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How private equity strategies impact the portfolio companies' performance

(Evidence from Norway)

GRA19703

BI Norwegian Business School

Master thesis

Supervisor: Chunyu Yang

Study program: Master of Science in Finance & Business

By Jonas Stenbro and Fredrik Lulai

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Abstract

This thesis studies the impact of private equity-backing on the portfolio companies they acquire, with evidence from Norway. We are researching the two main strategies in Norway, buyout and venture capital. The impact is measured looking at the change in performance for profitability, leverage, productivity and employment. A peer group for both strategies is created, to compare the performance of private equity-backed companies against non private equity-backed companies. We find that there is an increase in profitability, leverage and productivity compared to the peer groups, however, only for venture capital for the former two. There is also an increase in performance for employment, although this was not in line with recent research. We conclude that portfolio companies perform superior to their matched peer groups.

Acknowledgement

This thesis has both been challenging and exciting, and a pleasant way of ending 5 years at BI Norwegian Business School. We would firstly like to thank our supervisor Chunyu Yang for guiding and helping us with our thesis. Secondly, we would also like to thank both Carsten Bienz at NHH and Ivar Otto Ekker at BI for providing us with the data needed to accomplish this.

1 - Introduction and motivation

Private equity has been experiencing a boom in the recent decades, making it a popular alternative investment class for a diversified investor. This thesis will investigate the performance of private equity-backed portfolio companies in the years after an acquisition, using Norwegian data from 2000 to 2020. Our research for this paper is possible due to a collaboration with the Argentum Centre of Private Equity, which provided us with the relevant data.

We want to uncover whether there is a superior strategy between venture capital (VC) and buyouts, based on the performance of the companies being acquired, which will help us answer the following research question:

How private equity strategies impact the portfolio companies' performance

The performance is split in four categories and are measured separately. To be able to compare the performance of the portfolio companies for the two strategies, a peer group for both strategies are created, using data from the Centre of Corporate Governance Research. The peer group is created by matching one company from the venture capital data with one from the data of the Centre of Corporate Governance Research. To find a fitting match we are targeting NACE industry code, sales, debt ratio and relevant year. By using such filters, we are able to find a peer group that matches the two datasets well, which is crucial for this type of analysis. The reasoning is that the better match we can gather for each observation in the dataset, the better it can track the impact of private equity-backing. After extracting the data and processing it such that every acquisition contained a match with sufficient information, we were left with 172 observations, 92 for venture capital and 80 for buyouts, as well as 92 and 80 matches respectively.

Existing literature is comprehensive, although a big part of it includes data from the US. However, in recent years there has been some research in the Nordic as well, with (Friedrich, 2015) and (Bienz, 2016) using Norwegian data in their papers. Nevertheless, existing literature on venture capital from the Nordic is still absent, as there has not been extensive data until recent years. That is why we

want to cover this topic, as this is a research area that is lacking. This research paper will provide broader understanding of the private equity market in Norway, by including venture capital data as well as using data that is more recent than what is used in prior research.

The analysis is conducted by looking at the median values of change, from the entry year and three years after the acquisition. The categories we are covering are profitability, leverage, productivity, and employment. To identify whether the differences for each measure are significant or not, we are firstly using the Bera-Jarque test to test the dataset for normality. The test uncovered that there is in fact skewness and kurtosis present in our dataset, which is why we are further using the Wilcoxon signed-rank test to test for the significance in differences. The results for each of the four categories will give us an indication of how private equity backed companies in Norway perform compared to their peers, and if it is in line with previous research and criticism. We are testing the robustness of the data by excluding two factors that may have an impact on the data set, as well as identifying how much of an impact it has on profitability. We are therefore excluding the years of the great recession and energy companies, and looking at the results separately.

By following that procedure, we found that private equity-backed venture capital firms performed superior to private equity-backed buyout firms for both profitability and leverage. Both employment and productivity experienced an increase overall, however the increase in employment was the opposite of what we expected based on previous research, causing us to reject that hypothesis. The robustness tests uncovered that the great recession did have a negative effect on the firms for venture capital and a small effect on firms for buyouts. The exclusion of the energy sector, and the oil and gas companies in particular, told us that these companies had a big impact on the return on equity for buyout in particular. The portfolio companies for venture capital however saw minimal change, as the majority of the acquisitions belonged to the buyout group.

Our thesis is focusing on changes in performance after three years. This time-period could have been both shorter and longer, to uncover the changes in shorter and longer

term as well. However, we base our thesis on what previous research has shown, as evidence supports that there is a considerable improvement in profitability and cash flows, especially three years after the transaction (Bull, 1989; Kaplan, 1989; Malone, 1989; Singh, 1990)

2 - Literature review

2.1 - Venture capital

Private equity firms invest in a broad range of firms, depending on what strategy they are following. There are four strategies considered to be the most used and are often thought of as the main strategies in private equity investing, according to (Gilligan & Wright, 2020). These are venture capital, growth capital, leveraged buyouts (LBOs) and turnarounds.

Venture capital has developed to be an important strategy in both private equity and investing overall. The strategy is providing capital to small businesses that might otherwise have trouble funding their projects, and where great ideas now have a chance to develop because of that financing. These companies typically possess very few tangible assets, and an idea might be the only reason for the interest of the private equity fund. Therefore, the strategy is considered to be high-risk, with a potential of a high-reward. WhatsApp is a great example of this, being the largest private acquisition of a venture capital-backed company ever at the time, according to CB Insights.
The first firm that implemented such a strategy originates all the way back to 1946, established by the president of MIT and a professor at Harvard Business school. Nevertheless, the popularity for this type of investment did take some time. It was not until the late 1970 that the industry really started booming, and the trend has increased a lot since then (Gompers & Lerner, 2001).

According to Bob Zider´s paper in the Harvard Business review from 1998, venture capitalists expect ten times return of capital over five years, when they finance a company start-up over one to two years. With that said, very few of the venture capital investments that are being made actually succeed. On average, only one out of ten attempts are successful. Zeider´s reasoning is the many components that need to succeed collectively in order for the company to be considered successful. He further states that more than half of the companies will only return the initial investment at best, with the worst being a total loss. However, as venture capital has a certain deal structure and portfolio approach, only one or two out of ten portfolio companies need

to succeed for the venture capital fund to achieve their targeted return of 25% (Zider, 1998)

According to a study by Atlantic drift from 2011, Lerner, Pierrakis, Collins and Biosca found that the return performance of venture capital funds in the US and the UK had been very similar. The funds in the US have historically been outperforming UK funds, based on the internal rate of return (IRR), but the gap has been narrowed down in the recent years prior to this article. This earlier outperformance is similar to what Hege and Palomino concluded in their study from 2003, where they found that the venture capital funds in the US performed better in both IRR and type of exit. (Lerner et al., 2011)

Also, looking at how venture capital funding impacted the portfolio companies´ performance, there were some interesting findings. A study done by Gerasymenko, Clercq and Sapienza examined the impact of venture capital funding and its involvement on the portfolio company's performance. The performance was based on an indication of value creation by looking at the price per share and the realized gains or losses. The research showed that the more areas of venture capital involvement, the better the portfolio companies performed. It also revealed that venture capital funding was useful when using additions of outside CEOs for the portfolio companies. Their study was based on 163 early-stage French portfolio companies (Gerasymenko et al., 2015).

IIMB Management Review, an Indian journal, published a study in 2010, where Thillai Rajan raised some interesting questions regarding how much credit the venture capitalists could take for the performance of the portfolio companies, given that they only fund what they perceive to be the best. They pointed at empirical literature that indicated that the selection of good companies was the main reason for the performance prior to the funding, and this is what they wanted to research, with evidence from India. Firstly, he emphasizes how the performance variation could be a result of a disciplining force in which they impose upon the portfolio company. Such discipline rises from tools like stage investments, where they have the possibility to stop their funding, and convertible preferred stock. He further emphasizes that the profile of venture capital in emerging countries like India is different from those in

developed countries, using technology and business experience as examples (Rajan, 2010)

2.2 - Buyout

Leveraged buyouts (LBO) is the most used form of funding for private equity. The intention with an LBO is to completely buy out a company and improve its business and financials, before reselling it down the road. The name simply stems from the fact that these buyouts often are highly leveraged, sometimes as much as 90% of the overall funding, which allows for big acquisitions of a business for a company with less equity. The goal is that the cash flows produced by the business acquired will pay down the debt. There are different strategies for the private equity firms to use. The strategy of taking a company private by purchasing the outstanding equity of a public company is often used, but a private-to-private buyout is also common (Pignataro, 2013).

(Warga & Welch, 1993) looked at the effect of leveraged buyouts on the wealth of target shareholders in the short term. They used a sample of 43 bonds issued by 16 different firms in the timespan of four years, from 1985 to 1989. Their goal was to demonstrate that the trader-quoted data from the big investment banks offered conclusions on the effects of leveraged buyouts on debt holders that were different from those commonly used exchange-based data. They examined the hypothesis that equity holder gains arose from the expropriation of the debt holder's wealth, but they found these gains to only equal an average of 7% of the size of the shareholders gains. Further, there were also indications from their cross-sectional regressions that the leveraged buyout with the highest equity gains only had a weak relation to the leveraged buyouts with the highest bond losses.

There are many ways of looking at the effects of takeovers and buyouts, as where Warga and Welch looked at bondholders and shareholders, Billett, Jiang and Lie examined change in control covenant and its effect on takeovers (Billett et al., 2008). The study was published in 2008, using evidence from leveraged buyouts. They examined a sample of 407 deals, between the years 1991 to 2006. They refer to Warga and Welch´s article but emphasize that the wave of leveraged buyouts

occurring in their time frame involve less leverage than before. They further find evidence of how the bondholders wealth depends on the change in control covenants. These covenants were designed to protect the bondholders against the losses that were experienced in the time that Warga and Welch refers to. Moreover, they come to the same conclusion as Smith and Warner did in 1979, namely that managers who are trying to maximize the shareholder wealth might not include the use of change in control covenants, even if they might have favorable effects on its capability to issue bonds at good terms.

In 2014, Harris, Jenkinson and Kaplan did a study of the performance of close to 1,400 buyouts and venture capital funds from the US, by looking at a dataset of private equity fund-level cash flows. The data they were using was derived from 200 different institutional investors, which makes the data verified and the investment histories cross-checked. They base their study on earlier research results, looking at consistent private equity performance from the 1990s till present (Harris et al., 2014). There are many ways to look at the performance of a private equity firm, which the authors do emphasize, but to be able to compare the results with the public market, they used (Kaplan & Schoar, 2005) Public market equivalent (PME). This calculation is a market adjusted multiple of invested capital, which makes the comparison valid. Their introductory claim that buyout funds consistently outperform public markets still seem to hold, according to their conclusion later in the article. Despite having more recent data, as well as using several different data gathering methods, the PME results shows similar performance. Moreover, they used the same PME calculations with the data used for previous referenced research and came to the same conclusion as their peers. They further conclude that for each dollar being invested in the average private equity fund returned more than 20% than each dollar would have earned by investing in S&P500, since the 2000s.

The same dataset was used by (Robinson & Sensoy, 2013), when they did their study on the relations between management contract terms and the performance in private equity. The relations were based on compensation, cash flow performance and ownership. Their findings suggest that the managers that earn a higher fee will also deliver a higher gross performance, implying that they are incentivized to do a better job. They emphasize the agency costs as an important factor. However, there was no

evidence to support that higher fees or lower ownership by the manager were associated with a lower net of fee performance.

2.3 - Growth capital & turnarounds

Growth capital is a strategy used for investing in companies that are relatively mature but require more money to expand or restructure their business. It is a way of accelerating the growth further. The strategy can be similar to both late-stage venture capital, as well as having similar characteristics as a buyout. However, growth capital will prefer a market leader in a specific industry, where venture capital typically focuses on companies that are in an early stage and with a business model that has not been proven yet. Also, growth capital differs from typical buyouts as the buyout investment has a controlling equity position and growth capital does not.

The turnaround strategy stands out as it focuses on troubled companies with a potential to be improved, often with a management buyout. The reasoning is that the companies being targeted do not fulfill their potential due to bad decisions by the management. Such decisions may be a result of agency costs and can be eliminated by changing the management. Such a strategy is risky, and the targeted return is therefore higher (Gilligan & Wright, 2020).

In Norway however, these strategies are not common, and are rarely performed on the target companies in the Norwegian market. Neither of the data from Argentum Centre for Private Equity, Eikon or Zephyr identified enough observations during the timespan that these strategies could be analyzed, and we are therefore only focusing on the two main strategies in Norway, mainly buyouts and venture capital.

2.4 - Profitability

Operating performance and profitability have been thoroughly researched since the private equity market started booming in the last decades of the 1900s. Michael Jensen argued both in 1986 and 1988 that private equity buyouts provide great incentives for an increase in both efficiency and value. According to his incentive hypothesis about reduced agency-costs, the new incentives lead to gains in operating performance and profitability (Jensen, 1986).

