UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW
Financial Economics

Analyzing investments made in conjunction with the announcement of rights issues between 2014-2018

Bachelor Thesis 15 hp
Spring term 2020

Authors:
Joakim Jangrell
Joel Wärnberg

Supervisor:
Charles Nadeau

Abstract

Rights issues are a common way for companies to attain funding. The rights to buy stocks are usually sold with a discount to the investor. The goal of this essay is to study price movements associated with the announcement that a company will undertake a rights issue and the stocks 1-year return. The study also creates a daily rebalancing portfolio, which measures the 1-year return of rights issuing companies. Rights issues containing options programs and other units have been excluded and 125 companies have been randomly chosen to participate in the study. Constructing a daily rebalancing portfolio of the assets provides a portfolio on par with OMXSPI.

Keywords: Rights Issue, CAAR, BHAR,

Table of Contents

Introduction

Background

Rights issues are a form of equity issuance where the existing shareholders receive a right to take part in an equity offering before others. This is meant to ensure that the dilutive effects of the new shares can be mitigated for existing owners who invest further capital into the company. The shares issued to investors in rights issue offerings are often offered at a discounted rate. In conjunction with a rights issue, investors trade both the right to take part in the discounted share offering in the exchange for further capital investment and the share itself. Despite there being no dilutive effect for investors who accept the offer there is a tendency for a reduction in the price of the shares when a company announces that it will perform a rights issue. This might be partially caused by the poor reputation of the earlier performance of other companies who have performed rights issues. The negative price effect may also be partially explained by the pecking order theory, which postulates that issuing new equity is the least preferred method of raising capital. By doing so, managers send a signal to market participants that the company is unable to internally generate the funds that they need and that they believe a bank would not give them a favorable loan, or one at all. The targets of this study are academics and the investors who are vested in companies performing this type of capital acquisition. This study combines methodology built on existing studies and creates its own to build a portfolio that tracks the performance of 129 companies that have performed rights issues. The data used is from primary sources and randomly sampled. This data is gathered from financial databases and stock exchanges and has been carefully qualified to be able to partake in the study. The qualifying stocks performance were then measured using well-known portfolio measurements such as the Sharpe Ratio and methods used by similar studies also measuring companies performing rights issues. Earlier studies have often shown a poor performance for these investments, but we expect that these may be interesting investments when accounting for the discount given for the new shares.

Problem Description and Analysis

Rights issues command a large amount of capital investments yearly. However, academic finance remains divisive on the attractiveness of these investments. Earlier studies have shown conflicting reports of both short term and long term returns around and following a rights issue.

There are conflicting reports on if there is a consistent negative reaction associated with the announcement of an issue, as some show that there is a negative reaction, others find the opposite and others find no statistical significance. The explanations supporting the supposed poor performance of companies performing rights issues are many, yet the financial landscape may not hold for other markets and time periods.

Research Questions

Is there a significant reaction to the announcement of rights issues, on the Swedish stock markets, in terms of abnormal returns on the stock price?

Do the companies sampled beat a passive index-investing strategy?

Purpose and Contributions

This study aimed to evaluate if the results of others works made on different markets and years also held true for the scope which we chose to study. With poor performance of this type of stocks being the prevailing expected result. This would strengthen the argument against equity issuing companies by pecking order theory, signaling theory, and many more. An exceptional performance of these shares would be a vote against the prevailing skepticism towards companies performing rights issues. This is the only study which has evaluated these markets during this timeframe with the express intent of measuring their returns. Hopefully, the results of this study will help to illuminate the performance of companies who have performed rights issues. Our study can be translated into an investment strategy that can be applied by an investor without adjustment. This is also an evaluation of that strategy, and the entire thesis could be summarized as “What happens if you buy shares at the announcement day, sign the rights issue and hold the shares for 1 year?” and part of our purpose is an evaluation of this strategy.

Delimitations

Companies who have performed rights issues that are not of common stock have been excluded. Issuances without special consideration for those who are already vested in the company are also disregarded. Issuances towards specific investors that do not give the same rights to all existing investors are also disregarded in this study. Issuances that contain options are also disregarded from this study. This study has also not included the buying and selling of rights and assumes that all rights acquired are signed for no matter if the share price falls under the

signing cost during the signing period. The rights issue must have been successfully completed. This study has included delisted companies when it is possible and practical to do so, but companies lacking the necessary data have been excluded from the study. Dividends have not been taken into account. The delimitations this study used are typical for similar studies (Asquith & Mullins, 1986) (Kalay & Shimrat, 1987).

Target group of the study

This study was partly directed towards academics who seek information about rights issues, where they are able to use this study as basis for further studies into rights issues. The study was also geared towards investors who are seeking information about potential investments, so that they can be well-informed regarding their decisions in investing in rights issues.

Theoretical Framework

Pecking Order Theory

According to the pecking order theory, as companies seek to finance their projects and ongoing concerns, they seek the least costly forms of capital acquisition and do so according to a list in descending attractiveness (Myers & Majluf, 1984). Companies first prefer to finance their projects through internal revenue, secondly through debt. And when those options are not viable, they turn to equity financing in what is called a last resort (Myers & Majluf, 1984). This argues that companies who finance their going concern and expansions through internal revenue or debt are more desirable for investors than those who seek equity issuance financing.

Trade-Off Theory

Trade-off theory serves as an alternative viewpoint to the pecking order theory but does not contradict the pecking order theory on the attractiveness of equity issuing companies. Here, firms serve to find an optimal amount of debt before occurring marginal costs from debt, such as distress costs, to outweigh the gains of the marginal benefit of acquiring further capital (Myers & Majluf, 1984). Using trade-off theory to explain rights issues would point towards a company choosing to employ this method of financing due to already reaching an optimal debt leverage.

Signalling Theory

In contract theory, signaling is the idea that one party (termed the agent) credibly conveys some information about itself to another party (the principal). This notion is important to understand when studying the drop in price that tends to occur in conjunction with the announcement of a rights issue. This is because if the company believed that they could have passed the due diligence of a bank, they would have chosen that option for financing. A bank doing its due diligence would therefore not have given the company the capital that they require at a price that the company feels is viable. Taking on debt also signals that the company believes that it will be able to make the interest and the repayments that the bank requires for the loan to be given. Therefore, the attempt of seeking capital through a share dilution signals to the investor that the company is not healthy. A company performing a equity issuance may also send the signal that those with insider knowledge believe that their stock is overvalued (Myers & Majluf 1984). The theory behind this is that if the company believes that the shares are trading for more than what the company reasonably can be assumed to be worth, then the company benefits from selling more of these shares.

Lemons Problem

Adverse selection in rights issues is a problem of information asymmetry. This specific type of version of the problem, which takes place during rights issues is commonly known as the lemons problem (Meyers & Majluf, 1984). The lemons problem was first described by George Ackerlof in the paper "The Market for Lemons: Quality Uncertainty and the Market Mechanism". A summary of the problem can be described by the following: There can be said to exist two different types of companies, good and bad ones. It is, however, impossible for those that do not have insider knowledge to know whether this is a good or a bad company. This is because both good companies and bad companies use equity issuances, but since bad companies eventually fall out of other options for generating revenue, the market will be oversaturated with bad companies. Therefore, any investor who wishes to buy one of these companies, will demand to do so at a discount, since there is a good chance that this is a bad company because it is performing a rights issue. But this will further drive away good companies from the equity issuance markets, as it becomes costly to perform the issue, and the good companies still have other paths to go for acquiring capital. This only exacerbates the problem and is a market failure.

