STOCKHOLM SCHOOL OF ECONOMICS
MASTER THESIS IN FINANCE

The Resilience of Private Equity Owned Portfolio Companies during Crises

A study on private equity owned portfolio companies' operating performance as compared to their peers during the global financial crisis with start in 2007

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We study the operating performance of Swedish companies that have become subject to a buyout prior to the 31st of December 2007 and that have been owned by a Swedish buyout company during the whole period between the 31st of December 2007 and the 31st of December 2009. Taking a different stance than studies performed previously, we look into such development after a debt market boom, during the special market conditions characterized by a financial crisis. Our observations suggest an outperformance of the analyzed metrics for the private equity target firms; however, the significance of the results varies substantially between different metrics and time period. Although we fail to explain why the improvements are sustained, our findings indicate that some improvements in the development of the operating performance for private equity targets is sustained.

Keywords: Private equity, Downturn, Financial crisis, Operating performance, Resilience

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1 Introduction

Commitments to private equity funds in nominal dollars have increased strongly since private equity funds emerged in the early 1980s. Fuelled by strong returns both the number and size of private equity funds being raised increased significantly (Preqin, 2010). The Swedish private equity industry has also shown strong growth and superior returns historically (SVCA, 2010).

The financial crisis, starting in late 2007, has had a significant impact on the private equity industry, both in terms of deal activity and private equity capital raised. The global buyout deal value experienced a large decline and fell from BUSD 665 in 2007 to BUSD 71 in 2009. The global private equity capital[1] raised also experienced a decline and fell from BUSD 666 in 2008 to BUSD 228 in 2010 (Bain & Company, 2011). In the Swedish market, private equity capital raised has been severely hit by the crisis as well, although the decline in private equity deal activity was less severe than the decline on a global level. The Swedish private equity deal values also experienced a faster recovery with 2010 deal values ending up above the level prior to the crisis (SVCA, 2010).

Previous studies have both produced a solid set of theoretical factors affecting the development of private equity target firms vis-à-vis their peers, and tested the actual implications of these factors for varying sets of empirical data. Taking a different stance than studies performed previously, we look into such development after a debt market boom, during the special market conditions characterized by a financial crisis. More specifically, we analyze the industry-adjusted development of private equity targets during the credit crunch of 2007-2010. By performing our study in a specific period of time following a debt market boom, our aim is to contribute to the knowledge of the actual effects of the private equity industry's dependence on debt markets – and by so doing measuring the resilience of private equity controlled firms during a financial crisis.

We base our study on empirical data from the credit crisis of 2007-2010. In our study we concentrate on Swedish companies that have become subject to a buyout prior to the 31st of December 2007 and that have been owned by a Swedish buyout company[2] during the whole period between the 31st of December 2007 and the 31st of December 2009. For each target company we assign one industry peer, based on ownership structure, geographical location, industry classification, and size. By using 2007 as our base year and 2008 and 2009 as crisis years, we are able to compare the impact of the financial crisis on companies owned by buyout firms with their peers. Operating performance is evaluated by the usage of the following metrics: sales from operations, EBITDA margin, ROIC and FCF margin.

[1] Private equity capital here refers to the following fund types: buyout, real estate, venture, distressed private equity and other.
[2] Complemented with Swedish targeted buyouts by FSN Capital, headquartered in Oslo.

We also evaluate the development of net working capital, capital expenditure, number of employees and average compensation per employee.

In general, our observations seem to point to an outperformance of the analyzed metrics for the private equity target firms; however, the significance of the results varies substantially between different metrics and time period. Our findings are consistent with previous empirical studies of industry-adjusted positive development for the operating performance metrics used in our analysis. This does indicate some resilience in the added value of private equity firms, throughout constrained markets such as during the financial crisis.

We also study a number of factors which in theory could have explanatory power of improvements in firms' operating performance, but find no evidence of such relationships. Although we fail to explain why the improvements are sustained, our findings indicate that some improvements in the development of the operating performance for private equity targets are sustained, although there are signs of volatility.

It is also worth noting that rather than showing indications of a wealth transfer effect from employees to managers in the private equity owned portfolio companies, our analysis indicates a more complex development which may actually be beneficial to the labor force and the current employees.

The different sections of the paper are in the following order: Section 2) theoretical and empirical background is provided, which later serve as basis for the formulation of our hypotheses; Section 3) the area of study for our thesis is defined; Section 4) hypotheses relevant for our area of study and based on the theoretical and empirical background provided in section 2 are formulated; Section 5) the methods used in our study are outlined; Section 6) our sample and data are described in detail; Section 7) presentation and analysis of our results are provided; Section 8) conclusions based on our study are drawn and suggestions for further research are provided.

2 Theoretical background

In this section we present an industry description and a theoretical foundation of the private equity sector. Since our study focuses on the Swedish market during the financial crisis of 2007 to 2010, we briefly present recent industry development and also describe the geographical market and time period analyzed in our thesis in more detail. We discuss the implications on the industry of the analyzed time period and present results from previous empirical studies relating to our thesis. We here add to the introductory section with empirical observations in literature which will be used as a base in formulating our hypotheses.

2.1 Overview of the private equity industry

Private equity is defined by Jenkinson as equity investments that are not quoted on a stock market (Jenkinson, 2009). The two main forms of private equity are venture capital (VC), investments in early stage companies, and buyouts, where a private equity firm buys the whole company. Buyouts are referred to as leveraged buyouts (LBO), since they typically employ significant amounts of debt.

Private equity firms raise equity capital through private equity funds. These private equity funds are organized as limited partnerships in which the general partners (GPs), i.e. the private equity firms, manage the fund and the limited partners (LPs), e.g. institutional investors such as pension funds, endowments etc., provide most of the capital (Kaplan and Strömberg, 2009).

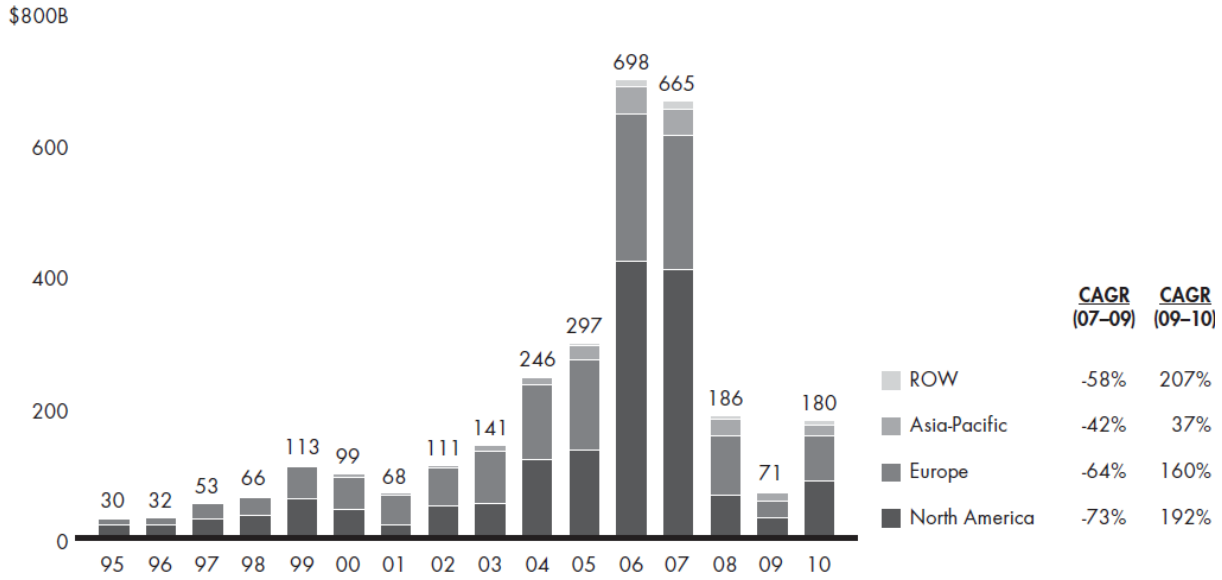
Commitments to private equity funds in nominal dollars have increased strongly since private equity funds emerged in the early 1980s. Commitments to U.S. private equity funds in nominal terms have increased from $0.2 billion in 1980 to over $200 billion in 2007 (Kaplan and Strömberg, 2009). From year 2000 and onwards the global buyout sector has evolved into a global industry. After a dip in fundraising during the economic downturn following the turn of the millennium, the capital raised by private equity funds globally increased over five times between 2003 and 2008, from $44 billion to $248 billion. Fuelled by strong returns both the number and size of private equity funds being raised increased significantly (Preqin, 2010).