Moreover, back in 1989, the Journal of Financial Economics published an article on how the management buyouts affected operating performance and value. Steven Kaplan looked at 76 large management buyouts. The targets were public companies, and all the buyouts occurred in the timespan of 6 years, from 1980 to 1986. The performance was measured over a three-year period, looking at market-adjusted returns for pre-buyout compared to post buyout. The sample he used was of management buyouts in companies that were delisted in that time-period, and announced they were going private. Of the 76 companies he measured, only data for 48 of them were available post buyout. Also, the total transaction value had to be higher than 50 million dollars. Kaplan found the operating income to be essentially unchanged for the first two years post buyout, and a 24% increase in the third year on average. Also, changes in ratios such as operating income to assets exceed the changes for the industry by around 20% for the three years, and over twice as much for net cash flow to assets, with 50% (Kaplan, 1989). This paper is in line with what Schipper and Smith published in 1988, where they examined management buyouts based on tax benefits.

In 2012, Wilson, Wright, Siegel and Scholes published an interesting article about private equity performance for portfolio companies. What is especially interesting is their time frame, focusing on buyouts during the global recession that came as a result of the financial crisis in 2008 (Wilson et al., 2012). Rasmussen had already published a similar study of increased insolvency risk and reduction in employment in economic downturns in 2008, in which they refer to in their study. Further, they tracked private equity-backed firms in the period of 1995 to 2010, in

the entire UK. Their main objective was to research the performance of private equity companies to non-buyout private and public companies prior and during the recession. The performance was based on efficiency, growth, and profitability (Rasmussen, 2008).

They further emphasize the pessimistic prospects that private equity backed buyouts had in the UK at the start of the recession, with high leverage as the main reasoning. Nevertheless, their findings were not in line with the concerns. As a matter of fact, the private equity-backed buyouts had a higher growth, as well as an increase in both productivity and profitability. Their overall conclusion is that private equity companies add value to the companies being bought.

In 2016, a study was published by Carsten Bienz, reviewing leveraged buyouts in Norway. His study was focused around three main topics: if there is an increase in firm performance for buyouts in Norway, if there are tax consequences and how the corporate governance works. The consequences for taxation in buyout investments are especially interesting, since it claims a stake of the future profits for companies. An increase in leverage is a common way of reducing taxation, creating a tax shield (Bienz, 2016). By reducing the taxes, one can move wealth from the stakeholder and over to the shareholders, which Roald and Roti research in their study in 2015 . By looking at the differences for private equity-backed companies against companies that are not, they find that there are in fact no difference in tax planning. They also highlight that general partners do not target firms that have a great potential of tax savings in their selection of target companies (Roald & Roti, 2015) . A study done by Badertscher, Katz and Rego in 2010 showed similar results, although with US data (Badertscher et al., 2010).

2.5 - Leverage

The capital structure of a portfolio company typically changes after an acquisition. According to Bloomberg, private equity firms now load more debt into their targets than ever before, with the highest average of leverage in the past 20 years, using data collected in 2022. The average was roughly six times the earnings (Scigliuzzo, 2022)

Leverage for PE-backed deals reached a new record in 2021

■ PE-Backed ■ Non PE-Backed
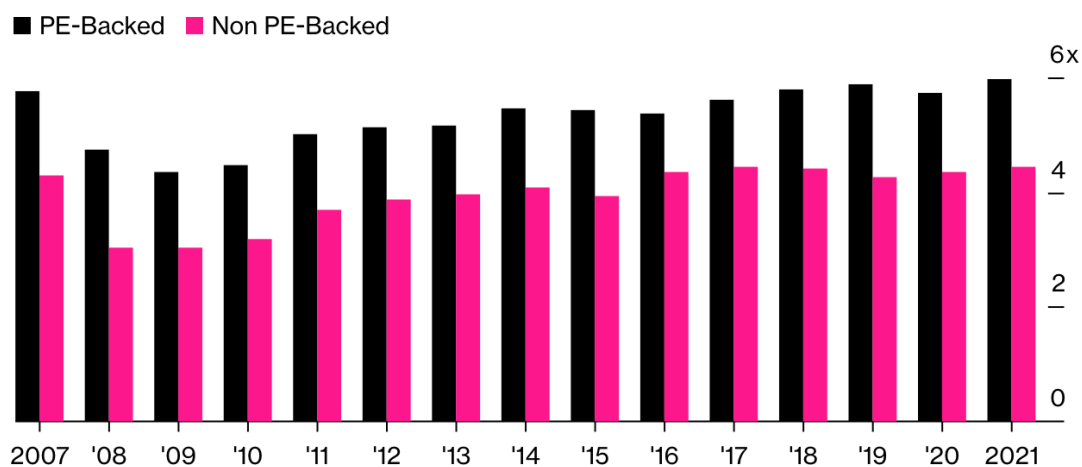
Source: S&P Global Market Intelligence's LCD

There are several reasons for a private equity fund to prefer an increase in leverage for their targets. According to pecking order theory suggested by Donaldson in 1961, debt is prioritized over equity because the cost is lower (Berk, 2016). Moreover, it provides a tax shield if the company is profitable, which will affect the profits positively. Also, the free cash flow problem is reduced and may even be removed entirely when a company is taking on additional leverage. The reasoning is that the free cash flow is used to service the debt instead of being in the manager's control. This is also what Jensen refers to in his paper on the "Control hypothesis" in 1986.

There are disadvantages by issuing debt as well, such as debt overhang problem and overborrowing, with the former making a company unable to fund positive NPV projects and the latter is when a company is investing in negative NPV projects using borrowed money. The bankruptcy costs increase as the debt increases, which is the main reasoning for why companies end up in distress. The trade-off theory considers the balance between the costs and benefits of debt, stating that it is an optimal level of debt for which the marginal value of the tax shield equals the marginal cost of financial distress. However, Miller is criticizing the trade-off theory. His reasoning is that taxes are sure, and the tax shield is observable, whereas bankruptcy is uncertain, and quite rare. Therefore, companies should in reality have more debt than what is observed in practice.

(Axelson et al., 2013) where they investigated the capital structure theories, using an international sample of buyouts from 1980 to 2008. The database they constructed contained a total of 1,157 buyouts, with the majority of the observations coming from North America and Western Europe. Their goal with the paper was to fill the gap of what determines leverage and pricing in private equity-backed firms. They further examined the factors and compared them to a matching set of publicly traded firms. They explain in their paper that most of the variation in leverage for acquisitions is because of time-series effects. They found that when there is a higher credit risk premium for leverage loans, there is lower leverage used in the buyouts. A result of this is that the buyout deals are procyclical and that the debt level will be higher when the credit market conditions are "hotter" as they described it.

They further investigate how much of an impact the availability of leverage has on the purchase price-multiple of the target companies. This is indeed true, as the price of the company is often higher when the leverage is less available. Moreover, they conclude their paper with the finding that the main consideration of leverage buyouts are the economy-wide credit conditions. A deal that contains higher leverage has often higher transaction costs and lower return. The Fund performing the buyout therefore tends to overpay when the availability for leverage is higher.

Their paper is related to what Berger, Ofek and Yermack published in 1997 (Berger et al., 1997), as well as (Baker & Wurgler, 2002).

2.6 - Productivity

Even though there has been much debate on whether private equity firms are productive or not, there is still a lot of research that backs the claim of it being superior to others. According to (Ernst et al., 2013) notes, proponents of private equity see it as a new and superior management model. This is based on not having to consider short term development of the stock prices, and the ability to focus on long-term value increasing investments.

Another important area to include in the research of private equity-backed firms is productivity, and in an investigation done using large longitudinal establishment and firm-level Census Bureau datasets, they find that management buyouts (MBO) has a strongly positive effect on total factor productivity (TFP) (Lichtenberg & Siegel, 1990). This was the first study done to measure the impact of MBOs and LBOs on productivity. The dataset that was used contained over 19.000 mostly large manufacturing plants in the U.S, from 1972-1988. The importance of the authors findings was not only that MBOs had a higher TFP compared to other comparable firms, but that this increase in economic performance could not be explained by reduction in R&D, layoffs, wages or capital investment.

More recent studies on the topic reveal further encouragement for the productivity of private equity backed firms as (Davis et al., 2014) also finds buyouts to increase TFP gains compared to other firms, here mainly through accelerated exits and entries of less productive and more productive establishments respectively. The positive effect of buyouts is also concluded, where they research U.S firms from 1980 to 2013, but the authors suggest a different reasoning for the superior performance of buyouts, suggesting the use of financial engineering rather than operating performance to reach these results. On the other hand (Goergen et al., 2014) discovers through interviews and company data that institutional buyouts are associated with lower wages, lower productivity and job losses. In other words, there are negative employment consequences without any improvements in productivity. The same goes for Scellato and Ughetto as they find no increase in productivity, but rather a decrease in operating profitability in their study of European companies from 1997 to 2004 focusing on three years after the buyout occurred (Scellato & Ughetto, 2013)

A study published in the Journal of Business Economics and Management conducted an analysis of a dataset containing Slovenian manufacturing firms. After excluding firms with no industry information obtainable, zero employees, zero sales value and more they ended up with a dataset of 5,369 firms and 13,854 observations. By computing the revenue to employee ratio they discovered that model was statistically significant but the model only explained 40 percent of variability in the ratio with growth as the explanatory variable. The relationship between the two variables was also linear and positive (Ponikvar et al., 2009).

2.7 - Employment

The increase in popularity for private equity in the last decades have also brought with it concerns and criticism. One of the major concerns that often seem to be highlighted is the impact a buyout has on the employment in the company being bought. The reasoning for the concerns is that since the goal of the strategy in simple terms is to cut costs to increase the financial performance, workers are often laid off, as it is often easier to decrease costs than to increase profits. However, several studies have shown the opposite, as (Association, 2006; Kearney, 2007; Shapiro & Pham, 2008) state a positive effect of private equity on employment. Although they do show positive effects, there are some implications. They all rely on surveys that might have selective responses and include some type of bias. The data also includes venture capital in addition, which is not part of the criticism, and the chances are that the results will be affected by this.

A new study about the topic was published (Davis et al., 2011). They investigated the same claims as above, but with a different approach to overcome the implication and bias that the previous research suffered. They constructed a dataset that covered private equity transactions in the US from 1980 to 2005, which tracked 3,200 target firms and 150,000 establishments. They tracked the establishments for five years both prior and after the transaction. The tracking was performed on a more detailed level than before, which helped them overcome some of the prior implications. One of the key details they were including in their analysis was job creation. Their findings do not support the previous research. They found that private equity deals actually led to a greater job loss for establishments as of the transaction year. For a two-year period, there was a decrease in employment by 3 percent against a control group. For a five-year period, the decrease was 6 percent, and the public-to-private deals were the strategy with the largest employment loss. With that said, their analysis also reveals that the job creation for the portfolio companies is higher than the control firms. One third of the difference is erased if this factor is considered.

A more recent study was published by (Goergen & Wood, 2014) which looked at the consequences of private equity acquisitions for employees. They used evidence that impacted employment, productivity, and wages. They emphasize the prior claims of job losses, decreased wages, and a lower productivity. They also emphasize the arguments that private equity acquisitions only focus on shareholders wealth in the short term. Where prior research relied on case studies and surveys, their approach was somewhat different. They used data from the acquired company's annual report, looking at the numbers both prior and after the buyout. They also did a limited number of interviews with different stakeholders, to get a broader understanding of the issues the industry was facing. Their dataset consisted of 106 institutional buyouts in the UK, between 1997 and 2006. They collected their data for 6 years prior to the acquisition and 4 years after, to see the effects. They found high evidence of downsizing for the targets in the institutional buyouts in the year after the acquisition was completed, which can confirm the claims of job losses. Also, they found lack of attention to an increase in productivity, which may suggest that the managers being brought in had other priorities than HR issues. Although they do highlight some negative consequences for institutional buyouts, they do underline that they only used data for institutional buyouts, suggesting that management buyout would probably show a more positive result, based on prior research in that field.

3 - Market analysis

3.1 - The Global Private Equity Market

The emergence of private equity funds came in the early 1980s and grew rapidly over the decades with American private equity funds reaching as high as $200 billion in 2007 compared to only $0.2 billion in 1980, in nominal dollars committed. As of June 2007, Kaplan and Strômberg reported that 17,171 private equity backed buyouts have been recorded all the way back from 1970 to 2007. To get a better understanding of the rapid growth of the private equity market, 5,188 of these were recorded between 2005 and 2007, and the value of these transactions exceeded $1.6 trillion. The transactions over the timespan represent 30 percent of the overall transactions recorded between 1984 and 2007 (Kaplan & Strömberg, 2009). The growth kept increasing with the years, as PWC reported 3,417 deals in the US private equity market in the second half of 2021. This is an increase of 48% from the second half of 2020 (Mahenthiran, 2022).

When the junk bond market crashed in the 1980s, a crash that lasted for over a decade, the LBOs of public companies decreased drastically by the early 1990s. This was not the downfall of LBOs, but rather a change of focus, where the new target of investments were centered around private companies over public. However, when the LBO market boomed in the mid 2000s, the trend was once again shifting towards the public to private transactions. Even with the recent increase in public-to-private buyouts, LBOs of private companies still accounted for more than 80 percent of transaction value and more than 90 percent of transactions.