Price Pressure Hypothesis

The price pressure hypothesis mainly relates to the supply and demand characteristics of goods and even stocks. As a company offers a rights issue it is announcing that the supply of stocks will increase. This means that there will be a rightward shift of the supply curve leading to a lower price for the sales price of the stock (Kalay & Shimrat, 1986). This holds if short selling is not allowed and there are no perfect substitutes for the share and that it will be sold at a given price, usually a discount. (Asquith & Mullins, 1986). Though right issues are meant to protect investors holding the share against dilution unlike equity issues, announcement effect is seen in both.

Since a rights issue requires further capital investment this can also cause a liquidity problem for investors. Investors face a situation where they can potentially be unable to meet the capital requirements to fully sign the rights issue. This can cause a sale pressure where investors try to exit their positions in larger volume than what would have occurred during normal market conditions, to free up liquidity to fully sign the rights issue and to have fewer rights to sign. They do this while they are still selling the share with rights to partake in the rights issue as this is more valuable than if they were to wait (Pike & Neale, 2006).

This can also be true for larger shareholders, which could cause even bigger effects of large amounts of shares being put up for sale at once. Eventually, however, the capital needed to offset the shock of the supply shift will enter the market and the asset will regain its equilibrium price. The price pressure hypothesis is an oft considered factor in the negative returns related to the announcement of equity (Kalay & Shimrat, 1986).

Efficient Market Hypothesis

The importance of the EMH as it is used in this study is that it provides a theoretical basis for saying that share prices react in a manner that incorporates todays changes and incorporates them quickly into the price of the stock. This is known as price efficiency. A result which shows that a rights issue investment strategy is profitable compared to a more generalist strategy such as passive index investing therefore would speak for the quality of investing in a rights issue portfolio. Since this form of the efficient market hypothesis posits that the market acts efficiently, then unveiling a decision increasing the market value must be viewed as a positive decision. It then follows that companies that show a strong performance must be viewed as

high quality companies. A positive result then would speak against the view of the signaling theory and the pecking order theory that argue that companies who go this way to perform capital acquisition are of lower grade compared to those that internally generate or borrow capital. In this study, the EMH is used, and therefore there is an assumption that companies with good returns are not getting those returns due to mispricing of the stock. This is based on a belief that markets are rational and incorporate new information in a rational way. Alfred Cowles stated that it is impossible to beat the market in the long term for investors (Cowles, 1932). This relates to the EMH which states that all known information is reflected in the share price. The comparisons that this study makes towards the index is because of these words; that it is impossible to beat the market over the long time. The defined years are perhaps not long enough to be called a "long-time strategy" in this sense, but if the strategy is able to beat the index during the time period then it must be considered a good strategy at least for the time it is active.

Portfolio Measurements

This study uses four different portfolio measurements in conjunction with the nominal return. These are the portfolio beta, Jensen's alpha, Treynor ratio, Sharpe ratio and the Modigliani risk-adjusted performance. These have been selected both due to how commonly they are referred to by investors but also to study different aspects of the portfolio.

Literature Review

The theoretical parts of the subject of rights issues are well studied with well-established supporting theories such as the Pecking order Theory and the Signalling theory. The subject draws interest from researchers from the bachelor level to the PhD level with appropriate levels of complexity. Previous studies are however often older than the five years that this study is watching. This causes a problem in the reliability of the results as market conditions are constantly evolving. There are, however measures that are regularly run and controlled for despite other specificities of the study. These are the announcement day effect, and different forms of abnormal returns calculations. An example of an oft cited study for measuring long-run abnormal returns is Loughran and Ritter (1995) who showed a strong evidence for long term underperformance for the equity issuing companies' stocks.

When studying the announcement day, it is common to conduct an event study, as done by Mackinlay (1997), which has been used in large extent within corporate finance, to examine the effects that an event has on stock prices. As stated earlier however, there is a general skepticism in the world of academic finance towards companies that are performing rights issues. Even though the general reaction by investors to seasoned equity offerings is negative (Armitage, 1998), (Berk et al., 2013, p.443), the evidence of reactions to the announcement of rights issues differs across the world. Kabir & Roosenboom (2003), Eckbo & Masulius (1992) and Slovin et. Al. (2000) found negative abnormal stock returns on or in conjunction to the announcement day. On the other hand, Tsangarakis (1996) and Tan et al. (2002), observed positive abnormal stock returns in their respective event windows on the Greek and Singapore markets. Armitage (2002), while looking for differences between, underwritten and non-underwritten, rights issues and open offers, found that the reaction to the announcement of rights issues was negatively impacted by the discounts in the issue terms. Tsangarakis (1996), while looking for this effect, did not find the discount significant. On the Nordic markets Bøhren et al. (1997) found a positive announcement day effect for non-underwritten rights issues and a negative effect for underwritten issues. Berglund et al. (1987) investigated the announcement effect of rights issues in conjunction with dividends on the Helsinki Stock Exchange and found a positive but non-significant announcement day effect when only measuring the rights issues. Peer reviewed studies of rights issues on the Swedish markets do not seem to exist. Unpublished sources, however, uniformly show negative effects on the announcement day.

Tsangarakis (1997) investigates the announcement effect of rights issues. The study is conducted on firms making a rights issue on the Greek Stock market between 1981-1990. He finds significant positive abnormal returns on the announcement day. He finds significant positive results on each of the three days leading up to the announcement. In another paper from the same year he measures if the size of the discount in the offering has an effect on the announcement effect of the offering. He divides the sample into two groups with the firms with the largest signing discount in one and the firms with the smallest discount in the other. He finds significant positive abnormal returns on the announcement day for both sub-samples. He also tests for CAARs where the large discount group show positive abnormal returns one and five days leading up to the event.

Tan et al. (2002) Studies the announcement effect of rights issues on stock prices on the Singapore exchange from 1987 to 1996 and find significant positive abnormal returns on the announcement day. They find no significance of CAARs leading up to the announcement but when controlling for information leakage and slow market reactions they find positive CAARs between the day before and the day after the announcement.

Kabir & Roosenboom (2003) examine the announcement effect of rights offerings on the Dutch market. They use a two day announcement day of (0,1). They find significant negative results both of the means using a t-test and the medians using the sign and the sign rank test and therefore conclude that the effect is negative.

Capstaff and Fletcher (2011) investigate long- and short-term performance of different equity offerings on the UK market from 1996 – 2007. They use the CAR approach and the BHAR. For rights offers with the CAR method they find a positive insignificant effect on the three days leading up to the announcement and a negative but insignificant effect on the announcement day. They find a negative long-term (1 year) performance -12,69% significant at the 1% level using CAR. With the BHAR method they find positive insignificant abnormal returns of +1,06% on the announcement day and positive but insignificant long-term (1 year) abnormal returns of +4,60% succeeding the announcement. They rely most on CAR over the event window and on BHAR for long-run results and conclude that Rights Issues perform the poorest across issuing methods on the announcement but outperforms all other methods in the long run.

Data

The study relies on the merging of data gathered through several sources. This is a mix of financial databases, banks, and financial websites. The selected markets for the study are Spotlight Stock Market, First north and Nasdaq Stockholm. First North was included even though it carries less stringent regulation compared to Spotlight and Nasdaq. This is because of the importance to have a broad sampling of markets represented in the sample, even though it is a less regulated market. This is because one of the target groups of this study is the retail trader/investor, and these can be found also on the First North market.

This study takes a quantitative approach to already existing data. Exclusionary criteria were decided at the beginning of the study, before testing, to avoid the effect of bias through changing the delimitations to fit the research goal. The delimitations were set to ensure that the rights issues are comparable and to ensure uniformity in the type of offering that is being measured. This gives a reliability in the uniformity of the results. Since this study finds its sources from two third parties that are non-academic, there is a threat of untrustworthiness in the data on these websites. However, it is our view that Avanza as a source must be given some confidence. As it is at the current period the largest stockbroker in Sweden, we feel safe in assuming that it meets at least the minimum reliability demands as a source. Nyemissioner.se is not as reliable as Avanza but is only used to find companies that have performed rights issues. Therefore, the information here is always verified through Avanza and the study does not rely on its data.

