GRA 19502

Master Thesis

Preliminary Report

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Start: 01.01.2018 09.00

Finish: 15.01.2018 12.00

Study Programme

MSc in Business, Major in Finance

Title

"Underpricing and Long Run Performance Patterns of Nordic Private-Equity-Backed and Non-Private-Equity-Backed IPOs"

Supervisor

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1.0 introduction

1.1 Motivation

When private equity (PE) funds exit their investments they often launch an initial public offering (IPO) to sell their shares (Berger and Udell, 1998). Research show that most IPOs are underpriced (Booth and Chua, 1996), thus IPOs leave a lot of money on the table. Money left on the table can be defined as "the differences between the issue price and the first day's closing price, multiplied by the number of outstanding shares" (Ritter, 2002, p.3). This implies that newly listed companies could have raised more capital in their IPOs. Thus, we want to investigate whether this is this also the case for IPOs backed by private equity funds. IPO underpricing is a subject with a lot of academic research with well-known articles, however previous research has not addressed PE-backed IPOs to the same extent, and especially not in the Nordics. Firstly, our thesis aims to investigate this subject further, i.e. *is PE-backed IPOs more or less underpriced than non-PE-backed IPOs?* Given our Nordic background, we want to investigate this subject on the stock exchanges in Norway, Denmark, Sweden and Finland.

Secondly, in addition to the research field of PE-backed IPOs and IPO underpricing, we want to study the share performance of companies' after their listings. Previous literature shows that PE-backed usually are less underpriced than its non-PE-backed IPO counterparty, ultimately giving investors less upfront incentives to invest in the issue. One possible reason for this, in line with our research aim, is that companies initially backed by PE funds outperform the non-PE-backed companies after their listing in terms of overall returns on the stock exchanges. Thus, our study can help explain why investors decide to subscribe in the issue despite the lower initial cash on the table. In addition, there seems to be limited amount of research in this field, especially in the Nordics, giving us greater incentives to examine the subject closer.

This preliminary thesis begins with a literature review explaining the most relevant theories of IPO underpricing, and PE-backed firms' performance. Further, we will discuss our research question(s) and explain our proposed methodology of this research, the data collection and a progression plan.

2.0 Literature Review

This literature review aims to investigate relevant and leading theories within the subject of our research. It seeks to give a brief summary of relevant literature that are most relevant and commonly accepted as the most renowned. Firstly, we will explain some of the most relevant IPO underpricing theories, and then we will go further into the theory that explains abnormal returns and performance after a company´s IPO. Secondly, we will elaborate on why there exist a knowledge gap, and why this subject needs further examination.

2.1 Ritter and Loughran

Jay R. Ritter and Tim Loughran (2002) has presented several relevant theories on IPO underpricing and why underpricing has changed over time. Their well-renowned article "Why Has IPO Underpricing Changed Over Time?" argues that IPO underpricing may have changed based on three explanations: "The changing risk composition hypothesis", "The realignment of incentives hypothesis", and "The changing issuer objective function hypothesis". These three explanations are non-mutually exclusive. This article focuses primarily on the internet bubble. However, we still believe that the article is applicable for our research.

The changing risk composition hypothesis is based on the assumption that IPOs will be more underpriced if they are riskier, compared to less risky IPOs (Ritter and Loughran, 2002). The hypothesis state that if the proportion of IPOs with risky stocks increases, the average underpricing should also increase. The authors argue that valuation uncertainty and technological uncertainty is the two most important risk factors driving the uncertainty of the IPOs.

The realignment of incentives hypothesis argues that lower incentives of the issuing firm's decision makers will not strive for a higher offer price, and leave more money on the table (Ritter and Loughran, 2002). Examples of this can be decreasing CEO fractional ownership, increasing share allocation to "family and friends", and fewer IPOs containing secondary shares.

The changing issuer objective function hypothesis is based on that issuing firms has changed their willingness to accept underpricing (Ritter and Loughran, 2002).