Secondary buyouts represented 20 percent of total transaction value in the early 2000-2004, mostly due to the fact that large corporations sold off their own divisions. The European market for LBOs grew rapidly in the same period with 48.9 percent of worldwide transaction value compared to the US with 43.7 percent. With both public-to-private and secondary buyouts trending, it reached new heights in the 2005-2007 private equity boom with more than 60 percent of the transaction value of LBOs. This return of public-to-private also just about tripled in average deal size between 2001-2006. Along with the increase in

popularity came new markets to invest in, with LBOs expanding their interest to companies in services and infrastructure. At this time, private equity started to get recognition in Asia as well, where it experienced a significant growth. It was however not as much as in Europe and North America.

As private equity funds usually have a limited lifetime, the exits are an important part of their life cycles. According to appendix 1 made from the 17,171 observations in the previously mentioned article, Kaplan and Strömberg showed that the way private equity funds chose to conduct their exits changed over the years. The biggest changes were in IPOs which went from 28% of exits in 1970-1984 to only 1% in 2006-2007 and financial buyouts which went from 5% in 1970-1984 to 17% in 2006-2007 (Kaplan & Strömberg, 2009). Specifically, this IPO activity got the interests of several academics and could partially be explained by financial globalization, as well as partially by an increased benefit of selling out to a larger organization (Gao et al., 2013).

From 1990 to 2011, the share of the world's IPO activity outside the US increased, while the share within the US declined. In fact, there were 0.37 US IPOs to every non-US IPO in the 1990s, but only 0.12 in the 2000s. As foreign capital markets were made easier to access, and foreign institutions were more commonly used, the IPOs were now moving towards a more equal share across the world. The biggest hit to this was the US small-firm IPOs which fell from 31% in the 1990s to 5% in the 2000s (Doidge et al., 2013a; Doidge et al., 2013b). Although there has been such decrease in initial public offerings in the U.S, the private companies backed by VC still raised money, achieving high revenues and employment, a privilege previously held only by their public peers. Out of all the startups with their first round of funding before 1997, which raised over $150 million, 80 percent went public. 83 percent of their capital raised was from public capital. By comparing this to first round funding after 1998, there are less than 40 percent of startups with more than $150 million raised which relied on public capital to achieve this. This means that the trend was now moving towards startups reaching out for private capital instead of public, which meant fewer IPOs in general. The average age of startups raising private capital also increased and more than doubled from 2000 to 2005, around roughly 3 years old after that. The evidence

from the paper suggests that mature firms tend to raise larger financing rounds (Ewens & Farre-Mensa, 2017).

The private equity market has also experienced immense growth in recent times with assets under management experiencing a 10 percent growth in 2019, which represents a 170 percent growth in the last decade. In the same period, the active private equity funds have also doubled in number. Further, McKinsey reports that PE outperformed its public market equivalent on the bulk of the measures over the past decade. North American fundraising also reached a new record in 2019 with a total $350 billion dollars raised in private equity, where most of the dollars raised were to buyouts. Buyouts therefore experienced a growth in fundraising of 84,5 percent compared to the prior year. The second biggest contributor was venture capital with a growth of 15,7 percent as we can see in appendix 2 (Alejandro Beltran de Miguel, 2022; Alejandro Beltran de Miguel, 2020)

3.2 - The Norwegian Private Equity Market

Even though Europe has a well-developed private equity industry, with countries like UK, France and Sweden having well developed markets, it is still a fairly new asset class in Norway. Norway had between €2,500 million and €5,000 million in private equity capital in 2006. The UK on the other hand has the largest market with 66.8 percent of the industry in Europe, followed by France and Sweden with respectively 9.5 percent at €10.6 billion and 8.4 percent with €9.4 Billion (Sandvik, 2008; Widding & Kjetil Havn, 2006). Nonetheless, the Norwegian private equity market has been growing rapidly over the past two decades. According to Preqin, Norwegian private equity firms raised $5.2 billion in 2021 despite the pandemic, which is almost double of what they raised in 2006, at $2.8 billion. The Norwegian private equity market has not only grown in funds raised, but also in the number of deals, as NHH's Argentum Centre for private equity states that there were close to 250 buyouts conducted up until 2013 (Bienz, 2016).

There has also been an increase in the amount of Norwegian fund managers. Since the beginning of 2018, a total of 125 Norwegian alternative investment fund managers were either registered or regulated by the Financial supervisory

authority of Norway, compared to 105 the year before. Half of these were private equity managers. Norway was the last Nordic country to establish a local private equity firm, with FSN capital in 2000 and Herkules Capital in 2002, compared to the other Nordic countries which started as early as the 1970s and 1980s (Spliid, 2013). This indicates that there is only in recent years that Private equity has gained traction in Norway, getting increased attention and being seen as an alternative way of financing businesses for economic growth and a stimulant for innovation. The European innovation scoreboard (EIS) makes a comparative analysis of EU countries on their innovation performance. EIS helps countries identify areas to address by assessing their relative strengths and weaknesses related to their innovation systems.

According to the EIS report, Norway is a strong innovator and has over time had increased performance relative to the EU, particularly in 2017 and 2019. This strong performance is according to a report published by international scientific co-publications, innovative SMEs collaborating with others, and employment in knowledge-intensive activities. The reports also mention the strengths of Norway, in which they emphasize employment impacts, linkages and attractive research systems. Further, the report mentions a recent minor decrease in performance. This is caused by reduced performance on venture capital and enterprises providing ICT training (European commission, 2021). Information communication technology training is an important factor in innovation as ICT is used both as efficiency-enhancing technologies and as a way of creating a competitive advantage through product innovation (Higón, 2012).

 The Norwegian private equity sector is either directly or indirectly affected by the oil and gas industry, just as the rest of the Norwegian economy. This has both positive and negative effects, but as the financial crisis in 2007-2008 and debt issues in Europe show, the Norwegian economy was mostly unaffected. On the other hand, the reduction of the oil price, which started in 2014, resulted in reduced investment activity, layoffs and debt restructuring in the oil-related sector. The result of these conditions had a clear impact on the private equity sector, as total investments went from 8.9 billion NOK in 2015 to 1.3 billion NOK by funds advised by Norwegian managers. The number of exits was also in a downward trend in the same time period with 49 in 2014, 45 in 2015 and 35 in 2016. The

relative decline on the Oslo stock exchange has also affected private equity as there were no exits in the form of an IPO in 2016 or 2017, which may indicate that IPOs are not a viable exit route, at least not under normal circumstances. However, 2016 was a record low year for listings overall, so the trend might not continue. On the more promising side, fundraising was at a record high during the same years, with 17 billion NOK raised over nine new funds in 2016, Norvestor VII closed at 4.9 billion NOK, OMP Capital AS (HitecVison V LP fund) closed at 381 million dollars and FSN Capital closed its fifth fund at 9.62 billion SEK (Hammerich, 2020).

Hammerich and Heistad proposed a way of categorizing the Norwegian private equity scene into 5 different categories. The first is composed of large generalist private equity investors, with FSN Capital, Herkules Private Equity and Novestor Equity as examples. The second is sector-specialist investors like HitecVison and Energy Ventures, which both focus on technology and assets within the market of exploration of gas and oil. Thirdly, we have a category consisting of managers in the venture and seed capital segment, in which the biggest one is Northzone Ventures. They have made a number of investments in different technology companies, with Spotify and Klarna as their biggest targets. In 2020, Klarna became the largest fintech company in Europe. As of the fourth category, there are some foreign managers from Stockholm and Helsinki that are active in the Norwegian market to the extent of establishing offices in Norway. This includes EQT, Altor, Nordic capital and Northzone. The fifth and last category consists of government-backed actors, and most prominently Argentum Fondsinvesteringer AS. Argentum is an investment company in private equity owned by the government and is an important investor in Scandinavian and Norwegian PE and Venture funds. The government established Investinor AS in 2017, which is a significant force in the venture segment, with an investment portfolio of 2.2 billion NOK as of Q3 2017, growing from 1.77 Billion NOK the year before.

In Norway, incentive schemes have traditionally been equity based and aimed at key personnel of the manager. As for the specific structure of these incentives from case to case, as the relevant legal framework and choice of investment model will have an effect. The AIF Act may also have an effect on the choice of incentive schemes that is not investment-based, as authorized fund managers are

subject to remuneration rules. As of 2017, a new legislation was made concerning non compete and non solicitation clauses which affected several employment contracts, making certain limitations and required compensations. These new restrictions should be addressed in the shareholder agreement for management incentive schemes (Hammerich, 2020).

With the key objective of most equity funds is to achieve superior returns through control of its portfolio companies, the legal framework for control investment in Norway makes a big impact on decisions, especially in an environment that changes continuously. An example is the implementation of the transparency act which passed in 2021. The act will demand more transparency and more due diligence for the companies (Gullhagen-Revling, 2021).

Both EU fund managers and non-EU fund managers that hold a marketing authorization in an EEA member state such as Norway are subject to certain reporting requirements when investing in unlisted companies which are not SMEs. They have to notify regulators whenever the proportion of voting rights of the non-listed company held by the fund or funds under management reaches, exceeds or falls below the threshold of 10, 20, 30, 50 and 75 percent. Additional disclosure requirements are also triggered upon acquiring control in the company. These same fund managers are also subject to rules concerning asset stripping, with restrictions on distribution, capital reduction, share redemption and acquisition of own shares for a period of 24 months from the acquisition (Hammerich, 2020).

4 - Data

4.1 - Sample Selection

The data section of our thesis provides a walkthrough of how we gathered and formed our dataset. The dataset is mainly split in two parts, the identified transactions within our timeframe and accounting data for all the transactions. The data is then sorted into the two strategies that we are investigating, namely buyouts and venture capital, and their matched peers. We are investigating the performance three years after an acquisition is performed. The chosen timespan is reasoned by evidence from the US, in which there were found a favorable effect for the profitability and cash flows of buyouts in the 1980s. A comparison of the year prior and the years after the acquisitions were made was done, and the evidence suggested a considerable improvement especially three years after the transaction (Bull, 1989; Kaplan, 1989; Malone, 1989; Singh, 1990). Therefore, we have chosen that particular year to uncover the changes in performance for the private equity-backed portfolio companies.

We have gathered data from several platforms, but we built our foundation using the Argentum Centre for Private Equity to identify buyout investments. It is a research centre that is concentrating on private equity in the Nordics and is based at the Norwegian School of Economics in Bergen. The Centre was founded in 2012 by Argentum, BA-HR, Energy ventures, HitecVision, Northzone Ventures, Norvestor Equity and PWC. They have built a database using Norwegian organizational numbers to identify the transactions. The data tracks transactions all the way back from 1982 and till 2015. The dataset contains different labels and options, which made it tidy for us to extract the data that was relevant for our thesis. Since we are looking at the Norwegian market, we sorted out all the transactions for the Norwegian portfolio companies being bought within our timeframe.

Our goal was to use the most recent data available, for our thesis to be as relevant as possible. To be able to cover the period of the last two decades, we needed to add some years to our existing dataset extracted from Argentum Centre. Since we

track performance for three years, and since accounting data for 2021 is unavailable at the time the data is extracted, 2017 is the last year being measured. To cope with the missing data for the last two years, we used three platforms, Brønnøysund Register Centre, Eikon and Zephyr. The two latter platforms offered access to data of transaction history for private equity in Norway. However, they labeled the transactions differently from each other, which made the process of sampling the data cumbersome. There were misclassified transactions that had to be either discarded or changed into the correct category if the information about the acquisition was incorrect. We managed to narrow the data down to a dataset where every observation contained sufficient information, split between venture capital data and buyout data. Since there were some missing transactions in the dataset from Argentum Centre, we used an overlapping search with both Eikon and Zephyr to find the missing ones. Because of that, a number of duplicate deals occured, and had to be accounted for.

Moreover, we used Brønnøysund Register Centre to identify the correct portfolio company. All Norwegian companies are registered with unique organizational numbers, making the process of tracking the correct company straightforward. Also, renaming of portfolio companies is a common outcome after a buyout procedure, in which Brønnøysund Register Centre plays an important role in keeping track with such changes. We were therefore able to use the register for the companies that performed these changes and keep them within our dataset. Furthermore, in addition to a change in name for some of the portfolio companies being acquired, changes in organizational number also change if the enterprise form of incorporation has changed. Such changes are also covered by announcements using Brønnøysund Register Centre.

To sample data for accounting as well as numbers of employees, we used two different platforms. We used Preqin as our main source for tracking the number of employees for the private equity deals. Preqin is a platform that provides data, analytics, and insights to the alternative asset community. The platform gave us information about the fund performing the acquisition, the length of the deal and financials regarding the deal, if available. It also provided us with information about the number of employees on a monthly level. However, due to Preqin only

tracking employment back to 2008, the sample size for this variable is smaller, but sufficient, nevertheless. We could have used Preqin for parts of the accounting data as well, but for most companies some data was missing or inconclusive, making us use another platform, namely Proff Forvalt.