Sample Selection

The first-place database where we have looked for samples to choose from is the website Nyemissioner.se. This is a privately owned website which gathers data on companies that have performed rights issues and IPOs. Therefore, this site can be viewed as unreliable, however it is only important for a first selection. Nyemissioner.se also uploads the terms for the issue such as if there will be a unit sold or simply a common stock and to what price it will be sold. If the terms found on Nyemissioner.se are part of our exclusionary criteria, they are discarded from further study. For companies that have performed rights issues more than once, we only let one of their rights issues participate in the study as to ensure that some companies who have partaken in more numerous rights issues do not weigh the study more than the others. When a company qualifies through the exclusionary criteria that has been set for ease of data management and comparability issues, it is then researched through another financial database. These are either Eikon Reuters Capital IQ or Avanza. Eikon Reuters and Capital IQ have the added advantage of being able to show charts of companies that are no longer listed, unlike Avanza and carries other features which makes it a better choice for data collection. Avanza has a more accessible user interface for locating company announcements. When the companies allowed into the study have been selected and recorded, they are randomly sampled. We have chosen a maximum size of 30 per year to match the amount of companies in the OMXS30. This amounts to a total of 150 instances out of 523 eligible. Many of these 523 are repeats of the same companies however, and the true number of eligible companies' number to an approximate of 300. This meant that, because in the final draft only 125 companies remained,

as some were discovered later to have insufficient chart coverage for the study and there were no eligible replacements. These consist of an even distribution of companies that have faced bankruptcy, companies that have been bought out, those missing essential information in their prospectus and companies who for other reasons have not had their exchanges recorded during the recorded period.

To avoid overlapping return calculations each firm was only allowed to participate once. Overlapping between securities performing more than one rights issue still occurs. The effects of further rights issues do not disqualify companies from the study. For companies that have performed more than one rights issue which qualifies into the study we have had to use a random number generator to decide which year to choose. This has been done before the random number generator to decide which companies to choose into the 30 per year sample, as these companies otherwise would have had a higher chance of being selected for the sample.

Data Gathering and Sources

Firstly, we rely on Nyemissioner.se to locate companies who may qualify into the study. We also use this information for a first pass and qualifier. It does not, however, tell us on which date the announcement was performed, meaning the first day that the market was made aware of the rights issue being made. For the announcement days we have used Avanza.se where press releases of Swedish companies are available. For the most part, there is no doubt through company communications which day is the announcement day However, in order for a company to be allowed to conduct a rights issue in Sweden this needs to be accepted on a general meeting (ABL 16 kap. 2 § 1st.) If this is not done on a previous ordinary general meeting, in order for the company to perform a rights issue they need to call for an extraordinary general meeting. In the cases this is done, and the reason for this is specified as accepting the right to conduct an issue, and when a specific plan for a rights issue is suggested, this has been defined as the announcement day. If the announcement is done after the markets are closed, the next trading day will be defined as the announcement day. Then the details of the Rights Issue were verified through public communications, first and foremost from Avanza. Then, Capital IQ was used to gain the price charts of the stock.

Bias

The usage of delimitations and selection criteria opens the data to different types of bias. It is important as researchers and for the readers to realize which these biases are to make a fair assessment of the validity of the results that are presented. The study attempts a balance between eliminating companies deemed disruptive to the calculations while still attempting to not bias the results significantly by the exclusion criteria.

This paper makes attempts at managing the survivorship bias. Generally, if a study only measures actively traded stocks it will not include the stocks who have performed the worst and have bankrupted. It will also not mention those stocks who have been bought out, often at a premium. There have been attempts to acquire the charts of companies that are delisted for any reason if they have been chosen into the study. But if unpractical to do so, the company has been removed from the study.

Finding the announcement day means to find a singular point in which the markets are informed that a rights issue will take place. There are difficulties associated with this. Even though we are able to find the first time that the company communicates that the Rights Issue is happening, the announcement is subject to information leak. Further, reading through a company published reports and analyzing their cash burn rate compared to their funds, one can predict a Rights Issue. However, for the sake of this study we assume that the first time that the company speaks about it openly on the market is the first time that the market is able to react to the news of a impending Rights Issue.

Methodology

To measure the 1-year performance of the rights issue shares, two different tests are used. One is the BHAR and the other is a daily rebalancing portfolio. The announcement day effect is also measured by using two different tests. One of these measures what proportion of negative daily returns usually seen in the shares compared to the announcement effect and the other is the CAAR, which measures the aggregate abnormal returns during the days surrounding the event.

Event Study

Model

To examine if the announcement of a rights issue affects the stock price of an issuing firm around the time of the announcement, an event study was conducted in accordance with the method in Mackinlay (1997). First the announcement day was set as the event, at time 0, denoted t_0. Then, an event window of seven days is specified and labeled L1. This is done in order to gauge information leakage, to limit the effects of the information reaching the market before the announcement, and delayed market reactions after the announcement. (Mackinlay, 1997). To evaluate the effect of the event, a measure of abnormal returns is established as the actual return of the firm on the day, T, subtracted by the expected returns of the firm on the corresponding day.

$$AR_{iT} = R_{iT} - E[R_{iT}|RmT]$$

AR_{iT} being the abnormal returns, R_{it} being the actual returns and $E[R_{iT}|RmT]$ the expected returns. RmT being the conditional information for the chosen normal return model. This study uses the market model suggested by Mackinlay (1997) as a normal return model. The model assumes a linear relation between the market returns and the security returns and can be described as the following:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}.$$

$t = t_{-y}, \dots, t_{-4}$. ε_{it} being the zero mean disturbance term and

$$Var(\varepsilon_{it}) = \sigma_{\varepsilon i}^2$$

The market model parameters are α_i, $\beta_i$and $\sigma_{\varepsilon i}^2$. An estimation window is set as the year prior to the event with the first day, last day and the length of the estimation window labeled t_{-y}, t_{-4} and L_2. In order to avoid interference from the event on the market model, the estimation window and event window do not overlap. Mackinlay (1997) suggests that when event days of different securities overlap, it is necessary to aggregate firms with overlapping event windows into portfolios or by using a multi-variable linear regression on the unaggregated returns of

these companies, and use the dates as dummy variables. (Mackinlay, 1997). Armitage (1995) presents evidence that if firms are randomly sampled across industries, the effect of such accommodations are very small, which is why this study assumes covariances to be 0. The length of the estimation window should according to Armitage (1995) be at least 100 days. The market model parameters are estimated from the estimation window using OLS regression. This study uses excel for these calculations and the formulas for the parameters can be found in Mackinlay (1997). After these estimates are obtained, the formulae used for calculating abnormal returns for every company over the event window is

$$AR_{iT} = R_{iT} - (\hat{\alpha}_i + \hat{\beta}_i R_{mT})$$

where AR_{iT}, R_{iT} and $\hat{\alpha}_i + \hat{\beta}_i R_{mT}$ are the abnormal, actual and expected returns of the stock "I" at time "T". $\hat{\alpha}_i$ and $\hat{\beta}_i$ are the estimated parameters for the share from the estimation window and R_{mT} is the actual return of the index portfolio at time t.