The authors argue that this is because of analyst coverage and co-opting decision makers through side payments. Analyst coverage is the case when the issuing firm emphasis on hiring a lead underwriter with a highly ranked analyst to cover the firm, and they become less concerned about avoiding underwriters with a reputation of extensive underpricing. Co-opting of decision-maker through side payment, also known as spinning, happens when the underwriters co-opt the executives of the issuing firm and venture capitalists by setting up personal brokerage accounts and allocating hot IPOs to these accounts. Spinning creates incentive to seek underwriters with a reputation of underpricing, rather than avoidance.

The article finds that most of the increase in underpricing during the internet bubble is due to the changing issuer objective function hypothesis. This is by studying 6,169 IPOs in the period from 1980 to 2000. However, the article also finds that some of the increase is due changes in the risk composition hypothesis and the realignment of incentives hypothesis.

2.2 Booth and Chua

The well-known article "Ownership dispersion, costly information, and IPO underpricing" published in 2005 explores the topic IPO underpricing further, and is written by James Booth and Lena Chua. The authors assume that the issuing firm desires a liquid stock in the secondary market, as investors value this liquidity. However, there exists information asymmetry among different investors, or between the investors and issuer. Empirical results show to be consistent with this theory.

The article argues that the production of information appears in two ways. Firstly, the issuing firm produces common value information using firm-commitment contracts and known underwriters. Secondly, investment bankers promote the issue, and investors investigate the issue and produce private value information. The private value information about the company are costly to produce. The authors argue further, "*These information costs are offset through initial underpricing*" (Booth and Chua, 2005, p.1). Thus, the final issue price is a function of the investment bankers' best estimate of value, subtracted by the total information costs for all the potential investors (Booth and Chua, 2005).

2.3 Fama and French

Fama and French´s published their well-known and highly cited articles "The Cross-Section of Expected Stock Returns" (1992), and "Common risk factors in the returns on stocks and bonds" (1993). They introduced three factors that explain a stock's excess returns compared to the risk-free rate of return. These three factors are the CAPM beta, SMB (small minus big, with respect to market capitalisation), and HML (high minus low, with respect to book-to-market ratio).

The CAPM beta is a stocks systematic risk compared to the market portfolio (Sharpe, 1964). SMB measures the historic excess return for small market capitalisation stocks over large market capitalisation stocks (Fama and French, 1993), while HML measures the historic excess return for stocks with high book-to-market compared to stocks with low book-to-market ratios (Fama and French, 1993). HML and SMB are risk factors in the sense that they capture common variation in stock returns.

Research done by Fama and French (1993) indicates that the three factors seems to explain average returns on stocks, and their time-series regression gives direct evidence on this issue. By comparing a stock's performance with the risk-adjusted return the three-factor model gives, can be one way to evaluate long-term performance of PE-backed IPOs. The model can also classify returns as abnormal or not.

2.4 Ritter

Ritter's article "The Long-Run Performance of Initial Public Offerings" from 1992 finds that issuing firms during 1975-1984 substantially underperform a sample of matching firms from the closing price on the first day of trading to their three-year anniversaries. However, the article finds substantial variation in the underperformance year-to-year and across industries, with companies that went public in high-volume years performing the worst.

Ritter highlights four reasons why long-run performance of IPOs are of interest. Firstly, the existence of price patterns might introduce investment opportunities for active trading strategies to produce superior returns. Secondly, if superior

returns exist, finding a nonzero after market performance calls into question the information efficiency of the IPO market (Ritter, 1992). This information asymmetry problem shares the same characteristics as Shiller's (1990) hypothesis that equity markets (especially the IPO market) in particular is subject to fads that explain market prices. Thirdly, the article emphasises that the volume of IPOs has large variations over time and that high-volume periods tend to be associated with poor long-run performance. These findings suggest that new issues take advantage of this "window of opportunity", a concept often referred to as the "hot issue" market phenomenon. This phenomenon is well documented in Ibbotson and Jaffe (1975), Ritter (1984), and Ibbotson, Sindelar, and Ritter (1988). Lastly, the cost of external equity capital for companies going public depends not only upon the transaction costs incurred in going public, but also upon the returns that investors receive in the aftermarket (Ritter, 1992).