As we can see investors' appetite for private equity funds seems to have increased significantly over the years. Superior investor returns have been emphasized as one of the reasons for this growth in private equity funds. When Kaplan and Schoar (2005) studied the average private equity fund returns, net of fees charged by the general partners, they found that the returns approximately equal the S&P 500 (with an average ratio of 93 to 97 percent of the S&P 500). They also found that returns seem to persist strongly across the funds raised by a partnership and that better performing partnerships are more likely to raise follow-on funds and larger funds. Phalippou and Gottschalg (2008) show similar results in their study. They also compare the average net-of-fees fund performance to the S&P 500,

and find a fund underperformance of 3% per year (6% per year if adjusted for risk). However, gross-of-fees fund performance is 3% above the S&P 500.

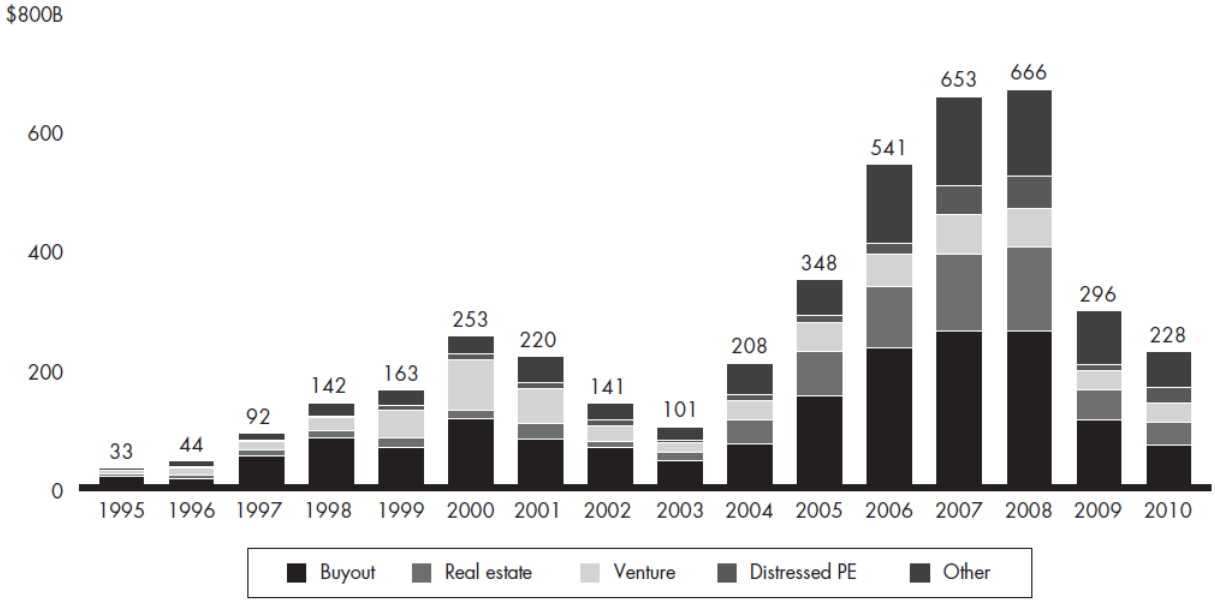
A study conducted by Metrick and Yasuda (2006) shows another aspect of the growth in private equity funds. It appears that more experienced private equity firms strive to obtain a higher pay per partner by increasing fund size rather than by increasing the pay-performance sensitivity of their contracts. (They also find that fee terms are more likely to differ between funds than carry terms.)

Figure 1. Global buyout deal value over the period 1995-2010.



The global buyout deal value has been growing strongly over the period 1995-2007, from BUSD 30 to BUSD 665, as shown in Figure 1 (Bain & Company, 2011). The private equity industry experienced a large decline in deal activity during the financial crisis and the global deal value fell to BUSD 71 in 2009. In 2010 the industry showed signs of recovery and the global deal value rose to BUSD 180, roughly corresponding to the global deal value in 2008.

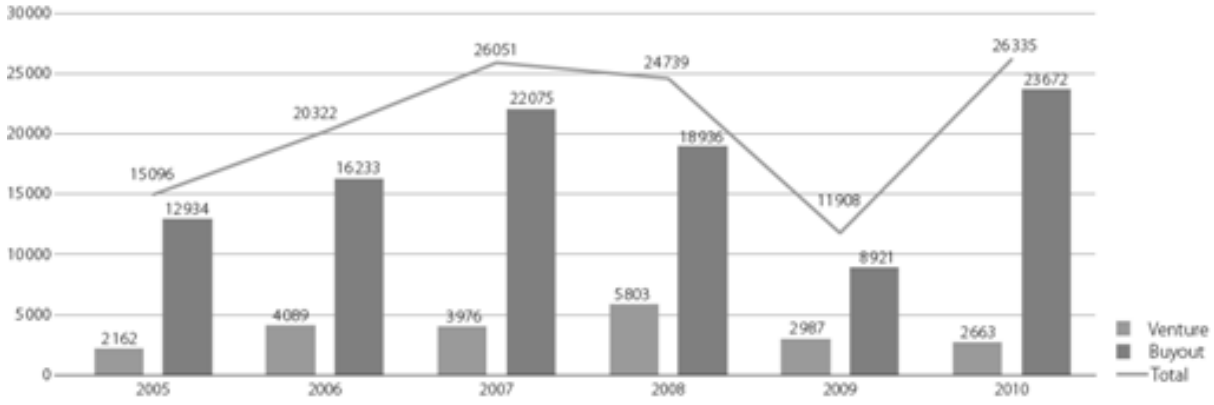
Figure 2. Global private equity capital raised by fund type over the period 1995-2010.



The global private equity capital[3] raised has been growing strongly over the period 1995-2008, from BUSD 33 to BUSD 666, as shown in Figure 2 (Bain & Company, 2011). The private equity industry experienced a large decline in raised capital during the financial crisis and the private equity capital raised globally fell to BUSD 228 in 2010.

2.2 The Swedish private equity industry

Figure 3 Swedish private equity deal activity (MSEK)

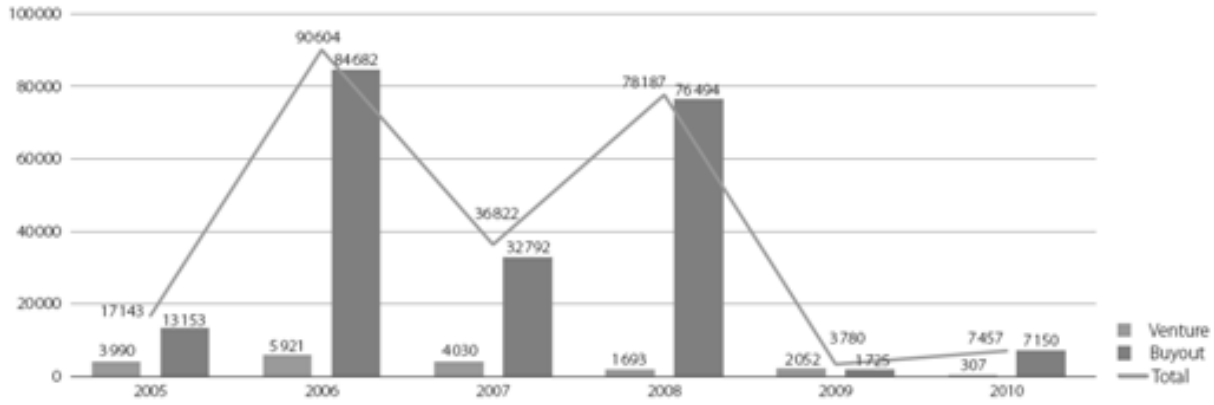


The Swedish buyout deal value has been growing steadily over the period 2005-2007; it almost doubled from BSEK 13 to BSEK 22, as shown in Figure 3 (SVCA, 2010). The Swedish private equity industry deal activity didn't fall as sharply as the deal activity on global level but the decline was still significant; during the financial crisis the deal value fell to BSEK 9 in 2009. However, in 2010, the

[3] Private equity capital here refers to the following fund types: buyout, real estate, venture, distressed private equity and other.