AR_{iT} is the disturbance term from the market model calculated outside of the sample under a null hypothesis that the event has no effect on the mean or the variance of the returns. Conditional on the R_{mT}, the abnormal returns are jointly normally distributed with a zero-conditional mean. When L_2 is large enough, the variance from sampling error is assumed to be 0 and hence the conditional variance is

$$Var(AR_{iT}) = \sigma_{\varepsilon i}^2$$

To draw overall conclusions of the event over the event window, the cumulative aggregated returns must be calculated (Mckinlay, 1997). First, the independent securities' abnormal returns are cumulated over the event window by the following formula:

$$CAR_{i(c1,c2)} = \sum_{c=c1}^{c2} AR_{it}$$

where $CAR_{i(c1,c2)}$ is the cumulated abnormal returns from any day, c1 to c2, where

$$t_{-3} \leq c1 \leq c2 \leq t_3.$$

With a large L_2 the variance of $CAR_{i(c1,c2)}$will be

$$Var\left(CAR_{i(c1,c2)}\right) = \sigma_{\varepsilon i}^2 * (c1 - c2 + 1)$$

Then the CARs are aggregated for the cumulative average abnormal returns for the securities by using the following formula:

$$CAAR_{(c1,c2)} = \frac{1}{N}\sum_{i=1}^{N} CAR_{i(c1,c2)}$$

Where N is the number of firms in the sample.

The variance of cumulated abnormal returns, aggregated and averaged over securities, in line with Mackinlay (1997) is:

$$Var\left(CAAR_{(c1,c2)}\right) = \frac{1}{N^2}\sum_{i=1}^{N} Var\left(CAR_{i_{(c1,c2)}}\right)$$

The method is also used for

$$AAR_t = \frac{1}{N}\sum_{i=1}^{N} AR_{iT}$$

and

$$Var(AAR_t) = \frac{1}{N^2}\sum_{i=1}^{N} \sigma_{\varepsilon i}^2$$

Where an estimator is used for $\sigma_{\varepsilon i}^2$ throughout.

Statistical tests

A normal distribution can be used to test the hypotheses that the mean abnormal returns in the event window are 0. This was done by the following formula:

$$t = \frac{AAR_t}{\sqrt{Var(AAR_t)}}$$

To test if CAARs are 0 the following test was used:

$$t = \frac{CAAR_{(c1,c2)}}{\sqrt{Var(CAAR_{(c1,c2)})}}$$

Different combinations of (c1,c2) were used.

To test for robustness a sign test and Wilcoxon signed rank tests was used on the announcement day and over the event window.

Calculating the AAP

The AAP or the average acquisition price is a combination of three things: The signing cost, the dilution, and the price of the stock at the date of purchase. When entering a stock performing a rights issue, the terms will state how many shares are needed to buy another share for the signing cost. If the terms state that 4 shares are required to gain the right to purchase another share then, every fifth share in your portfolio will be bought using the rights issue. Therefore, an average acquisition price example could be described as: A stock requires 4 shares to be able to sign for a fifth. The price of the share at the announcement day is 10 and the signing cost is 5. Then the AAP in this case is 9. Therefore, calculating the average acquisition price for each companies' stock, the following measure is used:

$$AAP_{it} = \frac{P_{it} \times N + R_i}{N + 1}$$

where S is the signing cost for the rights issue and P_{iT} is the price at which the stock has been purchased.

BHAR

Model

The BHAR is a commonly used measurement when studying rights issues. Abnormal Returns from the BHAR are:

$$Actual\ Returns - Expected\ Returns.$$

Where the expected returns are measured with a paired portfolio over the same time horizon. The OMXSPI is used as the matching portfolio. Since dividends are excluded, compounding will not be done and thus the long-run buy-and-hold abnormal returns can be calculated as:

$$BHAR_{it} = R_{it} - E[R_{it}]$$

Where $E[Rit]$ is the expected return of the OMXSPI over the time-period, also corresponding to the paired issuing company With the AAP and the data points the buy-and-hold results for each company is computed by:

$$R_{it} = \frac{P_t - AAP}{AAP}$$

As in Loughran & Ritter (1995), where companies have gone bankrupt or been acquired, Pt has been set as the closing price of the last trading day. This means that the BHAR can be less than -100%. Finally, the average abnormal returns are calculated as follow:

$$ABHAR_t = \frac{1}{N}\sum_{i=1}^{n} BHAR_{it}$$

Statistical test

When testing the long-term abnormal returns, this study uses a skewness-adjusted t-statistic, as suggested by Barber, Lyon & Tsai (1999):

$$t_{sa} = t + \sqrt{n}\left(\frac{1}{3}\hat{y}S^2 + \frac{1}{6n}\hat{y}\right),$$

where t is the normal t-statistic, S is the mean abnormal return divided by the variance of the abnormal return and $\hat{y}$ is an estimate of the skewness coefficient.

Another test that will be used to control for skewness and outliers is the Wilcoxon Signed Rank test.

Creating a daily rebalancing portfolio of rights issued between 2014-2018

A way to measure the returns of the companies performing rights issues is to order them into a portfolio. Creating such a portfolio requires some special considerations, however. This is because the underlying stocks of the portfolio are constantly changing in both composition and number of actively traded stocks. It is therefore best to measure the returns on a day by day basis. The portfolio therefore requires daily rebalancing.

Rebalancing

A portfolio using daily rebalancing returns a different amount than one with passive cumulative returns. The calculations of a portfolio with cumulative returns only needs to compare the beginning of the period against the end of the period. However, this study requires the daily percentage change of every actively traded stock without considering the cumulative returns of these stocks individually. This is because the removal of a share from the portfolio due to its 1-year observation window expiring must not count as a gain or a loss to the portfolio, yet its previous results must be recorded. Therefore, the portfolio in this study is a sum of daily percentage returns multiplied by an index number, 10 000. These daily percentage returns are calculated from each shares difference in cumulative returns. The steps to attaining the percentage change for a day in the portfolio can also be expressed as the following:

$$(NominalShareValue - AAP)/AAP$$

AAP being the combination of shares bought on the announcement day and shares bought through the issue. This is the figure which the cumulative returns are based on

$$CumulativeReturnday_{D-1} - Cumulativereturn_D$$

This gives us the daily change in percentage and is repeated for every share.

$$\frac{Dailychange_i + Dailychange_j + Dailychange_{n...}}{PortfolioWeight}$$

gives us the portfolio change for date 1. We repeat this process for all dates where there are actively traded stocks in the portfolio. The study uses an index number which the daily portfolio changes act on and it is this cumulative return that is recorded as the portfolios return. The baseline of this index is set to 10 000 and begins updating the day after the AAP has been established, which is the announcement day of the rights issue. The value of this index is then updated by the previous days' value, multiplied by the percentage change of the current days value. After these steps have been taken the cumulative percentage of the index changes are graphed and compared to the index of OMXSPI calculated in the same way. The first day of the index is calculated by:

$$10\ 000 * (1 + Dailychange1)$$

where dailychange1 is the day after the first announcement day has occurred. The following index change is calculated by:

$$Index_t = Index_{t-1} * Dailychange_t$$

Weights

The varying amount of actively traded stocks at different times brings the first problem. It is necessary to counter the fat tails associated with the end and the beginning of the series. It is inevitable that one stock shall be first and that one shall be last, and this invariably leads to a greater importance of the return of these stocks, whose greater weight then become a greater contributor of the portfolios total return. This is unacceptable and would illegitimize the results of the study. Therefore, this study has instead opted for using a fixed portfolio weight, which is the maximal amount of actively traded stocks at any one time. This number is 31. Using a portfolio which switches between being under and over-levered can have negative effects on the reliability of the results. The way the portfolio is weighted means, in this case, a lower return

but also a lower risk. The graph of the median weighted portfolio is added to the table for comparison.

Beta of the portfolio

The beta of the portfolio is calculated by using the covariance of the portfolio return compared to the OMXSPI, divided by the variance of the OMXSPI during the period studied.

$$\beta = \frac{Cov(r_a, r_b)}{Var(r_{b)}}$$

3 Month portfolio

A 3-month portfolio is created by removing the shares from the portfolio after 90 days of trading. Since this portfolio reaches a maximum of 15 active shares at any time, that weight is used instead of the 31 as seen in the 1-year portfolio. 90 days is chosen as a time period as this is a time period where the rights issues are converted to common stock and is not too many days away from that event.

