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Master Thesis

What Drives Performance in the Nordic Private Equity Market?

Start: 02.03.2017 09.00

Finish: 01.09.2017 12.00

BI Norwegian Business School

Oslo, Fall 2017

What Drives Performance in the Nordic Private Equity Market?

Submission date: August 31st, 2017

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Master of Science in Financial Economics

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Abstract

In this thesis, we study the performance of Nordic private equity buyout and venture funds between 2005 to 2016 using a dataset from Preqin. We have defined the Nordic to include Denmark, Finland, Norway, and Sweden. By looking at fund characteristics such as fund types, cycles, sequence number, location, and size, and measured it on IRR[1], TVPI and size, we have discovered the characteristics that drive private equity in the Nordic. Previous research indicates that our dataset is of high quality and shows a real picture of the private equity market. However, a pitfall in this work is that our sample size of venture funds only consists of seven funds. This will have an impact on the statistical results and makes it difficult to conclude anything about venture fund performance.

Our analysis reveal that buyout funds outperform venture funds in general, which is in line with existing work and of no surprise given our modern focus. Looking at cycles, we find that funds raised in bust periods significantly outperform funds that are raised in boom periods. Specifically, buyout funds raised in bust periods perform better than buyout funds raised in boom periods. Also, we report that small buyout funds are better than medium buyout funds, which gives evidence of a negative correlation between performance and size. Studying the relation between sequence number and performance, we find that funds with sequence number 1 outperform funds with sequence number 0, and that sequence number 3 is better than 1. This means that success increase the chances of creating a follow-on fund. These two findings are only significant when we use TVPI, and not IRR. Last, we find that buyout funds are larger than venture funds in general, and that funds located in Sweden are the largest in the Nordic region.

We believe our findings sets the ground for further research on many things. Specially, it would be interesting to relate Nordic PE performance to a relevant benchmark. Also, we think a closer look on the GPs ability to create abnormal return will be of high interest. Last, we suggest that it could be relevant to include real estate funds in the study of Nordic PE because it is such a major part of the Nordic economy.

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[1] From this point on, when we use IRR, we mean the Net IRR unless other is stated. Net figures are calculated as gross less fees and carried interests.

Preface

This thesis represents the completion of our Master of Science in Financial Economics at BI Norwegian Business School. Writing the thesis has been an educational and interesting journey. After we overcome the main issue of getting access to data, we have enjoyed almost every minute of our work.

We chose to write about private equity because of its secrecy and increased popularity in the Nordic, which tempted us. By attending several lectures on the basics of private equity, along with guest lectures that contained some of the largest PE firms in the Nordic, we really started to understand the industry's complexity and that sparked our interest and the eager to fully assess this thesis.

We would like to thank our supervisor Janis Berzins for his help in completing this thesis. A special thanks to the people who helped us getting access to the Preqin database. Without their help, we would not have been able to perform the research on the Nordic market. We would also like to thank Alexander Berg Erichsen for his guiding and helpful mind regarding the methodology and statistical tests. Last, we thank our family and friends for their support during the last couple of months.

Oslo, 2017

Fredrik R. Mattsson   Michael Nyvoll

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List of Acronyms

ANOVA	One-Way Analysis of Variance
CA	Cambridge Associates
CF	Cash Flow
DPI	Distributions to Paid-In capital
GIPS	Global Investment Performance Standards
GDP	Gross Domestic Product
GP	General Partner
HQ	Headquarter
IPO	Initial Public Offering
IRR	Internal Rate of Return
K-Wallis	Kruskal-Wallis
LBO	Leveraged Buyout
LLN	Law of Large Numbers
LP	Limited Partner
MWW	Mann-Whitney Wilcoxon
Na	Not Available
NPV	Net Present Value
PE	Private Equity
PIC	Paid-In capital
RVPI	Residual Value to Paid-In capital
TVPI	Total Value to Paid-In capital
VE	VentureXpert/Venture Economics

Introduction

Have you ever tried to search information about private equity funds online, and not seen as much as a number that looks like a performance metric? That is not unusual. Mystery and secrecy shadow the private equity industry. Even though it has become easier the last decade due to a tremendous increase in funds flow, it is still a limited understanding of private equity returns, capital flows, fund types, and their interrelation. Private equity, as the name indicates, is private. That means the industry is largely exempt from public disclosure requirements, and may be one of the main reasons for the secrecy.

The entry of CFA Institute's standards (GIPS) have opened the industry. Along with increased numbers of independent data providers, such as Burgiss, Cambridge Associate (CA), Preqin, and Venture Expert (VE) we now see more headlines in the news, more focus on performance, and an increased number of papers studying the industry.

Based on the growing interest and the lack of research that focus on the Nordic private equity market, we wish to provide some insight on this topic. In this thesis, we will investigate into the performance characteristics of Nordic private equity using a dataset provided by one of the leading data providers, Preqin. Mainly, we will focus on determining the underlying characteristic of performance in buyout and venture funds. We also study if there are differences in characteristics between the four Nordic countries.

The rest of the thesis is structured in the following way. In the next section, we go through the basics of private equity. In section 3 we review past literature on the field followed by a section with theory on private equity performance. The data we are provided with will be carefully handled in section 5, while we present our hypotheses and methodologies in section 6 and 7, respectively. We report and discuss our findings in section 8 before a summary of the work is done by the conclusion in section 9.

2. What is Private Equity

2.1 Private Equity

Private equity (PE) is referred to as a private market, where usually a fund invests in non-public companies that are deteriorating and needs to be restructured, or in companies that are promising and seen as good investments[2]. Characteristics of private equity covers terms as irregular timing of cash flows, closed-end, secrecy, high returns, and illiquidity. Such unique characteristics makes the measurements of returns a bit more complicated than in the standard asset classes (Ellis, Pattni and Tailor, 2012).

Many financial theories often include some basic assumptions of the public stock market characteristics like:

- Information is quickly spread to market participants[3]
- Markets are highly liquid
- Low transaction costs.

There are also many regulations that requires public companies to be transparent and reveal information about their performance. However, in the private equity market, no one of these assumptions are true (Litterman, 2003). Private equity investments are generally investments in closed-end funds characterized with high illiquidity and high management fees. The average lifetime of the PE fund is 10 years (Kaplan & Schoar, 2005), and the legal requirements of revealing information are low compared to public firms.

PE funds are structured as limited partnerships and include general partners (GPs) and limited partners (LPs). The GPs are the fund managers and they have the responsibility for all the actions within a PE fund. The LPs are often passive investors that commits equity to the funds.

Private equity funds invest in different types of investments. The most common are venture capital, buyout, real estate, mezzanine buyout, special situations, and funds

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[2] Private equity capital can also be used to invest in exchange-traded companies with the purpose of taking them private, see for example: EVRY in Norway https://www.evry.com/en/company/about-us2/our-history/

[3] See Eugene Fama's Efficient Market Hypothesis for more information

of funds. Venture capital and buyout capital are the two largest and most common private equity classes.

2.1.1 Venture Capital

Venture capital is capital invested in early-staged and promising businesses. These investments are typically of high risk but can also yield high returns. They are similarly structured as buyout funds, except for the size of the investments.

2.1.2 Buyout

A buyout generally means that the investment firm buys the majority of voting shares in an established company. In the PE industry, those companies are often deteriorating or not efficient enough to be as profitable as they could be. A buyout can also be called a leveraged buyout if the investment firm is acquiring a company using a small portion of equity and a large portion of debt (Kaplan & Strömberg, 2008).

2.1.3 General Partners

The GPs represent a group of managers commonly a PE firm, who are responsible for managing the PE fund. The GPs raise money from external and internal[4] investors to finance the investments and sets up an investment plan for the fund. Typically, they spend the first one to three years analyzing the market or sector they want to invest in before they buy. After a transaction is made, they also spend much of their time monitoring the portfolio companies besides looking for further investments. Between year three to six of the funds life, the GPs typically raises a new *"follow-on"* fund, which often will be dependent on the manager's previous success when collecting capital (Barber & Yasuda, 2016).

2.1.4 Limited Partners

The LPs are external investors such as pension funds, private investors, or funds of funds, that commit capital to the PE fund while entering a passive role. The term *"limited partners"* means that their total liabilities is limited to the amount that they invest in the fund. The GPs however, are personally responsible for the funds debt and legal proceedings. The limited partnership protects the potential profit to the LPs from double taxation because it is a *"flow-through entity"*.

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[4] Internal investors are the GPs, who normally invests 1-2% of the funds value.

This means that all profits flow directly to the individual LPs without going through state or federal taxes, as the *"normal"* corporation would have been obligated to do. (Tax Policy Center, 2017).

2.3 Fund Structure
The fund structure of buyout funds can be divided in four stages.

2.3.1 Fundraising
The fundraising process is the first stage of a PE fund where the GP search for potential investors to collect financing. The LPs agree to a capital commitment which means that they will provide a predetermined amount during a predetermined period, when the GP requires it. The LPs also sign a management contract that specifies the compensation to the GP, the GP's investment in the fund and other criterions to deal with the agency relationship between GPs and LPs (Robinson & Sensoy, 2013).

2.3.2 Investment
Once the book building process is done, the fund closes and the GPs starts the screening and due diligence process to value investment opportunities. Once a company have been targeted, the GPs will make a so called *"capital call"* to receive the LPs money. Through the PE fund, the GPs starts the process of buying shares and typically becomes a major shareholder and takes control over the operations of the company. Ljungqvist and Richardson (2003) study shows that buyout funds typically invests in 16.1 portfolio companies during the funds' lifetime while venture funds invests in 37.3 portfolio companies, on average.

2.3.3 Managing the Portfolio Company
The GPs will from now on typically engage in the day-to-day operations within the portfolio companies to optimize the core business and create value. This is often a long process that takes many years to accomplish for most of the private equity funds.

2.3.4 Exit Strategies

The final stage is to divest the portfolio company and realize the returns. Hungarian Venture Capital & Private Equity Association (2017) described the most common exits as:

- *"Trade-sale"* - which means that the GP sells all the shares to a third party, who often operates within the same industry as the portfolio company.
- *"Secondary buyout"* - in which the portfolio company is sold to another PE firm.
- *"Management buyout"* – the managers within a firm buys the company.
- *"Initial public offering (IPO)"* – the portfolio company goes public, i.e. listed on a stock exchange.
- *"Write-offs"* – the company fail to deliver positive returns.

When all the portfolio companies have been divested, the PE fund closes and the money that is left gets distributed to all claimants.

2.4 Fees

As mentioned earlier, by entering the agreement, LPs is obliged to invest in the fund when the GP's requires it. Metrick and Yasuda (2010) divides the total committed capital in the PE fund from the LPs into three separated parts:

$$Committed\ capital = investment\ capital + lifetime\ fees + establishment\ cost \quad (1)$$

Typically, LPs pays the GPs an annual management fee of 1-2% of the funds committed capital during the funds lifetime to cover the daily operations. In general, PE is characterized by long-term investments where it takes time for the private equity fund to become profitable, so the management fees to the GPs is necessary to in the build-up of the portfolio company. The GPs will also be rewarded a variable performance fee around 20% of total profits after exiting, which is called "carried interest" (Kaplan & Strömberg, 2008). According to Invest Europe (2017) and their publication *"The Little Book of PE"* the average PE fund needs to grow at least 8% per year to achieve the predetermined goals, otherwise the GPs carried interest compensation might not occur.

2.5 Returns

Private equity returns are often described as a J-shaped curve. It is normal to experience negative returns in the first year's due to management fees and start-up costs. After a while, the investments typically start to show positive returns and the level of returns will move towards and hopefully above the value of the invested capital, generating profits for investors.

A funds return is measured in many ways. The CFA Institute's Global Investment Performance Standards (GIPS) requires PE funds to report the following performance metrics on an annually basis (CFA Institute, 2012):

- Internal Rate of Return (IRR)
- Paid-In capital
- Distributions
- Committed capital
- Total Value to Paid-In capital (TVPI)
- Distributions to Paid-In capital (DPI)
- Paid-In capital (PIC)
- Residual Value to Paid-In capital (RPI)

IRR is the most common way of measuring performance in private equity, according to Phalippou (2008). The IRR is the annualized rate of return on the investments' underlying cash flows. The advantage of using IRR is that it considers the timing of cash flows. We will highlight its pitfalls and provide an example later when we encounter IRR in section 4.1.

Along with IRR is the performance multiples, which is popular within PE. When an investor looks at the performance of a PE fund, he should use IRR and multiples alongside to get a proper view of the fund's performance and history.

2.6 Asymmetric Information

The private markets have less regulations than public markets when it comes to revealing information, hence one can assume that the information asymmetry between investors and the private equity managers is larger. A principal-agent problem might occur if the GPs does not act in the best interest for investors.

Gilligan & Wright (2014) found that an increase in fund size generally lead to an increase in fees independent of fund performance.

Cummings & MacIntosh (2003) did a research on whether the information asymmetry affects the exit strategies for venture capital funds and reported that:

"If the information asymmetry is high, then the VC can maximize the overall proceeds of disposition by initially effecting a partial exit, because ownership retention constitutes a credible signal that the quality of the investee firm is high".

As we mentioned earlier, the limited partnership-agreement between GPs and LPs is typically structured with covenants to deal with the potential information asymmetry between them. Another aspect is that it probably is in the GPs best interest to perform well since they invest in the funds themselves (Kaplan, Strömberg, 2008). Also, they need to raise new funds in the future to stay in business, so focusing on performance instead of high manager fees, is crucial to engage in new investments (Berger & Udell, 1998).

2.7 Private Equity Investments – Good for the Society?

Many would argue that PE investments have become an important component in today's economy because it provides capital for innovative start-up firms and it can be used as capital for restructuring a mature firm that is not profitable. Swedish Private Equity & Venture Capital Association (SVCA, 2017) reports that

"more than 1000 Swedish companies have received PE capital adding up to €15 billion over the last 10 years. This is about the same as the total IPO capital supplied by Nasdaq Stockholm over the same period".

Skepticism is also present around PE investments. Some claims that the GPs might use non-sustainable methods to increase the value of the portfolio companies, which in the long-run could do more damage to the society[5]. However, this is beyond the scope of this thesis. For the interested reader, we recommend two articles in the Economist[6] from 2012.