Swedish private equity industry deal activity experienced a significant recovery and the deal value rose to BSEK 24, which is even higher than the level of deal activity in the boom year 2007.

Figure 4 Swedish private equity capital raised (MSEK)



The Swedish private equity capital raised has been fluctuating over the period 2005-2008, as shown in Figure 4 (SVCA, 2010). The Swedish private equity industry experienced a large decline in raised capital during the financial crisis and the private equity capital raised fell to BSEK 2 in 2009. In 2010, a small recovery to BSEK 7 was noted, which is still much lower than the BSEK 85 of private equity capital raised in 2006.

2.3 Sources of value creation

The ultimate purpose of private equity funds is to generate value for their investors. Value generation can originate from a multitude of sources, and whether or not the processes employed by practitioners are desirable has been debated (Kaplan and Strömberg, 2009). While proponents argue that private equity firms create value by improving the operational and financial efficiency of target firms, some critics respond that that value is redistributed rather than generated. Here we present some of the most commonly mentioned financial and operational impacts of private equity sponsors on their buyout targets.

The sources of value creation can broadly be classified into two categories: reduction of agency costs and operational engineering.

Reduction of agency costs

private equity managers typically employ a number of governance and financial engineering methods to ensure the target is optimally managed. Some of these methods are described below:

Incentives: Kaplan (1989b) discusses the incentive effect of increased management equity ownership post-buyout as one of the factors contributing to higher operational efficiency following a public to private ownership deal. According to the author, holding a larger stake of their firm encourages

management to engage in value maximizing activities, thus aligning the interests between shareholders and management. Studying a sample of 76 MBO's between 1980 and 1986, Kaplan finds that the median equity holding of the management team is almost quadrupled post-buyout.

The measures used to incentivize management are not limited to increased equity ownership. Associated with buyout deals are also stock- and option-based compensation plans for the target's management, put in place to yield the management team a large equity upside. By requiring managers to make a meaningful investment in the target company, managers will face a significant downside as well (Kaplan and Strömberg, 2009).

Control hypothesis: In section 2.1 we described the significant debt levels employed in buyout acquisitions. The increased leverage of the LBO target firm post-buyout has a direct effect on the discretion of its management. Jensen (1986) discusses the benefits of debt in motivating managers to perform efficiently in their operation of the firm. As the costs of debt payments unlike dividends to equity holders are non-flexible, the increased debt level incentivizes managers to maximize cash flow generation and discourages cash flow wasting activities. This reduces the risk of empire building where managers grow their firm at the cost of negative NPV investments, since the risk of bankruptcy increases.

Operational engineering

With most top private equity firms organizing around industries and some hiring industry experts, one reason for increased performance may be the added knowledge transferred to the target firm upon taking its ownership and control (Kaplan and Strömberg, 2009). Thus, using their knowledge to generate value creating plans for specific targets, private equity firms can make an array of changes in their target firm during the holding period, including improvements in production, cost-cutting or even strategic changes (Kaplan and Strömberg, 2009; Acharya and Kehoe, 2008). Additionally, private equity managers may provide their targets with their own contact network, extending the reach of the existing business network and creating new opportunities (Berg and Gottschalg, 2003).

Some changes relating to LBO deals might be considered value transferring rather than value creating. Shleifer and Summers (1988) argue that buyouts are associated with increases in operating income, stemming from a wealth transfer from employees and suppliers to shareholders, by for example layoffs or wage reductions.

Tax deductibility of debt

Because of the tax deductibility of interest payments wealth gains are obtained as a direct effect of exchanging equity for debt financing. Kaplan (1989) studies the value of tax benefits in 76 MBOs between 1980 and 1986. While Kaplan finds that, depending on the assumptions for the marginal tax

advantage of debt and how permanent the debt increases are, median wealth gains from tax benefits account for 21% to 142.6% of the premium paid to pre-buyout shareholders. The true value creation however is minimal – investor returns from tax deductibility gains are largely matched by taxpayer losses (Jenkinson, 2009).

2.4 Distressed firms

It should be noted that the added debt not only brings about positive effects, as per the control hypothesis and tax deductibility gains effect. With increased leverage comes higher cost of debt, including bankruptcy costs (Jensen, 1986). The high levels of debt associated with private equity deals may lead to higher risk of bankruptcy for target firms, relative to their industry peers.

A working paper by Hotchkiss et al. (2011) studies the influence of private equity ownership both in non-financially distressed firms and in firms' restructuring efforts following financial distress, and aim to assess the likelihood and severity of financial distress for private equity target firms. The authors use data from 2,156 leveraged loan-borrowing firms from 1997 to 2010 and also note that "The most recent LBO boom, ending abruptly with the beginning of the financial crisis in 2007, has left a record number of private equity-owned firms in default". Despite this, when controlling for leverage and credit rating, the authors find no impact of private equity ownership on default probability. Additionally, the authors find that private equity controlled firms are more likely to remain as independent firms following default, reorganize more quickly, and, for private equity firms with more financial and reputational capital, are more likely to restructure out of court. They also find that recovery rates to creditors following a default is lower for private equity-controlled firms, which could be due to private equity targets defaulting with higher leverage, or private equity-owned firms being more successful in restructuring their debt through concession with bondholders.

Andrade and Kaplan (1998) study the effects and sources of financial distress for 31 highly leveraged transactions during the buyout boom of the 2nd half of the 1980s, by following their sample from before the leveraging transaction until the resolution of financial distress. By studying the industry-adjusted value development from pre-transaction to the time of distress resolution, they find that the sample firms experience marginally positive value changes. This, the authors conclude, favors the view that leveraged transactions, distressed or non-distressed, create value.

Additionally, the authors assess how costly financial distress is and what determines its costs. They find high leverage to be the primary factor in driving firms into financial distress, with poor firm- and industry performance playing much smaller roles. The authors use operating and net cash flow margin as measures of operating performance and find that both metrics decline while the firms are in distress, but then rebound quickly. Analyzing debt and equity market values, they find the cost of financial distress to be 10 to 20 percent of the firm value. By further analyzing the cross-sectional determinants for the costs of financial distress, the authors find no relation of the costs to the presence of buyout

sponsors or industry performance. The most frequent effects of the way costs materialize are found to be impaired capital expenditures, selling assets at depressed prices, and delayed restructuring.

Aside from the added risk of bankruptcy due to the material debt levels, there is a clear theoretical case for private equity control as a superior form of firm ownership. Such arguments led to Michael Jensen's prediction that leveraged buyouts would become the dominant corporate ownership form (Jensen, 1989). Jensen argued that an optimized capital structure together with an active board, a strong incentive program for the management, and concentrated ownership would result in a superior model of governance. However, shortly after Jensen's prediction in 1989, buyout activities disappeared almost entirely. The cause of this was the collapse of the junk bond market. After these events, the dependence of buyout activities on credit market conditions has been evident (Axelson et al., 2010).

2.5 Private Equity and debt markets

A typical debt arrangement for a private equity deal contains borrowings from a loan syndicate, with facilities of different seniority and maturity (Axelson et al., 2010). Much of the debt used for private equity financing is relatively long-term – maturities of 7-9 years are common – and have a substantial non-amortizing share (Jenkinson, 2009). Although the first wave of private equity buyouts saw higher debt ratios (90-85%), with ratios of 70% the second wave – prior to the credit crisis of 2007 – still experienced highly leveraged deals (Kaplan and Strömberg, 2009). Since private equity deals are still financed predominantly by debt, a question of obvious relevance is how the state of the debt market affects the private equity industry.

A recent paper by Axelson et al. (2010) provides an analysis of the financial structure of large buyouts, using a multinational sample of 1157 deals from 1980 to 2008. The authors note that the level and structure of debt has varied significantly over time, and try to explain the reason for this variance. Both leverage and private equity activity is pro-cyclical, with "high leverage peaking in the late 1980's, the late 1990's, and 2006-2007, and dropping in the early 1990's, the early 2000's and in 2008". Additionally, buyout activity follows the same cycles.

Somewhat surprising, Axelson et al. (2010) finds that the level of debt used in a LBO does not correlate with the capital structure of the comparable peers in the target firm's industry. The authors proceed with trying to explain post-LBO leverage with a number of factors known to explain cross-sectional differences in leverage of public firms, but find no consistent relations. Rather, the amount of leverage as well as the purchase prices paid for target firms, the authors find, seem to be strongly driven by debt market conditions.