Short term unrealized profits due to the calculated AAP

Part of the volatility in the sample comes from the way the AAP is calculated. Since the AAP uses a combination of both the cost of the newly issued shares and the price of the shares at close on the announcement date, this might be a bit misleading. This is because the actual AAP at the announcement day is only the share price at close on the announcement date. This is because the rights issue is yet to happen at the announcement date, and the shares have not yet been issued. But in our model, the previously mentioned combination of prices of the AAP on the announcement day is used. How can using an unreal price be justified? This is a question of market efficiency. On the announcement date, the terms of the rights issue are already known. Both the size, the dilution, the relevant dates, and the signing cost. Therefore, an investor can use the communicated information to calculate what AAP they will have after the issuance is complete. So, while the AAP is not realized yet, it can be assumed to hold true unless for some reason the rights issue fails or if the rights issue is aborted. This study does not include either case, so it is a non-issue.

Sharpe Ratio

The Sharpe Ratio is calculated by the following formula:

$$\frac{Asset\ Return - Risk\ Free\ Rate}{Standard\ deviation\ of\ asset\ return}.$$

The asset return is the sum of the daily changes measured in the time period. The risk-free rate is the average of the risk-free rate during the time period measured. The standard deviation of asset return is the standard deviation of the daily returns of the measured time period. (Sharpe, 1996).

Jensen's alpha

Jensen's alpha is calculated as the following:

$$alpha = R_p - \left(R_f + \beta\left(R_M - R_f\right)\right)$$

and is measured on a year by year basis using Feb.11 as a starting point. The risk-free rate is calculated by the average risk-free rate during the year, beginning on the first trading day of the year and ending at the last. The beta of the portfolio has been calculated in the study prior, and the alpha also uses the year by year portfolio returns calculated previously. The returns continue to use the OMXSPI as its basis and calculates the return of the OMXSPI by summing its daily returns for the period studied.

Treynor Ratio

The Treynor Ratio is calculated using the following formula:

$$\frac{R_p - R_f}{\beta_p},$$

where R_p is return of the portfolio studied during the period. Rf is the average of the risk-free rate during the period, and Bp is the beta of the portfolio, as compared to with OMXSPI in this case. It therefore gives a return that is both contingent on the risk-free rate and the beta of the portfolio.

Modigliani Risk-Adjusted performance

The Modigliani Risk-Adjusted performance is calculated by

$$M^2 = S * \text{Std. B} + \text{R}_f$$

where S is the Sharpe ratio, Std. B is the standard deviation of the benchmark, in this case the OMXSPI and the risk-free is based on the average of the risk-free rate during the studied time-period.

Jarques-Bera Normality test

The Jarques-Bera is a non-negative goodness of fit test aimed to measure if a distribution is normal. This will be used towards the daily return distribution to see if the returns are normally distributed. The Jarques-Bera test is calculated by the following:

$$JB = \frac{n}{6}(S^2 + \frac{1}{4}(K-3)^2)$$

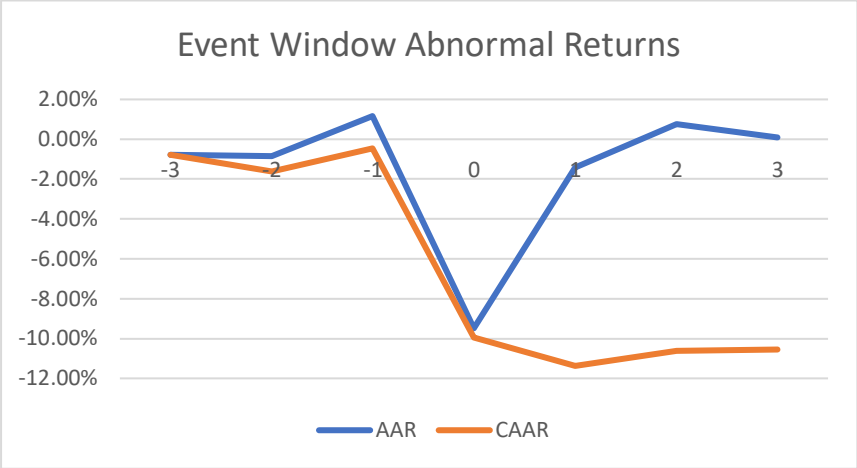
where a test statistic close to zero signals a normal distribution. The null hypothesis of the test is that there is a normal distribution, with results over 1 rejecting the null hypothesis at the 5% significance level.

Empirical Results

Results from the Event Study

Figure 1 illustrates the AAR and CAAR over the event window and uses day 0 as the announcement day. The announcement day has a negative AAR of -9,49% and is nonzero at the 1% significance level. The AARs for days -1 and +1 are significant at the 5% level. Day -1 has a positive abnormal return of 1,16% while day +1 has a negative AAR of -1,43%. CAARs of all (c1,c2) combinations tested show significance except for (-3,-1). Therefore no conclusions about market timing is drawn due to overvaluation. Table 1 in appendix show the results from the event study. In Table 1 in the Appendix the AARs and CAARs are presented with corresponding t-statistics. The results are in line with Kabir & Roosenboom (2011) but contradict those of Tsangarakis (1996) and Tan et al. (2002).

Figure 1



Results from BHAR

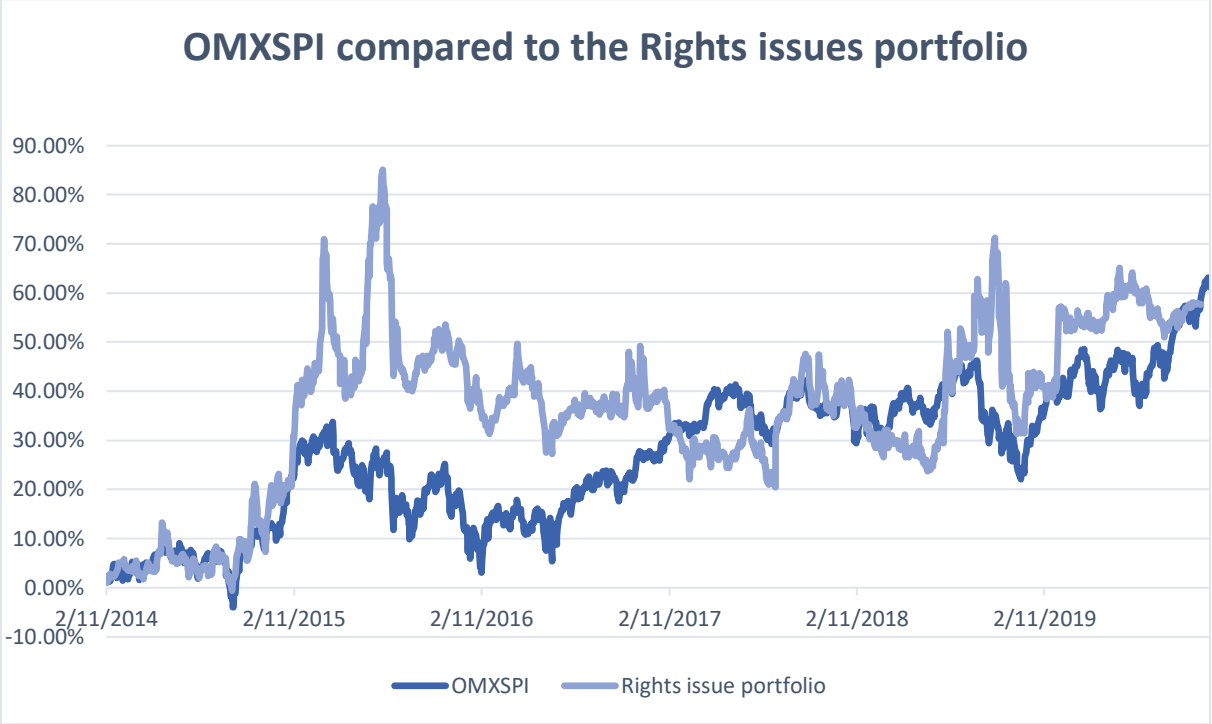
The tests show non-significance at the 5% significance level. The Wilcoxon Signed Rank test provides a z-score of -1,93 and show that 61,6% of the BHARs are negative. The results resemble those of Capstaff & Fletcher (2011) using the BHAR which were also positive and insignificant. The mean and the median point in different directions due to the skewness.