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[5] E.g. job-destroying due to cutting costs, tax deduction performing a leverage buyouts (LBOs) etc.
[6] Link to articles:

http://www.economist.com/blogs/freeexchange/2012/09/private-equity
http://www.economist.com/node/21543550

2.8 Private Equity in the Nordics

British Private Equity & Venture Capital Association (BVCA, 2014) describes the Nordic PE market as

"one of the most successful and active in Europe" with a *"generally strong economy[7] and great welfare systems such as a "world-class education system".*

A report by S&P Global Market Intelligence (2016) shows that from 2014 to 2016, the Nordic PE market experienced a growth in funds raised from global PE investors by 23 %. Sweden is a big part of this growth since it is, and has been for many years, the most dominant Nordic country in terms of new capital and deal counts. Sweden received nearly €47 billion of PE capital between this period, while Norway on second place, received €27 billion. The report also finds that Nordic GPs tend to invest most of their capital between the Nordic countries. The most popular foreign market where Nordic GPs invests is North America followed by United Kingdom.

Argentum (2015), a Norwegian state-backed PE investment firm, reported that capital raised in the Nordic PE market between 2008 and 2015 have been €5 billion per year on average, where the majority is invested in buyouts. A more recent report from Invest Europe (2016) states that Nordic funds accounted for over 10% of annual European fundraising. In 2016, Nordic PE funds collected €7.15 billion where 31% of the funds raised was in venture funds, and 69% in buyout funds. The Nordic countries that attracted most venture capital was Sweden and Finland, while Sweden and Denmark received most of the buyout capital.

The largest LPs in Nordic PE are government-owned pension funds, insurance companies and banks according to BVCA (2014). Argentum (2015) reports that the most common exit strategy for Nordic PE funds in 2015 was trade-sell, which accounted for half of the total amount of exits in the Nordic countries.

When it comes to invested capital in PE as percent of GDP for 2016, Sweden invested 0.61%, Denmark 0.44%, Finland 0.3%, and Norway 0.28%, according to Invest Europe (2016). Looking at investments in venture capital, we see that

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[7] Sweden, Norway, and Denmark have "AAA" in Standard and Poor's credit rating, while Finland have "AA+". https://tradingeconomics.com/country-list/rating (27th of July 2017)

Denmark is number one in Europe with 0.1%, and Finland (0.05%) is number two with half the spending. The same report revealed that Sweden invested most of the Nordic countries in buyout with 0.6% of its GDP, which makes them the second most spending country in Europe on buyout. Average spending on buyout for the Eurozone is 0.23%. Denmark and Finland spend 0.33% and 0.21%, respectively. Worth noticing is that Norway only invested 0.1% of its GDP in buyout.

3. Literature Overview

To our knowledge there are no existing papers that covers the Nordic private equity market. However, there has been a large increase in studies on the U.S private equity. Most of the existing work focuses on PE performance and compare it to the performance of public markets.

We are encouraged and inspired by several international papers, that all covers the performance of PE in some ways. We have tried to extract some of the theories used and proposed, and applied them in our dataset covering the Nordic market.

Many research papers have come up with different conclusion when comparing the performance between private equity funds versus a public benchmark (often S&P 500). Kaplan & Schoar (2005), Robinson and Sensoy (2011) and, Ljungqvist and Richardson (2003) found in their research that private equity funds have performed equally or better than S&P 500, while Phalippou & Gottschalg (2009) shows an underperformance after adjusting for overstated reported values in previous research. However, we will not investigate Nordic PE fund returns compared to a suitable Nordic benchmark index in this thesis but it would be of high interest to investigate it in future research.

Most of the previous research have focused on buyout and venture capital when studying the performance of private equity funds, which is natural since they are the most common strategies. Kaplan & Schoar (2005) found that venture funds performed better than buyout funds using a dataset between 1980 to 1997. Ljungqvist and Richardson (2003) collects data from one of the largest LPs in private equity in the U.S. Since they received all information about the LPs investments between years 1981 to 2001 they claim that there should be no

survivorship bias in their data and the results showed that buyout funds created more economical value than venture funds in their sample. Robinson and Sensoy (2013) came up with a similar conclusion, favouring buyout funds.

Harris, Jenkinson & Kaplan (2013) used an updated dataset from Burgiss when they investigated the performance of 1400 U.S. buyout and venture capital funds derived entirely by information from the LPs of the funds. They compared their findings to the results in previous research and found that buyout funds achieved better performance compared to S&P 500 than earlier studies had documented, while venture capital funds outperformed public equities in the 1990s but underperformed in 2000s. An updated version in 2015 from the same authors, compared European funds versus North American funds. The results indicated that buyout funds in North America and Europe have performed equal. Venture funds, however, appears to be less successful in Europe than in North America compared to the public benchmarks, but the sample size of the venture funds in Europe were too small to draw any strong conclusions.

Many papers have focused on why there are major differences in the reported performance of PE funds in many publications. Typically, there are four common providers of data that have been used in research papers on PE: Burgiss, Cambridge Associates (CA), Preqin, and Venture Economics (VE).

The data collected from the VE database tend to appear in the most eminent research papers during 1990s and at the beginning of the 21st century. Phalippou and Gottschalg (2009) concluded that performance estimates found in previous research, and was used as industry benchmarks, were overstated. They claimed that in commonly used samples, accounting values reported by mature funds for non-exited investments are substantial. They also document biases towards better performing funds in this data. Stucke (2011) presents strong evidence that many funds stopped being updated from around 2001 and yet were retained in the VE data while earlier work by Harris, Jenkinson and Stucke (2010) concludes that returns based on the VE sample are consistently lower than those from other commercial providers for most years.

Ljungqvist and Richardson (2003) discusses this topic and claims that the mixed results from different papers (up to 2003) can be partly attributed to the quality of the data where aggregated performance data from VE were commonly used except

from Kaplan & Schoar in an early study from 2002, who used anonymized fund-by-fund data. The consequence of using anonymized datasets is however that

"you cannot account the timing of the cashflows or the risk profile of the portfolio companies"

when investigating the excess returns, Ljungqvist and Richardson (2009) claims. Jegadeesh, Kräussl & Pollet (2009) supports Ljungqvist and Richardson's (2003) critique and argues that many of the previous papers use databases that suffer from self-reported data, which leads to a potential selection bias where PE funds that performed poorly are less likely to be included.

More recently, Harris et al. (2013) uses data from all four different commercial sources to study U.S buyout and VC funds' performance. They found that private equity performance in Preqin and CA are similar to the Burgiss database. While the VE database tend to have a downward bias, and concludes that the results in Kaplan & Schoar (2005) and Phalippou and Gottschalg (2009) understate fund returns, especially for buyout funds. So, the variation between results of PE funds in previous papers may potentially be due to the use of different databases that includes potential biased data.

Many of the eminent PE publications have discussed relationships between returns and different fund characteristics. The fund size, which can be referred to as the total capital committed to the fund, is one characteristic that has been focused on. Ljungqvist and Richardson (2003) have tested the performance between small versus large PE funds and found that small PE funds tend to perform better. They motivate it with the following relationship

"the more money being raised in the fund's vintage year, the worse is the fund's subsequent performance".

Metrick & Yasuda's (2010) paper found a positive relationship between GPs experience and higher management fees for buyout funds. They explain that experienced GPs tend to increase the fund size to receive higher management fees, even though it might be negative for the funds' performance. This might cause a principal-agent problem and might be one of the reasons for the findings of Ljungqvist and Richardson (2003).

Kaplan & Schoar (2005) finds that fund flows are positively related to past performance and that larger funds performed better than smaller funds. However, Harris, Jenkinson & Kaplan (2015) states that venture and buyout funds tend to experience an inverse relationship between fund performance and aggregate capital committed where

"large infusions of capital into private equity may challenge the ability of funds to create value for their investors".

Both Robinson and Sensoy (2013), and Kaplan and Strömberg (2008) concludes that low performance in PE funds follows periods with high fundraising, which also supports Ljungqvist and Richardson (2003) and is similar to Harris et al. (2015) findings.

Also, Ljungqvist and Richardson (2003) investigates the relationships between funds sequence number and performance. They found that first time funds tend to perform better than follow-on funds. But the results were not significant so we cannot rely on that test result in our analysis. In Kaplan & Schoar (2005) first-time funds perform worse than funds with a higher sequence number. Further, they find that

"highly skilled GPs may be able to invest in better investments"

due to proprietary access. We can assume that highly skilled GPs in this context is a GP with a proven track-record and experience. Barber & Yasuda (2016) show that GPs with strong interim performance are significantly more likely to raise a follow-on fund and to raise a larger fund. This is something that Sensoy & Weisbach (2011) also concludes with and supports Kaplan & Schoar's (2005) positive relationship between fund flows and previous performance. Ljungqvist, Richardson and Wolfenzon (2007) have another possible reason explaining performance and experience:

"In particular, we find that young fund managers' investments are less responsive to market conditions and that such managers invest in riskier targets. The fact that younger funds take larger risks can help explain the negative expected returns Kaplan & Schoar (2005) find for first-time funds."

Kaplan & Schoar (2005) paper finds that funds raised in bust periods are more likely to create follow-on funds, suggesting that they perform better than funds raised in

boom periods. Robinson and Sensoy (2013) support this statement claiming that the absolute performance of private equity funds raised in booming years is significantly worse than funds raised in bust periods.

Kaplan and Strömberg (2008) reports that capital raised to PE funds tend to decline when the performance of the fund is declining which is consistent with a counter-cyclicality in fundraising and returns.

In Ljungqvist et al. (2007) private equity funds tend to accelerate their investment pace when interest rates are low and those results are consistent with the notion that debt financing availability affects booms and busts in the private equity market.

4. Theory

4.1 Performance Metrics

4.1.1 Multiples
Multiples are a common performance measure in PE and there are several different multiples that tells an investor either how much capital he has received from his investment or how much capital he could expect to receive. The CFA Institute's Global Investment Performance Standards (GIPS) was first introduced within PE in 2005, and the standards were effective from January 1st, 2006 and then revised in a third edition effective from January 1st, 2012. The engagement of such standards makes it easier to compare multiples between funds. GIPS Chapter 7, requires GPs to disclose the following multiples.

4.1.1.1 Distributed to Paid in Capital (DPI)
DPI is often called the realization multiple. It measures the amount that has been paid out to investors. It is calculated by dividing cumulative distributions by paid in capital. This tells the investors how much money they got back from their investment. DPI is best suited for evaluating a fund later in its life because there are more distributions to measure against.

$$DPI = \frac{Cumulative\ distributions}{Paid\ in\ Capital} \hspace{3cm} (2)$$

Given the formula we learn that DPI might be volatile in a funds early stage. If a fund returns some money after one year, the multiple will increase, but then GPs can ask LPs for more money in year two, and the multiple will decrease.

4.1.1.2 Residual Value to Paid in Capital (RVPI)
RVPI is the counterpoint to DPI and more relevant early in a funds life because it measures the remaining market value of the fund's capital which has not yet to be realized. It is calculated by dividing the residual value (or fair market value) by paid in capital.

$$RVPI = \frac{Net\ Asset\ Value}{Paid\ in\ Capital} \tag{3}$$

The RVPI metric is subjective as there are many ways a fund can calculate the value of unrealized returns. Ellis and Steer (2011) suggests that there is little sign of systematic bias in valuations, at least for relatively mature funds. Also, the GIPS have been introduced to get a more equal judgement on how residual value should be valued. Investors must keep in mind that not every GP follow the same standards.

4.1.1.3 Total Value to Paid in Capital (TVPI)
The TVPI is known as the fund's investment multiple and it is the sum of DPI and RVPI. It is given by:

$$TVPI = \frac{(Net\ Asset\ Value + Distributions)}{Paid\ in\ Capital} \tag{4}$$

The multiple is commonly referred to as the Net Multiple, as do Preqin. Because it contains the RVPI, it will fluctuate until the fund is fully realized. Early in a fund's life, and for inexperienced GPs, TVPI might be highly uncertain.

4.1.1.4 Paid in Capital (PIC)
The PIC multiple measures how much of the fund's capital is invested. It is given by:

$$PIC = \frac{Paid\ in\ Capital}{Committed\ Capital} \tag{5}$$

This measure gives the investor a view of how fast the GPs are investing their money during the investment period. A high PIC means that the fund is near the end of its life and has invested most of committed capital.

4.1.1.5 Gross vs. Net
Because GPs often use gross and net multiples interchangeably in marketing and conversations with investors, it is important to know which figures are being

reported. Gross multiples represent the fund's gross returns and do not account for management fees or carried interest. Net multiples are more representative of the actual returns an investor would have received because they include the effects of fees and carried interests.

4.1.2 Drawbacks of multiples

The most obvious drawback of using multiples, is that they do not take into consideration the timing of capital calls and distributions, nor does it take into consideration time value of money. Despite that the multiples are relatively easy to understand, without the time dimension, one could get the same multiple by putting money in the bank and wait. Therefore, timing is a critical factor when comparing actual fund performance.

Another concern about multiples is that they do not provide investors with information about the underlying risk of the investments, or the potential reinvestment performance of distributions. This critique is also raised on more traditional asset classes, like stocks and dividend payments, which is not reported with its underlying risk.

When using multiples as performance evaluation, they should be used in comparison with cash flow data as well as forecasts on when capital calls and distributions will occur.

4.1.3 Internal Rate of Return

IRR is frequently used by investors and, alongside with multiples, it is a powerful way to get a complete overview of the fund's performance. Another strength of the IRR is that it can be used in comparison with other type of investments. However, investors should be aware of that if it is used alone, it can be misguiding and show a wrong picture. Therefore, the CFA Institute requires that funds report the since inception IRR, along with the DPI, RVPI, and TVPI.