The authors present two possible explanations for their findings. One is based on the option-like compensation for the GPs, and was originally proposed by Axelson et al. (2009) GPs may have an incentive to increase the riskiness of the fund beyond what is optimal for LPs. When debt is relatively expensive these overinvestment tendencies are mitigated. When debt is relatively cheap however, GPs can increase the value of their option by investing more aggressively, thus increasing the risk of overinvestment.

Another explanation stems from the fact that private equity funds may have superior access to debt financing, which if exploited could lead to arbitrage profits. By making equity investments financed by relatively cheap debt private equity funds can gain on the different conditions in the two markets.

The credit crunch of 2007-2010

As Axelson et al. (2010) find, buyout activities peaked prior to the credit crisis of 2007-2010. Consistent with these findings, Acharya et al. (2007) note that the credit market experienced an explosion in liquidity from 2003 until the start of the collapse of the subprime market in June 2007. This liquidity boom aided in driving the LBO boom during the same period of time.

The authors also analyze the possible implications of the debt market development during its recent boom. With an increase in the availability of syndicated bank debt, as well as increased activity in the secondary markets of debt including debt bundling to structured products such as collateralized loan obligations (CLOs), the loans do not necessarily remain the economic risks of the banks that originate them. Therefore, the screening and monitoring of deals weakened, which may have led to excessive LBO lending. On a similar note, the authors discuss the fact that a number of LBO deals have been funded with debt having particularly weak covenants, which might also be a manifestation of weak lending standards and monitoring incentives.

Jenkinson (2009) also notes that a feature of the recent leverage boom was the loose covenants associated with loan agreements. Many private equity funds negotiated “cov-lite” loans for which few requirements other than the periodical interest payments were installed. Jenkinson argues that with measures such as these, private equity funds could make use of not only the low interest rates witnessed prior to the credit crisis, but also particularly lenient terms on their debt financing.

In summary, private equity funds seem to have taken advantage of the recent debt market developments prior to the crisis. As Axelson et al. (2010) note, this behavior can, in the perspective of the LPs, lead to either positive or negative results – positive if the increased leverage comes from arbitraging on capital markets, negative if it is an effect of GPs’ overinvesting.

2.6 Previous Research

We here present and summarize the results from a number of studies which use empirical data to analyze the impact of the theoretical value creation sources previously presented. These studies test whether the operating changes above occur, and if so, to what extent. While previous findings include studies performed on samples of varying geographical markets as well as different time windows, to our knowledge there exists no previous study focusing specifically on effects observed after a credit boom. This is the distinguishing feature of our study (A full description of our study is presented in section 3).

Aside from differences in the market and period of time studied, an analysis of private equity target firm development can also be performed for development during the pre-buyout years, the holding period or the post-exit years. Our study is focusing on development during the holding period. In this section we therefore present a subset of findings pertaining to the development of private equity targets during the holding period.

Findings on operational performance

In Kaplan's (1989b) study of 76 MBOs completed between 1980 and 1986, the author analyzes a number of metrics to find whether the operating changes predicted by theory occur. The analysis is performed on changes in the metrics from their levels one year prior to the buyout to one, two and three years after the buyout. Two such metrics are operating income (EBITDA) and net operating cash flow, which are measured both in levels, as a fraction of assets and as a fraction of sales. Adjusting for industry changes, Kaplan finds significant outperformance for the fractioned variants of both metrics at the 1% level, for all years, as well as the level changes of net cash flow (although at slightly higher significance levels).

In their master thesis, Grubb and Jonsson (2007) use a sample of 73 Swedish LBOs exited between 1981 and H1 2006 to assess whether industry-adjusted operating performance is improved during the holding period. The metrics used are sales growth, EBITDA margin (fraction of sales) and ROIC. Analyzing the development of these metrics during the entire holding period, the authors find significant outperformance of industry peers for EBITDA margin at the 1% level, for ROIC at the 5% level, and for sales growth at the 10% level.

Smith (1990) studies the changes in operating performance for a sample of 58 MBOs targeted between 1977 and 1986. She finds significant increases in industry-adjusted operating cash flows as a fraction of both employees and assets, from the first year before the buyout, to the first post-buyout year.

In another study performed on Swedish data, Lundgren and Norberg (2006) replicate the methods used in Kaplan's (1989b) study in their master thesis, using a sample of 67 LBOs between 1988 and 2003.

The authors' only finding with statistical significance on analyzing the development of operating performance is a negative industry-adjusted sales development from one year prior to the buyout, to one year after the buyout (at the 10% level).

The above results all refer to studies of improvements in the companies' operational performance. As described in section 2.3, several factors may partake in yielding these improvements (when they are found). Below we summarize findings on factors which may have contributed to such improvements.

Findings on operating efficiency

Smith (1990) finds significant increases in the ratio of sales to NWC, and addresses adjustments in the management of net working capital as one contributor to the post-buyout increases in operating returns. She finds that both industry-adjusted accounts receivables collection period and inventory holding period are lowered significantly after the buyout.

Lundgren and Norberg (2006) measure the industry-adjusted changes in NWC, both as a stand-alone value and as a fraction of sales and assets. In their analysis from the pre-buyout year to post-buyout, they find no results with statistical significance – however their results could be interpreted as indicative of improvements when NWC is measured as a level value or as a fraction of sales.

Findings on capital expenditure

Kaplan (1989b) measures the level of new investments by looking at capital expenditures (including capitalized leases and excluding acquisitions). With varying levels of statistical significance he finds reduced industry-adjusted capital expenditure from the first year prior to the buyout to the first and second year following the buyout, when capital expenditure is measured as a level value, or as a fraction of sales.

Lundgren and Norberg (2006) measure capital expenditure as the year on year difference between the level of fixed assets, adding depreciation and amortization. They find significant reductions in industry-adjusted capital expenditure for their buyout targets, for all their studied holding periods regardless if capital expenditure is measured in itself or as a fraction of sales or assets.

Findings on changes in employment

Kaplan (1989b) studies changes in the number of employees from the pre-buyout year to the first post-buyout year where such a value is reported. For the full sample, Kaplan finds a significantly lower employment development for the buyout firms than their industry peers. However, when excluding sample companies with significant divestitures and acquisitions, the significance of the findings is lost.

Grubb and Jonsson (2007) find no significant impact on employment nor wage levels for the target firms. Such results are also reported by Lundgren and Norberg (2006). Their findings seem indicative of slightly lower employee and sales per employee development than industry peers, however lacking statistical significance no definite conclusions can be drawn.

3 Area of study

Previous literature has developed several theoretical factors affecting the development of private equity target firms vis-à-vis their peers, as well as tested the actual implications of these factors for varying sets of empirical data. Taking a different stance than studies performed previously, we look into such development after a debt market boom, during the special market conditions characterized by a financial crisis. More specifically, we analyze the development of private equity targets during the credit crunch of 2007-2010.

3.1 Purpose and contribution

In the theory section above (2 *Theoretical background*) we presented several factors contributing to industry-adjusted value creating activities for private equity targets. We also presented studies linking private equity activities with debt markets, and studies on private equity performance under financial distress.

The market characteristics surrounding a financial crisis affect several factors central to the private equity industry. As Axelson et al (2010) discuss, private equity buyout activities are highly correlated with debt market yields which, prior to the crisis in 2007, experienced a significant boom. Furthermore, the economic shocks resulting from the constrained debt markets may put pressure on the buyout target and their peers, increasing the risk of both financial and economic distress.

By performing our study on the development of private equity firms specifically during the years following a debt market boom, our aim is to complement the literature with research performed when several of the above factors are in effect. Specifically, we aim to gain a deeper understanding of the cyclicality observed in the private equity industry by measuring the resilience of private equity-controlled firms during a financial crisis.

We will use the literature on empirical findings previously presented as reference studies to aid in analyzing our results. Likewise, we also hope our study will be beneficial as reference for future research in related areas.

3.2 Hypotheses

Given the results from previous studies as well as the findings on the connection of the private equity industry and debt markets, and private equity buyouts under financial distress, we develop the following hypotheses to be assessed in our study.

Hypothesis 1 (H1): We will observe positive industry-adjusted development of operating performance for the target firms.

