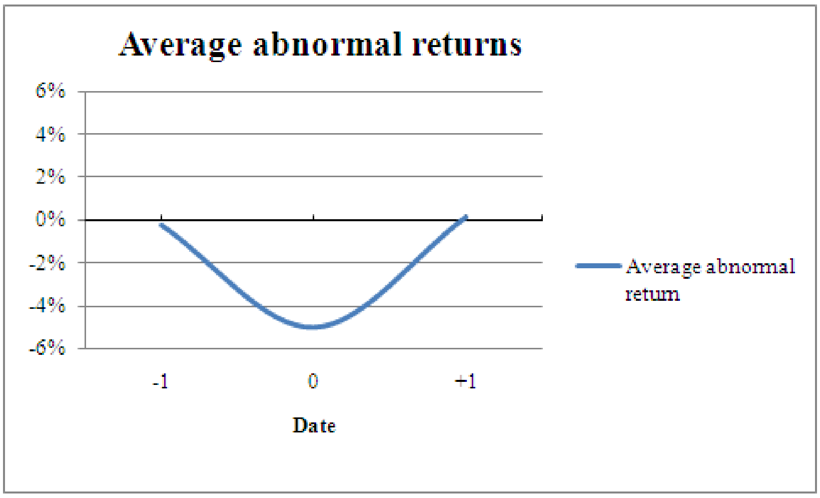

Exhibit 13 displaying a graph on average abnormal returns in our sample on the announcement day, the day prior and the day after

The average abnormal returns for the preceding day and the second day are -0,21% and +0,16%, respectively (as compared to the identified announcement date's average abnormal return of -4,96%). To determine whether these have statistical significance or not, one sample T-tests are run in SPSS. None are found significantly different from zero (see appendix 1.5 for test details).

Analysis

Initial tests showed a significant negative announcement day abnormal return in our sample, with a mean of -4,96%. Further analysis through multiple regression showed that the magnitude of the negative return could partially be explained by whether the SEO was announced in connection with an acquisition or not, and by the stock return in the 125 days prior to the announcement. The dividend yield and the price to book ratio, on the other hand, did not show a significant correlation with announcement day abnormal returns. Having confirmed the quality of our results, we now turn to the task of interpreting them.

Average Abnormal Return

Starting off, we conclude that our mean announcement day abnormal return of -4.96% is in line previous studies, although slightly larger than most findings (Asquith and Mullins (1986); Barclay and Litzenberg (1987); Dierkens (1991); Mikkelson and Partch (1986)). This higher magnitude could be unique to the time period studied, in which two stock market "crashes" contributes to volatility. It could also be an effect of the relatively high volatility of the cyclical, export-dependent Swedish stock market. Regardless of the reason for a slightly higher magnitude, the significant negative abnormal return confirms that the phenomenon of negative announcement day returns shown in previous studies exists in the Swedish market as well.

Acquisition Dummy Variable

Perhaps most interesting, announcing the SEO in connection with an acquisition had a very strong positive impact on announcement day returns. In fact, the majority of firms engaging in this experienced a positive announcement day abnormal return, as opposed to the negative average return of the remaining sample. This is consistent with what we predicted based on the theories of Miller and Rock (1985) and Ambarish et al (1987). Specifically, this is in line with Ambarish et al's framework, in which firms with good growth opportunities can experience a positive reaction.

It is possible that the market reaction to SEOs in connection with acquisitions is a result of the general market sentiment (i.e. rising or declining stock markets) and attitude towards acquisitions. Given the long period of rising markets with an abundance of acquisitions being made in general during our sample period, our results can be driven by a subset of samples with positive returns that took place during "good" years. To address this concern, we aggregate the abnormal returns of firms announcing SEOs in connection with acquisitions into two groups: Those that took place during years of rising stock markets and those that took place during years of declining stock markets. The data is shown in Exhibit 14.