In contrast to multiples, the IRR takes into consideration the timing of cash flows. IRR is the discount rate which makes the Net Present Value (NPV) of a series of cash flows equal to zero and the GIPS (CFA Institute, 2012) has the following formula of IRR:

$$V_E = \sum_{i=0}^{n} CF_i(1+R)^{W_i} \qquad (6)$$

Where V_E is the ending value of the portfolio, CF_i is the value of cash flow i, and W_i is the weight of cash flow i in period t (assuming the cash flow occurred at the end of the day), as calculated according to the following formula:

$$w_{i,t} = \frac{D_t - D_{i,t}}{D_t} \qquad (7)$$

Where D_t is the total number of calendar days in period t, and $D_{i,t}$ is the number of calendar days from beginning of period t to cash flow i. The IRR is obtained by selecting values for R in formula (6) and solving the equation until the result equals V_E. For example, if three external cash flows (including the value at the beginning of the period) have occurred, the computational formula will have three terms:

$$V_E = CF_0(1 + R)^{W_0} + CF_1(1 + R)^{W_1} + CF_2(1 + R)^{W_2} \qquad (8)$$

The first term deals with the first external cash flow, CF_0, which is the value of the portfolio at the beginning of the period; W_i is the proportion of the period when the external cash flow CF_1 was held in the portfolio. Because CF_0 is in for the whole period, $W_0 = 1$. The larger the value of CF_i in the term, the more it will contribute to the total, but the smaller the exponent (i.e., the value of W_i), the less the term will contribute to the sum. The usual effect is that the first term, with a large CF_0 and W_0 equal to 1, will contribute far more than the other terms. This leads us to one of the biggest pitfall of the IRR, namely that GPs can be incentivised to boost the metric by returning distributions earlier than they should. Money received early is more valuable than money received later. We shall therefore see another example, inspired by Bison, a U.S data provider within private equity, where it becomes clear that IRR must be seen in comparison with multiples.

Imagine two funds, fund A and fund B that are both eight years into a ten-year fund life. Below is their committed capital and distributions as well as IRR and TVPI multiple. We see that they have the same IRR of 15.6%, but different TVPI's where fund A has a 0.5x higher TVPI than fund B. This is because fund A return more cash in total than fund B. But fund B return 3 million after just one year and it is almost 55% of committed capital at the time. If an investor only cares about IRR he would be indifferent of the two funds, but when he cares about how much money he gets in return of his investment he should look at the TVPI of fund A and choose that.

Date	Fund A	Fund B
2/1/2006	-2,500,000	-2,500,000
7/1/2006	-2,500,000	-2,500,000
4/1/2007	-1,000,000	-1,000,000
3/25/2007	0	3,000,000
9/1/2008	-1,000,000	-1,000,000
1/1/2009	0	0
6/1/2009	1,000,000	1,000,000
1/1/2010	3,000,000	3,000,000
6/1/2011	3,000,000	0
12/1/2013	3,600,000	0
1/1/2013	0	0
3/31/2014	5,000,000	5,000,000
Cash In	7,000,000	7,000,000
Total Value	15,600,000	12,000,000
TVPI	2.23	1.71
IRR	15.6%	15.6%

Figure 1 – IRR example with cash flows from Bison (2017).

Here, we have focused on the positive aspects of IRR because we think that when you understand the background of it and use it alongside multiples it is more than enough to evaluate performance of PE funds, and there exist no better publicly available measure. However, Phalippou (2008), provided us with an excellent understanding of the usage of IRR and its limitations. He looks at IRR in a quite negative way, and we recommend the curious reader to read his paper.

5. Data

This thesis is based on a dataset from Preqin. According to Brown, Harris, Jenkinson, Kaplan, and Robinson (2015), Preqin gets their data from public sources as well as direct requests for submission. They also make use of the Freedom of Information Act (FOIA) which requires certain LPs to reveal some information, at least in the US.

Brown et al. (2015) reports that outside the U.S, over 70% of the reported data comes from voluntary filings of GPs. Other sources are regulatory filings, listed firm financial reports, annual reports, and monitoring of media outlets. Preqin work

hard to be consistent with its methodologies and crosschecks all its fund data information.

Preqin has been researching the PE industry for over a decade, and is one of the most awarded alternative assets data providers. As of 4th of July 2017, Preqin covers 27,642 firms and 49,863 funds, and 25,794 funds with performance data, (Preqin Global Data Coverage, 2017). For the Nordic region, there was 225 PE Nordic-based institutional investors as at January 2017. The number of active funds in the Nordic market was 33 (19, 3, 9, and 2 for buyout, venture, real estate, and infrastructure, respectively) as at January 2017. Preqin has registered 2,217 Nordic deals in buyout, 2,188 in venture, 344 in real estate and 727 in infrastructure.

Harris, Jenkinson, & Stucke (2010) point out that GPs may not be incentivised to provide IRR, but Preqin themselves claims to have the most trusted and comprehensive data available (Preqin, 2008). However, when research relies on voluntary submission of data, problems with both survivorship bias and backfill bias can be present. Survivorship bias occurs when poor performing funds stop reporting results and falls out of calculations. Backfill bias occur when funds stall their performance reporting only to backfill them when better results have been achieved. Harris, Jenkinson, & Stucke (2010) find that the Preqin data could suffer from backfill bias, while according to Russell (Gupta, 2012), a global asset manager, there seem to be no survivorship bias in Preqin's dataset.

5.1 Data Processing
The original dataset came with records of 463 PE funds from Denmark, Finland, Norway, and Sweden between vintage year 2005 to 2016. We initially wanted data going back to 2000. We believe that would have solved some of our non-normal distribution issues and it could have shed more light on the performance of bust periods since we would have had data on funds that were raised and more mature during the dot.com bubble in the early 2000's. However, in our originally dataset many of these funds had missing data and editing needed to be done.

First, the sizes of the funds were in nominal terms, so we adjusted them for inflation (Bureau of Statistics, 2017). All fund sizes are now presented in 2016 euros.

Second, only buyout and venture funds were kept. We count 47 buyout funds and 11 venture funds that has either reported multiples or IRR. When we only include funds that report both metrics we have 41 buyout funds and 6 venture funds. This number of funds is of course a very small sample, even too small for this thesis to make any sufficient impact, but we believe that we will be able to make some reasonable conclusions after all. Ideally, we should have had at least 30 venture funds, but we can only use what we have available at the time. Since most of the PE research have focused on either buyout, venture, or both, we decided to drop real estate to compare our results with other studies.

Third, we had to give the funds sequence numbers. We did this by giving funds numbers from 0 to 4, where 0 indicates that it is a fund managers first fund with no follow-on funds, 1 indicates that it is the first fund with follow-on funds, 2 is number two and so on. We did this so we could get a picture of how big impact follow-on funds have on performance. For example, if a fund manager with many funds perform better than a manager with only one fund? We will know this by comparing the sequence numbers performance. If funds with sequence number 1 is significantly better than funds with sequence number 0 we can conclude that well performing first time funds will increase the probability of creating a follow-on fund.

We know our dataset contains too few observations, especially on venture funds, and that the possibility that we will suffer from both type I[8] and type II[9] error when we run the statistical tests. Despite this we have chosen to ignore the issue and do our best to complete the study. We are confident that we will get some interesting results that may give baseline for further studies.

After having dropped the necessary data, we were left with a sample of 47 PE funds. Later in the analysis, we will make use of two different tests depending on the number of groups we are testing for. If we have two independent groups we use the Mann-Whitney-Wilcoxon test (MWW-test), which is used to compare the rank sum of the groups. The test will rank all the observations from both groups and then sums the ranks from one of the groups which is compared with the expected rank

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[8] Type I error is the detection of an effect that is not present, i.e. incorrect rejection of a true null hypothesis.
[9] Type II error is the failure to detect an effect that is present, i.e. incorrectly retaining a false hypothesis.

sum. The MWW-test is a non-parametric test and appropriate to use when the dependent variable (IRR, TVPI, or Size) is non-normal.

When we have three or more groups, we will make use of the Kruskal-Wallis H test (K-Wallis), which is used when the distribution of the dependent variable is non-normal. K-Wallis test is an extension of the MWW-test when you have two or more unrelated groups.

For our descriptive statistics, we have chosen to rely on data that are controlled for outliers. This choice was difficult to make because an exclusion of outliers is the same as saying that skilled fund managers cannot create abnormal returns, or that it is impossible to fail and experience large negative returns. Since we have no way of finding out if the extreme values are a matter of typing error or real values, it is not a right or wrong choice. The main reason for why we control for outliers is that it will have a severe impact on the reported means and medians of our small dataset.

Because of our scepticism to exclude the outliers, we have reported both the descriptive statistics and all our tests excluding and including outliers. Tables including numbers and the tests are found in the Appendices at the end of our paper. For the analysis, we have focused on data where we control for outliers unless other is stated.

5.2 Descriptive Statistics

We report that the mean IRR (size) {TVPI} of the sample is 8.51% (€889M) {1.37}. The tables in Appendix A reports all descriptive statistics for the whole dataset. As you will see, we control for some specific factors, like fund types, cycles, size, sequence numbers, and countries.

5.2.1 Fund Types

In our dataset, we have 38 buyout funds and 6 venture capital funds. This makes our sample quite skewed towards buyout funds and difficult to robust and reliable conclusions. Despite this, we report that buyout {venture} funds have a mean IRR of 10.12% {-1.68%}, size of €1007M {€138M} and TVPI of 1.44 {0.94}.

5.2.2 Cycles

We have defined cycles as boom and bust, and for our sample period between 2005 and 2016 we only have one bust period according to the National Bureau of Economic Research (NBER), where they define a bust period to be

> *"a significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in real GDP, real income, employment, industrial production, and wholesale-retail sales".*

For our study, this corresponds to vintage years between 2007 to 2009. We have 12 observations between this interval and they have a mean IRR of 13.58% (€803M) and {1.72}. For boom periods, which is all other vintage years, the same numbers are 7.13% (€947M) and {1.26}.

5.2.3 Size

We control for size by dividing funds into small, medium, and large size. Funds with a value of €100 million (M) or less is characterised as small funds, a value between €100M to €500M is medium size, and above €500M is large.

For large funds, i.e. above €500M, we report a mean IRR of 10.99%, size (€2105M), and TVPI of {1.43}. For medium sized funds, we find the mean IRR to be 7.86%, (€252M), and {1.38}, while small sized funds have similar numbers of 7.6%, (€70M), {1.22}. Number of observations for the respectively classifications is 15, 24, and 4.

5.2.4 Sequence Numbers

The idea with sequence numbers is to get a variable that can explain manager skills. We have given all the funds a number from 0 to 4 based on which number the fund is in the line of other funds by the same manager. If a fund has no follow-on funds it is given the number 0. A managers' first fund will be given the number 1, while the next fund is given the number 2, and so on. Because we have sorted the funds out ourselves we may suffer of some biases. We have treated a manager funds like a follow-on fund only if it is made very clear by the name. That means if a fund name is *"Buyout Fund I"*, and the next fund is *"Buyout Fund II"* we have given them sequence number 1 and 2. But if for example the second name is "Venture Fund II" and that's the only two funds in the dataset by that manager we have given both a sequence number of 0. Therefore, the other bias we may suffer from is that if we don't have the first fund in our sample, like if the manager started its first fund in 2000, we will treat the second fund which started in 2005, like that manager's first fund and give it sequence number 0 or 1 depending on if there are more follow-on funds.

We also report the findings of both sequence number 0 and 1 as a group because they both are a fund managers first fund. We gave this group a value of 5 in the test process. The numbers are found in the tables in Appendix A.

5.2.5 Countries

We look at countries to get an overview of the basic characteristics of performance. For our sample, each fund is located where the GP is headquartered (HQ). Sweden has the largest representation in our sample with 16 out of 44 PE funds while the rest is almost equally divided between Denmark, Finland, and Norway. Our descriptive statistics shows that average fund size in our sample is largest in Sweden (€1870M) followed by Norway (€549M), Denmark (€239M) and Finland (€191M). IRR and {TVPI} for the respective countries are 12.34% {1.57}, 7.5% {1.29}, 12.23% {1.38}, and 7.36% {1.26}.

6 Hypothesis

Our goal with this thesis is to detect the characteristics of performance in the Nordic private equity market, and to see if we can find some distinctions from other PE markets. We do this by looking at fund performance and compare the fund characteristics against each other. Our hypotheses are based on previous literature on the subject and our own subjective opinions.

6.1 IRR and TVPI

We expect both IRR and TVPI to show approximately the same results as they are performance metrics. If there are some underlying factors that need special attention the assumption can be changed, but our hypothesis for IRR and TVPI are that these measures are equal.

6.1.1 Fund Types

We will look at how buyout funds perform compared to venture capital funds. Historically, we know that venture funds outperformed buyout in the 90s, while buyout have outperformed venture in the 00s. Harris, Jenkinson & Kaplan (2013) find that average venture capital fund returns in the U.S, outperformed public equities in the 1990s, but have underperformed public equities in the most recent decade. The key difference to understand the performance of the two types is to

look at their characteristics. While buyout invests in larger firms and more developed management, venture invests in much less developed and smaller firms. That means, the volatility of their portfolios will be greater. With history in mind, and the fact that we have a small sample we expect buyout to outperform venture.

6.1.2 Cycles

Since our study is bound to the time interval between 2005 and 2016, we only face one cycle as defined by the National Bureau of Economics (2017). Funds initiated between 2007 to 2009 are considered the bust cycle, while all other funds in our sample are started in a boom period. When funds are started during a bust period they are more likely to attract less funds because of people's scepticism and unwillingness to allocate capital in risky assets. That is not necessarily a bad thing because research have proven that too large funds have difficulties creating excessive returns. Harris, Jenkinson & Kaplan (2013) find that both absolute performance and performance relative to public markets are negatively related to aggregate capital commitments for both buyout funds and venture funds.

However, we believe that funds created early in the bust period will underperform, while funds created in the middle to last quartile of the bust period could be able to outperform all other funds because of the enormous comeback of the market after the crisis and the fact that they would have invested at lower prices than funds that invest in boom periods. We think the latter will outweigh the former. Also, funds that are created in the start of boom periods will have much of the same characteristics as funds in the last quartile of bust periods and will smooth the difference between the two groups.

Therefore, our hypothesis is that funds created during the bust period will outperform other funds because of the turnaround it will achieve. Boom periods last longer than bust periods and boom periods are characterized by long periods of economic growth, which is a prerequisite for higher returns, but studies have proven that periods with high fundraising are followed by lower returns.