Table 2

	BHAR
N	125
Mean	3,02%
Stdv	0,95796218
Skew	3,5954
t-score	0,3522
Johnson t-score	0,37
Min	-119,0%
Max	630,6%
Median	-17,81%
z-score	-1,93

Returns from the Rights issue portfolio

Figure 2



Following are the portfolio measurements of the rebalancing portfolio when averaging from start to finish:

Table 3

Average Performance Values Over the Portfolio	
Nominal Returns	9,61%
Modigliani Risk-adjusted	2,94%
Beta	0,2409
Sharpe Ratio	2,22
Jensens Alpha	7,26
Treynor Ratio	0,449

Jarque-Bera test

The Jarque-Bera test returns 21. The daily returns can therefore not be assumed to be normally distributed. The daily returns distribution shows a skew of 1,03 and a kurtosis of 9,04

3-month portfolio

The graph of the 90-day portfolio is added to the appendix. The returns from this portfolio are negative and show a much poorer performance than the 1-year portfolio, yielding negative results.

Suggestions for further research

Studying intraday trading on the announcement day would lead to a greater understanding of the selling behavior for the announcement day. The Market Model used in the Event Study can also be adjusted to measure changes in risk over the event window with the firm specific betas.

Studies calculating the return of rights issuing companies must consider the discounted rate of the signing cost. This is sometimes ignored and leads to misleading returns for investors who choose to sign and therefore receive a lower AAP. There is a benefit for investors in more numerous studies like this in other markets to see if companies performing rights issues perform as well there or if strong recent performance is an abnormality of the Swedish markets.

A study, in line with Tsangarakis (1997), on the effect that the discounted offer price in rights issue offerings has on the announcement effect of such an offering on Swedish stock markets could be conducted.

Conclusion

The announcement day consistently shows negative returns. This corresponds to what Signaling Theory, Pecking order Theory and the Price pressure Hypotheses postulates. However, when holding these shares for the 1-year period, the investor receives a portfolio with a Modigliani Risk-adjusted performance which outperforms the OMXSPI. This means that for this study, a company performing a rights issue, does not mean that it will underperform from the moment of the announcement. Also, the investment strategy used in the daily rebalancing portfolio show strong enough results that it is not correct to state that an announcement day investing strategy is not profitable. Surprisingly, holding the shares for only 90 days before selling leads to a negative portfolio return, which is something that this study did not expect. This suggests that it is not simply due to a mispricing in the short-term price of the share due to the rights announcement causing price-shocks. These results hint that even healthy companies use rights

issue financing. Since the portfolio is under-levered, the strategy could also be optimized by further investments. In the example used, not all of the investor's capital would be employed, and this could easily be changed for greater profit. However, as we saw when deciding to not use a portfolio weighted by how many stocks were actually trading, is that these shares do have a large amount of volatility. It would be unwise to totally disregard the reasons as to why these shares warrant investors to be careful. The portfolio shows a large kurtosis and therefore investors who are not willing to take on risk must de-leverage the portfolio. To buy a single non-rights issuing share would also be unwise from a risk management perspective, so this is not a flaw inherent in rights issues but a flaw in being undiversified. As for the BHAR, a non-significant mean and a significant negative median with heavy outliers and a skewed distribution makes us weary to use the BHAR independently and makes us question the rights issues. Comparing the distribution of the BHAR returns with the distribution of daily returns from the adjusted portfolio the BHAR portfolio appears extremely volatile and relies heavily on the positive outliers in order to outperform the index. Subject to our method, combining the CAAR, the Rebalanced Portfolio and BAHR leads to a conclusion that an investor entering the rights issuing stocks on the announcement day and holding them for one year would beat the OMXSPI. The significant negative AAR of day 1 and the fact that the CAAR with the strongest significance was (0,1) would suggest that investors would benefit further from entering the stocks the day after the announcement instead. The fact that there are huge negative abnormal returns over the announcement, that the Rights Issue Portfolio underperforms the index over 3 months and have positive abnormal returns a year later suggests that the rights issues performing companies have a undeservedly poor reputation .To remember however is that this is a random sample of companies. It is possible that a discerning investor could be able to pick out the lemons from the peaches and improve on this performance. It must be remembered however that there is no use looking backwards in markets and that every investment must be valued on its own merits. Rights issuing companies may after all, not have a lot of similarities between each other than that they choose a certain path for financing their future projects.

Reference list

Armitage, S. (1995). Event Study Methods and Evidence on Their Performance. *Journal of Economic Surveys*, 9, pp. 25-52.

Armitage, S. (1998). Seasoned Equity Offers and Rights Issues: A Review of the Evidence. *European Journal of Finance*, 4, pp. 29-59.

Armitage, S. (2002). Do Underwriters Certify Value? Evidence From UK Rights Issues and Open Offers. *Journal of Business, Finance and Accounting*, 29(9&10), pp. 1239-1273.

Asquith, P., & Mullins, D. W. (1986). Equity Issues and Offering Dilution. *Journal of Financial Economics*, 15, pp. 61-89.

Barber, B. M., Lyon, J. D., & Tsai, C. L. (1999). Improved Methods for Tests of Long-Term Abnormal Stock Returns. *Journal of Finance*, 54, pp. 165-201.

Barclay, M. and Litzenberger, R. (1988). Announcement Effects of New Equity Issues and the Use of Intraday Price Data. *Journal of Financial Economics*, 21, pp. 71.

Berglund, T., Liljeblom, E., & Wahlroos, B (1987). Stock Price Reactions to Announcements of Stock Dividends and Rights Issues: A Test of Liquidity and Signalling Hypotheses on the Helsinki Stock Exchange. *Finance: revue de l'Association Française de Finance*, 8, pp. 109-132

Berk, J., Harford, J., Ford, G., Mollica, V. & Finch, N. (2013). Fundamentals Of Corporate Finance. Sydney: P. Ed Australia.

Bøhren, Ø., Eckbo, B. E., & Michalsen, D. (1997). Why Underwrite Rights Offerings? Some New Evidence. *Journal of Financial Economics*, 46, pp. 223-261

Capstaff, J., & Fletcher, J. (2011). Long Term Performance and Choice of SEO Method by UK Firms. *Journal of Business, Finance and Accounting*, 38(9-10), pp. 1262-1289.

Eckbo, B. E. and Masulis. R. W. (1992). Adverse Selection and the Rights Offer Paradox. *Journal of Financial Economics*, 32, pp. 293-332.

Edil, M. and Bacha, O. I. (2010). Pricing Efficiency of Stock Rights Issues in Malaysia. *Applied Financial Economics*, pp. 751-760.

Evans, G. H. (1995). The Theoretical Value of a Stock Right. *Journal of Finance*, 10, pp. 55-61.

Fama, E. F. (1998). Market Efficiency, Long-Term Returns, and Behavioural Finance.*Journal of Financial Economics*, 49, pp. 283-306.

Ginglinger, E., Koenig-Matsoukis, L., & Fabrice, R. (2013). Seasoned equity offerings: Stock market liquidity and the rights offer paradox. *Journal of Business Finance and Accounting*, 40, pp. 215-238.