SEOs with acquisitions

Market	Number	AAR
Rising		
2003-2007	20	2,32%
Declining		
2000-02, 2008	7	3,46%

Exhibit 14 displaying the number of announcements made in connection with an acquisition in our sample that are made during years of rising stock markets and declining stock markets. *AAR* is the average abnormal return of the group.

As we can see in Exhibit 14, the positive effect is consistent over rising and declining periods, rejecting the theory that the positive return is the effect of a positive general market sentiment, and further corroborating our findings.

Prior Stock Return of the Firm

The variable measuring the firm's stock return of the 125 days preceding the announcement is significant at the 10% level. Interestingly, the correlation is positive as opposed to the negative return predicted. We see two possible explanations for not achieving the predicted result. Either Myers and Majluf's theory that only overvalued firms issue equity is wrong, or the 125 day stock price run-up does not signal to investors that the management is taking advantage of a temporary overvaluation. Without further research, it is not possible to reject any of these explanations.

This leaves us with the question why the correlation is significantly positive. Earlier studies have shown that firm stock returns are negatively correlated with abnormal announcement day returns while the market returns are positively correlated with announcement day abnormal returns (Bayless and Chaplinsky, 1996). The positive correlation in our test can be an effect of the latter relationship combined with a high correlation between firm and market returns in our sample. It can also be that the 125 day stock price run-up in itself has a positive impact on announcement day abnormal returns, perhaps because investors interpret a high figure in this variable as a sign of possible further growth in their invested equity. In order to examine this further, we add the variable MRUNUP, measuring the market return of the 125 days preceding the announcement. Presented in Exhibit 15 is a bivariate correlation matrix of AR, RUNUP and MRUNUP.

Correlations

		AR	MRUNUP	RUNUP
AR	Pearson Correlation	1	,244*	,300**
	Sig. (2-tailed)		,011	,002
	N	108	108	108
MRUNUP	Pearson Correlation	,244*	1	,638**
	Sig. (2-tailed)	,011		,000
	N	108	108	108
RUNUP	Pearson Correlation	,300**	,638**	1
	Sig. (2-tailed)	,002	,000	
	N	108	108	108

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Exhibit 15 displaying bivariate correlations between the variables *AR*, *MRUNUP* and *RUNUP*

In the exhibit above, both MRUNUP and RUNUP is positively correlated with the announcement day abnormal return. There is also a strong correlation between MRUNUP and RUNUP. These results imply that both explanations offered above are possible, although the correlation between MRUNUP and RUNUP makes it difficult to decide on the true casual relationship. Further analysis is needed to understand the positive correlation, but since the focus of this study is to test the theories of asymmetric information, we conclude by saying that these findings are not able to corroborate Myers and Majluf's predictions.

Dividend Yield and Price to Book Ratio

The dividend yield and the price to book ratio did not have a significant correlation with announcement day abnormal returns. The dividend yield intended to measure the maturity of the firm as a proxy for its growth opportunities, while the price to book ratio intended to measure the growth opportunities that the market has priced into the stock price of the firm. The importance of growth opportunities is developed in the theories of Miller and Rock (1985) and Ambarish et al (1987) as explained above in our literature review. Our findings fail to support their predictions. This can mean that their theories do not apply to the Swedish market, but it can also be an effect of the variables not adequately measuring what they were intended to measure: growth opportunities.

Conclusions

In summary, the results of this study do not produce a consistent answer as to the role of information asymmetry in the phenomenon of abnormal announcement day returns. One variable corroborates the theories we have presented, while three fails to do so. Announcing the SEO in connection with an acquisition of another firm has a significant positive impact on announcement day returns, consistent with the importance of growth opportunities in the theories presented. On the other hand, the price to book ratio and the dividend yield, intended to measure the presence or lack of growth opportunities, do not have a significant correlation with announcement day abnormal returns. The stock return of the 125 days preceding the announcement has a significant positive correlation with announcement day abnormal returns, as opposed to the predicted negative correlation.