This is predicted by both agency theory and theory on operational engineering. Such results have also been verified empirically in a number of studies (see for example, Kaplan (1989b), Smith (1990) and Grubb and Jonsson (2007)). We also account for the known relevant factors which differ between the sample used in our study and previous research. Firstly, our sample is likely to be heavily based on buyouts occurring just prior to the credit crunch, when debt costs were particularly low. This may have a negative effect in the quality of the buyouts, as discussed by Axelson et al. (2010). Secondly, part of the economic shock following the crisis may increase the risks of financial (and economical) distress for the buyouts as well as their peers. As Andrade and Kaplan (1998) suggest, private equity buyouts do show some elasticity in their value creating activities (although it is important to note that their study followed buyout targets to the time of resolution). Thirdly, the economic shocks following the crisis are bound to have some market implications for which it is difficult to predict the industry-adjusted effects a priori. We have no reason to believe however, that such effects are more severe for private equity targets than other firms.

Weighing these considerations with previous empirical results, we expect to observe continued outperformance as measured by a set of operating performance metrics (OPMs) during the credit crunch period.

Hypothesis 2 (H2): We will observe positive industry-adjusted development of capital efficiency for the target firms.

This is in line theory in addition to Smith (1990). As above, the results may be impacted by the market conditions during our period of study. Apart from showing lower industry-adjusted development due to the potential lower target quality in our study, we find no reason of reduced capital efficiency beyond each respective buyout targets' industry in general.

Hypothesis 3 (H3): We will observe negative industry-adjusted development capital expenditure for the target firms.

This is in line with theory as well as previous empirical evidence. As above, the results may be impacted by the market conditions during our period of study. Specifically, Andrade and Kaplan (1998) show capital expenditure to be one of the primary costs of financial distress. Since private equity targets are required to generate substantial cash flows due to their debt levels, we expect this effect to be larger for the buyout firms than their peers.

Hypothesis 4 (H4): We will observe a wealth transfer effect from employees to managers.

This is in line with theory, and Kaplan's (1989b) findings. No such effects were noted by the studies performed on Swedish markets, although since we lack evidence of rejections on this hypothesis, we will assume these effects can be observed in our study. We find no reason that this effect should be altered due to the market conditions in our sample.

Hypothesis 5 (H5): Industry-adjusted improvements in operating performance can be explained by measurable financial and operating changes.

In testing H1 we assess the industry-adjusted operating performance improvements of our sample target firms, and in H2-H4 we test for patterns in changes of factors potentially explaining any observed performance improvements. We also aim to connect these findings. If the theories presented above lead to actual changes in the private equity targets' operations which create improved operating performance, we should be able to find such relations.

Many theoretical factors for improved buyout performance are difficult to measure. However, we will attempt to relate the factors studied in H2-H4 as well leverage to improvements in operating performance. We expect to be able to explain a significant part of any outperformance (if such an outperformance is observed) with these factors.

4 Methodology

As previously described, the goal of our study is to assess the resilience of private equity owned firms during financial downturns. Our hypothesis describes a number of areas, based on theory and previous empirical findings, on which we will be basing our analysis. For each such area, one or more metrics, based on accounting data from each firms' financial statements, is used to gauge the performance or level in that particular area. The main part of our analysis is structured to find any changes in such metrics which are not explained by industry development.

We base our study on empirical data from the credit crisis of 2007-2010. During this period, a total sample of 40 buyout targets and industry peers are analyzed (for a full description of our sample, see *6 Sample and Data*). All private equity target companies in our sample have been subject to a buyout transaction prior to 2008. With data from year end 2007, 2008 and 2009, we measure the development of our selected metrics for the buyout targets as well as their industry peers, for two years during the economic downturn.

This differs from the general procedure used in previous studies - often the development from 1y prior to buyout to 1, 2 or 3 years post-buyout is assessed - but is required since we intend to measure the industry-adjusted performance during the crisis years. Exclusively analyzing targeted companies 2007 would have yielded to small a sample. Of the analyzed companies, only 14 were bought out during 2007 (see Appendix A for the full sample description). Rather, our method lets us use a larger sample, which nonetheless is heavily based on buyouts prior to the crisis years.

4.1 Metrics studied

We here describe the metrics used in our analysis. For each metric we assess the development during 2008 and 2009 for the portfolio companies, relative to industry peers.

Measuring operating performance (H1)

We base our measures of operating performance on the following metrics:

Sales from operations: We include sales growth in our analysis since we believe it to be the simplest measure of a company's results, in the sense that the company's reported sales is the measure we can obtain with the least possible influence of potential company- or industry-specific accounting decisions. Furthermore, sales growth is one of the most fundamental drivers of a company´s cash flow, which is what yields profits to its investors.

EBITDA margin: A firm's EBITDA margin takes into account its expenses, but is not affected by differing practices on depreciation and amortization. By measuring EBITDA as a fraction of sales, we

also account for any non-organic changes through divestitures or acquisitions. As such, we can measure improvements in the productivity of the company´s operations by analyzing the development of its EBITDA margin.

ROIC: A firm's ROIC measures its capital efficiency. It represents after-tax profits generated by a company's core operations divided by the capital invested in order to generate those profits. This measure is another fundamental driver of its cash-flow.[4]

FCF margin: FCF is the cash flow generated by a company's operations that is freely distributable to its investors, after deducting investments back into its operations. We believe this measure to be of particular interest in the private equity industry, since highly leveraged firms are under constant pressure to handle interest payments to its debt investors. By measuring FCF as a fraction of sales, we account for any non-organic changes due to divestitures or acquisitions, during the holding period.

We believe that these metrics provide a thorough measure of several aspects of the operating performance of the sample in our study. Furthermore, they are all based on metrics used in previous studies, which will allow us to compare our results to findings from previous literature.

Measuring operating changes (H2-H4)

Similar to the way in which we measure industry-adjusted operating performance development for the private equity targets in our sample, we use a number of metrics to assess changes in operations resulting from the buyout transactions. These evaluations are based on the following metrics:

Net Working Capital: The development of net working capital is evaluated, both at level value and as a fraction of sales.

Capital expenditure: We measure changes in capital expenditure, both at level values and as a fraction of sales.

Number of employees: We measure the year-on-year changes in the reported number of employees (full-time equivalents).

Average compensation per employee: To assess Shleifer and Summers' (1988) wealth transfer effects arguments, our aim is to measure changes in average wages of non-board members. In this metric we therefore include all wages and pensions not distributed to the board or CEO, as well as all reported social costs, divided by the reported number of employees.

[4] We use the following definition of ROIC $= \frac{\text{NOPLAT}}{\text{IC}} = \frac{\text{EBIT*(1-}\tau\text{)}}{\text{E+D}}$
By using this definition, a few assumptions are implied. Firstly, goodwill amortization is assumed to be an operating expense. Secondly, we assume all cash and cash equivalent items are necessary for operations – thus we do not deduct any cash from the reported debt. The tax rate used is 26.3 % for all years.

4.2 Evaluation method

We use a sample of all firms bought by our selected private equity sponsors prior to 31st of Dec 2007 and held during the entirety of 2008 and 2009. For each target company we assign one industry peer, based on ownership structure, geographical location, industry classification, and size.

Our method of selecting one comparable peer firm per private equity target company in our sample differs from several other studies previously reviewed, which instead assign groups of industry comparables for each target firm (see for example, Kaplan (1989b) and Grubb and Jonsson (2007)). Since ideally we would want to compare each buyout firm with an identical non-private equity controlled firm (to test H1) not to cause bias due to factors not controlled for in our regressions, we believe our method should yield a well-balanced set of comparables for our sample. Furthermore, selecting single firms as comparables as opposed to a portfolio of industry peers reduces the risk of skewness bias as discussed by Barber and Lyon (1996). Specifically, both our portfolio companies and the selected peers are equally likely to experience abnormal development during the study period.

We adopt what we perceive as the most common approach to measuring industry-adjusted changes for the variables used in our study (see for example Lundgren and Norberg (2006), Kaplan (1989b) and Grubb and Jonsson (2007)). Below we denote with X our variable under study and S our sample statistic generated from X, with P referring to our private equity target firm and C its selected peer comparable. For ratio-based metrics, we use a difference in difference approach to produce S (5.1). For level variables, we measure the difference using a standard growth formula (5.2).

$$S = \left(X_T^P - X_t^P\right) - \left(X_T^C - X_t^C\right) \tag{5.1}$$

$$S = \frac{X_T^P}{X_t^P} - \frac{X_T^C}{X_t^C} \tag{5.2}$$

T denotes the period end while t denotes the period start. The S statistic is evaluated for each metric during three periods of time: from 2007 to 2008, from 2008 to 2009 and for the full period 2007 to 2009. We are mainly interested in the full period development but also want to examine potential year on year differences.