6.1.3 Size

When it comes to size previous research have mostly focused on mutual funds and the conclusions is that larger funds underperform compared to the market. For PE, such research does not exist yet. However, Gompers and Lerner (2000) find that large funds pay a higher price for their investments and such reducing their value creation, while Kaplan & Schoar (2005) find a positive relation between fund flows

and past performance, but that the relationship is concave, meaning that when the fund becomes too large its performance will surge. We believe that medium sized funds outperform small funds, as well as large funds outperform small. We do not think that medium sized funds will be significantly better than large funds.

6.1.4 Country

Comparing the different Nordic countries is done to see if we find some differences that could be reason for further investigation. There exists no previous studies on the different Nordic countries that link and compare performance. We base our hypothesis on descriptive data collected from Invest Europe, NVCA, SVCA, DVCA, and FVCA.

We do not believe there would be any significant differences in performance of the four countries. Looking at the nature of Nordic PE we see that even though the funds are located in different countries, they invest across the borders and the markets are relatively correlated.

6.1.5 Sequence Numbers

For sequence numbers, we expect funds with no follow-on funds (sequence number equal 0) to underperform other sequence numbers. Said differently we expect funds that have follow-on funds to perform better than funds that has no other funds. This can also be translated into fund managers with many follow-on funds will have a greater track-record than fund managers with only one fund. Further, we expect the relation to be concave, which means that we think a sequence number of 2 and 3 to be significantly better than 0, while the outperformance will decrease as the sequence numbers get higher.

6.2 Size

6.2.1 Fund Types

Looking at buyout and venture funds we know that venture fund typically invests in a firm's earlier stage than buyout funds. This indicates that venture funds raise less money because the firms they invest in are smaller and with greater risk. Therefore, we expect buyout funds to be significantly larger than venture funds.

6.2.2 Cycles

For boom and bust periods we believe that funds that are raised during a bust period will attract less capital than funds that are raised during a boom. In recessions

investors tend to be more pessimistic and unwilling to invest money in risky asset classes.

6.2.3 Countries

Sweden is the country that has most capital under management by far, so we expect Sweden to be significantly larger in size compared to the other countries while we do not expect the difference between the rest to be significant.

6.2.4 Sequence Numbers

Looking at sequence number we will expect that fund size increases with sequence number because small funds will be mainly located in the lowest sequence numbers, like 0 and 1, while medium and large funds are from a fund managers first fund and further. Also, funds with less assets under management will be less likely to have a follow-on fund. Chung, Sensoy, Stern and Weisbach (2010) find that there is a strong relationship between past performance and the possibility of starting a follow-on fund. They also report that fund flows in private equity reflect learning about ability over time, which means that top performing fund will be more likely to attract more funds. Therefore, we believe that funds with higher sequence number will be larger than those with lower sequence number.

7 Methodology

7.1 Statistical tests

This analysis is based on several tests done in both Microsoft Excel and the statistical program Stata. Due to our small sample, we will only make use of the tests that is appropriate when the distribution of the data is non-normal. These two are the MWW-test, and Kruskal – Wallis H test.

7.1.1 Mann-Whitney Wilcoxon rank-sum test

The MWW-test is often referred to as the non-parametric alternative to the independent t-test and is more proper if the distribution of the sample is non-normal. We use the test to identify if there are statistical significance between two independent, unrelated groups on a dependent variable. In our study, the dependent variable will either be IRR, TVPI, or size. Due to our small sample, the MWW-test will be most appropriate in the analysis.

There are three assumptions for the MWW-test that must be overheld:

1. The dependent variable should be measured at the interval or ratio level.
2. The independent variables should consist of two categorical, independent (unrelated) groups.
3. It should be independence of observations, i.e. it should be no relationship between the observations in each group or between the groups themselves.

The assumptions are related to the design of the study and should be a matter of reflection before the choice of which test to use is made. For our sample, we view the assumptions as fulfilled.

However, it is possible to argue that the third assumption is not overheld because the IRR and TVPI variables may not be entirely independent as they will move in accordance with the financial market. When the market goes up, so will the performance numbers and vice versa. We ignore this matter, mostly because it seems to be the same in other studies and because it will be a tedious job to overcome this bias.

The null hypothesis of the MWW-test is that the two populations have the same distribution with the same median. If the null is rejected, it indicates that one distribution is shifted either to the right or to the left of the other. Below is an example:
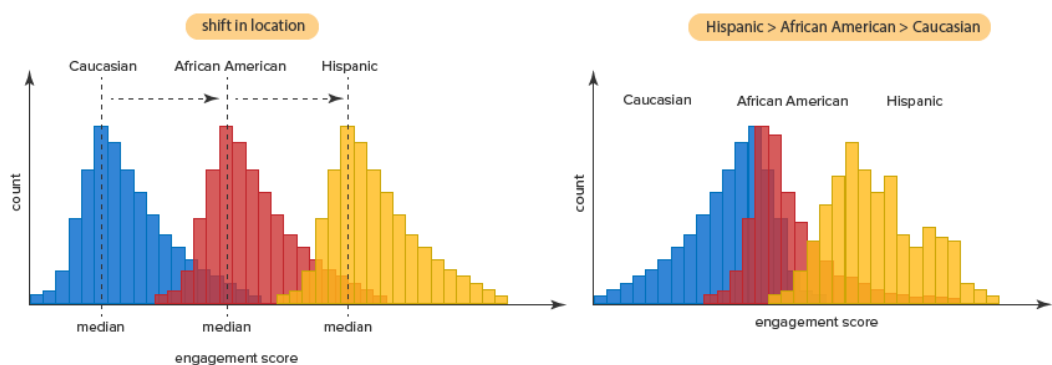
Figure 2 - Lærd Statistics on different distribution in variance.

To the left we have three groups with similar distributions and hence, we can compare the groups medians. On the right, we have three groups with different

distribution and so we cannot compare the medians, but we must compare the rank sum of the means.

The MWW-test is done by ranking all the variables in an ascending order. Then the expected rank of each group is calculated. When there are equal values in the distribution they receive an equally weighted rank, which is calculated as the mean of all the ties. The test then reveals which group is dominating which and if it is significant. The group that has a real rank that exceeds the expected will be the one dominating the other.

7.1.2 Kruskal-Wallis H test

The Kruskal-Wallis H (K-Wallis) test is used to determine whether the means of three or more independent, unrelated groups are statistically significant. Because of our small sample, especially for venture funds, and the greater chance of having non-normal data we use the Kruskal-Wallis H test (K-Wallis test) which is the non-parametric alternative to the One-Way Analysis of Variance (ANOVA) test and a generalized form of the MWW-test. We make use of the K-Wallis when we cannot use the ANOVA, i.e. when the data is non-normal. It tests whether there is some statistical significance between the groups mean rank-sum or the medians.

K-Wallis have the same assumptions as the MWW-test. It requires you to know the distribution of the data so the interpretation of the test results is done correctly. If the distribution in the groups are similar, it compares the groups median. If the distribution is different, the test results must be interpreted as difference in the mean rank of the groups. Our data indicates that it is the latter of the two distributions that applies, which means we will be comparing the mean rank-sum unless other is stated.

K-Wallis is an omnibus test[10]. Therefore, we must use a post-hoc test to determine which groups are different.

7.2 Test Selection Process

We start by examining the data for outliers by generating studentized residuals. Studentized residuals are a type of standardized residual that can be used to identify

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[10] It only tests if the explained variable in the dataset is significantly different from the unexplained variable, and does not tell which of the groups that are different.

outliers, or extreme values. Extreme values on the high end will receive a large number, while extreme values on the low end will receive a large negative number. We exclude studentized residuals that exceed +2 or -2. This is to handle the outlier problem, which will have a severe impact on our tests due to the small sample size. When we do the following tests, we make sure that outliers on both ends are excluded from the study.

However, we also report statistics and tests based on an untrimmed dataset, i.e. that includes all the variables in our sample. This is because we think it is important to include all the observations. It is, in fact, a highly discussed matter within statistics whether to exclude or include outliers. For our field, if you exclude them, you are saying that fund managers cannot obtain returns above normal or fail and lose a lot of money.

Next, we check whether the data is normally distributed or not. To do so, we use the Shapiro-Wilk normality test, which is given by

$$W = \frac{(\Sigma_{i=1}^{n} \alpha_i x_i)^2}{\Sigma_{i=1}^{n} (x_i - \bar{x})^2} \tag{8}$$

Where W is the test statistic and α_i is a constant and x_i is the i-th order statistic, i.e. the i-th smallest number in the sample, while $\bar{x}$ is the sample mean. If the p – value of the test is equal to, or smaller than 0.05, the null hypothesis is rejected in favour of the alternative hypothesis of non-normal distribution. In most cases, we have also looked at the skewness and kurtosis of the distributions with the SK-test. This test is given by

$$K^2 = Z_1^2 + Z_2^2 \tag{9}$$

Where K^2 is the test score and Z_1^2 and Z_2^2 is the distribution of the test statistic for skewness and kurtosis, respectively. K^2 has an approximately x^2 distribution with two degrees of freedom. If K^2 is significant, the null hypothesis of normal distribution is rejected in favour of the alternative hypothesis of a non-normal distribution.

For non-normal distribution of the data we know that we either will use the MWW-test or the K-Wallis test. It depends on how many independently unrelated groups

we have. Regardless of the number of groups we must investigate the distribution of the data to know if we are comparing

    (i)   the mean rank of the variables, or

    (ii)   the medians of the groups

Worth noticing is that we decided to group the independent variable size into three different groups and tested them with the MWW-test. Instead, we could have made use of the K-Wallis test. The consequence of this choice is that when the input change, i.e. when we compare small to medium, and medium to large, that the mean IRR or TVPI will be different for medium sized funds. This is because the distribution of the values changes as we change the sample input. This is fairly logic, but we think it is worth mentioning.

In the appendices, we also report test values for the whole data sample, i.e. when we have included all observations. We get quite different results for some of the characteristics which show how big impact outliers can have.

8 Findings

Here in this section, we look at the results from our statistical tests and show the effects of the different fund characteristics on IRR, TVPI, and size. The characteristics we have tested for is fund type, cycles, size, countries, and sequence number, which will be controlled for both individually and in combination with the other characteristics.

8.1 IRR and TVPI

IRR and TVPI are measures that are based on the funds ability to return cash, i.e. their performance. We therefore expect them to move interchangeably, and show somewhat similar results when the underlying characteristics are similar. We will report both metrics, but the comments will be based on IRR, unless TVPI shows a different result.

8.1.1 Fund types

The difference between buyout funds and venture funds is strongly significant[11] with an average mean IRR of 10.12% and -1.68%, and TVPI of 1.45 and 0.94, respectively (Table 13 and Table 14). This is in line with our hypothesis and the fact that research shows that venture capital has underperformed during the 00's. The significance becomes even stronger when we do not control for outliers, see Appendix D, table 16.

8.1.2 Cycles

We report that funds raised in bust periods is strongly significant[12] better than funds raised in boom periods with an IRR of 11.82% and 7.13%, and TVPI of 1.64 and 1.29, respectively. This is in line with our expectations we presented as our hypothesis. The funds that were raised during this period could invest at a lower price and therefore experience a tremendous return on their investments. These findings are in line with what other have found earlier, see Robinson and Sensoy (2011). They find that periods with high capital inflow is followed by low performance. We believe that this is one of the reason that bust periods outperform boom periods. High capital inflow is likely to incur in booming periods when investors are positive and invest their money in risky assets like PE. The significance is stronger for TVPI than it is for IRR.

Looking at cycles on fund types we discover that buyout funds have a mean IRR of 13.58% in bust periods and 8.53% in boom. This difference is weakly significant. TVPI shows strongly significant difference with 1.72 for bust, and 1.34 for boom periods. For venture funds, we have a mean IRR of -9.3% and -0.16% for bust and boom, respectively. However, we only have data for one venture fund in the bust period and therefore it will not be weighted in our analysis.

If we compare fund types, we can see that buyout clearly outperform venture in both cycles even though we have insufficient data on venture funds. This is in line with what others have found, see Harris, Jenkinson & Kaplan (2013) or Robinson and Sensoy (2011).

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[11] $0.01 \leq$ p-value = strongly significant. $0.01 <$ p-value ≤ 0.05 = significant. $0.05 <$ p-value ≤ 0.1 = weakly significant.

[12] Strongly significant on TVPI, while weakly significant on IRR

8.1.3 Size

Comparing small sized funds to medium sized funds we find that they have an IRR of 7.6% and 7.86%, respectively. Thus, we find no significant difference. The same comparison between small funds and large funds give IRRs of 7.6% and 9.72%, but still not significant at any level. The last comparison between medium funds and large funds reports IRR of 8.89% and 9.72%, respectively with no significance to report.

Looking at TVPI we report the numbers 1.31, and 1.4 when we compare small to medium, 1.27, and 1.39 for small to large, and 1.4 to 1.39 for medium to large. None of these findings are significant at any level. This contrasts with what others have found. Kaplan & Schoar (2005) find that larger funds have a higher return than smaller funds. Robinson and Sensoy (2011) find a concave relationship between size and returns, which is what we believed we would find.

When we look at buyout funds, we see that small funds are significantly better than medium funds, with IRR of 13% against 10.16%. However, there are only two funds in the small category so our findings are not very robust. When we include outliers, we do not have a significant difference. With TVPI as the independent variable we have significance both with and without outliers when we compare small funds to medium funds. This shows that smaller funds outperform medium sized funds within buyout. There is no significance between the other categories.

For venture funds, we only have data on small and medium funds. The IRR is 2.2% for small, and -3.63% for medium with no significance. For TVPI the same numbers are 0.93, and 0.77. On venture funds, we have only 6 observations and therefore, our findings are not robust. The fact that Harris, Jenkinson & Kaplan (2013) reports smaller venture funds to outperform larger venture funds and we do not, could be a direct consequence of the lack of data.

Looking at fund types, we find a significant difference between medium buyout funds and medium venture funds, with an IRR of 10.16% and -3.63%, respectively. TVPI shows similar results with a slightly weaker significance.