Proff Forvalt is a Norwegian Business platform, providing highly reliable accounting data and analysis. They collect their data from SSB, Goava Nyhetssøk, debt collection agencies, Eiendomsregisteret and Brønnøysundregisteret. Considering that venture capital invests in early-stage companies and startups, as well as most of the Norwegian private equity buyouts uses a private-to-private strategy, Proff Forvalt is our most suitable choice of collecting such data. The accounting data provided by Proff Forvalt contains end-of-year financial data. This means that we only look at the year that the buyout is occurring, and track year for year, even if there are acquisitions taken place in different months, making the 3-year progression different from each other. Moreover, Proff Forvalt also has its limitations, especially for providing data for parts of the venture capital sample. A pattern of missing data for newly established firms being acquired in the first years of business was shown for some of the observations. It was split between missing parts of the data to an inconclusive accounting dataset, which made us leave out several deals for both strategies.

One of the challenges for our dataset was to consider the extreme observations. Looking at accounting ratios and measures such as return on sales, debt ratio and EBITDA margin we found several outliers. We observed these observations for both strategies, but particularly venture capital. The reasoning for that finding is that smaller companies, which is the case for venture capital, often have low or no income. Therefore, multiples using sales as the denominator tend to be unrealistically big either positively or negatively, and we had to account for such values. With all that considered and sorted out, we were left with a total of 172 acquisitions, split between 80 buyouts and 92 venture capital.

We will use data from the Centre for Corporate Governance Research when we are identifying our peer group. They focus on ownership and governance of firms, and their impact on value-creation and welfare of the stakeholders in a firm. They

focus especially on non-listed firms in Norway. They provide a detailed database of such firms, which includes accounting data, consolidated accounting data and more.

To identify our peer groups for both buyout and venture capital we will use industry codes, sales, debt ratio and year. We found four filters to be the most suitable number, as three would have given us less precise matches. Five filters however, were too detailed, as a very small part of the dataset could find matches for all five. Therefore, as it made less sense to have one part of the dataset match well with four, and another part match well with four different filters, we made a choice of four filters for consistency. We are using industry code to make sure that we find a match in the same industry, in line with Friedrich's study from 2015. The reasoning is that measures of performance may differ across industries. We are also using one of the most commonly used firm characteristics, namely firm size, and we are measuring it by looking at total sales, as previosly done by (Dang et al., 2013) and (Berk, 1997). We use size as a measure as it is often correlated positively with innovation, adoption of technology as well as having a higher productivity and growth (Amatori et al., 2011). Further, we use debt as one of the matching measures, as we want companies in the same debt range as the ones we are comparing with. The reasoning is that debt tends to increase for portfolio companies compared to companies that are not backed by private equity (Scigliuzzo, 2022). By using companies with a similar debt ratio, we are able to measure the change better, to answer the hypotheses. We use year as the last filter, as we want to find a match in the same year as the one we are comparing with. The logic behind that is that the economy changes with time, and it would not be reasonable to compare the performance of a company in 2015 with the performance of a company during a financial crisis.

The NACE industry code is a 5-digit code that lets us identify all the companies that are in the same industry as the one we are trying to match. The matched company is identified as the company with the most similar measures in the same year as the one we are comparing with. We are therefore exhausting all the other candidate firms, and left with the best match for that year. We perform this procedure for every company in both strategies, until we have the same number of

observations for both strategies and their matched peer group. This procedure will therefore provide us with a peer group that is the most comparable to the one it is matching, as we are looking at the best match for each company separately. We only look at the present year of the entry when locating the matches, and do not look at the progress the company is making during the timespan of three years. Companies experiencing bankruptcy during the three years are therefore present in the data. Consequently, the data set might indicate how private equity-backing keeps startups for venture capital away from bankruptcy, by providing them with their funds.

The distribution of acquisitions below highlight the sectors that stand out in terms of numbers. ICT and energy is especially popular, with almost twice as many acquisitions as the rest separately. We can also see a pattern in the years after the first decade, with three years in a row with a high number of acquisitions from 2010.

Table 1

The table below illustrates the distribution for buyouts and venture capital throughout the timespan of our sample collection. It seperates them by the sector they operate in. It provides an overview of the total acquisitions per sector per year, showing which sector is most common in a given year.

Buyout and Venture capital distribution per sector

Entry year	Energy	Life Science	ICT	Cleantech	Consumer	Industrial	Other	Total
2000	-	2	5	-	-	-	-	7
2001	-	-	2	-	1	-	2	5
2002	-	-	1	-	1	1	1	4
2003	1	1		-	1	-	-	3
2004	3	-	1	-	3	1	-	8
2005	1	1	3	-	2	-	-	7
2006	2	-	2	-	2	1	-	7
2007	2	-	1	2	-	1	-	6
2008	1	-	4	2	1	2	-	10
2009	1	-	3	4	1	-	-	9
2010	4	1	3	2	-	6	1	17
2011	3	3	4	-	3	3	1	17
2012	8	1	6	1	3	1	1	21
2013	6	-	2	-	1	-	-	9
2014	3	2	2	-	-	-	1	8
2015	2	-	3	-	1	1	2	9
2016	3	1	2	-	2	5	-	13
2017	-	-	6	-	2	3	1	12
Total	40	12	50	11	24	25	10	172

4.2 - Strengths And Limitations Of The Data Sample

We have built an extensive custom database for buyouts in Norway. The data is collected and built from several sources, as well as matched against one another. This approach arguably increased the robustness and validity of the data sample. Further, we cover a timeframe of roughly two decades. This means that the data includes a financial crisis, which all good financial dataset should (Giordani, 2021). Also, since Proff Forvalt provides both full accounting data as well as analysis for key numbers, we are able to analyze this data using our own methodology. We have used several measures to identify the peer group for both strategies, locating each matched peer one by one. By performing this procedure, we are making sure that each matched peer is similar to the company being acquired, and the performance being tracked will be as precise as possible.

Strengths aside, there are also several limitations to our dataset that needs to be considered. Firstly, although our dataset contains 172 observations, there are still an adequate number of missing observations due to limitations in the time span covered by Preqin. This mainly affected the measure of numbers of employees and revenue per employee. Moreover, accounting data were also missing for several observations in the Proff Forvalt platform, due to changes in organizational numbers, deleted accounts because of bankruptcy or insufficient data. Also, a few of the companies being acquired only have accounting data up until the buyout date, often as a result of them being merged within the acquirer, making it impossible to get that data. Therefore, we were unable to include every acquisition being done in our time frame. That can potentially make the dataset biased if the observations being left out is significantly different from the average observation.

Furthermore, as we mentioned earlier, we are only looking at the data year by year, regardless of the month that the acquisition is taking place. The reasoning for this is that the accounting data is published yearly, which makes it impossible to separate by months. For some observations, especially when the acquisitions take place in the first quarter, the buyout will have more of an impact on their numbers in that first year, but it was an assumption we had to make.

Also, as for our peer group, it is impossible to find a company that matches perfectly. The results can therefore not be perfectly compared, and one might get slightly different results if proceeding with the same approach but with a slight change in the filters used for matching the peers.

5 - Methodology

The choice of financial performance measure, or any performance measure in general, is critical when evaluating a company. Measurement for only financial performance is often inadequate. Therefore, including several measures, acknowledging that both equity and debt have a cost, and incorporate the financial risk-return into the performance calculations (Venanzi, 2011).

As Meeks and Meeks emphasize in their study from 1981, performance is not only a financial measurement, and profits can increase even if there is no increase in efficiency. Their reasoning is that if bargaining power is enhanced as a result of a merger or buyout, the profitability could increase even if efficiency stays the same.

Also, as (Alperovych et al., 2013) observed in their article, increases in efficiency after a buyout is common. This is especially the case for private buyouts, as well as divisional, as they have above the average scores in efficiency measures. Finally, they emphasize the pattern of the efficiency curve being convex and suggest that most of the improvements in efficiency are occurring in the first two years. Based on prior research we are therefore considering several types of measures in our analysis.

5.1 - Profitability

When analyzing the profitability for the portfolio companies, we will look at several different measures. EBITDA-margin, return on sales, return on equity, and return on total capital are the ones we have chosen for our analysis.

EBITDA-margin is a frequently used measure to compare the relative profitability when two companies are of different sizes, as the ratio is a product of both the EBITDA but also the revenue. The margin will tell us whether the companies we are looking at are operating efficiently to maximize its profitability. It is a helpful measure to see the benefits of a cost cutting program, which often is the case when a private equity company acquires a target. EBITDA has its limitations however, as it does not take debt into consideration. EBITDA calculations should therefore not be fully trusted alone. We will also be looking at the return on sales,

which is somewhat similar to the EBITDA-margin in that it also measures the efficiency of the money spent in a company. The difference, however, is that the return on sales takes more costs into consideration, such as capital investments and equipment.

Moreover, we are also interested in investigating the portfolio companies' ability to efficiently generate profits. What is considered a good return on equity varies from sector to sector, and we will look at the ratio for both strategies and their matched peers. Even if a high return on equity is often a good indicator of strong performance, it may also be a result of a low amount of equity compared to the net income. Also, venture capital targets are often not profitable or barely profitable in the early stages, which can result in a low denominator when they finally reach the profits in the first years, making the return on equity measure very high.

The last measure we will use for profitability is the return on total capital, which also indicates the efficiency of the capital in the company. The measure tells us how good the company is to generate a return based on the capital structure, both for equity and debt holders. Using this measure we are able to compare how efficient the companies are in converting invested funds to profits, for both different sectors and strategies. The four measures used individually may not tell us much, but using them together should paint a picture of the financial performance of the target companies.

5.2 - Leverage

In this section of our thesis, we will use data that can provide further insight into the changes in the capital structure of a company after its acquisition.
There are several ratios that could tell us how these changes are occurring, but we have chosen the debt ratio. The debt ratio which Proff Forvalt is using simply divides the companies' total liabilities by the total equity. It tells us how the investments are funded, and how suited the equity owners are in the event of an economic downturn. In addition to this, we have also calculated the equity ratio as a robustness test. This will solve for bias in our dataset. It is a measure of the

proportion of the equity compared to the total assets. If the two ratios indicate two different realities, we would know that there is bias in some of the observations used in our dataset.

5.3 - Productivity

Revenue per employee is an important measure which contributes to the picture of the efficiency of the firm. The ratio roughly measures the revenue per employee which tells us how productive a certain firm is with each of their employees. A disruptive factor to consider while measuring this is the specific industry the firm is in, which we use industry codes to resolve. The motivation for choosing this measure is to look at historical changes and compare it to a peer group. In doing so we will see how buyouts improve or decrease efficiency in utilization of their employees over the buyout period and comparing it to a peer in the same time period. For the measurement we use Full time equivalent (FTE) employee's data from Preqin and revenue data gathered from Proff Forvalt. As to ensure the cleanest data possible we excluded all firms which didn't have obtainable data on revenues or employees in both time periods, and firms with zero employees or zero revenue. In doing so we ended up with a dataset consisting of data on 30 for venture capital and 51 for buyouts.

Another measure for operating performance we include is the fixed asset turnover ratio (FAT). This compares net sales to fixed assets, and tells us how well the company generates net sales from its investments in fixed assets. This is another efficiency measure which considers the capital invested in assets instead of human capital to generate income. By using a combination of both measures we will have a better understanding of both the efficiency of the firm, and the source of its efficiency. For our dataset we use the same requirements as in revenue per employee but exchange the requirement for employees with fixed assets data. In doing so we are left with data on 24 VC and 42 buyouts.

5.4 - Employment

We have seen a lot of misconceptions about private equity claiming LBOs bring with it huge job losses. The fact is that some job losses occur when there is a buyout and in the years after, but there are also a lot of job creations, which makes the losses marginal (Davis et al., 2011). Some studies also show positive employment growth from LBOs and VC (Paglia & Harjoto, 2014).

Even though PE and their impact on employment have been thoroughly researched we still want to consider it in our analysis, both to get a better understanding of the actions the firms have taken, but also to see if there is a different trend in Norway compared to firms in the U.S, as most of the research have been conducted on American firms.

We are using the number of employees as a measurement for employment, in which we investigate if there is a change in this variable three years after the acquisition. This measure will give us an indication of whether there is an increase or decrease in employees on average, in which an increase will help disprove the claims made regarding job losses in private equity. Further, we are using wage expense as one of our measures for employment, to delineate the change post acquisition. Wage expenses include any form of compensation paid to the employees within a company. It is reasonable to assume that this expense will be quite correlated with the change in number of employees. The two measures combined give an understanding of how employment changes after an acquisition.

5.5 - Statistical methodology

To determine whether the mean of the measure at time 0 is statistically significant from the mean at time 3, we should conduct a paired sample t-test. The reasoning for the use of this test is that we are interested in the difference between two variables that are separated by time (Mee & Chua, 1991)
The null hypothesis of this test is that the population mean of the differences is zero, while the alternative hypothesis is that the difference is not zero. However,

the paired sample t-test has the assumption that the distribution is normal, and that might not be the case for our dataset.