The empirical findings in the article (with a sample of 1526 IPOs of common stock in the period 1975-1984) was that the average holding period return for the IPOs was 34.47% on the 3-year anniversary, whereby the holding period return for the market was 61.86% over the same period. The article finds three possible explanations for this underperformance, with the first being risk mismeasurement. The second was bad luck and the third was fads or overoptimism.

2.5 Levis

To increase our insight on the long-run performance of private equity-backed IPOs we have chosen to include the article "The Performance of Private Equity-Backed IPOs" by Mario Levis. The article finds that the performance of private equity-backed IPOs displays better operating and market performance when compared to other IPOs (e.g. venture capital-backed IPOs and non-PE-backed IPOs) in the three following years after the public listing on the London Stock Exchange. The empirical evidence also suggests marked differences across the IPOs in terms of market size, industry classification, first-day returns, and key operating characteristics at the time of flotation, in favour of PE-backed IPOs.

The article finds abnormal buy-and-hold returns of PE-backed IPOs remain positive over the three-year period, while the performance of VC-backed IPOs and their non-sponsored counterparts is consistently poorer or negative. The

results also consistent using the Fama and French (1993) regression, suggesting that performance is not due to size or book-to-market effects. In addition, the evidence does also suggest that the differences are not due to timing of the different IPO groups or the results of some extreme performances of a very small group of IPOs (Levis, 2011, p.254).

2.6 Other Studies

In Barber and Lyon´s article "Detecting long-run abnormal stock returns: The empirical power and specification of test statistics" (1997) the authors argue that two measures can be used to evaluate long-run performance of IPOs. The two measures are Cumulative Abnormal Returns (CAR), and Buy and Hold Abnormal Returns (BHAR). CAR is the sum of all abnormal returns, and its calculation is usually over smaller time intervals (Barber and Lyon, 1997). BHAR is the difference between the long-run return for a sample asset over a benchmark asset selected to capture expected return, and is a long-run measure (Barber and Lyon, 1997), however in chapter 4 in this report we will elaborate more on these concepts. We observe the same argumentation for these measurements in Ritter (1992) and Lewis (2011).

Looking at ownership structure, although venture capital-backed IPOs deviate somewhat from private equity-backed IPOs, significant data on lead venture capitalist shows that VC firms have an average 19% ownership stake at the time of the IPO, and the aggregate holdings by all venture capitalists represents, on average, 34% of the outstanding shares (Barry et al., 1990).

2.7 Knowledge Gap

Previous research developed by Ritter and Loughran, and Booth and Chua has focused on IPO underpricing, and several theories are developed within this subject. These are all relevant for our field of interest and research questions. Moreover, previous research on IPO underpricing for PE-backed companies, and their performance after their listings have also been studied in some markets, like the British, French and Dutch. However, this has not been done in the Nordic countries. Hence, we believe that this is a knowledge gap in the literature because our research within the Nordic markets does not necessarily give the same results as previous research in other countries and markets. We want to examine this

knowledge gap by examining if PE-backed IPOs are more or less underpriced than non-PE-backed IPOs, and if their performance is better or worse after their listings.

3.0 Research Question and Objective

Our research question will limit the thesis to the already mentioned field of study. The main objective in this thesis is to check whether private equity-backed IPOs are less underpriced compared to non-private equity-backed IPOs, and whether there is any difference in the long-run performance of the two aforementioned IPO types. Hence, we have two main research questions:

1) *Does PE-backed IPOs in the Nordics outperform the market short- and longer-term?*
2) *Does PE-backed IPOs in the Nordics display lower degrees of underpricing and higher longer-term performance compared to non-PE-backed IPOs?*

3.1 Research question limitations

Our research question and objective limits our thesis to some extent. For instance, we have chosen to exclude historical data before 2002, as we want to avoid "the tech bubble" as it most likely would reduce our study's statistical inference. In our view, the main drawback by excluding this period is that the pre-tech bubble years had a lot of IPOs, both private equity-backed and non-private equity-backed (Loughran and Ritter, 2002). That said, our sample includes the financial crisis in 2008, and we argue that the exclusion will not damage the thesis in any considerable way, as this period share many of the characteristics as the aforementioned crisis in 2000.