Statistical significance

Since we use a relatively large original sample (N=40), we can assume via the central limit theorem that the sample mean of S is approximately normally distributed. To seek statistically significant differences in the metric developments, we base our tests on the Z statistic, which in the case that the population difference of development of X is zero has the distribution below (5.3).

$$Z = \frac{\bar{S}}{\sigma_S} \underset{\sim}{\text{approx}} N(0,1) \tag{5.3}$$

If the population difference of the development of X is not zero, we expect an observed S to deviate significantly from what can be expected by the distribution in (5.3). We assess the significance of the changes each period with a one-sided t-test, since we are unaware of the population variance but assume equality between the populations. The test is designed to reject the null hypothesis that the difference in population which contrasts our hypotheses H1-H4, if the data provides enough evidence.

Alternatively, we could have used the Wilcoxon signed rank test as a substitute to the Student's t test. This would have provides a different validation of our results, since the test is nonparametric and thus does not assume our data is normally distributed. The use of this test is also a common approach in similar studies (see for example Lundgren and Norberg (2006) and Kaplan (1989b)) However, since all our tests are performed under conditions which lets us assume a normal distribution for the mean of S, the t test should produce reliable results.

Explaining operating performance (H5)

To explain any positive findings in industry-adjusted operating performance, we relate such findings to factors which according to theory are potential sources of private equity targets' value creation. For the industry-adjusted development of each OPM, we therefore attempt to find the influence of each metric listed above as used in measuring operating changes, as well as target company leverage. Specifically, we estimate the regression models shown below (5.4-5.7). As above, P refers to a private equity target firm while C refers to its industry peer. T denotes the period end while t denotes the period start. For each OPM, we use the time period t to T for which we can reject the null hypothesis of no positive industry-adjusted performance development on the lowest significance level.

$$\left(\Delta\text{Sales growth}_{t,T}^{P} - \Delta\text{Sales growth}_{t,T}^{C}\right)_i = \alpha + \beta_1 * \text{LEVERAGE}_{\text{t}\ i}^{\text{P}} \quad (5.4)$$
$$+\beta_2 * \left(\Delta\text{CAPEX Acq.}_{t,T}^{P} - \Delta\text{CAPEX Acq}_{t,T}^{C}\right)_i$$
$$+\beta_3 * \left(\Delta\text{CAPEX excl. Acq.}_{t,T}^{P} - \Delta\text{CAPEX excl. Acq.}_{t,T}^{C}\right)_i$$

$$\left(\Delta\text{ROIC}_{t,T}^{P} - \Delta\text{ROIC}_{t,T}^{C}\right)_i = \alpha + \beta_1 * \text{LEVERAGE}_{\text{t}\ i}^{\text{P}} \quad (5.5)$$
$$+\beta_2 * \left(\Delta\text{WC}_{t,T}^{P} - \Delta\text{WC}_{t,T}^{C}\right)_i$$
$$+\beta_5 * \left(\Delta\text{WAGES}_{t,T}^{P} - \Delta\text{WAGES}_{t,T}^{C}\right)_i$$

$$\left(\Delta\text{EBITDA margin}_{t,T}^{P} - \Delta\text{EBITDA margin}_{t,T}^{C}\right)_i = \alpha + \beta_1 * \text{LEVERAGE}_{\text{t}\ i}^{\text{P}} \quad (5.6)$$
$$+\beta_2 * \left(\Delta\text{WC}_{t,T}^{P} - \Delta\text{WC}_{t,T}^{C}\right)_i$$
$$+\beta_5 * \left(\Delta\text{WAGES}_{t,T}^{P} - \Delta\text{WAGES}_{t,T}^{C}\right)_i$$

$$\left(\Delta\text{FCF/Sales}_{t,T}^{P} - \Delta\text{FCF/Sales}_{t,T}^{C}\right)_i = \alpha + \beta_1 * \text{LEVERAGE}_{\text{t}\ i}^{\text{P}} \quad (5.7)$$
$$+\beta_2 * \left(\Delta\text{WC}_{t,T}^{P} - \Delta\text{WC}_{t,T}^{C}\right)_i + \beta_3 * \left(\Delta\text{CAPEX}_{t,T}^{P} - \Delta\text{CAPEX}_{t,T}^{C}\right)_i$$
$$+\beta_5 * \left(\Delta\text{WAGES}_{t,T}^{P} - \Delta\text{WAGES}_{t,T}^{C}\right)_i$$

In 5.4 above the impact of leverage, acquisition capex and capex excluding acquisitions on sales growth is evaluated. We divide capex into acquisition capex and capex excluding acquisitions since management might strive to lower capex excluding acquisitions in order to focus on sales growth through other measures. With higher leverage the risk for management empire building and excess investments decreases. Acquisitions are expected to directly result in sales growth. In 5.5 above the impact of leverage, working capital and average employee compensation on ROIC is evaluated. In 5.6 above the impact of leverage, working capital and average employee compensation on EBITDA margin is evaluated. In 5.7 above the impact of leverage, working capital, capex and average employee compensation on FCF/Sales is evaluated.

LEVERAGE refers to the debt ratio of the target company at time t. WC and CAPEX refers to NWC sales and Capex respectively, for all OPMs except for ROIC, where we instead use the ratio metrics NWC / Sales and Capex / Sales. Although we believe the ratio metrics to be superior to the level values for reasons stated above, we use level variables to mitigate endogeneity issues when the regressand is directly dependent on sales. WAGES refer to the average employee compensation as calculated above.

A similar method to the above regression model was used by Grubb and Jonsson (2007) to explain industry-adjusted changes in operating performance as measured by the EBITDA margin. As regressors, the authors use a leverage variable, changes in the target company's labor force and wage level, as well as a measure of management incentives and the type of buyout observed.

5 Sample and Data

Our study aims to assess how buyouts have affected the operating performance of the studied companies. Since the emphasis of our study is on the operating impact of buyout on companies, we assigned a peer company to each studied company that has been subject to a buyout in order to adjust the company's performance for market factors. In our study we concentrate on Swedish companies that have become subject to buyout prior to the 31st of December 2007 and that have been owned by a Swedish buyout company during the whole period between the 31st of December 2007 and the 31st of December 2009. The period was chosen with the following considerations at hand: 1) to be able to study the companies operating performance during the crisis; 2) to have a large enough data set in order to achieve statistically significant results. By using year 2007 as our base year and the years 2008 and 2009 as crisis years, we were able to compare the impact of the financial crisis on companies owned by buyout firms with their peers.

5.1 Dataset

We use the database *Capital IQ* to find all Swedish target firms bought out by a set of well-known Swedish private equity sponsors actively held and bought out prior to 2008, complemented with Swedish targeted buyouts by FSN Capital, headquartered in Oslo. The private equity sponsors studied are Accent, Altor, EQT, FSN Capital, Industri Kapital, Nordic Capital, Procuritas, Ratos, Segulah and Triton. The resulting set of transactions was also complemented with buyout deals listed in the sponsors' respective websites. In total this yielded a set of 57 transactions.

Industry peers

We evaluate the most relevant peer for each target firm by assuming the following procedure, listed in order of priority: 1) Ownership: not buyout firm; 1) geography: Sweden; 2) Industry classification: based on the SNI 2007 code as reported by the database *Affärsdata*; 3) Size in terms of sales. In such cases where the target firm is a holding company with various subsidiaries we use the SNI code we find has been the most represented by the target group. We have also verified each peer suggested in accordance with this methodology by examining their websites to conclude whether they are indeed an appropriate peer or not (due to the fact that the SNI codes vary in their specificity). In cases where we have deemed the selected peer is not appropriate, we have erred on the size factor to find another comparable firm. In rare cases it has been difficult to assign a peer to companies in our dataset. If the application of the methodology mentioned above could not result in a company in an industry that we considered as close enough to the industry within which the buyout company, we have excluded the observation from our dataset. [5]

[5] An example is the company KGH Customs Services which operate in the customs compliance area – as the suggested firms with the above methodology consisted of general logistics and transporting companies

In addition to excluding companies for which we could not find a suitable peer firm, we also had to filter our original list of sample buyouts on a number of other accounts. This includes companies which during the study period has been merged into other substantial entities, companies which are subsidiaries to other firms in our sample, and companies for which we could not find annual reviews on either of the years during the study period either on *Affärsdata* or on the company websites. The application of the methodology described resulted in a total of 39 matched pairs, henceforth referred to as the dataset. A full list of our sample portfolio companies and peers is presented in Appendix A.