Our sample sizes for buyouts and venture capital are respectively 80 and 92. When a sample size is larger, usually above 30 observations, the chances are that the dataset will have a normal distribution, and parametric procedures can be used. Also, according to the Central limit theorem, this will be the case regardless of the shape of the data. The theorem also states that the violation should not cause major issues even if the assumption does not hold. However, if there is a serious deviation from normality, then the further procedures should be assessed (Elliott & Woodward, 2007). Since we are looking at private to private buyouts and especially venture capital, we have data with a lot of variation in the different ratios and measures. The reason for this is simply that the financials vary a decent amount for the target companies, since many of them are acquired without having a lot of revenue. Therefore, even minor increases in revenue will have large impacts on the ratios and measures which causes a very high variation, and some outliers. Therefore, since there is a high probability that the dataset is not normally distributed, and since there might be a serious deviation from normality, we wanted to test just that.

We will be applying the Bera-Jarque test to test our dataset for normality. The test is based upon skewness and kurtosis, and tests whether the distribution suffers from these two standardized moments. For a distribution to be normal, the coefficient of kurtosis needs to be 3. The coefficient could also be defined using excess kurtosis, in which a normal distribution would need to be 0. The approach is to test if the coefficient of skewness and the one of excess kurtosis are jointly equal to 0. Skewness and kurtosis are express as follows:

$$b_1 = \frac{E(u^3)}{(\sigma^2)^{3/2}} \quad \text{and} \quad b_2 = \frac{E(u^4)}{(\sigma^2)^2}$$

The test statistic for Bera-Jarque is given by:

$$W = T\left(\frac{b_1^2}{6} + \frac{(b_2 - 3)^2}{24}\right)$$

The null hypothesis for the test is that the distribution is normal, and if rejected, the alternative hypothesis is that the distribution is not (Brooks, 2014). We will be using an alpha of 5 percent, in which the null hypothesis will be rejected if the p-value is below that.

Table 2

Bera-Jarque test

Profitability year 0

Measure	Buyout			Venture capital			Peer Group Buyout			Peer Group Venture Capital		
	Test statistic	P-value	Sample size	Test statistic	P-value	Sample size	T-stat	P-value	Sample size	T-stat	P-value	Sample size
Return on equity	59.72	1.07E-13	80	711.63	3E-155	92	195.37	3.76E-43	80.00	765.30	7E-167	92
Return on total capital	8.14	0.02	80	363.24	1E-79	92	12.04	0.002	80.00	557.19	1E-121	92
Ebitda-margin	826.90	2.76E-180	80	1357.28	2E-295	92	202.57	1.03E-44	80.00	2126.81	0E+00	92
Return on sales	420.09	6.02E-92	80	1680.00	0E+00	92	172.74	3.09E-38	80.00	17216.03	0E+00	92

Profitability year 3

Measure	Buyout			Venture capital			Peer Group Buyout			Peer Group Venture Capital		
	Test statistic	P-value	Sample size	Test statistic	P-value	Sample size	T-stat	P-value	Sample size	T-stat	P-value	Sample size
Return on equity	700.47	7.85E-153	80	1294.63	7E-282	92	19360.02	0.00E+00	80.00	3075.04	0.0E+00	92
Return on total capital	204.67	3.60E-45	80	33506.84	0E+00	92	6.10	0.0473	80.00	534.42	9.0E-117	92
Ebitda-margin	5158.59	0.00E+00	80	581.91	4E-127	92	418.60	1.26E-91	80.00	4986.59	0.0E+00	92
Return on sales	1917.24	0.00E+00	80	1129.46	5E-246	92	377.29	1.18E-82	80.00	9539.60	0.0E+00	92

The table above provides an overview of the Bera-Jarque test statistics for the different profitability measures. Every variable contains a p-value that is less than alpha, and as close to zero as it gets. The test statistics are also rather high for most of the variables, with some exceptions. The return on total capital for the buyout peer group in year 3 is the variable that is closest, with a p-value of 0.0473. Therefore, the null hypothesis is rejected for all variables, and there is significantly skew and/or leptokurtic present.

Table 3

Bera-Jarque test

Leverage year 0

Measure	Buyout			Venture capital			Peer Group Buyout			Peer Group Venture Capital		
	T-stat	P-value	Sample size	T-stat	P-value	Sample size	T-stat	P-value	Sample size	T-stat	P-value	Sample size
Debt ratio	86.25	1.9E-19	80	1738.62	0.0E+00	92	1207.79	5.4E-263	80	3587.23	0E+00	92
Equity ratio	6.06	0.048	80	632.14	5.4E-138	92	130.6025	4.37E-29	80	434.60	4.23E-95	92

Leverage year 3

Measure	Buyout			Venture capital			Peer Group Buyout			Peer Group Venture Capital		
	T-stat	P-value	Sample size	T-stat	P-value	Sample size	T-stat	P-value	Sample size	T-stat	P-value	Sample size
Debt ratio	1098.61	2.8E-239	80	776.54	2.4E-169	92	20211.65	0.0E+00	80	3403.66	0E+00	92
Equity ratio	3.17	0.205	80	13.68	1.1E-03	92	121.63	3.9E-27	80	265.38	2.4E-58	92

The table above show mostly similar results as for profitability, in which the null hypothesis is being rejected. However, the equity ratio for the buyout group in year 3 is not significantly skewed and/or leptokurtic, with a p-value of 0.205. We can nevertheless observe that its peer group is significant, and we will perform the tests consistently for all variables.

Table 4

Bera-Jarque test

Productivity year 0

Measure	Buyout			Venture capital			Peer Group Buyout			Peer Group Venture Capital		
	T-stat	P-value	Sample size	T-stat	P-value	Sample size	T-stat	P-value	Sample size	T-stat	P-value	Sample size
Revenue per employee	3493.6	0.00E+00	52	1261.89	9.7E-275	33	3426.37	0.00E+00	52	15.075	5.33E-04	33
Fixed asset ratio	391.2	1.1E-85	48	93.17	5.9E-21	25	495.20	2.94E-108	48	2246.67	0.00E+00	25

Productivity year 3

Measure	Buyout			Venture capital			Peer Group Buyout			Peer Group Venture Capital		
	T-stat	P-value	Sample size	T-stat	P-value	Sample size	T-stat	P-value	Sample size	T-stat	P-value	Sample size
Revenue per employee	2708.14	0.0E+00	52	17.10	1.9E-04	33	2708.14	0.00E+00	52	2.877	0.237	33
Fixed asset ratio	2630.29	0.00E+00	48	87.09	1.2E-19	25	2477.23	0.00E+00	48	1943.71	0.0E+00	25

The table above show similar results as the previous, with all variables having a p-value of roughly zero, except fore one. Revenue per employee for the venture capital peer group in year 3 has a p-value of 0.237, which makes it not statistically significant, and indicates strong evidence for the null hypothesis. However, as the revenue per employee for venture capital is statistically significant, we will use the same apporach for both measures going forward.

Table 5

Bera-Jarque test

Employment year 0

Measure	Buyout			Venture capital			Peer Group Buyout			Peer Group Venture Capital		
	T-stat	P-value	Sample size	T-stat	P-value	Sample size	T-stat	P-value	Sample size	T-stat	P-value	Sample size
Wages	21118.4	0.00E+00	80	198.55	7.7E-44	92	49.82	1.5E-11	80	538.787	1.01E-117	92
Number of employees	4589.3	0.0E+00	74	942.62	2.1E-205	47	1271.14	9.4E-277	74	145.453	2.60E-32	47

Employment year 3

Measure	Buyout			Venture capital			Peer Group Buyout			Peer Group Venture Capital		
	T-stat	P-value	Sample size	T-stat	P-value	Sample size	T-stat	P-value	Sample size	T-stat	P-value	Sample size
Wages	19368.13	0.0E+00	80	1048.37	2.2E-228	92	95.88	1.51E-21	80	263.82	5.16E-58	92
Number of employees	1060.63	4.87E-231	74	2213.38	0.0E+00	47	658.27	0.00E+00	74	12.92	1.6E-03	47

The table above provides test statistics for employment, and shows a similar pattern as before. For employment Every observation is significant, with a p-value of approximately zero. There is no normality in the data set for these measures.

Since the data is not normally distributed, we will have to use a nonparametric analysis. The reasoning is that a nonparametric analysis does not depend on the assumption that the data values we are using are from a specific distribution. These tests are usually not as powerful as the parametric counterparts but are still robust tests when there is non-normality present (Brooks, 2014). The nonparametric test that is equivalent to a paired t-test is the Wilcoxon signed-rank test (Corder & Foreman, 2014). The test procedure is a comparison of two samples that are paired or related. We have different sets of measures, where one part of the set is the year that the buyout was occurring, and the other part is the same measure, only three years after. The sets of measures are related, since the same company is tested twice. Therefore, each test score has another counterpart of test score. We are following the univariate procedure of (Goergen et al., 2014),

where they also used the Wilcoxon test for differences in medians. In their study they were looking at changes in employment growth, wages over employees and turnover over employees.

We will use the test that is considered for large samples, as our sample is beyond 50 observations for both strategies, as well as the peers. The null hypothesis states that there is no difference observed between the year of the buyout and three years later. The alternative hypothesis will therefore state that there is in fact a difference. We will use the following formulas to find the mean and standard deviation respectively:

$$\mu_T = \frac{n(n+1)}{4} \quad \text{and} \quad \sigma_T = \sqrt{\frac{n(n+1)(2n+1)}{24}}$$

To find the z-score we will use the following formula:

$$z^* = \frac{T - \mu_T}{S_T}$$

For a two-tailed test with an alpha of 0.05, we will not reject the null hypothesis if $-1.96 \leq Z^* \leq 1.96$ (Corder & Foreman, 2014).
With our relatively high number of observations, the test will not describe the strength of the treatment, but it will identify the presence or absence of a significant difference in the data we are testing. Also, statistician Jacob Cohen stated the following in 1988: "The primary product of a research inquiry is one or more measures of effect size, not p-values". Therefore, in addition to comparing the z-score to the critical value, we will use the effect size to uncover the magnitude of the change. It is calculated using the following formula:

$$ES = \frac{|z|}{\sqrt{n}}$$

The effect size will range from 0 to 1, where 20% is small, 50% is medium and above 80% is considered large (Cohen, 1988). Also, when interpreting the results,

we will be able to not only see the difference, but also see if there is a positive or negative effect, when looking at positive ranks compared to the negative ranks (Corder & Foreman, 2014).

Table 6

Wilcoxon Signed Rank Test

Profitability

Measure	Buyout			Peer Group Buyout		
	P-value	ES	Sample size	P-value	ES	Sample size
Ebitda-margin	0.471	0.008	80	0.003	0.215	80
Return on sales	0.142	0.120	80	0.029	0.215	80
Return on equity	0.029	0.216	80	0.020	0.233	80
Return on total capital	0.005	0.287	80	0.009	0.275	80

Measure	Venture capital			Peer Group Venture Capital		
	P-value	ES	Sample size	P-value	ES	Sample size
Ebitda-margin	0.003	0.435	92	0.081	0.147	92
Return on sales	0.001	0.326	92	0.097	0.136	92
Return on equity	0.014	0.232	92	0.003	0.289	92
Return on total capital	0.000	0.494	92	0.058	0.165	92

The table above provide p-values and effect sizes for profitability, for both buyouts, venture capital and their peer groups. For buyout, return on equity and return on total capital are significant, with only return on equity being significant on both 5% and 10%. The peer group provide lower p-values, with all four being significant on both 5% and 10 percent. We do however see that the effect sizes ranges between small and medium for both. As for venture capital, all four variables are significant on ever level, except return on equity at 1%. The effect sizes are close to medium for return on total capital as well as ebitda-margin. In contrast, its peer group only provide one variable that is significant on every level, and the effect size are therefore low for the last three. They are however significant at 10%.

Table 7

Wilcoxon Signed Rank Test

Leverage

Measure	Buyout			Peer Group Buyout		
	P-value	ES	Sample size	P-value	ES	Sample size
Equity ratio	0.418	0.023	80	0.488	0.014	80
Debt ratio	0.344	0.045	80	0.283	0.107	80

Measure	Venture capital			Peer Group Venture Capital		
	P-value	ES	Sample size	P-value	ES	Sample size
Equity ratio	0.005	0.268	92	0.092	0.139	92
Debt ratio	0.020	0.216	92	0.153	0.107	92

The table above illustrate the p-values for equity- and debt ratio, as well as the effect sizes. What stands out is that only threevariables are significant, namely the equity ratio and the debt ratio for venture capital, as equity ratio is signficant at all levels and debt ratios is signficant at 5% and 10%. The peer group however, only provide one significant variable, namely equity ratio at 10%. The effect size is very low overall, for buyout and its peer group especially.

Table 8

Wilcoxon Signed Rank Test

Productivity

Measure	Buyout			Peer Group Buyout		
	P-value	ES	Sample size	P-value	ES	Sample size
Revenue per employee	0.130	0.158	52	0.325	0.063	52
Fixed asset ratio	0.031	0.278	47	0.040	0.259	47

Measure	Venture capital			Peer Group Venture Capital		
	P-value	ES	Sample size	P-value	ES	Sample size
Revenue per employee	0.053	0.288	33	0.105	0.222	33
Fixed asset ratio	0.046	0.229	25	0.026	0.406	25

The table above provides an outlook of the the p-values and effect sizes for the measures used for productivity. For buyout and the peer group, only fix asset ratio is significant of the two, being significant on 5% and 10% for both measures. Venture capital provide similar results, only the revenue per employee is also significant for this strategy at 10%. However, there is a small to medium effect size for several measures, with fixed asset ratio for both buyout and its peer group close to 0.3. This simply tells us that there might in fact be a difference even if they are not significant.