Hansen, R. S. (1988). The demise of the rights issue. *The review of financial studies*, 3, pp. 289-309.

Kabir, R., & Roosenboom, P. (2003). Can the stock market anticipate future operating performance? Evidence from equity rights issues. *Journal of Corporate Finance*, 9(1), pp. 93-113

Kalay, A., & Shimrat, A. (1987). Firm value and seasoned equity issues: Price pressure, wealth redistribution, or negative information. *Journal of Financial Economics,* 19(1), pp. 109-126.

Loughran, T., & Ritter, J. R. (1995). The New Issues Puzzle. *Journal of Finance,* 50, pp. 23-51.

MacKinlay, A. C. (1997). Event Studies in Economics and Finance. *Journal of Economic Literature,* 35(1), pp. 13-39.

Myers, S. C. (1984). The Capital Structure Puzzle. *The Journal of Finance*, 39, pp. 575-592.

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of financial economics* 13, pp. 187-221.

Ngatuni, P., Capstaff, J., & Marshall, A. (2006). Long-Term Performance Following Rights Issues and Open Offers in the UK. *Journal of Business Finance and Accounting,* 34, pp. 33-64.

Panousi, V., & Papanikolaou. D. (2012). Investment, Idiosyncratic Risk, and Ownership. *Journal of Finance*, 678, pp. 113-148.

Pike, Richard, and Bill Neale. Corporate Finance and Investment: Decisions and Strategies. 5.th ed. Hemel Hempstead: Prentice Hall, 2006. Print pp. 426-428

Ross, A. (1977). The Determination of Financial Structure: The Incentive-Signalling Approach. *Bell Journal of Economics*, 8, pp. 23-40.

Slovin, M., Sushka, M., & Lai, K. (2000). Alternative flotation methods, adverse selection and ownership structure: evidence from seasoned equity issuance in the UK. *Journal of Financial Economics*, 57, pp. 157-190.

Smith, C. W. (1986). Raising Capital: Theory and Evidence. *Midland Corporate Finance Journal*, 4, pp. 6-22.

Tan, R., Chng, P. L. and Tong, Y. H. (2002). Private Placements and Rights Issues in Singapore. *Pacific-Basin Finance Journal*, 10, pp. 29-54.

Tsangarakis, N. V. (1996). Equity Rights Issues: Signalling vs. issue price irrelevance hypothesis. *European Financial Management*, 2(3), pp. 299-310.

Tsangarakis, N. V. (1996). Shareholder Wealth Effects of Equity Issues in Emerging Markets: Evidence from Rights Offerings in Greece. *Journal of the Financial Management Association*, 25(3), pp. 21-32.

Databases

Thomas Reuters-Eikon. (2020)

Capital IQ Markets (2020)

Avanza

Appendix

Table 1

Average abnormal returns			Cumulative average abnormal returns		
Day	AAR	t-statistic	(c1,c2)	CAAR	t-statistic
-3	-0,77%	-1,38462*	(-3,-3)	-0,8%	-1,38462*
-2	-0,85%	-1,53434*	(-3,-2)	-1,6%	-2,06402**
-1	1,16%	2,09485**	(-3,-1)	-0,5%	-0,47580
0	-9,49%	-17,08873***	(-3,0)	-9,9%	-8,95643***
1	-1,43%	-2,57339**	(-3,1)	-11,4%	-9,16173***
2	0,76%	1,37248*	(-3,2)	-10,6%	-7,80316***
3	0,07%	0,13398	(-3,3)	-10,5%	-7,17369***
			(0,1)	-10,9%	-13,90322***
			(-1,1)	-9,8%	-10,14247***

*,**,*** stands for significance at 10%, 5% and 1% level.