8.1.4 Sequence Numbers

In table 37 and 38 we have reported the results from sequence numbers on IRR and TVPI. For IRR, we find no evidence for significant differences. For TVPI, we find a weakly significance between sequence number 1 (1.65) and 0 (1.15), while we

report a significance between sequence number 3 (1.07) and 1 (1.65). This indicates that there is some evidence of manager skills in the Nordic PE market, which is in line with what others have found in different markets. However, we had expected to find a much stronger evidence and the fact that IRR shows no significant difference is surprising. Another surprise is that we find the strongest significance between sequence number 3 and 1, when we would expect it to be between 2 and 0, or 3 and 0. In the data that includes all the observations we find no significance either from IRR or TVPI.

However, this could be a trend first laid out by Harris, Jenkinson, Kaplan and Stucke (2014) who says that

"recent research by Sensoy, Wang and Weisbach (2013) finds that the ability of certain types of investors to achieve higher performance, as originially found by Lerner, Schoar and Wongsunwai (20017), has disappeared in recent years. This may reflect a reduction in performance persistence that GPs provide, this decreasing the value of long-established relationships between LPs and particular GPs".

8.1.5 Country

When we look at the four different countries we find no significant difference in the distribution of performance. IRR is 11.66%, 7.36%, 7.3%, and 5.17% for Sweden, Finland, Denmark, and Norway, respectively.

A possible explanation is that the Nordic countries are well correlated and the fund managers invests across the country's leading to more similar result. There is no evidence that funds located in one country experiences greater returns than a fund located in a different country within the Nordic region.

8.2 Size

8.2.1 Fund types

Comparing fund types, we find that buyout funds is significantly larger than venture funds, €553M versus €138M. Several papers report similar results, see for example Higson & Stucke (2012), which suggest that buyout funds are more scalable. The results are fairly expected as we mentioned that venture funds typically invest in earlier-stage firms, which is less valued.

8.2.2 Cycles

In boom periods, investors tend to be more willing to invest. Hence, we believed that funds raised in a boom period should be larger than funds raised in bust periods. Our findings show no significance between the two types with €527M in boom periods, and €411M in bust periods.

When we look at boom periods and compare buyout funds with venture funds we find that the size of buyout is significantly larger than venture funds with €602M against €140M. In bust periods, we report no significance between the two types, because we only have one venture fund raised in this period. Further, we find that buyout funds raised in boom periods have a mean size of €602M, while those raised in bust periods have a size of €437M. The same numbers for venture funds is €140M in boom, and €126M in bust. None of them are significant.

8.2.3 Sequence Numbers

In our hypothesis, we believed that the relation between size and sequence numbers would be linear, with a funds size increasing with the sequence number. In table 39 we do not report any significance of this. We see that funds with sequence number 1 has a mean size of €463M, while funds with sequence number 4 has a mean size of €1385M, but since we only have one fund in our sample with sequence number 4, we cannot say if this is significant. Sequence number 0 has a size of €293M, while 0&1 has a value of €411M. We are not able to confirm the same results as Metrick & Yasuda (2010) did when they reported that GPs in buyout funds with experience sharply increase the size of their funds.

8.2.4 Country

Funds raised in Sweden (€902M) is strongly significant larger than funds raised in Finland (€178M), and significantly larger than funds raised in Denmark (€267M). Compared to Norway, no such significance is found. This is what we expected as Sweden has more experience with PE, and is more attractive for foreign investors than its neighbours.

9. Conclusion

In this thesis, we have investigated the performance of Nordic private equity funds, focusing on buyout and venture. We have used a dataset on individual fund returns and characteristics from the Preqin database covering the period from 2005 to 2016. There exists no other research that uses as updated data as we do. Most of the research that exist uses data from the 90s and early 00s and have focused primarily on U.S private equity. Nordic PE is described as one of the most successful markets and we hope this work can contribute to more focus and be a baseline for further research.

First, it seems that buyout funds outperform venture funds, which is in line with previous research. We find no evidence that venture outperform buyout for any of our controlling variables. Controlling for buyout funds, we see that small funds is better than medium funds. Medium buyout funds outperform medium venture funds.

Second, funds raised in bust periods are statistically significant better than funds raised in boom periods. A pitfall of our finding is that we only have data that covers one bust period. However, our finding is in line with what others have found and embedded in theory.

Third, we find that funds with a follow-on fund outperform funds without follow-on funds. We also report that funds with sequence number 3 outperform sequence number 1. These finding is only significant when it is measured on TVPI, which raises a credibility issue with our data.

Fourth, when we control for size, we find that buyout funds are larger than venture funds. Looking at each country, we find that Swedish funds are significantly larger than Finnish funds and weakly significant compared to Danish funds.

Finally, our thesis seems to discover the basic characteristics of the Nordic private equity market. However, we seem to have missed some of the main characteristics that applies to the broader market. This could be due to the lack of data, and potential biases. We strongly suggest further research to include an investigation of performance relative to a market index of private equity, which should be Nordic based. In addition, a closer look at fund managers and their value creation is of high interest. Also, we think that real estate should be included in future research because it is such a big part of the success of the Nordic economy.

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Appendices

Appendix A – Descriptive Statistics

Descriptive Statistics for IRR									
			Type		Cycle		Size		
Sequence Number	Statistics	All	Buyout	Venture	Boom	Bust	Small	Medium	Large
All	Observations	44	38	6	31	12	4	24	15
	Mean	8.51	10.12	-1.68	7.13	13.58	7.6	7.86	10.99
	Median	10.25	10.85	-2.25	9.7	13.8	4	10.25	11.3
	Std Error	1.28	1.14	4.24	1.41	2.04	7.42	1.72	1.33
0&1	Observations	22	19	3	16	6	3	13	5
	Mean	9.93	14.29	-4.6	11.09	16.57	6.9	11.51	9.42
	Median	10.3	11.3	-5.3	9.25	16.45	-1.7	10.7	10.7
	Std Error	2.52	3.16	2.94	3.86	2.87	10.45	3.65	1.71
0	Observations	6	3	2	5	1	2	3	1
	Mean	1.4	7.4	-7.3	3.54	-9.3	-3.5	0.73	13.2
	Median	-0.45	10.7	-7.3	0.8	-9.3	-0.35	0.8	13.2
	Std Error	3.63	4.61	2	3.59	0	1.8	5.77	0
1	Observations	16	15	1	10	5	1	10	5
	Mean	13.13	13.35	9.8	11.06	14.34	27.7	14.74	6.98
	Median	11	11.3	9.8	9.25	13.9	27.7	12.05	8.7
	Std Error	2.84	3.03	0	4.18	2.21	na	3.98	2.07
2	Observations	13	12	1	8	5	1	8	5
	Mean	12.52	12.75	9.7	12.58	12.42	9.7	11.41	12.62
	Median	13.7	13.85	9.7	12.5	13.7	9.7	12.35	14
	Std Error	0.98	1.03	0	0.99	2.18	na	1.67	2.23
3	Observations	6	5	1	6	0	0	2	3
	Mean	7.9	11.34	-15.8	7.9	na	na	4.85	15.67
	Median	11.2	15	-15.8	11.2	na	na	4.85	15.9
	Std Error	4.12	2.78	0	4.12	na	na	2.55	0.34
4	Observations	1	1	0	1	0	0	0	1
	Mean	6.6	6.6	na	6.6	na	na	na	6.6
	Median	6.6	6.6	na	6.6	na	na	na	6.6
	Std Error	0	0	na	na	na	na	na	0

Table 1 – Descriptive Statistics for IRR – Mean and median numbers in %.

			Type		Cycle		Size		
								Descriptive Statistics for TVPI	
Sequence Number	Statistics	All	Buyout	Venture	Boom	Bust	Small	Medium	Large
All	Observations	44	38	6	31	12	4	24	15
	Mean	1.37	1.44	0.94	1.26	1.72	1.22	1.38	1.43
	Median	1.34	1.35	0.84	1.21	1.76	1.07	1.34	1.36
	Std Error	0.06	0.59	0.15	0.06	0.1	0.31	0.09	0.07
0&1	Observations	22	19	3	16	6	3	13	5
	Mean	1.49	1.61	0.76	1.4	1.9	1.22	1.56	1.55
	Median	1.53	1.73	0.64	1.41	2.02	0.93	1.8	1.57
	Std Error	0.10	0.09	0.14	0.1	0.12	0.44	0.13	0.13
0	Observations	6	3	2	5	1	2	3	1
	Mean	1.07	1.38	0.63	1.16	0.61	0.79	1.17	1.34
	Median	0.985	1.34	0.63	1.04	0.61	0.79	1.04	1.34
	Std Error	0.19	0.27	0.02	0.21	0	0.15	0.37	0
1	Observations	16	15	1	10	5	1	10	5
	Mean	1.65	1.66	1.49	1.5	1.86	2.09	1.68	1.5
	Median	1.77	1.8	1.49	1.53	1.97	2.09	1.81	1.57
	Std Error	0.09	0.1	0	0.11	0.14	0	0.12	0.17
2	Observations	13	12	1	8	5	1	8	5
	Mean	1.44	1.46	1.21	1.31	1.64	1.21	1.35	1.56
	Median	1.36	1.38	1.21	1.31	1.62	1.21	1.31	1.55
	Std Error	0.07	0.07	0	0.05	0.11	0	0.08	0.12
3	Observations	6	5	1	6	0	0	2	3
	Mean	1.14	1.21	0.64	1.14	na	na	1.1	1.28
	Median	1.17	1.19	0.64	1.17	na	na	1.1	1.3
	Std Error	0.08	0.06	0	0.08	na	na	0.06	0.05
4	Observations	1	1	0	1	0	0	0	1
	Mean	1.06	1.06	na	1.06	na	na	na	1.06
	Median	1.06	1.06	na	1.06	na	na	na	1.06
	Std Error	na	na	na	0	na	na	na	0

Table 2 – Descriptive Statistics for TVPI

			Type		Cycle		Size		
Sequence Number	Statistics	All	Buyout	Venture	Boom	Bust	Small	Medium	Large
All	Observations	44	38	6	31	12	4	24	15
	Mean	889	1007	138	947	803	70	252	2105
	Median	326	433	126	326	365	75	232	1385
	Std Error	200	226	28	242	393	12	25	440
0&1	Observations	22	19	3	16	6	3	13	5
	Mean	633	711	117	797	183	62	221	2051
	Median	178	314	126	320	144	65	158	1357
	Std Error	237	271	27	318	53	13	35	791
0	Observations	6	3	2	5	1	2	3	1
	Mean	333	549	96	374	126	52	257	1123
	Median	142	487	96	158	126	52	158	1123
	Std Error	171	315	30	204	0	14	115	0
1	Observations	16	15	1	10	5	1	10	5
	Mean	746	787	125	1083	203	84	211	1948
	Median	248	314	125	422	156	84	165	1357
	Std Error	318	337	0	485	60	0	35	827
2	Observations	13	12	1	8	5	1	8	5
	Mean	1164	1254	94	866	1642	94	297	2599
	Median	427	433	94	253	634	94	309	1917
	Std Error	485	518	0	606	845	0	44	996
3	Observations	6	5	1	6	0	0	2	3
	Mean	1348	1378	260	1348	na	na	276	2112
	Median	908	614	260	908	na	na	276	2149
	Std Error	531	649	0	531	na	na	26	854
4	Observations	1	1	0	1	0	0	0	1
	Mean	1385	1385	na	1385	na	na	na	1385
	Median	1385	1385	na	1385	na	na	na	1385
	Std Error	0	0	na	na	na	na	na	0

Descriptive Statistics for Size

Table 3 – Descriptive Statistics for Size – All mean and median numbers are in million EUR.

Descriptive Statistics for Countries by IRR					
		Country			
Statistics	All	Norway	Sweden	Denmark	Finland
Observations	44	9	16	8	10
Mean	8.51	7.50	12.34	12.23	7.36
Median	10.25	9.70	11.5	12.45	2.75
Std Error	1.28	2.56	0.97	5.72	3.33

Table 4 – Descriptive Statistics for country by IRR – All mean and median numbers are in %.

Descriptive Statistics for Countries by TVPI					
		Country			
Statistics	All	Norway	Sweden	Denmark	Finland
Observations	44	9	16	8	10
Mean	1.37	1.29	1.57	1.38	1.26
Median	1.34	1.21	1.56	1.35	1.12
Std Error	0.06	0.11	0.07	0.16	0.15

Table 5 – Descriptive Statistics for country by TVPI

Descriptive Statistics for Countries by Size					
		Country			
Statistics	All	Norway	Sweden	Denmark	Finland
Observations	44	9	16	8	10
Mean	889	549	1870	239	191
Median	326	427	1240	151	143
Std Error	200	155	451	56	46

Table 6 – Descriptive Statistics for Country by Size – All mean and median numbers are in million EUR.

Appendix B – Descriptive Statistics – All Observations

			Type		Cycle		Size		
Sequence Number	Statistics	All	Buyout	Venture	Boom	Bust	Small	Medium	Large
	Observations	47	41/47	6/47	34/47	13/47	5/47	26/47	16/47
All	Mean	11.45	13.37	-1.68	11.31	11.82	15.92	11.66	9.72
	Median	10.7	11.3	-2.25	10.25	13.7	9.7	10.7	11
	Std Error	2.08	2.15	4.235	2.715	2.57	10.11	3.13	1.77
	Observations	24	20/24	4/24	17/24	7/24	4/24	14/24	6/24
0&1	Mean	13.97	16.97	-1	14.42	12.87	17.48	15.52	8.02
	Median	10.7	11.45	-2.25	9.8	13.9	13	11.15	9.7
	Std Error	3.67	4.02	4.16	4.92	4.42	12.9	5.25	1.98
	Observations	7	4/7	3/7	6/7	1/7	3/7	3/7	1/7
0	Mean	8.23	17.85	-4.6	11.15	-9.3	14.07	0.73	13.2
	Median	0.8	11.95	-5.3	5.75	-9.3	-1.7	0.8	13.2
	Std Error	7.49	10.95	2.94	8.16	0	17.6	5.77	0
	Observations	17	16/17	1/17	11/17	6/17	1/17	11/17	5/17
1	Mean	16.34	16.74	9.8	16.21	16.57	27.7	19.56	6.98
	Median	11.3	11.45	9.8	9.8	16.45	27.7	12.5	8.7
	Std Error	4.17	4.42	0	6.39	2.87	na	6.01	2.07
	Observations	15	14/15	1/15	9/15	6/15	1/15	9/15	5/15
2	Mean	10.98	11.07	9.7	11.24	10.58	9.7	10.21	12.62
	Median	11	12.35	9.7	11	11.2	9.7	11	14
	Std Error	1.35	1.44	0	1.59	2.56	na	1.9	2.23
	Observations	7	6/7	1/7	7/7	0/7	0/7	3/7	4/7
3	Mean	4.51	7.9	-15.8	4.51	na	na	-2.03	9.43
	Median	7.4	11.2	-15.8	7.4	na	na	2.3	15.45
	Std Error	4.86	4.12	0	4.86	na	na	7.04	6.25
	Observations	1	1/1	0/1	1/1	0/1	0/1	0/1	1/1
4	Mean	6.6	6.6	na	6.6	na	na	na	6.6
	Median	6.6	6.6	na	6.6	na	na	na	6.6
	Std Error	0	0	na	na	na	na	na	0

Table 7 – Descriptive Statistics for IRR – Mean and median numbers in %.