Table 9

Wilcoxon Signed Rank Test

<u>Employment</u>

Measure	Buyout			Peer Group Buyout		
	P-value	ES	Sample size	P-value	ES	Sample size
Number of employees	0.000	0.617	74	0.000	0.501	74
Wages	0.000	0.610	80	0.000	0.731	80

Measure	Venture capital			Peer Group Venture Capital		
	P-value	ES	Sample size	P-value	ES	Sample size
Number of employees	0.000	0.697	47	0.006	0.400	48
Wages	0.000	0.640	92	0.038	0.186	92

The table above tells a different story than the two former tables, with 7 out of 8 measures being significant and only wages for the venture capital peer group being insigificant at 1%. The effect sizes are high for both buyout and venture capital, as well as buyouts peer group. The effect sizes ranges from medium to large for most of these variables, which tells us that its is indeed a significant difference in these variables.

6 - Hypotheses

We will use four different sub hypotheses to answer our main hypothesis. These sub hypotheses will be based on prior research. Therefore, if we have observed an increase or a decrease in a category of measures in prior research, this is also what we will expect to happen in our results, and that is what we will use for our null hypothesis. These sub hypotheses will then help us answer our research question, namely:

How private equity strategies impact the portfolio companies' performance

6.1 - Hypothesis I – Profitability

For this part of our thesis, we will use four measures to observe the profitability as mentioned earlier. We have seen in several studies that both sales and revenue tend to increase after an acquisition. We are using both sales and revenues in our calculations for different ratios. Also, since private equity firms have in their own interest to earn money, we have seen in numerous studies that they generate value for the portfolio companies, often due to an increase in profitability and efficiency. Therefore, our hypothesis for profitability is:

Private equity-backed firms in Norway experience an increase in profitability compared to its peer group.

6.2 - Hypothesis II – Leverage

As we mentioned earlier in our thesis, the capital structure tends to change for portfolio companies after an acquisition. The debt increases in the years after, as the private equity firms load more debt into their targets than their peers. This trend has increased further in recent years, with the highest average of leverage in the past 20 years. We expect the same for our data, as we are using data for roughly the same time-period. Therefore, our hypothesis is:

Private equity-backed firms in Norway experience an increase in leverage compared to its peer group.

6.3 - Hypothesis III – Productivity

We have also looked at prior research for productivity, to form our sub hypothesis within this category. There are studies showing that there is a strong positive effect on productivity for private equity-backed firms when looking at total factor productivity. Also, since the private equity firms do not have to consider short term development of stock prices, they can instead focus on long-term value increasing investments. We expect to see a similar result from our dataset, making our hypothesis the following:

Private equity-backed firms in Norway experience an increase in productivity compared to its peer group.

6.4 - Hypothesis IV – Employment

There has been criticism and controversy regarding employment and job losses within private equity-backed companies in the recent decades. However, the studies show mixed results. Some studies that were published around the financial crisis show that the claims are false, and that there are positive indicators for employment after an acquisition. Nevertheless, more recent studies, from 2011 and 2014 show the opposite, when compared to a peer (Davis et al., 2011; Goergen et al., 2014). We will therefore expect that there is in fact a decrease in employment, and our hypothesis is:

Private equity-backed firms in Norway experience a decrease in employment compared to its peer group.

7 - Analysis

To capture the performance and differentiate the strategies and their peer groups, we will compare the median values of change for the different measures. The median value will be used to measure the change from the time of entry and three years after the acquisition, to see the impact of private equity-backing compared to the matched peer group. By following this procedure, we will identify how well they perform compared to companies that are closely related in terms of industry, debt and revenue, but which are not backed by private equity. By doing so, we will uncover whether the private equity backing is the reasoning for a possible improvement, or if the similar companies would have experienced such improvement without the backing. The comparison of median values will be conducted and displayed category for category, measure by measure, for all four groups, as illustrated in the methodology. The reasoning for median as a measurement is that data for private equity, and venture capital in particular, consist of many extreme values, as previously mentioned. Therefore, as the median separates the higher and lower half and picks the observation in the middle, it is a better measure to use for such data. If we were to use average, the results would have been impacted by the extreme values, which could have impacted the results and conclusions. All results and calculations for changes will be found in the appendix.

In addition to comparing how the two strategies are performing against their peers, we will also look at the change in performance for the two strategies against each other. The reasoning for both procedures is that one strategy may do well against its peer group, but still have lower performance when comparing strategy to strategy. Furthermore, we will conduct a robustness test to identify any potential bias in our dataset. We will firstly remove a sector that we suspect has an impact on the results, based on previous research. Secondly, we will remove a timespan that we suspect also has an impact.

7.1 - Profitability

Our hypothesis for profitability is built on the findings of prior research, whereas Wilson, Wright and Scholes concluded in their article from 2012 that private equity-backed targets experienced an increase in profitability, using evidence from the UK. Kaplan came to the same conclusion in 1989 using data from the US, with the same time frame of three years. Therefore, the hypothesis is built on the expectations of similar results using Norwegian data.

Results

Table 10

Profitability

This table reports the changes in median values from the entry year of private equity backing and three years after. It illustrates and compares the performance in terms of profitability in four different measures, both for strategy to strategy and each strategy to the corresponding peer group. The changes are calculated on an end-of-year basis for all measures. The Wilcoxon signed-rank test is displayed below using p-value for each measure to tell if the changes are significantly different from zero, at a 1%, 5% and 10% level.

Measure	Buyout	Peer Group Buyout	Venture Capital	Peer Group Venture Capital
Return on equity	-9%	-16.2%	18.5%	-3.6%
(Wilcoxon p-value)	(0.028)	(0.020)	(0.014)	(0.003)
Return on total capital	-3%	-4.0%	20.9%	-0.6%
(Wilcoxon p-value)	(0.005)	(0.008)	(0.000)	(0.058)
Ebitda-margin	-2%	-2.3%	20.6%	-4.6%
(Wilcoxon p-value)	(0.471)	(0.028)	(0.003)	(0.081)
Return on sales	-4%	-1.9%	21.8%	-4.6%
(Wilcoxon p-value)	(0.142)	(0.028)	(0.001)	(0.097)

Firstly, we identify a negative change in return on equity for both buyout and the peer group, with both being significant at 5 and 10 percent. However, the peer group for buyout decreased by 7 percent more than buyout, making return on equity for buyout more robust than its matched peers for this particular measure. Also, the return on equity is still way beyond the market average of 8.25% (Damodaran, 2022), with 34% for buyout and 27% for the peer group after three years (Appendix 3). Since private equity-backed targets often experience an increase in its leverage after an acquisition, an increase in the return on equity is expected. The reasoning is that the assets increase with more debt, but the equity stays the same. The equity is then considered lower relative to the total assets, and

since the denominator in the return on equity is equity, the ratio may increase even if net income stays the same. However, as we are illustrating further on in our analysis, an increase in leverage for buyout is not the case.

A similar pattern can be seen for the return on total capital for both buyout and the matched peer group, although the decrease is of 3 percent and 4 percent respectively. The return on total capital is significant on all three levels. The ratio is quite low in year three for buyout, with 4 percent compared to 6 percent for its peers. A low return on total capital might imply that the debt is high, which it is for both, with more than twice as much debt as equity. Furthermore, both ebitda-margin and return on sales tells a similar story, with a slight decrease in both measure for buyout and peer group. However, the measures are not significant at any of the three levels for buyout, in contrast to the peer group, indicating that we cannot say for certain if there is a change.

Venture capital on the other hand, is rather positive, for which the change is fluctuating around a 20 percent increase for every measure. All the four measures are significant on all levels, except return on equity for 1 percent. For the peer group however, only return on equity is significant for all three levels, and the latter three being significant only on the 10 percent level. What is particularly interesting, is the performance compared to the peer group where the change decreases during the same time-period. The reasoning is that the matched companies for parts of the sample went bankrupt during the three years. This is a good indication of how important private equity-backing may be for companies of that size, as that stage of time is crucial for a company to succeed.

Furthermore, even with a decrease in change for the measures, buyouts do experience positive measures after the three years, whereas venture capital proceeds to have negative measures at the end of the three years, with a positive change. There is however the change that is interesting to measure the impact of the private equity backing, for which venture capital is superior for profitability. The hypothesis that private equity-backed firms in Norway experience an increase in profitability compared to its peer group is therefore rejected for buyout and accepted for venture capital.

7.2 - Leverage

We built our hypothesis around what prior research has shown to be the case for private equity, where they tend to load more debt onto their targets compared to non-private equity-backed. This is also in line with what Scigliuzzo wrote in his article at Bloomberg, which was published in January this year (Scigliuzzo, 2022).

Results

Table 11

Leverage

This table reports the changes in median values for each measure from the entry year of private equity backing and three years after. It illustrates and compares the performance in terms of leverage in two different measures, both for strategy to strategy, and each strategy to the corresponding peer group. The changes are calculated on an the end-of-year basis for all measures. The Wilcoxon signed-rank test is displayed below using p-value for each measure to tell if the changes are significantly different from zero, at a 1%, 5% and 10% level.

Measure	Buyout	Peer Group Buyout	Venture Capital	Peer Group Venture Capital
Equity ratio	-19%	-19%	-15%	-10%
(Wilcoxon p-value)	(0.418)	(0.448)	(0.005)	(0.092)
Debt ratio	4%	4%	50%	13%
(Wilcoxon p-value)	(0.344)	(0.283)	(0.020)	(0.153)

The results in our analysis are similar to what was published in the Bloomberg article. The debt ratio increases for both buyout and its peer group, with both increasing its ratio by 4 percent. The equity ratio for buyout decreases with the same amount as the peer group, which is the correlation we would expect using these two measures. Nevertheless, according to the Wilcoxon signed-rank test, none of the changes in the ratios for buyouts are significant on any of the three levels. Also, both buyout and the peer group had a debt ratio above 2 already, for which buyout increased its debt ratio from 2.05 to 2.20 and the peer group increased the debt ratio from 2.36 to 2.45, which is a lower difference than what the Bloomberg article suggested. This was however based on data from the US and might imply that Norwegian data tells another story.

For venture capital, the debt ratio increased by 50 percent. At entry, the median value of the debt ratio was 0.4, and increased to 0.6. The debt ratio drastically increased relative to the buyout group, which is why the change is significant on both 5 percent and 10 percent levels. The steep increase in debt for venture capital in contrast to buyout might be explained by the lower debt ratio in the entry year, for which a small increase leads to a larger impact compared to buyout. The

equity ratio supports this as well, presenting a significant change at all three levels. The peer group for venture capital shows similar results, although lower compared to venture capital. The debt ratio increases with 0.1 from 0.74 to 0.84 and the equity ratio decreases by 0.054 from 0.518 to 0.464. These changes are however only significant for the equity ratio on a 10 percent level. Since the null hypothesis is not rejected for the latter five levels, the results suggest that there is no real difference between the two periods for that particular measure.

Consequently, there is evidence supporting that there is a higher increase in leverage for private equity-backed venture capital targets, compared to their peers. For that reason, our hypothesis that private equity firms in Norway experience an increase in leverage compared to its peer group is not rejected for one out of two strategies. For buyout however, the results are inadequate, and we cannot accept the null hypothesis based on our results. Further research is required to conclude about the matter for Norwegian data.

7.3 - Productivity

We have built our hypothesis on the grounds of the debate that private equity firms tend to deprioritize the productivity of the targets after an acquisition. Several studies have however found that productivity tends to increase rather than decrease. Our goal for including this measure is therefore to uncover whether the same trends are present using Norwegian data.

Results

Table 12

Productivity

This table reports the changes in median values for each measure from the entry year of private equity backing and three years after. It illustrates and compares the performance in terms of productivity in two different measures, both for strategy to strategy, and each strategy to the corresponding peer group. The changes are calculated on an the end-of-year basis for all measures. The Wilcoxon signed-rank test is displayed below using p-value for each measure to tell if the changes are significantly different from zero, at a 1%, 5% and 10% level.

Measure	Buyout	Peer Group Buyout	Venture Capital	Peer Group Venture Capital
Revenue per employee	-10.8%	0.1%	40.2%	26.6%
(Wilcoxon p-value)	(0.130)	(0.325)	(0.053)	(0.105)
Fixed asset ratio	38.1%	-4.7%	145.2%	32.3%
(Wilcoxon p-value)	(0.031)	(0.040)	(0.046)	(0.026)

Starting off by looking at the revenue per employee for buyout and the peer group, there is a 10.8 percent decrease for buyout compared to 0.1% increase for the matched peers. However, neither of the two measures are significant on any of the three levels, meaning that we cannot say for certain that there is a significant change in the variables. We are therefore unable to state if one of the two groups are superior for revenue per employee. The fixed asset ratio has increased by 38.1 percent compared to a decrease of -4.7 percent for the peer group, with both being significant at 5 percent and 10 percent levels. It indicates that the buyout group is more efficient with their use of investments in fixed assets when they are generating sales, while the peer group is decreasing that same efficiency. Nonetheless, the fixed asset ratio is significantly higher for the peer group than for buyout at entry, making it harder to maintain or increase for the peer group. To be able to increase their fixed asset ratio further they would have to increase the sales or decrease the average fixed assets. Nonetheless, we do look at the change from private equity backing and find that backing to be superior to the peer group without backing for this certain measure.