As we are solely focusing on IPOs, our main sample of firms will likely consist of larger privately held companies (pre-IPO ownership). Thus, our sample will most likely exclude small to medium sized firms, as these companies rarely chose to get listed on the stock exchange as exchanges often requires a certain market cap. For instance, to grasp the magnitude of excluding these firms, only 2% of the companies in Norway had more than 50 employees (Statistics Norway, 2017).

We find similar statistics in Denmark, Sweden and Finland as well. However, as firm specific differences in our case is limited to leverage, market cap, total assets, etc., and we argue that this limitation will be marginal. In addition, as IPOs within the centre of scope in our thesis, these firms are in our view considered irrelevant. That said, we believe it is important to highlight that this skewness exist on a company level, as it could have given us a greater insight into why firms decide to go public and the decision criterions private equity sponsors uses when deciding to initially buy stakes in the private companies. This information could arguably help us understand why (or why not) private equity-backed companies perform better than non-private equity-backed firms in the long-run.

Another possible limitation to in our study could be the fundamental risk associated with the different IPO categories. For instance, it could be argued that conventional performance measurement methodologies (as proposed in Chapter 4 of this report) do not fully capture the distinctive risk associated with the private equity-backed IPOs (e.g. leverage, timing, growth opportunities etc.). However, we will to the best of our ability try to adjust for these differences by e.g. accounting for these metrics in our regression analysis. However, we have yet to figure out how to do this and we will dig deeper into this when we have gathered our complete dataset. That said, we argue that this only will limit our thesis quality somewhat (if any), depending on our approach used in the final thesis.

In terms of geographical limitations, we decided to exclude Islandic IPOs in our sample, although it is considered a part of the Nordic countries. The main reason for this exclusion is the limited data available, and per 1 January 2018, only 16 firms was listed on the exchange (Nasdaq, 2017). Hence, we argue that by limiting our sample to the other four Nordic countries will not have any significant impact on our research results. That said, as we have yet to investigate the Icelandic IPO market from 2002 to 2015, we do not exclude the Icelandic market fully until we have made deeper investigations. For instance, the pre-financial crisis period might be of interest as the Icelandic stock exchange was booming, before eventually collapsing in 2008.

3.2 Possible hypotheses

As we have already mentioned earlier, there exits empirical evidence of significant IPO underpricing, as proven by Ritter (2002). Moreover, there exists evidence that private equity-backed IPOs are less underpriced when compared to non-private equity-backed IPOs. For instance, there exits evidence that PE-backed IPOs are less underpriced on the Amsterdam Stock Exchange (Frederikslust and Geest, 2001), on the two London Stock Exchanges (Levis, 2011), and the French Stock Exchange (Bourrat and Wolff, 2013). Hence our first hypothesis is:

> *Hypothesis 1: Private equity-backed IPOs will be less underpriced compared to non-private equity-backed IPOs on the Nordic stock exchanges.*

According to previous literature on long-run performance between PE-backed IPOs and benchmarks suggests that PE-backed IPOs achieve positive and significant cumulative abnormal returns, both in equal- and value-weighted terms (Levis, 2011). In addition, there exits some empirical evidence that PE-backed IPOs achieve greater cumulative abnormal returns than comparable benchmark indices (Levis, 2011). That said, there also exits literature which argues that IPOs in the long-run underperform benchmark indices (Ritter, 1992). Hence, our second and third hypotheses are:

> *Hypothesis 2: Private equity-backed companies will perform better in the long-run, then non-private equity backed companies on the Nordic stock exchanges.*

> *Hypothesis 3: Private equity-backed companies will perform better in the long-run compared to benchmark indices.*

To strengthen the quality of our thesis, we want to investigate several sub segments within our chosen sample. Previous literature has identified different results based on industries and size (Levis, 2011). Hence, we also want to investigate the following hypotheses:

Hypothesis 4: Private equity-backed IPOs outperform its financial sector indices for each performance measure (CAR and BHAR).