			Type		Cycle		Size		
Descriptive Statistics for TVPI									
Sequence Number	Statistics	All	Buyout	Venture	Boom	Bust	Small	Medium	Large
All	Observations	47	41/47	6/47	43/47	13/47	5/47	26/47	16/47
	Mean	1.48	1.56	0.94	1.42	1.64	1.31	1.57	1.39
	Median	1.34	1.36	0.84	1.29	1.71	1.21	1.35	1.35
	Std Error	0.11	0.12	0.15	0.15	0.13	0.26	0.19	0.08
0&1	Observations	24	20/24	4/24	17/24	7/24	4/24	14/24	6/24
	Mean	1.68	1.82	0.95	1.66	1.71	1.33	1.87	1.47
	Median	1.62	1.77	0.84	1.49	1.97	1.3	1.81	1.46
	Std Error	0.20	0.23	0.21	0.28	0.21	0.33	0.33	0.14
0	Observations	7	4/7	3/7	6/7	1/7	3/7	3/7	1/7
	Mean	1.15	1.45	0.76	1.25	0.61	1.08	1.17	1.34
	Median	1.04	1.5	0.64	1.19	0.61	0.93	1.04	1.34
	Std Error	0.18	0.2	0.14	0.19	0	0.3	0.37	0
1	Observations	17	16/17	1/17	11/17	6/17	1/17	11/17	5/17
	Mean	1.89	1.92	1.49	1.89	1.9	2.09	2.06	1.5
	Median	1.8	1.81	1.49	1.57	2.02	2.09	1.81	1.57
	Std Error	0.26	0.28	0	0.41	0.12	0	0.39	0.17
2	Observations	15	14/15	1/15	9/15	6/15	1/15	9/15	5/15
	Mean	1.39	1.4	1.21	1.28	1.55	1.21	1.31	1.56
	Median	1.34	1.35	1.21	1.28	1.59	1.21	1.28	1.55
	Std Error	0.07	0.07	0	0.05	0.13	0	0.08	0.12
3	Observations	7	6/7	1/7	7/7	0/7	0/7	3/7	4/7
	Mean	1.07	1.14	0.64	1.07	na	na	0.94	1.16
	Median	1.15	1.17	0.64	1.15	na	na	1.04	1.25
	Std Error	0.1	0.08	0	0.1	na	na	0.16	0.13
4	Observations	1	1/1	0/1	1/1	0/1	0/1	0/1	1/1
	Mean	1.06	1.06	na	1.06	na	na	na	1.06
	Median	1.06	1.06	na	1.06	na	na	na	1.06
	Std Error	na	na	na	0	na	na	na	0

Table 8 – Descriptive Statistics for TVPI

Descriptive Statistics for Size								
			Type		Cycle		Size		
Sequence Number	Statistics	All	Buyout	Venture	Boom	Bust	Small	Medium	Large
All	Observations	47	41/47	6/47	34/47	13/47	5/47	26/47	16/47
	Mean	847	950	138	883	751	66	257	2049
	Median	326	427	126	320	326	65	232	1371
	Std Error	189	212	28	224	365	10	25	416
0&1	Observations	24	20/24	4/24	17/24	7/24	4/24	14/24	6/24
	Mean	603	699	119	779	175	24	240	1810
	Median	178	320	126	326	132	23	166	1240
	Std Error	218	257	19	299	45	3	38	689
0	Observations	7	4/7	3/7	6/7	1/7	3/7	3/7	1/7
	Mean	293	425	117	320	126	51	257	1123
	Median	126	269	126	112	126	51	158	1123
	Std Error	150	255	27	175	0	8	115	0
1	Observations	17	16/17	1/17	11/17	6/17	1/17	11/17	5/17
	Mean	730	768	125	1029	183	84	236	1948
	Median	314	320	125	488	144	84	174	1357
	Std Error	299	316	0	442	53	0	40	827
2	Observations	15	14/15	1/15	9/15	6/15	1/15	9/15	5/15
	Mean	1039	1107	94	784	1423	94	278	2599
	Median	404	415	94	214	531	94	292	1917
	Std Error	427	453	0	541	724	0	43	996
3	Observations	7	6/7	1/7	7/7	0/7	0/7	3/7	4/7
	Mean	1193	1348	260	1193	na	na	271	1884
	Median	614	908	260	614	na	na	260	1676
	Std Error	475	531	0	475	na	na	16	645
4	Observations	1	1/1	0/1	1/1	0/1	0/1	0/1	1/1
	Mean	1385	1385	na	1385	na	na	na	1385
	Median	1385	1385	na	1385	na	na	na	1385
	Std Error	0	0	na	na	na	na	na	0

Table 9 – Descriptive Statistics for Size – All mean and median numbers are in million EUR.

Descriptive Statistics for Countries by IRR					
		Country			
Statistics	All	Norway	Sweden	Denmark	Finland
Observations	47	10/47	17/47	9/47	11/47
Mean	11.45	5.17	11.66	18.39	11.16
Median	10.70	8.55	11.3	13.90	3.20
Std Error	2.08	3.27	1.14	7.97	4.85

Table 10 – Descriptive Statistics for Country by IRR – All mean and median numbers are in %.

Descriptive Statistics for Countries by TVPI					
		Country			
Statistics	All	Norway	Sweden	Denmark	Finland
Observations	47	10/47	17/47	9/47	11/47
Mean	1.48	1.23	1.54	1.87	1.30
Median	1.34	1.18	1.6	1.36	1.18
Std Error	0.11	0.12	0.07	0.51	0.14

Table 11 – Descriptive Statistics for Country by TVPI

Descriptive Statistics for Countries by Size					
		Country			
Statistics	All	Norway	Sweden	Denmark	Finland
Observations	47	10/47	17/47	9/47	11/47
Mean	847	520	1778	267	178
Median	326	364	1123	158	132
Std Error	189	142	433	56	43

Table 12 – Descriptive Statistics for Country by Size – All mean and median numbers are in million EUR.

Appendix C – Fund Characteristic Comparisons

Fund Characteristics (FC) Comparisons by IRR				
FC	IRR %	Observations	P-value	Test
Buyout	10.12	38/44	0.0089***	MWW
Venture	-1.68	6/44		
Boom	7.13	31/44	0.097*	MWW
Bust	11.82	13/44		
Small	7.6	4/28	0.5545	MWW
Medium	7.86	24/28		
Small	7.6	4/20	0.5082	MWW
Large	9.72	16/20		
Medium	8.89	23/39	0.5582	MWW
Large	9.72	16/39		

Table 13 – Fund Characteristic Comparisons by IRR

Fund Characteristics (FC) Comparisons by TVPI				
FC	TVPI	Observations	P-value	Test
Buyout	1.45	40/46	0.0095***	MWW
Venture	0.94	6/46		
Boom	1.29	33/46	0.0073***	MWW
Bust	1.64	13/46		
Small	1.31	5/30	0.6561	MWW
Medium	1.4	25/30		
Small	1.27	3/19	0.5758	MWW
Large	1.39	16/19		
Medium	1.4	25/41	0.8307	MWW
Large	1.39	16/41		

Table 14 – Fund Characteristic Comparison by TVPI

Fund Characteristics (FC) Comparisons by Size				
FC	Size €M	Observations	P-value	Test
Buyout	553	37/43	0.0116**	MWW
Venture	138	6/43		
Boom	527	31/43	0.5695	MWW
Bust	411	12/43		

Table 15 – Fund Characteristic Comparison by Size

Appendix D – Fund Characteristic Comparison – All Observations

Fund Characteristics (FC) Comparisons by IRR				
FC	IRR %	Observations	P-value	Test
Buyout	13.37	41/47	0.0064***	MWW
Venture	-1.68	6/47		
Boom	11.31	34/47	0.2844	MWW
Bust	11.82	13/47		
Small	15.92	5/31	0.9572	MWW
Medium	11.66	26/31		
Small	15.92	5/21	0.9342	MWW
Large	9.72	16/21		
Medium	11.66	26/42	0.7461	MWW
Large	9.72	16/42		

Table 16 – Fund Characteristic Comparison by IRR – Including All Observations

Fund Characteristics (FC) Comparisons by TVPI				
FC	TVPI	Observations	P-value	Test
Buyout	1.56	41/47	0.0085***	MWW
Venture	0.94	6/47		
Boom	1.42	34/47	0.0138**	MWW
Bust	1.64	13/47		
Small	0.94	6/31	0.5727	MWW
Medium	1.66	25/31		
Small	1.31	5/21	0.6795	MWW
Large	1.39	16/21		
Medium	1.57	26/42	1	MWW
Large	1.39	16/42		

Table 17 – Fund Characteristic Comparison by TVPI – Including All Observations

Fund Characteristics (FC) Comparisons by Size				
FC	Size €M	Observations	P-value	Test
Buyout	950	41/47	0.0074***	MWW
Venture	138	6/47		
Boom	883	34/47	0.5681	MWW
Bust	751	13/47		

Table 18 – Fund Characteristic Comparison by Size – Including All Observations

Appendix E – Fund Type Comparisons on Fund Characteristics

Fund Type (FT) Comparisons on Fund Characteristics (FC) by IRR					
FC	FT	IRR %	Observations	P-value	Test
Boom	Buyout	8.53	26/31	0.0531*	MWW
	Venture	-0.16	5/31		
Bust	Buyout	13.58	12/13	na	na
	Venture	-9.3	1/13		
Small	Buyout	13	2/4	0.4386	MWW
	Venture	2.2	2/4		
Medium	Buyout	10.16	20/24	0.0201**	MWW
	Venture	-3.63	4/24		
Large	Buyout	9.72	16/16	na	na
	Venture	na	na		

Table 19 – Fund Type Comparison on Fund Characteristics by IRR

Fund Type (FT) Comparisons on Fund Characteristics (FC) by TVPI					
FC	FT	TVPI	Observations	P-value	Test
Boom	Buyout	1.34	28/33	0.0924*	MWW
	Venture	1.00	5/33		
Bust	Buyout	1.72	12/13	na	na
	Venture	0.61	1/13		
Small	Buyout	1.30	2/4	0.4386	MWW
	Venture	0.93	2/4		
Medium	Buyout	1.48	21/25	0.0414*	MWW
	Venture	0.95	4/25		
Large	Buyout	1.39	16/16	na	na
	Venture	na	na		

Table 20 – Fund Type Comparison on Fund Characteristics by TVPI

Fund Type (FT) Comparisons on Fund Characteristics (FC) by Size					
FC	FT	Size €M	Observations	P-value	Test
Boom	Buyout	602	26/31	0.0209**	MWW
	Venture	140	5/31		
Bust	Buyout	437	11/12	na	na
	Venture	126	1/13		
Small	Buyout	58	3/5	0.2482	MWW
	Venture	80	2/5		
Medium	Buyout	273	22/26	0.1179	MWW
	Venture	167	4/26		
Large	Buyout	2049	16/16	na	na
	Venture	na	na		

Table 21 – Fund Type Comparison on Fund Characteristics by Size

Appendix F - Fund Type Comparisons on Fund Characteristics – All Observations

Fund Type (FT) Comparisons on Fund Characteristics (FC) by IRR					
FC	FT	IRR %	Observations	P-value	Test
Boom	Buyout	13.29	29/31	0.0344**	MWW
	Venture	-0.16	5/31		
Bust	Buyout	13.58	12/13	na	na
	Venture	-9.3	1/13		
Small	Buyout	25.07	3/5	0.2482	MWW
	Venture	2.2	2/5		
Medium	Buyout	14.44	22/26	0.0157**	MWW
	Venture	-3.625	4/26		
Large	Buyout	9.72	16/16	na	na
	Venture	na	na		

Table 22 – Fund Type Comparison on Fund Characteristics by IRR

Fund Type (FT) Comparisons on Fund Characteristics (FC) by TVPI					
FC	FT	TVPI	Observations	P-value	Test
Boom	Buyout	1.49	29/34	0.0799*	MWW
	Venture	1.00	5/34		
Bust	Buyout	1.72	12/13	na	na
	Venture	0.61	1/13		
Small	Buyout	1.56	3/5	0.2482	MWW
	Venture	0.93	2/5		
Medium	Buyout	1.68	22/26	0.036**	MWW
	Venture	0.95	4/26		
Large	Buyout	1.39	16/16	na	na
	Venture	na	na		

Table 23 – Fund Type Comparison on Fund Characteristics by TVPI

Fund Type (FT) Comparisons on Fund Characteristics (FC) by Size					
FC	FT	Size €M	Observations	P-value	Test
Boom	Buyout	1011	29/34	0.0141**	MWW
	Venture	140	5/34		
Bust	Buyout	803	12/13	0.285	MWW
	Venture	126	1/13		
Small	Buyout	58	3/5	0.2482	MWW
	Venture	80	2/5		
Medium	Buyout	273	22/26	0.1179	MWW
	Venture	167	4/26		
Large	Buyout	2049	16/16	na	na
	Venture	na	na		