For each of the 39 target firms and their selected peer, we manually produce a list of accounting information relating to the metrics in our study by extracting information from the companies' annual financial statements found on *Affärsdata*. In cases where a firm's fiscal year does not coincide with calendar year, we have made appropriate modifications by linear interpolation on balance sheet items and weighted averages on items from the firms' income and cash flow statements. In total a number of 4735 data points were extracted from the financial statements.

Data summary

For the starting and end year in our study, we present summary statistics for the metrics used in our study as well as the debt ratios observed, for buyout and peer firms respectively (appendix B). The sample buyouts mainly consist of firms acquired close to the credit crisis, with 12 firms acquired in 2007, 14 acquisitions in 2006, 8 acquisitions in 2005, 2 acquisitions in 2004, 2 acquisitions in 2001 and one acquisition performed in 2000.

One may conclude from the summary statistics that the debt ratio is substantially higher for the buyout companies than their peers, which is to be expected. One may also suspect that in the full sample a few metrics are affected by extreme values, as evident by substantial differences in mean and median in addition to large standard deviations. This is the case for Capex / sales for portfolio companies in 2007 and ROIC for peer firms during both years. Fraction measures such as these are particularly sensitive for inflation if the denominator is especially low. Since any extreme observations may potentially have unbalanced effect on our study, we control for them in our tests. Specifically, we do not include observations which deviates more than four standard deviations from the mean of the full sample. Such observations are considered outliers by Gujarati (2003) and are dropped to reduce the risk of heteroskedasticity.

6 Results and Analysis

In this section we present our findings relating to the hypotheses presented earlier, using the methodology described in section 5.

Hypothesis 1 (H1): We will observe a superior operating performance for the target firms.

The table below presents the results of our analysis of the operating performance metrics (table 1).

Table 1. The table shows summary statistics for the operating performance metrics, and results from the t tests of the sample mean differences between our sample of private equity buyouts and their peer comparables.

Annualized values				95% Mean confidence interval		One sided t test
Metric	N	Mean	Median	lower bound	upper bound	p-value
Sales growth						
08-09	39	7.4%	-1.1%	-5.3%	20.1%	0.12
09-10	39	5.8% [c]	4.9%	-1.6%	13.1%	0.06
08-10	39	6.8% [c]	4.1%	-2.1%	15.0%	0.06
EBITDA / Sales						
08-09	38	2.6% [b]	0.6%	-0.5%	5.7%	0.05
09-10	38	-0.6%	-0.4%	-3.1%	2.0%	0.67
08-10	39	-0.5%	1.0%	-5.4%	4.2%	0.59
ROIC						
08-09	38	5.0% [a]	4.0%	1.6%	8.3%	0.00
09-10	39	0.4%	2.8%	-4.2%	4.9%	0.43
08-10	39	0.9%	2.4%	-3.8%	5.4%	0.35
FCF / Sales						
08-09	29	3.1%	-0.5%	-9.2%	15.4%	0.30
09-10	38	4.8% [b]	1.6%	-0.8%	10.5%	0.04
08-10	29	8.1%	1.1%	-5.7%	21.9%	0.12

[a] Significant at the 1% level.
[b] Significant at the 5% level.
[c] Significant at the 10% level.

We note that for the entire selection of operating performance variables, our results are indicative of a higher rate of development for the private equity target firms than our peers. This is the case both for the year on year changes and for the full period, except for the median sales increase 2008-2009, the median FCF / sales increase during the same period, as well as the EBITDA margin development during between 2009 and 2010 and the full period mean. In general, our observations do seem to point to an outperformance of the analyzed metrics for the private equity target firms; however, the significance of the results varies substantially between different metrics and time period.

For sales growth, we observe a significantly higher performance of buyout firms in the latter as well as the full period at the 10% level. Although outperformance cannot be concluded for the first year

development, the result may be interpreted as relatively strongly indicating since we observe a p-value of just over 0.12 for this period. Our findings are consistent with Grubb and Jonsson's (2007) study which also observe significant industry adjusted sales increases (at the 10% level), although the authors analyze the development during the entire holding period. Worth mentioning is also that our finding does conflict with Lundgren and Norberg's (2006) study in which the authors' only significant finding in changes of operating performance was a negative industry-adjusted sales development from the first pre- to the first post-buyout year.

For EBITDA margin we find mixed indications for the different time periods. The only statistically significant measure however is the first period development at the 5 % level. We find the first period observation consistent with findings from both Kaplan (1989b) and Grubb and Jonsson (2007). A bit puzzling is the contrasting second period development which seems indicative of underperformance for our private equity target firms.

The ROIC development for our sample has evolved in a manner similar to EBITDA margin. Consistent with Grubb and Jonsson (2007), we find with strong significance at the 1 % level that the buyout targets outperform their peers in terms of ROIC development for the first period in our study.

We find FCF margin to be indicative of positive industry-adjusted development for private equity targets during the full period, and do find significant industry-adjusted development during the second period. Although we use a different measure of cash flow than Kaplan (1989b) and Smith (1990), our observations affirm their findings.

In addition to the above analysis, we also evaluate the same metrics controlling for fixed effects in three sample subsets: buyouts performed prior to 2004, intermediate buyouts performed 2004 to 2005 and recent buyouts performed 2006 and 2007. By grouping our observations into these subsets we control for unobservable cross-group differences in metric development. We expect the older buyouts to be lower performing than the other groups since their holding periods vastly surpasses industry averages. Additionally, newer buyouts may be subject to restructuring efforts the first few years which may impair their performance. However, these regressions yield no statistically significant results, which may be attributed to small subset sample sizes.

In general, our findings are consistent with previous empirical studies of industry-adjusted positive development for the operating performance metrics used in our analysis. This does indicate some persistence in the added value of private equity firms, throughout constrained markets such as during the financial crisis. Only accounting for statistically significant year on year changes however, two of our metrics show positive industry-adjusted changes during the first year and two show positive

industry-adjusted changes during latter year. Thus we cannot make any conclusions as to differences in value-adding activities during the two crisis years.

Hypothesis 2 (H2): We will observe superior capital efficiency for the target firms.

The table below presents the results of our analysis on net working capital (table 2).

Table 2. The table shows summary statistics for the net working capital metrics, and results from the t tests of the sample mean differences between our sample of private equity buyouts and their peer comparables.

Annualized values				95% Mean confidence interval		One sided t test
Metric	N	Mean	Median	lower bound	upper bound	p-value
NWC						
08-09	38	11.6%	-5.4%	-31.8%	55.0%	0.70
09-10	38	-4.6%	1.2%	-33.4%	24.2%	0.37
08-10	39	42.3%	1.2%	-66.9%	151.5%	0.22
NWC / Sales						
08-09	39	0.7%	-0.9%	-2.7%	4.1%	0.69
09-10	38	-0.5%	0.0%	-2.7%	1.7%	0.33
08-10	38	-0.4%	0.2%	-2.3%	1.5%	0.33

None of our observations on industry-adjusted capital efficiency is significant on any reasonable level. We note that the development of level values of NWC is highly volatile as shown by the relatively large confidence spans for the population mean. As a ratio of sales, the volatility is reduced – however, our findings do little in providing even indicative measures of industry-adjusted development.

Our findings conflict with our hypothesis as well as previous empirical studies, namely Smith's (1990) findings of improved capital efficiency. Additionally, while Lundgren and Norberg (2006) do not find any significant industry-adjusted changes in NWC or NWC / sales, for any of their study periods, their results can be interpreted as indicative of improvements. Our results do not suggest any such improvements.

Hypothesis 3 (H3): We will observe lower capital expenditure for the target firms.

The table below presents the results of our analysis of the investing activities (table 3).

Table 3. The table shows summary statistics for the capital expenditure metrics, and results from the t tests of the sample mean differences between our sample of private equity buyouts and their peer comparables.