Hypothesis 5: There exits sector specific differences in abnormal returns for private-equity backed IPOs when compared to its sector indices for each performance measure (CAR and BHAR)

Hypothesis 6: Private equity-backed IPOs outperform Nordic small & mid cap indices for each performance measure (CAR and BHAR)

Lastly, we want to highlight that our hypothesises are not carved in stone and is very much in a "work-in-progress" stage. We might add or change some of the six hypotheses above to better fit our final thesis problem statement and overall goal.

4.0 Methodology, Data Collection and Progression

4.1 Methodology

This thesis will be using a sample of IPOs listed on the four main stock exchanges in the Nordics (Norway, Sweden, Denmark, and Finland) between 2002 and 2015. The focus of the thesis relies on quantitative data and quantitative data techniques. To justify our quantitative approach, previous literature often refers to research reliability and validity to measure the quality of the research paper. Validity of research refers to the extent at which requirements of scientific research methods is used during the process of generating research findings (Research Methodology, 2017). Furthermore, it is common to distinguish between internal and external validity, where the former is the extent to which a casual conclusion based on a study is warranted, which is determined by the degree of which a study minimizes systematic error ("bias"). The latter refers to the degree to which it is warranted to generalize the results to other contexts.

In our case, we argue that applying a quantitative approach should strengthen our study's external validity, as any results we uncover will likely be of relevance to similar scenarios and can to some degree be compared to previous research and analysis on similar markets (or under similar conditions). For instance, we have found equivalent analysis on the United Kingdom (Levis, 2011), France (Bourrat

and Wolff, 2013), and the Netherlands (Frederikslust and Geest, 2001), amongst others, further strengthening this view. In terms of internal validity, the Nordic markets have some unique characteristics when for instance compared to other economics around the globe. In addition, the Nordic countries have different corporate governance structures, dividend policies, and income distribution on the general population, etc. Since it can be hard to account for these differences in our dataset, we argue that our internal validity will be moderate.

Reliability refers to the extent to which the same answers can be obtained using the same instruments more than one time (Research Methodology, 2017). In other words, if the research is associated with high level of reliability, then other researches can generate the same results using the same research methods under similar conditions. For our study, we argue that the level of subjectivity is low, as our thesis uses public available information and common statistical approaches. Hence, we argue that the reliability of our study is rather high.

In accordance with previous research on the topic, we find that the most natural quantitative techniques to use are regression analysis. However, as we have not yet determined exactly what types of regression analysis we will conduct, and we will wait to conclude on this matter until we finalise our dataset. Nonetheless, as already mentioned in our literature review, several approaches are relevant for our thesis, and we will likely select approach based on these findings. That said, we would be using different common financial formulas to calculate different key data points in our analysis. For instance, we have to calculate the return on the first day of trading, the cumulative abnormal return (CAR), and buy and hold abnormal return (BHAR), to mention a few. The first two are simple arithmetical calculations, while we can calculate BHAR by compounding 36 (or 48) monthly returns in addition to the first partial month after the first day of trading. When a firm portfolio is delisted from the database, the portfolio returns for the next months is an equally weighted average if the remaining firms in the portfolio (Levis, 2011, p.259). The null hypothesis, as used by Levis, test whether the mean BHARs are equal to zero using the skewness-adjusted t-statistic with bootstrapped p-values as suggested by Lyon, Barber, and Tsai (1999).

$$BHAR = \frac{1}{n}\sum\nolimits_{i=1}^{n}[(\prod_{m=1}^{m}\left(1+r_{i,m}\right)) - (\prod_{m=1}^{m}\left(1+r_{b,m}\right))\,]$$

Where: $r_{i,m}$ is the return of firm i, and $r_{b,m}$ is the return of the benchmark b, in month m.