Looking at the revenue per employee for venture capital and the peer group, we find that there is a 40.2 percent and 26.6 percent increase respectively. The measure indicates how much revenue an employee can generate for the firm, and a higher measure may also indicate a higher productivity. Therefore, the venture capital group is experiencing a higher change in revenue per employee

than the peer group, which may prove that there is an increase in productivity when the firm is backed by private equity. However, the change is only significant on the 10 percent level for venture capital. The reason that most of the scores are insignificant is that the measure experience quite drastically increases as well as decreases, making the variation of the changes very high, combined with a low number of observations for this measure, which together makes the test more prone to bias.

The change in fixed asset ratio for venture capital and the peer group is high, with both measures being significant at 5 percent and 10 percent. The reason for the steep increase for venture capital is that the sales for companies being targeted by venture capitalists are often low, as they are in the early years of development. Therefore, when the sales increase they tend to increase drastically, percentage wise. The result of this is that the numerator of the ratio increases much more than the denominator, which is explaining the increase. The same should be the case for the peer group, as they have similar sales at entry, however, as a number of these companies experience bankruptcy when not being backed by private equity, the increase is lower. Also, equal to buyout and the peer group, the fixed asset ratio is higher for the peer group at entry, making it harder to increase further.

For that reason, there is evidence supporting that there is an increase in productivity for both buyout and venture capital. We see strong evidence towards an increase for venture capital, but also for one out of two ratios for buyout. Consequently, we accept the hypothesis that the private equity-backed firms in Norway experience an increase in productivity compared to its peer group.

7.4 - Employment

Criticism around private equity surfaced with the increase in popularity in the last decades. Cutting costs by laying off workers was one of the main concerns and has been researched ever since. The results have differed, and the researchers disagree whether there is a positive effect on employment for private equity-backed companies or not. We built our hypothesis on the basis of this research, as Norwegian data may provide new insight surrounding the topic.

Results

Table 13

Employment

This table reports the changes in median values for each measure from the entry year of private equity backing and three years after. It illustrates and compares the performance in terms of employment in two different measures, both for strategy to strategy, and each strategy to the corresponding peer group. The changes are calculated on an the end-of-year basis for all measures. The Wilcoxon signed-rank test is displayed below using p-value for each measure to tell if the changes are significantly different from zero, at a 1%, 5% and 10% level.

Measure	Buyout	Peer Group Buyout	Venture Capital	Peer Group Venture Capital
Number of employees	35.3%	22.2%	34.1%	23.1%
(Wilcoxon p-value)	(0.000)	(0.000)	(0.000)	(0.006)
Wages	56.1%	9.1%	94.0%	14.1%
(Wilcoxon p-value)	(0.000)	(0.000)	(0.000)	(0.038)

The number of employees has experienced an increase for both buyout and its peer group, with both measures being significant on all levels. The increase for buyout was 35.3 percent compared to 22.2 percent for the peer group, making buyout superior to the peer group for this measure using our data set. The wages experience a similar increase, with both measures being significant on all levels. The increase in buyout is way beyond the increase for the matched peers, with 56.1 percent compared to 9.1 percent. What is particularly interesting however, is that the increase in wages relative to the increase in number of employees is higher for buyout than the peer group, meaning that the change in wages for buyout is not only a result of more employees. An increase in wages overall is expected, and could be explained by inflation, but in spite of that, it does not explain such a difference. A possible explanation is the increase in productivity, for which buyout performs superior to its peer group. According to a study done by (Wakeford, 2004), there is strong evidence that productivity and real wages are cointegrated, meaning that an increase in productivity is associated with an increase in wages, which is what we see for our results as well.

The results for venture capital are almost identical to what we saw for the number of employees for buyout and the peer group, with both measures being significant on all three levels. Number of employees increased with 34.1 percent for venture capital compared to 23.1 percent for the matched peer group. Nonetheless, the

wages have increased drastically relative to the change in number of employees for venture capital, with 94 percent compared to 14.1 percent for the peer group. The reasoning for the steep increase is that startups often pay little to no wages in the early years of development. Therefore, when the wages increase, they tend to increase by a high amount, making the overall median change high. The same explanation does not apply to the peer group, even if the companies are matched on different factors and should be somewhat equal. The reasoning is that the number of private equity-backed companies going bankrupt are significantly lower for private equity-backed firms than for the peer group, which is why there is a decrease in the median change in wages for the peers.

Therefore, there is evidence supporting that there is an increase in the measures for employment in private equity-backed companies, based on the number of employees and wages. Consequently, we cannot accept our hypothesis that private equity-backed firms in Norway experience a decrease in employment compared to its peer group, and the recent studies regarding this topic are not representative based on the Norwegian data and the timespan we are using.

8 - Robustness tests

We have performed two tests to uncover if there are any potential bias in our data set, and how much of an impact it may have. With bias we mean either sectors or years that should have an influence on the results, and if the influence is in line with what can be expected based on earlier research. For these tests we will be using the data for all four categories, to see if the exclusion of a sector or a time-period can influence the results obtained, and compare them to the original results. We will firstly exclude the energy sector, and secondly exclude the timespan of 2006-2009.

8.1 - Exclusion of year 2006-2009

We have chosen the exclusion of the great recession and the last year leading up to the recession as one of our two robustness tests. The great recession had a major impact on the global economy, making it a suitable choice to see if it had an impact on our data set. Even if the financial crisis did not have a major impact on the Norwegian economy, it did however affect the Norwegian private equity market, as the total funds raised decreased to the lowest value since 1992.

Results

Table 14

Profitability - Exclusion of year 2006-2009

This table reports the changes in median values from the entry year of private equity backing and three years after. It illustrates and compares the performance in terms of profitability in four different measures, both for strategy to strategy and each strategy to the corresponding peer group. The changes are calculated on an end-of-year basis for all measures. The Wilcoxon signed-rank test is displayed below using p-value for each measure to tell if the changes are significantly different from zero, at a 1%, 5% and 10% level.

Measure	Buyout	Peer Group Buyout	Venture Capital	Peer Group Venture Capital
Return on equity	-12%	-17.4%	24.0%	-3.4%
(Wilcoxon p-value)	(0.145)	(0.039)	(0.001)	(0.009)
Return on total capital	-5%	-3.9%	24.9%	-0.6%
(Wilcoxon p-value)	(0.010)	(0.033)	(0.000)	(0.193)
Ebitda-margin	-2%	-1.7%	23.2%	-3.4%
(Wilcoxon p-value)	(0.440)	(0.078)	(0.001)	(0.273)
Return on sales	-5%	-1.3%	22.7%	-4.0%
(Wilcoxon p-value)	(0.129)	(0.082)	(0.001)	(0.261)

By excluding the time span of 2006-2009, the number of observations decreased from 80 to 66 for buyout and 92 to 75 for venture capital, and the same for the two peer groups. What is interesting is that buyout slightly decreased in three out of four measures, compared to the original results. Return on equity and return on total capital, the two measures that were significant on all three levels earlier, are now only significant on all three levels for the latter one. The peer group sees a similar decrease for return on equity, and a minimal increase in return on total capital.

For venture capital, all four measures are now significant on all three levels, compared to before where return on equity was not. There is a significant increase in all four measures compared to the peer group, in which the peer group only experiences an increase compared to before for two out of four measures. We can therefore conclude that based on our results, the great recession had a negative impact on the profitability of private equity-backed firms for venture capital, and a minimal effect for buyouts on return on total capital.

Table 15

Leverage - Exclusion of year 2006-2009

This table reports the changes in median values for each measure from the entry year of private equity backing and three years after. It illustrates and compares the performance in terms of leverage in two different measures, both for strategy to strategy, and each strategy to the corresponding peer group. The changes are calculated on an the end-of-year basis for all measures. The Wilcoxon signed-rank test is displayed below using p-value for each measure to tell if the changes are significantly different from zero, at a 1%, 5% and 10% level.

Measure	Buyout	Peer Group Buyout	Venture Capital	Peer Group Venture Capital
Equity ratio	-24%	-25%	-12%	-6%
(Wilcoxon p-value)	(0.389)	(0.357)	(0.006)	(0.113)
Debt ratio	13%	12%	50%	11%
(Wilcoxon p-value)	(0.211)	(0.198)	(0.021)	(0.163)

For leverage, equity ratio decreases for buyout and the matched peer group, and debt ratio increases, compared to the original results. These results are however still insignificant at all three levels. The peer group for venture capital provides similar results, being insignificant at all three levels, meaning that we cannot say for certain that there is a change in median values present for these measures. Venture capital however, provides results that are significant at all three levels for

equity ratio and at both 5 percent and 10 percent for debt ratio. The overall
changes for leverage are small when excluding the timespan of 2006 to 2009.

Table 16

Productivity - Exclusion of year 2006-2009

This table reports the changes in median values for each measure from the entry year of private equity backing
and three years after. It illustrates and compares the performance in terms of productivity in two different measures,
both for strategy to strategy, and each strategy to the corresponding peer group. The changes are calculated on an the
end-of-year basis for all measures. The Wilcoxon signed-rank test is displayed below using p-value for each measure to
tell if the changes are significantly different from zero, at a 1%, 5% and 10% level.

Measure	Buyout	Peer Group Buyout	Venture Capital	Peer Group Venture Capital
Revenue per employee	11.0%	6.0%	45.2%	31.7%
(Wilcoxon p-value)	(0.153)	(0.197)	(0.061)	(0.095)
Fixed asset ratio	42.7%	1.3%	87.9%	42.8%
(Wilcoxon p-value)	(0.039)	(0.002)	(0.049)	(0.018)

Looking at productivity, we find a trend of an increase in 7 out of 8 results,
compared to the original results. Fixed asset ratio increased with less than the
original results when excluding the timespan of 2006 to 2009. There is however
an increase overall, meaning that productivity either decreased or increased less
than the rest of the dataset. This is in line with a study done by (Hagelund, 2009),
where he looked at productivity growth in Norway. His study showed a decrease
in overall productivity in the time period of 2006 to 2009.

Table 17

Employment - Exclusion of year 2006-2009

This table reports the changes in median values for each measure from the entry year of private equity backing
and three years after. It illustrates and compares the performance in terms of employment in two different measures,
both for strategy to strategy, and each strategy to the corresponding peer group. The changes are calculated on an the
end-of-year basis for all measures. The Wilcoxon signed-rank test is displayed below using p-value for each measure to
tell if the changes are significantly different from zero, at a 1%, 5% and 10% level.

Measure	Buyout	Peer Group Buyout	Venture Capital	Peer Group Venture Capital
Number of employees	32.0%	22.2%	68.2%	33.3%
(Wilcoxon p-value)	(0.000)	(0.000)	(0.000)	(0.004)
Wages	64.7%	17.2%	104.8%	43.2%
(Wilcoxon p-value)	(0.000)	(0.000)	(0.000)	(0.002)

For employment, all the measures are significant at all three levels. Buyout and
the peer group experience an increase in wages when the timespan is excluded,
with the number of employees almost unaffected by the exclusion. For venture
capital however, there is an increase in both measures for both groups, indicating

a positive correlation. This tells us that employment decreased during the great recession, for venture capital and their peer group especially.

8.2 - Exclusion of the energy sector

The second robustness test we are conducting is the exclusion of the energy sector. The reasoning for the removal of this sector is that it includes the acquisitions for oil and gas. The Norwegian economy is either directly or indirectly exposed to their oil and gas extraction and their dependent industries. Therefore, oil and gas should have an impact on the performance of the portfolio companies, and we are excluding the energy sector to test for just that.

Also, the energy sector contains 40 observations in total, making it the sector with the second most observations. By excluding the energy sector, the number of observations decreased from 80 to 56 for buyout and 92 to 77 for venture capital, and the same for the two peer groups. What is particularly interesting is that the decrease in observations for buyouts are twice the percentage than for venture capital, with roughly 30 percent and 15 percent respectively.

Results

Table 18

Profitability - Exclusion of energy sector

This table reports the changes in median values from the entry year of private equity backing and three years after. It illustrates and compares the performance in terms of profitability in four different measures, both for strategy to strategy and each strategy to the corresponding peer group. The changes are calculated on an end-of-year basis for all measures. The Wilcoxon signed-rank test is displayed below using p-value for each measure to tell if the changes are significantly different from zero, at a 1%, 5% and 10% level.