Table 24 – Fund Type Comparison on Fund Characteristics by Size

Appendix G – Fund Characteristic Comparison on Fund Type

Fund Characteristic (FC) Comparisons on Buyout by IRR				
FC	IRR %	Observations	P-value	Test
Boom	8.53	26/38	0.0759*	MWW
Bust	13.58	12/38		
Small	13	2/22	0.0299**	MWW
Medium	10.16	20/22		
Small	13	4/18	0.3128	MWW
Large	9.72	14/18		
Medium	10.16	20/36	0.8735	MWW
Large	9.72	16/36		

Table 25 – Fund Characteristic Comparisons on Buyout by IRR

Fund Characteristic (FC) Comparisons on Buyout by TVPI				
FC	TVPI	Observations	P-value	Test
Boom	1.34	28/40	0.003***	MWW
Bust	1.72	12/40		
Small	1.56	3/24	0.0113**	MWW
Medium	1.48	21/24		
Small	1.30	2/18	0.7785	MWW
Large	1.39	16/18		
Medium	1.48	21/37	0.6907	MWW
Large	1.39	16/37		

Table 26 – Fund Characteristic Comparisons on Buyout by TVPI

Fund Characteristic (FC) Comparisons on Buyout by Size				
FC	Size €M	Observations	P-value	Test
Boom	602	26/37	0.3696	MWW
Bust	437	11/37		

Table 27 – Fund Characteristic Comparisons on Buyout by Size

Fund Characteristic (FC) Comparisons on Venture by IRR				
FC	IRR %	Observations	P-value	Test
Boom	-0.16	5/6	na	na
Bust	-9.3	1/6		
Small	2.2	2/6	0.6434	MWW
Medium	-3.63	4/6		

Table 28 – Fund Characteristic Comparisons on Venture by IRR

Fund Characteristic (FC) Comparisons on Venture by TVPI				
FC	TVPI	Observations	P-value	Test
Boom	1.00	5/6	na	na
Bust	0.61	1/6		
Small	0.93	2/5	0.3743	MWW
Medium	0.76	3/5		

Table 29 – Fund Characteristic Comparisons on Venture by TVPI

Fund Characteristic (FC) Comparisons on Venture by Size				
FC	Size €M	Observations	P-value	Test
Boom	140	5/6	na	na
Bust	126	1/6		

Table 30 – Fund Characteristic Comparisons on Venture by Size

Appendix H – Fund Characteristic Comparison on Fund Type – All Observations

Fund Characteristic (FC) Comparisons on Buyout by IRR				
FC	IRR %	Observations	P-value	Test
Boom	13.29	29/41	0.2699	MWW
Bust	13.58	12/41		
Small	25.07	9/25	0.282	MWW
Medium	14.44	16/25		
Small	25.07	4/19	0.4531	MWW
Large	9.72	15/19		
Medium	14.44	22/38	0.7449	MWW
Large	9.72	16/38		

Table 31 – Fund Characteristic Comparisons on Buyout by IRR

Fund Characteristic (FC) Comparisons on Buyout by TVPI				
FC	TVPI	Observations	P-value	Test
Boom	1.49	29/41	0.0068***	MWW
Bust	1.72	12/41		
Small	1.56	3/25	0.0314**	MWW
Medium	1.68	22/25		
Small	1.56	3/19	0.502	MWW
Large	1.39	16/19		
Medium	1.68	22/38	0.5346	MWW
Large	1.39	16/38		

Table 32 – Fund Characteristic Comparisons on Buyout by TVPI

Fund Characteristic (FC) Comparisons on Buyout by Size				
FC	Size €M	Observations	P-value	Test
Boom	1011	29/41	0.3744	MWW
Bust	803	12/41		

Table 33 – Fund Characteristic Comparisons on Buyout by Size

Fund Characteristic (FC) Comparisons on Venture by IRR				
FC	IRR %	Observations	P-value	Test
Boom	-0.16	5/6	na	na
Bust	-9.3	1/6		
Small	2.2	2/6	0.6434	MWW
Medium	-3.63	4/6		

Table 34 – Fund Characteristic Comparisons on Venture by IRR

Fund Characteristic (FC) Comparisons on Venture by TVPI				
FC	TVPI	Observations	P-value	Test
Boom	1.00	5/6	na	na
Bust	0.61	1/6		
Small	0.93	2/6	0.8143	MWW
Medium	0.95	4/6		

Table 35 – Fund Characteristic Comparisons on Venture by TVPI

Fund Characteristic (FC) Comparisons on Venture by Size				
FC	Size €M	Observations	P-value	Test
Boom	140	5/6	na	na
Bust	126	1/6		

Table 36 – Fund Characteristic Comparisons on Venture by Size

Appendix I – Sequence Number Comparison

Sequence Number Comparison by IRR				
SN	IRR %	Observations	P-value	Test
0 vs. 1	1.4 10.89	6/65 15/65	0.18	K-Wallis
0 vs. 2	1.4 10.98	6/65 15/65	0.171	K-Wallis
0 vs. 3	1.4 4.51	6/65 7/65	0.984	K-Wallis
0 vs. 4	1.4 6.6	6/65 1/65	0.992	K-Wallis
1 vs. 2	10.89 10.98	15/65 15/65	1	K-Wallis
1 vs. 3	10.89 4.51	15/65 7/65	0.545	K-Wallis
1 vs. 4	10.89 6.6	15/65 1/65	0.996	K-Wallis
0&1 vs. 2	8.18 10.98	21/65 15/65	0.914	K-Wallis
0&1 vs. 3	8.18 4.51	21/65 7/65	0.91	K-Wallis
0&1 vs. 4	8.18 6.6	21/65 1/65	1	K-Wallis
2 vs. 3	10.98 4.51	15/65 7/65	0.529	K-Wallis
2 vs. 4	10.98 6.6	15/65 1/65	0.995	K-Wallis
3 vs. 4	4.51 6.6	7/65 1/65	1	K-Wallis

Table 37 – Sequence Number Comparison for IRR

Sequence Number Comparison by TVPI				
SN	TVPI	Observations	P-value	Test
0 vs. 1	1.15 1.65	7/69 16/69	0.072*	K-Wallis
0 vs. 2	1.15 1.38	7/69 15/69	0.788	K-Wallis
0 vs. 3	1.15 1.07	7/69 7/69	0.998	K-Wallis
0 vs. 4	1.15 1.06	7/69 1/69	1	K-Wallis
1 vs. 2	1.65 1.38	16/69 15/69	0.428	K-Wallis
1 vs. 3	1.65 1.07	16/69 7/69	0.02**	K-Wallis
1 vs. 4	1.65 1.06	16/69 1/69	0.689	K-Wallis
0&1 vs. 2	1.5 1.38	23/69 15/69	0.953	K-Wallis
0&1 vs. 3	1.5 1.07	23/69 7/69	0.124	K-Wallis
0&1 vs. 4	1.5 1.06	23/69 1/69	0.88	K-Wallis
2 vs. 3	1.38 1.07	15/69 7/69	0.485	K-Wallis
2 vs. 4	1.38 1.06	15/69 1/69	0.965	K-Wallis
3 vs. 4	1.07 1.06	7/69 1/69	1	K-Wallis

Table 38 – Sequence Number Comparison for TVPI

Sequence Number Comparison by Size				
SN	Size €M	Observations	P-value	Test
0 vs. 1	293	7/66	0.982	K-Wallis
	463	16/66		
0 vs. 2	293	7/66	0.993	K-Wallis
	436	13/66		
0 vs. 3	293	7/66	0.548	K-Wallis
	796	6/66		
0 vs. 4	293	7/66	0.413	K-Wallis
	1385	1/66		
1 vs. 2	463	16/66	1	K-Wallis
	436	13/66		
1 vs. 3	463	16/66	0.786	K-Wallis
	796	6/66		
1 vs. 4	463	16/66	0.561	K-Wallis
	1385	1/66		
0&1 vs. 2	411	23/66	1	K-Wallis
	436	13/66		
0&1 vs. 3	411	23/66	0.626	K-Wallis
	796	6/66		
0&1 vs. 4	411	23/66	0.491	K-Wallis
	1385	1/66		
2 vs. 3	436	13/66	0.752	K-Wallis
	796	6/66		
2 vs. 4	436	13/66	0.537	K-Wallis
	1385	1/66		
3 vs. 4	796	6/66	0.912	K-Wallis
	1385	1/66		

Table 39 – Sequence Number Comparison for Size

Appendix J – Sequence Number Comparison – All Observations

Sequence Number Comparison by IRR				
SN	IRR %	Observations	P-value	Test
0 vs. 1	8.23 16.34	7/71 17/71	0.856	K-Wallis
0 vs. 2	8.23 10.98	7/71 15/71	0.999	K-Wallis
0 vs. 3	8.23 4.51	7/71 7/71	0.998	K-Wallis
0 vs. 4	8.23 6.6	7/71 1/71	1	K-Wallis
1 vs. 2	16.34 10.98	17/71 15/71	0.927	K-Wallis
1 vs. 3	16.34 4.51	17/71 7/71	0.547	K-Wallis
1 vs. 4	16.34 6.6	17/71 1/71	0.99	K-Wallis
0&1 vs. 2	13.97 10.98	24/71 15/71	0.992	K-Wallis
0&1 vs. 3	13.97 4.51	24/71 7/71	0.722	K-Wallis
0&1 vs. 4	13.97 6.6	24/71 1/71	0.997	K-Wallis
2 vs. 3	10.98 4.51	15/71 7/71	0.944	K-Wallis
2 vs. 4	10.98 6.6	15/71 1/71	1	K-Wallis
3 vs. 4	4.51 6.6	7/71 1/71	1	K-Wallis

Table 40 – Sequence Number Comparison for IRR

Sequence Number Comparison by TVPI				
SN	TVPI	Observations	P-value	Test
0 vs. 1	1.15 1.89	7/71 17/71	0.353	K-Wallis
0 vs. 2	1.15 1.38	7/71 15/71	0.99	K-Wallis
0 vs. 3	1.15 1.07	7/71 7/71	1	K-Wallis
0 vs. 4	1.15 1.06	7/71 1/71	1	K-Wallis
1 vs. 2	1.89 1.38	17/71 15/71	0.508	K-Wallis
1 vs. 3	1.89 1.07	17/71 7/71	0.235	K-Wallis
1 vs. 4	1.89 1.06	17/71 1/71	0.921	K-Wallis
0&1 vs. 2	1.68 1.38	24/71 15/71	0.887	K-Wallis
0&1 vs. 3	1.68 1.07	24/71 7/71	0.518	K-Wallis
0&1 vs. 4	1.68 1.06	24/71 1/71	0.977	K-Wallis
2 vs. 3	1.38 1.07	15/71 7/71	0.958	K-Wallis
2 vs. 4	1.38 1.06	15/71 1/71	0.999	K-Wallis
3 vs. 4	1.07 1.06	7/71 1/71	1	K-Wallis

Table 41 – Sequence Number Comparison for TVPI

Sequence Number Comparison by Size				
SN	Size €M	Observations	P-value	Test
0 vs. 1	293 730	7/71 17/71	0.968	K-Wallis
0 vs. 2	293 1039	7/71 15/71	0.773	K-Wallis
0 vs. 3	293 1193	7/71 7/71	0.749	K-Wallis
0 vs. 4	293 1385	7/71 1/71	0.961	K-Wallis
1 vs. 2	730 1039	17/71 15/71	0.981	K-Wallis
1 vs. 3	730 1193	17/71 7/71	0.96	K-Wallis
1 vs. 4	730 1385	17/71 1/71	0.995	K-Wallis
0&1 vs. 2	603 1039	24/71 15/71	0.89	K-Wallis
0&1 vs. 3	603 1193	24/71 7/71	0.875	K-Wallis
0&1 vs. 4	603 1385	24/71 1/71	0.989	K-Wallis
2 vs. 3	1039 1193	15/71 7/71	1	K-Wallis
2 vs. 4	1039 1385	15/71 1/71	1	K-Wallis
3 vs. 4	1193 1385	7/71 1/71	1	K-Wallis

Table 42 – Sequence Number Comparison for Size

Appendix K – Country Comparison

Country Comparison by IRR				
Country	IRR %	Observations	P-value	Test
Norway vs. Sweden	5.17 11.66	10/44 17/44	0.224	K-Wallis
Norway vs. Denmark	5.17 7.3	10/44 7/44	0.954	K-Wallis
Norway vs. Finland	5.17 7.36	10/44 10/44	0.936	K-Wallis
Sweden vs. Denmark	11.66 7.3	17/44 7/44	0.654	K-Wallis
Sweden vs. Finland	11.66 7.36	17/44 10/44	0.574	K-Wallis
Denmark vs. Finland	7.3 7.36	7/44 10/44	1	K-Wallis

Table 43 – Country Comparison for IRR

Country Comparison by TVPI				
Country	TVPI	Observations	P-value	Test
Norway vs. Sweden	1.23 1.54	10/46 17/46	0.201	K-Wallis
Norway vs. Denmark	1.23 1.38	10/46 8/46	0.843	K-Wallis
Norway vs. Finland	1.23 1.3	10/46 11/46	0.975	K-Wallis
Sweden vs. Denmark	1.54 1.38	17/46 8/46	0.774	K-Wallis
Sweden vs. Finland	1.54 1.3	17/46 11/46	0.39	K-Wallis
Denmark vs. Finland	1.38 1.3	8/46 11/46	0.97	K-Wallis

Table 44 – Country Comparison for TVPI

Country Comparison by Size				
Country	Size €M	Observations	P-value	Test
Norway vs. Sweden	520 902	10/43 13/43	0.264	K-Wallis
Norway vs. Denmark	520 267	10/43 9/43	0.676	K-Wallis
Norway vs. Finland	520 178	10/43 11/43	0.392	K-Wallis
Sweden vs. Denmark	902 267	13/43 9/43	0.024**	K-Wallis
Sweden vs. Finland	902 178	13/43 11/43	0.005***	K-Wallis
Denmark vs. Finland	267 178	9/43 11/43	0.978	K-Wallis