Figure 3

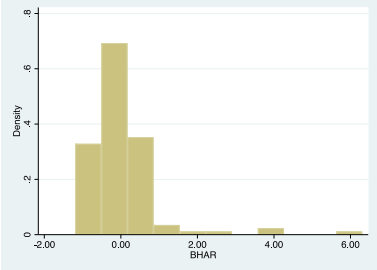


Figure 4

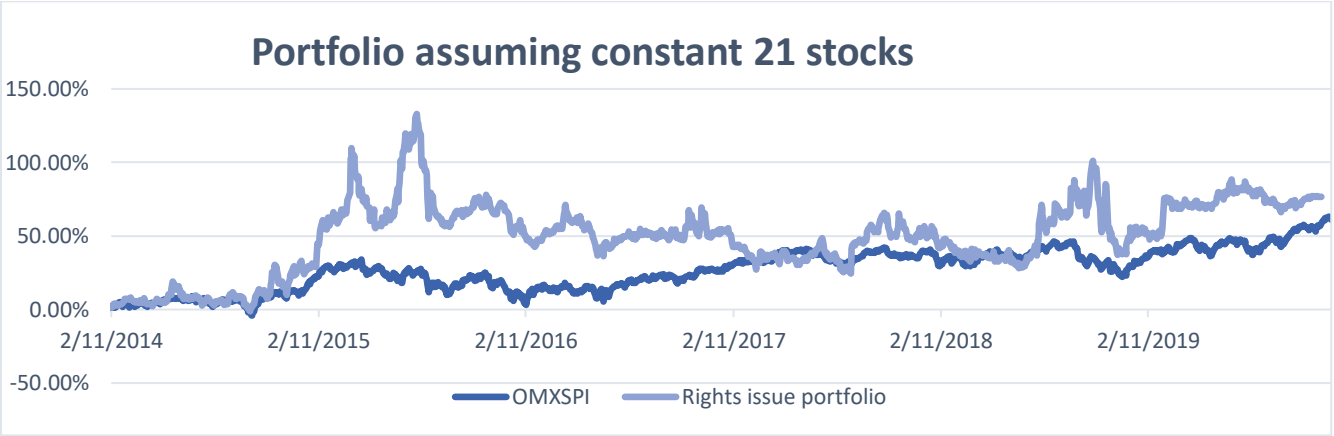


Figure 5

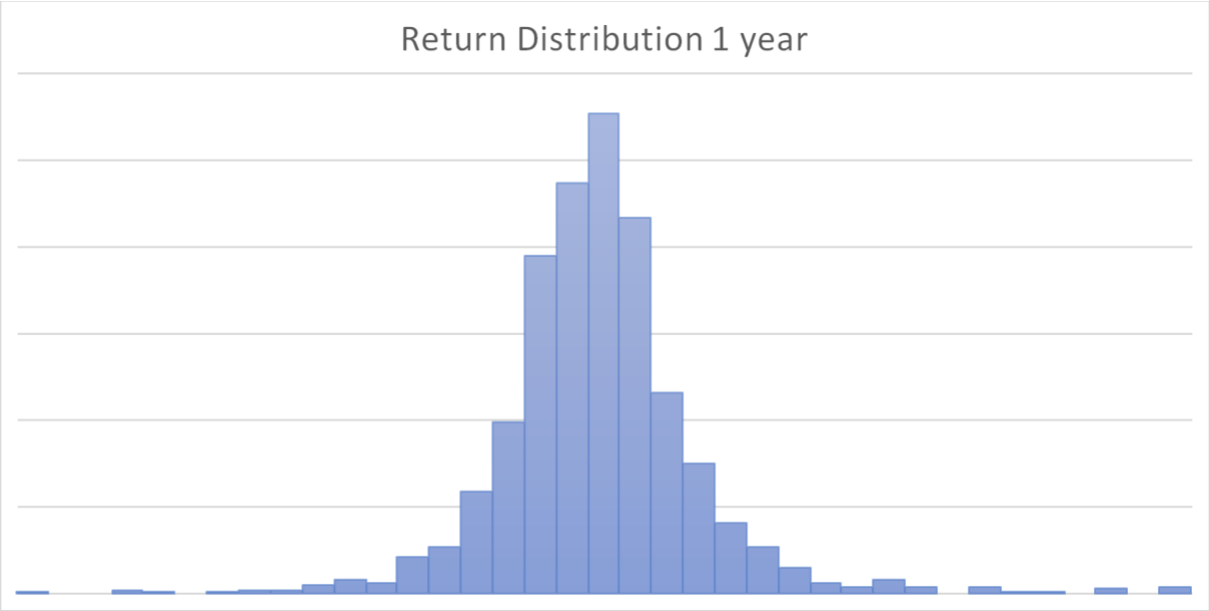


Figure 6

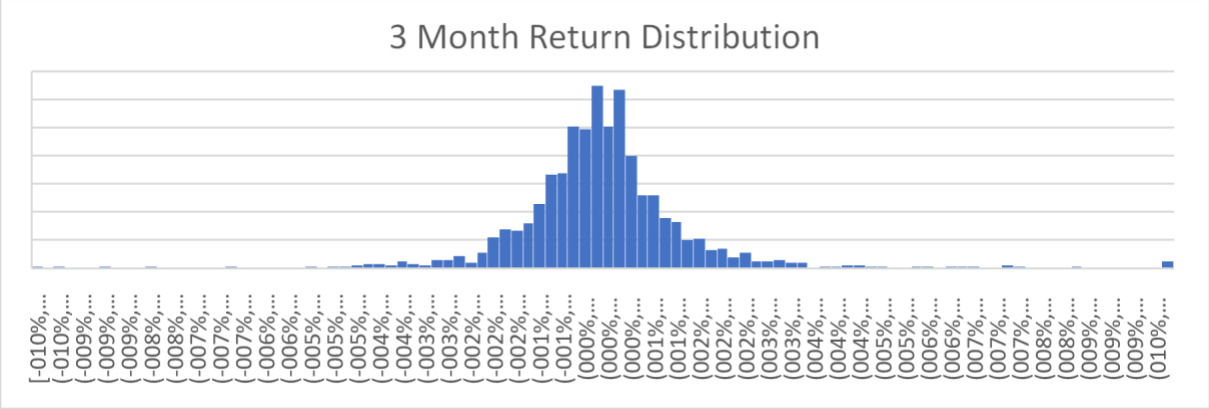


Figure 7

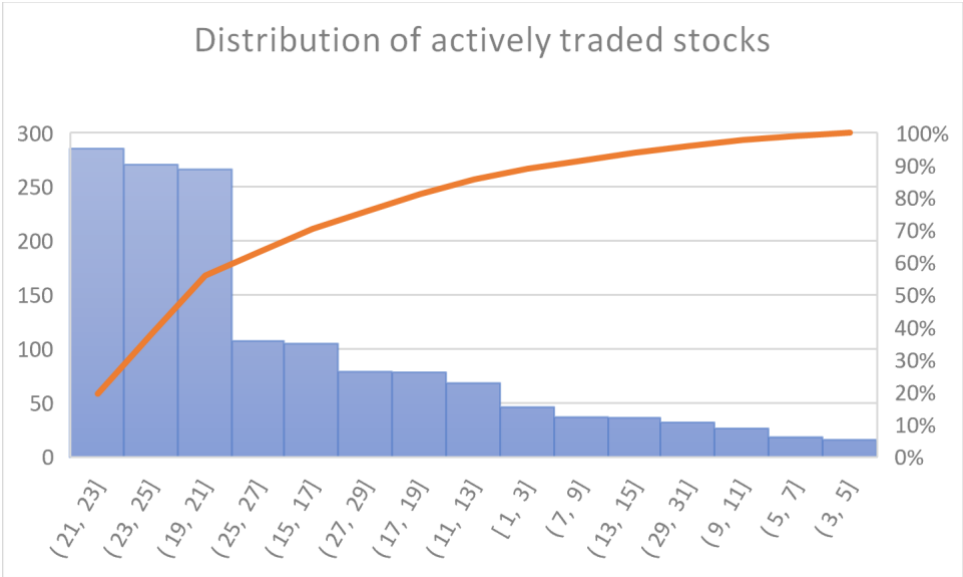


Table 4

Average Performance Values Per Year	2014	2015	2016	2017	2018	2019
Nominal Returns	30,55%	5,31%	-3,55%	1,18%	-0,81%	24,96%
Modigliani Risk-adjusted	6,74%	1,35%	-0,91%	0,37%	0,08%	10,01%
Sharpe Ratio	5,59	1,19	-1,39	-0,19	-0,57	8,71
Jensens Alpha	25,09	10,18	-8,77	-0,79	0,36	17,48
Treynor Ratio	1,583	0,167	-0,199	0,022	-0,06	1,186

Table 5

Descriptive Statistics of the Rebalanced portfolio	
Mode	-0,00055
Median	-0,02%
Mean	0,04%
Standard Deviation	0,013254
Skew	1,03
Kurt	9,04

Figure 8

Table 6
Companies studied by year of announcement

2014	2015	2016	2017	2018
Emotra	Kopy Goldfields	Sinch AB(aka CLX)(2016)	Spiffbet AB	NP3 Fastigheter
Brighter	Serstech	Hybricon Bus Systems	Alimak Group AB	Toleranzia
Elanders	Medfield Diagnostics	WeSC AB	Cantargia AB	Compare-IT Nordic
Stendörren	Eniro AB	FX International	Papilly AB	Cline Scientific
Karo Pharma	Mavshack AB	Diamyd Medical AB	CombiGene	Double Bond Pharmaceutical(B)
Angler Gaming	Image Systems AB	C-RAD AB	Episurf Medical AB(B)	Invent Medic Sweden
Latvian Forest (B)	Alteco Medical	A1M Pharma	Challenger Mobile	Redwood Pharma
Hansa Medical	Opus Group AB	Recipharm AB	Aha World(Blick)	PharmaLundensis
Tribona	Hexatronic Group AB	LIDDS AB	Josab International	Acosense
WntResearch	Eurocine Vaccines	NFO Drives	SaltX Technology Holding AB	Cortus Energy AB
Immunicum	BioInvent International	Rootfruit Scandinavia	Ortivus AB	Odd Molly
Spago Nanomedical	BE Group AB	Slottsviken(b)	Eltel AB (stamaktie)	ZetaDisplay
Kentima Holding	Orasolv	Mackmyra Svensk Whisky AB	Brandbee Holding	Mekonomen
ProstaLund	Kancera AB	Dextech Medical	ExpreS2ion Biotech Holding AB	Ellen AB
ProfilGruppen	Jojka Communications	Savo-Solar Oy	European Institute of Science	Dustin
Impact Coatings	Hanza Holding AB	Igrene	Follicum	Enzymatica
Umida Group (Cefour)	SensoDetect	Immunovia AB	Doxa AB	EQL Pharma
Online Brands	Saniona	Insplorion	Ivisys AB	iApotek Int
Synthetic MR	True Heading	Irisity AB	Fastout Int.	Cavotec
Anoto Group	Taurus Energy	Pexa (b aktier)	Arcam AB(stam)	Ecomb
Vindico Security	Bayn Europe AB	Heliospectra AB	DalsSpira Mejeri	Ecoclime(B)
Traveas(Everysport Media)	Sivers IMA	PledPharma AB	SciBase AB	Ahlstrom-Munksjö
Miris Holding	Exalt	Tele2 AB		Saxlund Group AB
Nordic Mines	Oboya Horticulture Industries	Amhult (b aktie)		Panion Animal Health
CDON Group(senare QLIRO)	Vigmed Holding AB	C Security Systems		Scandinavian Real Heart
Arc Aroma Pure (B)	AroCell			
Oasmia Pharmaceutical				