Measure	Buyout	Peer Group Buyout	Venture Capital	Peer Group Venture Capital
Return on equity	-40%	-12.8%	22.0%	-3.7%
(Wilcoxon p-value)	(0.002)	(0.006)	(0.020)	(0.006)
Return on total capital	-6%	-4.0%	21.9%	-0.5%
(Wilcoxon p-value)	(0.006)	(0.008)	(0.000)	(0.006)
Ebitda-margin	-4%	-1.3%	25.4%	-5.4%
(Wilcoxon p-value)	(0.413)	(0.045)	(0.001)	(0.079)
Return on sales	-5%	-1.0%	20.7%	-6.7%
(Wilcoxon p-value)	(0.171)	(0.045)	(0.003)	(0.056)

Looking at buyout and the matched peer group, both ebitda-margin and return on sales are still insignificant for buyout, with a minimal further decrease in both measures for both groups, compared to the original results. What does stand out

however, is the drastic decrease in the change of return on equity for the buyout group. Since we are looking at the median values, this means that most of the companies excluded in this test provided a rather high change in return on equity. According to these results, portfolio companies for buyout in the energy sector provide high return on equity compared to the rest of the sample.

For venture capital however, two out of four measures have a slight increase, and the other two have a slight decrease. For the venture capital peer group, we can see a slight decrease in both ebitda-margin and return on sales.
Since venture capital contained only half as many energy acquisitions as buyout, the minimal change compared to the original data set was expected.

Table 19

Leverage - Exclusion of energy sector

This table reports the changes in median values for each measure from the entry year of private equity backing and three years after. It illustrates and compares the performance in terms of leverage in two different measures, both for strategy to strategy, and each strategy to the corresponding peer group. The changes are calculated on an end-of-year basis for all measures. The Wilcoxon signed-rank test is displayed below using p-value for each measure to tell if the changes are significantly different from zero, at a 1%, 5% and 10% level.

Measure	Buyout	Peer Group Buyout	Venture Capital	Peer Group Venture Capital
Equity ratio	-12%	-22%	-23%	-16%
(Wilcoxon p-value)	(0.512)	(0.301)	(0.004)	(0.076)
Debt ratio	5%	10%	25%	21%
(Wilcoxon p-value)	(0.214)	(0.121)	(0.049)	(0.091)

The changes in equity and debt ratio is still insignificant at all three levels when looking at the results for leverage. For venture capital and the peer group, we can see that the debt ratio for the peer group is now significant at 10 percent, in contrast to before. The debt ratio tends to decrease for venture capital when excluding the energy sector, which may indicate that portfolio companies being backed by private equity in the energy sector increase the leverage by more than the median.

Table 20

Productivity - Exclusion of energy sector

This table reports the changes in median values for each measure from the entry year of private equity backing and three years after. It illustrates and compares the performance in terms of productivity in two different measures, both for strategy to strategy, and each strategy to the corresponding peer group. The changes are calculated on an the end-of-year basis for all measures. The Wilcoxon signed-rank test is displayed below using p-value for each measure to tell if the changes are significantly different from zero, at a 1%, 5% and 10% level.

Measure	Buyout	Peer Group Buyout	Venture Capital	Peer Group Venture Capital
Revenue per employee	-14.8%	6.1%	54.9%	31.2%
(Wilcoxon p-value)	(0.091)	(0.111)	(0.0421)	(0.099)
Fixed asset ratio	33.4%	9.6%	37.3%	25.2%
(Wilcoxon p-value)	(0.037)	(0.032)	(0.067)	(0.036)

Looking at the significant measures for buyout and the peer group, we can see a decrease for buyout, and the opposite for the peer group, compared to the original results. Productivity tends to decrease when excluding the energy sector, meaning that portfolio companies backed by private equity and their peers in the energy sector experience an increase compared to the median. The same increase can be seen for venture capital and the peer group on revenue per employee. There is however a decrease in the fixed asset ratio compared to the original results, meaning that portfolio companies backed by private equity and their peers in the energy sector experience a higher increase compared to the original median values.

Table 21

Employment - Exclusion of energy sector

This table reports the changes in median values for each measure from the entry year of private equity backing and three years after. It illustrates and compares the performance in terms of employment in two different measures, both for strategy to strategy, and each strategy to the corresponding peer group. The changes are calculated on an the end-of-year basis for all measures. The Wilcoxon signed-rank test is displayed below using p-value for each measure to tell if the changes are significantly different from zero, at a 1%, 5% and 10% level.

Measure	Buyout	Peer Group Buyout	Venture Capital	Peer Group Venture Capital
Number of employees	32.0%	22.2%	68.2%	33.3%
(Wilcoxon p-value)	(0.000)	(0.000)	(0.000)	(0.004)
Wages	64.7%	17.2%	104.8%	43.2%
(Wilcoxon p-value)	(0.000)	(0.000)	(0.000)	(0.018)

Employment is similar to the original results in terms of significance. We can see a slight increase in wages for all four groups, meaning that portfolio companies backed

by private equity in the energy sector experience a lower change in wages compared to the median for the original results. The number of employees increases slightly for buyout, and increases significantly for venture capital. This means that there are more new employees in private equity-backed companies in the other sectors, in terms of overall median value.There seems to be a positive correlation between wages and number of employees.

9 - Conclusion

Our thesis investigates how private equity strategies impact the portfolio companies' performance in Norway. The results suggest an overall outperformance for private equity-backed companies compared to the matched peer groups. Our research provides new insight for private equity in Norway, as we are including venture capital data in our study, as well as using recent data from 2000 to 2020.

The performance for profitability increased compared to the peer group, and was in line with what was expected according to previous research. The increase was however only present for venture capital, as we could not say for certain whether there was a significant change in the profitability for buyout. Our hypothesis was therefore only accepted for one out of the two strategies.

A similar pattern is shown for leverage, as only venture capital experiences a significant increase in its measures compared to the matched peer group. The change for buyout was therefore insignificant, and we could not conclude whether there was a change in leverage compared to its peer group. The hypothesis is consequently only accepted for one out of two strategies.

There was strong evidence towards an increase in the measures for productivity, especially for venture capital. The productivity increases more than for the matched peer group, and we can conclude that private equity-backed companies improve their productivity more than the peer group based on our results. The hypothesis is therefore accepted for this category.

Similar to productivity, our results showed an increase in the measures for employment compared to the matched peer groups. The improvement in employment was however not in line with the most recent research found using data from the US, and we therefore were forced to reject the hypothesis that there was a decrease in overall employment compared to the peer groups.

We performed two different robustness tests, by excluding the timespan of 2006 to 2009 and by excluding the energy sector. By performing the former test we found that

an exclusion led to an increase in overall performance, meaning that the great recession had a negative impact. This is in line with our expectations based on earlier research regarding the great recession, and the dataset displays that. The removal of the energy sector is the second test, as oil and gas either directly or indirectly affect the Norwegian economy. The most important takeaway from the exclusion was that private equity-backed companies in the energy sector experience an increase in leverage, productivity and employment. The energy sector therefore performs better than the original median values for those categories.

Our analysis does however only focus on the three-year period after the initial acquisition, meaning that a short or longer time-period may provide different results. Also, as there are many ways to choose how to match a peer group, a different set of filters may lead to different results, as the peer group may change. In addition, there is a lack of research on private equity using Norwegian data. Therefore, the thesis must use research from the rest of the world for comparison and expectations for hypotheses.

Our results were insignificant for buyout on both profitability and leverage, and we are not able to conclude whether there is a change for these measures when being backed by private equity. Further research is therefore recommended to investigate this change using Norwegian data. Also, research is conflicting in regards to improvement in employment for private equity-backed companies. Our study using Norwegian data diverges with the most recent research using data from the US, and we recommend further research on this topic in Norway.
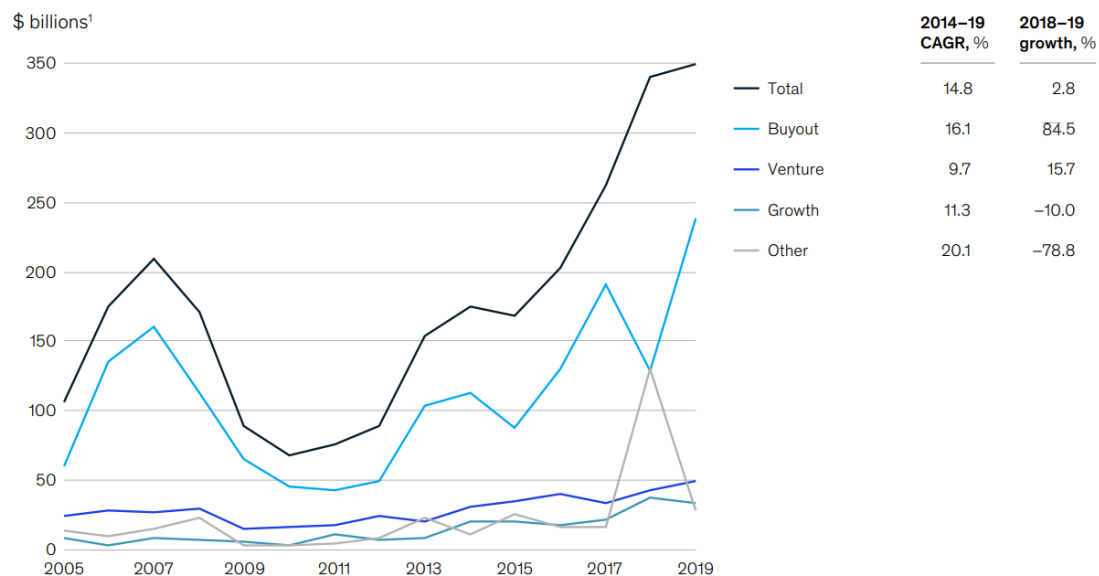
10 – Appendix

Appendix 1

Exit Characteristics of Leveraged Buyouts across Time

Year of original LBO	1970–1984	1985–1989	1990–1994	1995–1999	2000–2002	2003–2005	2006–2007	Whole period
Type of exit:								
Bankruptcy	7%	6%	5%	8%	6%	3%	3%	6%
IPO	28%	25%	23%	11%	9%	11%	1%	14%
Sold to strategic buyer	31%	35%	38%	40%	37%	40%	35%	38%
Sold to financial buyer	5%	13%	17%	23%	31%	31%	17%	24%
Sold to LBO-backed firm	2%	3%	3%	5%	6%	7%	19%	5%
Sold to management	1%	1%	1%	2%	2%	1%	1%	1%
Other/unknown	26%	18%	12%	11%	10%	7%	24%	11%
No exit by Nov. 2007	3%	5%	9%	27%	43%	74%	98%	54%
% of deals exited within								
24 months (2 years)	14%	12%	14%	13%	9%	13%		12%
60 months (5 years)	47%	40%	53%	41%	40%			42%
72 months (6 years)	53%	48%	63%	49%	49%			51%
84 months (7 years)	61%	58%	70%	56%	55%			58%
120 months (10 years)	70%	75%	82%	73%				76%

Note: The table reports exit information for 17,171 worldwide leveraged buyout transactions that include every transaction with a financial sponsor in the CapitalIQ database announced between 1/1/1970 and 6/30/2007. The numbers are expressed as a percentage of transactions, on an equally-weighted basis. Exit status is determined using various databases, including CapitalIQ, SDC, Worldscope, Amadeus, Cao and Lerner (2007), as well as company and LBO firm web sites. See Strömberg (2008) for a more detailed description of the methodology.

Appendix 2

North American PE fundraising reached an all-time high in 2019.

$ billions[1]

	2014–19 CAGR, %	2018–19 growth, %
Total	14.8	2.8
Buyout	16.1	84.5
Venture	9.7	15.7
Growth	11.3	−10.0
Other	20.1	−78.8

Appendix 3

Profitability

	Buyout		Venture capital	
	Entry	Year 3	Entry	Year 3
Return on equity	44%	34%	-33.5%	-15.0%
Return on total capital	7%	4%	-28.1%	-7.3%
Ebitda-margin	11%	9%	-28.3%	-7.7%
Return on sales	9%	5%	-39.5%	-17.7%

	Peer Group Buyout		Peer Group Venture Capital	
	Entry	Year 3	Entry	Year 3
Return on equity	44%	27%	6.0%	2.5%
Return on total capital	10%	6%	2.1%	1.5%
Ebitda-margin	6%	4%	9.8%	5.2%
Return on sales	6%	4%	7.5%	2.9%

Leverage results

	Buyout		Venture capital	
	Entry	Year 3	Entry	Year 3
Equity ratio	0.33	0.26	0.70	0.60
Debt ratio	2.05	2.20	0.40	0.60

	Peer Group Buyout		Peer Group Venture Capital	
	Entry	Year 3	Entry	Year 3
Equity ratio	0.29	0.23	0.52	0.46
Debt ratio	2.36	2.45	0.74	0.84

Productivity results

	Buyout		Venture capital	
	Entry	Year 3	Entry	Year 3
Revenue per employee	2183258	1947033	355321	498080
Fixed asset ratio	16.03	22.14	6.18	15.15

	Peer Group Buyout		Peer Group Venture Capital	
	Entry	Year 3	Entry	Year 3
Revenue per employee	2445435	2448191	1033727	1308594
Fixed asset ratio	39.58	37.74	22.54	28.22

Employment results

	Buyout		Venture capital	
	Entry	Year 3	Entry	Year 3
Number of employees	84	113	22	30
Wages	39929500	62332000	4128000	8007000

	Peer Group Buyout		Peer Group Venture Capital	
	Entry	Year 3	Entry	Year 3
Number of employees	37	49	6	9
Wages	33461500	36508000	2278000	2600000

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