Table 45 – Country Comparison for Size

Appendix L – Country Comparison – All Observations

Country Comparison by IRR				
Country	IRR %	Observations	P-value	Test
Norway vs. Sweden	5.17 11.66	10/47 17/47	0.655	K-Wallis
Norway vs. Denmark	5.17 18.39	10/47 9/47	0.186	K-Wallis
Norway vs. Finland	5.17 11.16	10/47 11/47	0.763	K-Wallis
Sweden vs. Denmark	11.66 18.39	17/47 9/47	0.653	K-Wallis
Sweden vs. Finland	11.66 11.16	17/47 11/47	1	K-Wallis
Denmark vs. Finland	18.39 11.16	9/47 11/47	0.664	K-Wallis

Table 46 – Country Comparison for IRR

Country Comparison by TVPI				
Country	TVPI	Observations	P-value	Test
Norway vs. Sweden	1.23 1.54	10/47 17/47	0.719	K-Wallis
Norway vs. Denmark	1.23 1.87	10/47 9/47	0.25	K-Wallis
Norway vs. Finland	1.23 1.3	10/47 11/47	0.996	K-Wallis
Sweden vs. Denmark	1.54 1.87	17/47 9/47	0.703	K-Wallis
Sweden vs. Finland	1.54 1.3	17/47 11/47	0.836	K-Wallis
Denmark vs. Finland	1.87 1.3	9/47 11/47	0.329	K-Wallis

Table 47 – Country Comparison for TVPI

Country Comparison by Size				
Country	Size €M	Observations	P-value	Test
Norway vs. Sweden	520 1778	10/47 17/47	0.034**	K-Wallis
Norway vs. Denmark	520 267	10/47 9/47	0.96	K-Wallis
Norway vs. Finland	520 178	10/47 11/47	0.896	K-Wallis
Sweden vs. Denmark	1778 267	17/47 9/47	0.01***	K-Wallis
Sweden vs. Finland	1778 178	17/47 11/47	0.003***	K-Wallis
Denmark vs. Finland	267 178	9/47 11/47	0.998	K-Wallis

Table 48 – Country Comparison for Size

Appendix M – Preliminary Thesis

Master Thesis

Preliminary

What drives performance in the Nordic Private Equity market?

- *A study on characteristics of the Nordic Private equity segment*

Supervisor: Janis Berzins

Introduction

We will here study the performance of Nordic private equity firms and funds during 2000-2015, and what the characteristics of good, average, and bad performance are. In order to be able to do that, we need to gather information and data on the performance indicators we want to use. A description on these indicators will be made in the theory part. We will focus on dividing the different funds into groups of best performing, average performing and bad performing firms. It will be important to define the different states of performance by using existing work and theory. One way to do this could be to take the average of all and use it as the average performance. Performance above average is good and below is bad. We may need to add/subtract some percentage points to separate. When we have done this, we will start to study what their different characteristics are. What drives the good performance? Is it that firms have many different funds at management, is it managerial skills? What role do size play in performance? Cycles, i.e. when the funds are started? And most important maybe, which stage it focuses on. Will early stage venture capital be most profitable or is it buyouts that characterize the good performers? On this last aspect, several works have already been done in general and we will be able to compare the results of the Nordic with pre-existing studies.

Why do we want to do this? PE is embraced with secrecy and it is not easy to get information about it because it is, you guessed it right, private. A lot of subjects we have had at school have touched upon PE during lectures and cases, and that has aroused our interest. We feel that the literature on PE misses a cover of the Nordic market specific and we want to contribute with that. In addition to contribute with a new study we also want to do this out of self-interest, to get to know the market and to understand how the mechanisms work. Also, as we focus on the 2000 to 2015 we will give an updated and fairly relevant study on how the market has developed post-crisis.

This work is important because there is no such work existing (at least to our knowledge of today). We want to do this study so other can read the paper and get an overview of the characteristics on performance of the Nordic private equity market. Previous studies emphasize the secondary market of private equity funds and does not cover the market as a whole nor other firms. Also, there is a master thesis on direct investments in private equity in the Nordic. This looks at the

Limited partners (LPs) and define private equity as buyouts. None of the above are published papers, but previous master thesis and therefore cannot be seen as acknowledged studies.

We have not started the investigation of data yet, but we plan to get our data from Preqin which is the leading data source of different assets classes. Other sources we will address is Argentum and Thompson Reuters (more could and will be added). We expect to meet some obstacles on the way with the data. First, we do not know how much data that are available and for which segment it will include, so we have not decided if we should only concentrate on VC and buyout yet (which seems to be the case of all existing studies). Second, it seems like there are several drawbacks with all different sources with the main being that data is reported on a voluntarily basis and therefore there is a possibility of the data being biased towards overperformance. Several published papers discuss this issue and we will read them carefully to get a good objective view to our decision. Third, the Nordic countries have different currencies and we do not know if the reported numbers are in local currency or not. We will need to convert all data into a common currency which will be euros.

Literature Review

We have not found any published papers or journals that includes specific research about the Nordic PE market. Argentum, a Norwegian governed PE firm has its own database with data and provide quarterly and annual reports about the market, which we will find useful. They have published a report that analyse the market between 2006-2013. We intend to get in contact with Argentum and get access to their research. Also, they have a research department at the Norwegian School of Economics (NHH) that focuses solely on the Nordic PE market.

Previous work focuses on buyout and venture capital (VC) because they are the, by far, biggest variants of PE. A lot of the existing research is focused on performance. "Kaplan and Schoar (2005) examine the returns to buyout and VC funds using fund cash flow data from Venture Economics (VE). They calculate a public market equivalent (PME) that compares how much a PE fund investor actually earned net of fees to what the investor would have earned in an equivalent investment in the S&P 500. While their focus is return persistence across funds of the general partner (GP), they report that buyout fund investors earn slightly less than the public market. VC funds slightly underperform public markets on an equal-weighted, but outperform on a capital-weighted basis" (Harris, Jenkinson and Kaplan, 2012). Phalippou and Gottschalg (2009) obtain qualitatively similar results and a similar, but more negative, conclusion for buyout funds. They use an updated version of the Kaplan and Schoar (2005) dataset. However, Stucke (2011) find a significant problem with the VE data. He presents strong evidence that many funds stopped being updated from around 2001 and yet were retained in the VE data. Harris et al. (2010) support the findings and conclude that returns based on the VE sample are consistently lower than those for other commercial providers for most years. Harris, Jenkinson and Kaplan (2012) confirms these findings, they suggest that the results in Kaplan and Schoar (2005) and Phalippou and Gottschalg (2009) understate fund returns, especially for buyout funds. Robinson and Sensoy (2011) find a quite opposite result. They find that buyout funds outperform the market with 18%, while VC funds outperform it by 3%. Most of the earlier studies uses VE as data source. Robinson and Sensoy was the first to publish a paper that proves that PE outperform the market. They used data from a confidential proprietary data set obtained from a large, institutional limited partner (LP) with extensive

investments in private equity. So, the main factor for different results is different data provider. In PE, there is four common providers of data: Preqin, Burgiss, Cambridge Associates (CA) and VentureXpert/Thomson Reuters/Thomson Venture Economics (VE). Harris, Jenkinson, and Kaplan (2012) uses data from all four different commercial sources to study U.S buyout and VC funds. They provide an in-depth analysis of the data that provides us with information on the pros and cons of different sources. Despite this, they have only focused on the US and thus, provides us with no information on data for the Nordic. For our work, we will assume that it has the same characteristics.

Progress

We have made a list of literature that we will have to read and therefore expand the review of literature section. We need to cover more literature on the performance characteristics, discussions on the different data providers and why all studies seem to choose a definition on PE only including buyout and VC. Other studies and literature will also be investigated.

The structure of the introduction and theory part will be adjusted so it is more specific and covers all aspects and assumptions that we will make. This is a continuous process.

A crucial section will be to address the issue of which performance metric to use since there are several and all have pros and cons. The current stand is to use internal rate of return (IRR) and/or total value to paid-in capital (TVPI), but this might change when we get a better overview of the literature on performance metrics.

Our hypotheses will be made for each characteristic. For example, we expect that a fund with high IRR and TVPI will be in the buyout section. Or that the funds size is small or that it's sequence number is high.

We have not reached the process of which statistical methods we will use to test our hypothesis(es). In theory, we are first going to divide them into two or three groups and then run tests to see which characteristics that are statistical significant to the performance.

Our next steps will be to cover more literature and to start investigating data. We look forward to this task and are very eager to continue on this project to see what links we can find and if we will be able to draw some comparisons between the Nordic economy as a whole and the Nordic PE market.

Background

What is Private Equity?

Private equity (PE) is capital that is invested in non-publicly traded firms and is a source of corporate financing for private firms. The opposite of publicly traded firms or exchange traded firms. The basic PE strategy can be viewed in the figure below where investments are made into a targeted company – we will later call this a portfolio company – in which we take on an active or passive role and waits for the company to increase its profitability in order to sell it at a higher price than we originally paid.

PE strategies involves five different methods, venture capital (VC), buyout, mezzanine buyout (MBO), special situations and funds of funds. VC and buyout is the largest and most common.

Differences between private equity and public equity

In the public stock market, there are many regulations about the information that needs to be provided by the listed firms. In modern finance theory, the basic assumption we make in the public stock market is that information is quickly spread to market participants, markets are highly liquid, low transaction costs etc. In the private equity market, no one of these assumptions are true (Litterman, 2003). The PE investors will normally require a higher return than in the stock market given the illiquidity they are facing. (Wright and Robbie, 1998)

Another important difference between public equity investments and private equity, is the time perspective. While investors in public equity typically follows every market movement of the underlying investment, the private equity investors typically have a long-time horizon before they expect profit. Hence, they're more tolerant to short-term losses and extra need for additional capital in order to create value for the company in the long-run since the actual payoff to the investors

happens when the firm divests the portfolio company.

Asymmetric information

The private markets have less regulations than public when it comes to revealing information, hence one can assume that the information asymmetry between investors and the private equity managers is huge. (Cummings and MacIntosh, 2003) did a research on whether the information asymmetry effects the ending strategies for venture capital funds and their findings concluded that "If the information asymmetry is high, then the VC can maximize the overall proceeds of disposition by initially effecting a partial exit, because ownership retention constitutes a credible signal that the quality of the investee firm is high."

The limited partnership - agreement between the fund managers (GPs) and funds investors (LPs) is a key function to face the problem with asymmetric information between them. Due to the time-structure of the partnership, the GPs need to raise new funds in order to stay in business, hence the importance of succeeding and not demanding too much compensation with the existing funds is crucial in order to make new investments. (Berger and Udell 1998).

Private Equity funds
Limited partnership, GPs, and LPs

The PE fund is the key resource for the PE firm in order to collect equity and the most common way to invest in PE. PE funds are structured as limited partnerships and includes general partners (GPs), who are the managing partners of the PE firm and has the responsibility for the actions of the PE fund, and limited partners (LPs), (often pension funds, banks, etc.) who are passive investors that commits the fund with most of the funding capital. Most of the PE funds are of the "closed-end" – type, which means that the investors (LPs) cannot withdraw their capital until the fund is terminated and sold (Kaplan and Strömberg, 2008).

Management fees

During the lifetime of the PE fund, the LPs have agreed to commit capital when

it's needed by the GPs[13]. (Metrick and Yasuda, 2010) divides the total committed capital in the PE fund from the LPs into three separated parts:

Committed capital = investment capital + lifetime fees + establishment cost, where LPs typically pays the GPs a management fee of 1-2% of the committed capital in the fund during the investment in order to cover the daily operations. Due to the fact that PE investments is generally long-term investments, it therefore takes a while for the private equity firms to become profitable, the management fee to the GPs is necessary to withhold the built-up of the portfolio-company. The GPs will also be rewarded a fraction, typically around 20%, of total profits after exiting which is called "carried interest", (Kaplan and Strömberg, 2008) and (Gompers and Lerner, 2000).

According to (Invest Europe, the little book of PE) the average PE fund needs to grow at least 8% [14] per year in order to typically achieve the predetermined goals. Otherwise the GPs carried interest might not occur.

Venture capital

Venture capital is capital invested in early-staged and promising businesses. These investments are typically of a high risk but can also yield a high return. They are similarly structured as the buyout-funds which will be explained next.

Buyout

PE Funds who makes a buyout, is simply buying the majority of shares in an established, mature company.

In general, the buyout- fund goes through four different phases during a 10-year process combining the info from (Kaplan and Strömberg, 2008) and (EVCA), we can summarize it as:

i) Fundraising

This is at the beginning when the fund managers have come up with an idea of an PE investment and they need financing via investors. The typical LPs are often

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[13] The GPs themselves invest some money into the PE fund as well (approximately 1% on average), (Kaplan and Strömberg, 2008).

[14] Note: Invest Europe, formerly known as EVCA, (European Private Equity & Venture Capital Association) did not provide any source regarding the percentage, so we should not totally rely on it, but instead view it as an indication.

pension funds and funds-by-funds and at this fundraising phase, they agree to a commitment of providing a predetermined amount during a predetermined period of time when its needed by the GPs.

ii) Investment in a company

When enough money has been collected from the LPs, the GPs will start a screening and due diligence process in order to select potential target companies. Once a company have been targeted, the GPs will make a so called "capital call" in order to receive the LPs money. The PE fund use their position as the major shareholder and takes control over the operations of the targeted company, in order to make it more efficient.

iii) Managing the portfolio company

The fund managers will from now on typically engage in the day-to-day operations of the portfolio company in order to optimize the company's operations such that it can create value. This process takes often many years to accomplish for most of the private equity funds.

iv) Exit/divesting

When it is time to sell the portfolio company, there are many ways of divesting it (HVCA 2017) lists five main exits related to this.

1. "Trade-sale" - which means that the GP sells all the shares to a third party – buyer, which often operates within the same industry as the portfolio company.

2. "Secondary buyout" - in which portfolio company is sold to another PE firm.

3. "Management buyout" – the managers within a firm buys the company.

4. "Initial public offering (IPO)" – the company goes public, i.e. gets listed on a stock exchange.

5. "Write-offs" – the company fail to deliver positive returns.

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