These results are contradictive. One measure intended to test the importance of growth opportunities is significant, while two others are not. Because of this, we can not draw any conclusion as to the importance of growth opportunities in announcement day abnormal returns. The prior stock return of the firm is significant according to our test, but the positive impact is contrary to what we predicted based on theory and prior studies, rendering us unable to draw any conclusion related to information asymmetry.

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Databases

Cision Wire (http://www.cisionwire.com)

COMPUSTAT

Hugin Online (htttp://www.huginonline.com)

Nasdaq OMX New Issue Database (http://nordic.nasdaqomxtrader.com/newsstatistics/corporateactions/Stockholm/Issues)

Appendices

1.1

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	,007	,003		2,517	,014
	RUNUP	-,009	,004	-,360	-2,121	,037
	DivY	-,069	,200	-,221	-,343	,732
	PBR	,000	,001	-,066	-,225	,822
	AcqDUMMY2	-,004	,006	-,130	-,733	,465
	RUNUP2	,003	,003	,115	,797	,428
	DivY2	,060	,795	,039	,076	,940
	PBR2	5,763E-7	,000	,007	,022	,982
	A10	,015	,008	,243	1,945	,055
	A11	,000	,001	,043	,277	,783
	A12	-,004	,075	-,010	-,056	,955
	A13	,000	,000	,057	,436	,664
	A14	,064	,116	,096	,549	,584
	A15	,010	,039	,071	,245	,807

a. Dependent Variable: ûi2

Appendix 1.1 displaying results from White's general heteroscedasticity test. The A-variables refer to the variables in Regression 2 with the corresponding number

1.2

Correlations

		AR	AcqDUMMY	RUNUP	DivY	PBR
Pearson Correlation	AR	1,000	,442	,300	,186	,094
	AcqDUMMY	,442	1,000	,309	,277	-,088
	RUNUP	,300	,309	1,000	,113	,175
	DivY	,186	,277	,113	1,000	-,117
	PBR	,094	-,088	,175	-,117	1,000
Sig. (1-tailed)	AR	.	,000	,001	,027	,167
	AcqDUMMY	,000	.	,001	,002	,182
	RUNUP	,001	,001	.	,122	,035
	DivY	,027	,002	,122	.	,114
	PBR	,167	,182	,035	,114	.
N	AR	108	108	108	108	108
	AcqDUMMY	108	108	108	108	108
	RUNUP	108	108	108	108	108
	DivY	108	108	108	108	108
	PBR	108	108	108	108	108

Appendix 1.2 displaying Pearson correlations for the independent variables

1.3

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-,081	,013		-6,448	,000		
	AcqDUMMY	,088	,021	,384	4,079	,000	,833	1,200
	RUNUP	,029	,017	,154	1,659	,100	,861	1,161
	DivY	,170	,204	,075	,836	,405	,912	1,096
	PBR	,002	,001	,110	1,236	,219	,937	1,068

a. Dependent Variable: AR

Appendix 1.3 showing the VIF measure for Regression 1

1.4

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions				
				(Constant)	AcqDUMMY	RUNUP	DivY	PBR
1	1	2,126	1,000	,07	,08	,01	,06	,06
	2	1,090	1,397	,05	,04	,46	,06	,08
	3	,933	1,509	,00	,02	,28	,35	,18
	4	,574	1,924	,01	,52	,04	,51	,14
	5	,277	2,768	,86	,34	,22	,02	,54

a. Dependent Variable: AR

Appendix 1.4 showing the Condition Index of Regression 1

1.5

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
SDAR	108	,0016	,10143	,00976

One-Sample Test

	Test Value = 0					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
SDAR	,166	107	,868	,00162	-,0177	,0210

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
PREDAR	108	-,0021	,04538	,00437

One-Sample Test

	Test Value = 0					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
PREDAR	-,474	107	,636	-,00207	-,0107	,0066

Appendix 1.5 displaying one-sample T tests for abnormal returns the day prior (PREDAR) and the day after (SDAR) the chosen announcement date