The aftermarket performance for our samples (overall, sector and size-adjusted) is computed using the formula above, where the return is compared to the different benchmark indices in the Nordic markets (more on this in the data collection section below). However, we emphasise that our final method might deviate from the suggestions above, as we might discover new or better methods to isolate and answer our problem statement.

4.2 Data collection

To create a sufficient dataset, the first part of our analysis revolving around IPO underpricing, we first have to collect a list of every company that was listed on the Nordic exchanges (Norway, Sweden, Denmark and Finland) between 2002 and 2015. We decided to use a 13-year horizon to ensure significant statistical results for our main sample, as well as for our sub-samples (e.g. the sector performance analysis, which naturally has a lower sample size). Based on this list, we will categories the IPOs as either "private equity-backed" or "non-private equity-backed". Previous literature on private equity ownership concentration shows that ownership threshold used to define a firm as "private equity-backed" requires that the owners have significant influence and control over the firm. An article based on Belgian PE-backed companies (sample of 270 firms) and ownership concentration (Besuelinck and Manigart, 2007) finds that most PE sponsors have an ownership stake between 10-40%. Hence, our preliminary ownership threshold will be in the range of 10-40%. However, the identification process of private equity-backed IPOs could pose a challenge. This is due to the combined effect of limited publicly available information for private companies and the overlapping nature of the sponsors' involvement in PE transactions (Levis, 2011). We will then have to collect data about the offering price on each IPO, the market value of the IPO (offer price multiplied by the post-issue number of shares outstanding) and the market price after the first day of trading. To ensure data reliability, we will also gather the prospectus for every IPO in our list (if available) and crosscheck the offering price. We will gather the list of every IPO on the four

stock exchanges through direct communication (Sweden, Denmark and Finland) and through BI Norwegian Business School's library (Norway).

The second part of our data collection process revolves around the market performance of both the private equity-backed and non-private equity-backed IPOs over a 2-year period after the offering. We will collect the monthly returns for each IPO using Bloomberg. To measure the abnormal return across the four countries and sector sub segments, will use several market and sector indices, as well as small, mid and large cap indices. Our benchmarks include a benchmark reflecting the total market, a size-adjusted benchmark reflecting the market capitalization of individual companies, an industry benchmark reflecting the broad industry classification of each IPO, and a style benchmark matching the individual characteristics (e.g. size and book-to-market) of the firms in the sample of IPOs. For instance, for the Norwegian market, we will use the Oslo Børs Benchmark Index (OSEBX), Oslo Børs Mid Cap Index (OSEMX), and Oslo Børs Small Cap Index (OSESX). That said, we have yet to conclude on what indices that most accurately reflects the benchmark performance across the Nordics, so our preliminary list of indices might change further into the thesis progression.

Lastly, we will likely use several secondary sources such as Preqin, Dialogic or Cambridge Associates. These sources include general statistics about the IPO and private equity market trends, including the number of offerings per year (categorised by country). In addition, we have to gather company information on financial data such as total assets, equity, market cap, net interest-bearing debt etc. This information will help us categories the offerings in to small, medium and large cap deals.

4.3 Thesis progression plan

As the thesis deadline is 1st September 2017, we have approximately eight months to complete our thesis. As we both work nearly fulltime besides writing our thesis, we developed a progression plan to ensure that we meet the deadline. However, we stress that the current plan at this time is preliminary and deviations from the plan might occur. As a result, we work with larger periods to make the planning more accurate and realistic.

January	*Deadline Preliminary Master Thesis: 15. January*
	Complete Preliminary Thesis Report and gather data from the four stock exchanges. Gather publically available prospectuses to supplement the data from the stock exchanges.
February	Dig deeper in to existing literature and compare with our own sample. Structure our dataset and begin with the quantitative analysis.
March	Continuation of quantitative analysis.
April	Finalise first draft of thesis.
May	Review feedback on first draft and process feedback.
June	Finalize thesis.
July	Finalize thesis.
August	Finalize thesis.
September	*Final deadline Master Thesis: September 1st*

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