Annualized values				95% Mean confidence interval		One sided t test
Metric	N	Mean	Median	lower bound	upper bound	p-value
Capex						
08-09	34	-4.0%	-23.3%	-50.3%	42.3%	0.43
09-10	37	6.5%	2.7%	-20.5%	33.5%	0.69
08-10	34	-17.4%	-6.1%	-94.1%	59.2%	0.32

Capex / Sales						
08-09	38	0.1%	0.0%	-3.3%	5.1%	0.67
09-10	39	-1.1%	0.0%	-3.0%	0.8%	0.12
08-10	39	-32.7%	0.1%	-98.0%	33.0%	0.16

Similar to our findings on working capital, we do not observe any significant industry-adjusted changes in capital expenditure neither in levels nor as a fraction of sales. As a fraction of sales however, the results does seem indicative of reduced capital expenditure for the latter period, as the p-value for the t test is 0.12. This also holds for the analysis of the full period, albeit with a slightly higher p value of 0.16.

Our results differ from previous empirical findings in that we for our sample fail to note any significant reductions in investing activities as found by both Kaplan (1989b) and Lundgren and Norberg (2006). Since we do find indications of reductions rather than increases however, we do not deem our findings as completely opposing previous literature.

Hypothesis 4 (H4): We will observe a wealth transfer effect from employees to managers.

The table below presents the results of our analysis of employees and wages (table 4).

Table 4. The table shows summary statistics for the employees and wages metrics, and results from the t tests of the sample mean differences between our sample of private equity buyouts and their peer comparables.

Annualized values				95% Mean confidence interval		One sided t test
Metric	N	Mean	Median	lower bound	upper bound	p-value
Avg wages						
08-09	37	17.5%	3.3%	-1.1%	36.2%	0.97
09-10	38	-4.8% [a]	-0.4%	-11.6%	2.0%	0.08
08-10	37	9.8%	6.3%	-5.8%	25.5%	0.89
Employees						
08-09	38	1.6%	1.3%	-2.6%	5.9%	0.78
09-10	38	6.2%	1.6%	-3.3%	15.8%	0.90
08-10	38	8.3%	1.1%	-3.4%	20.0%	0.92

[a] Significant at the 10% level

The results from our analysis of employees and employee compensation provide mixed indications of the wealth transfer effects expected. Our only statistically significant finding is an industry-adjusted reduction of average wages observed during 2009, which is significant at the 10% level. However, if we would have taken a completely opposite stance in constructing our hypothesis test where we reject H0 if the industry-adjusted development of wages increases, we would have found the 2008 development as showing a significant industry-adjusted increase at the 5 % level. Similarly, the full period wage development measure, as well as the latter- and full period employee development ratios,

would have implied industry-adjusted benefits to employees with p-values of 0.11, 0.10 and 0.08 respectively.

Rather than showing indications of a wealth transfer effect from employees, our analysis indicates a more complex development which may actually be beneficial to the labor force and the current employees. These results contrasts theory, and goes against previous findings showing indications of wealth transfer effects such as Kaplan (1989b) and Lundgren and Norberg (2006).

Hypothesis 5 (H5): Industry-adjusted improvements in operating performance can be explained by measurable financial and operating changes.

The table below presents the results from our regressions of operating changes on the operating performance measures (table 5).

Table 5. Results from regressions of explaining factors on operating performance metrics.

OPM	α	LEVERAGE	WC	CAPEX	ACQUISITIONS	WAGES
Sales growth						
Coefficient	-0.05	0.31	-	0.01	0.00	-
p-value	0.88	0.55	-	0.36	0.81	-
N = 39, R^2 = 0.03, time period = 2008-2010						
EBITDA / sales						
Coefficient	-0.08	0.13	0.02	-	-	-0.17 [b]
p-value	0.65	0.59	0.57	-	-	0.06
N = 37, R^2 = 0.13, time period = 2008-2009						
ROIC						
Coefficient	0.05	-0.04	-0.11 [a]	-	-	0.01
p-value	0.69	0.84	0.00	-	-	0.925
N = 37, R^2 = 0.35, time period = 2008-2009						
FCF / sales						
Coefficient	0.02	0.05	-0.01	0.00*	-	-0.33
p-value	0.89	0.82	0.86	0.73*	-	0.11
N = 37, R^2 = 0.10, time period = 2009-2010						

[a] Significant at the 1 % level
[b] Significant at the 10 % level
* Includes expenditures for acquisitions.

For sales growth, we find the overall explaining power of the regressors to be very low, as indicated by the R^2 of 0.03. We find no support for agency theories in that increased leverage would incentivize managers to increase sales (as sales growth is one of the fundamental drivers of cash flow). For both

excess capital expenditures (excluding acquisitions) and acquisitions our findings suggest practically no relation to excess sales growth.

As the second fundamental driver of cash flow, we would have expected EBITDA margin to be influenced by leverage using the same reasoning as for sales growth. Although the coefficient has the expected sign, no such conclusion can be made. Furthermore, we find no effect on EBITDA margin for changes in net working capital. We do however find a negative relation between industry-adjusted wage and EBITDA margin development, significant at the 10% level. This is expected but hardly offers any proof of wealth transfer theories – the overall explanatory power of all factors on the observed industry-adjusted changes in EBITDA margin is low at an R^2 of 0.13. Additionally, as shown in table 4, industry-adjusted average compensation increased for this time period (together with increases in EBITDA margin as shown in table 2).

For ROIC, we find a substantially higher value of R^2 than found in any other regression at 0.35. The only factor for which we find a significant relationship to industry-adjusted sales development is industry-adjusted net working capital, on the 1% level. Specifically, each percentage reduction in excess net working capital development increases excess ROIC development by 0.11% on average. This would seem to support the theory that private equity ownership leads to improvements in operational efficiency which in turn improves operating performance. In a sense however, the increase in ROIC could be a result of the same process that decreases NWC. If the overall asset base of the target company is lowered, then invested capital (the denominator in ROIC) could be decreased just as well as operating current assets. Thus the negative relationship observed between net working capital and ROIC do not necessarily show the expected effect of increased operational efficiency per se, but instead could reflect that both variables are dependent on the company asset base.

For FCF / sales, the explanatory power of the regressors used is low with an R^2 value of 0.10. Additionally, none of the metrics used as regressors are found to be related to FCF / sales with any reasonable level of significance. However, average employee compensation seems indicatively to have a negative effect, with a p-value of 0.11. As above, this provides little support for wealth transfer theories (although the industry-adjusted development of average employee compensation did in fact decline during this time period, while FCF / sales increased).

The results from our regressions do not show any consistent explanatory power of any of the considered operating change metrics for any of the OPMs. Somewhat surprising, we do not find any influence on any OPM of the target firms' debt ratios. According to agency theory, we would have expected higher target debt levels to be associated with increases in operating performance by, for example, elimination of negative NPV investments. We were especially expecting to find a relation

between leverage and cash flows, since higher leverage puts firms under pressure to pay required interest payments. Our sample however, does not support any such relationship.

In summary we find very little explanatory power for operating performance of the metrics used. In cases where statistically significant relationships are found, we cannot exclude factors that may influence the relationship to the point where it is difficult to draw conclusions. We therefore do not find empirical support for the relevant theories during the study period.

7 Conclusion

In a relatively short period of time, private equity funds have grown to become a global industry. While showing a steady growth pattern over the long run, the industry has experienced cyclical activity levels highly dependent on debt market conditions. During periods of constrained debt markets, such as the financial crisis of 2007-2010, the industry has seen significant decreases in activity levels.

How private equity funds generate value is not a clear-cut issue. We have described an array of operational and financial changes through which operational improvements are likely to arise. The fact that buyout activities and the leverage of targets are particularly dependent on the cost of debt has led to questions on potential differences in the quality of buyouts entered when debt is particularly cheap, which is often the case before financial crises. Simultaneously, the crisis has led to economic shocks which may increase the risk of financial and economic distress.

In this study, we have assessed how resilient the value creating activities in private equity targets are during such market conditions. We build on studies previously performed on the operating improvements of private equity buyout targets. By evaluating industry-adjusted operating performance on sales growth, EBITDA margin, ROIC and FCF / sales, we find clear patterns of sustained improvements in operating performance even during constrained markets. These findings are in line with our main hypothesis (H1).

Interestingly, the industry-adjusted positive development of the studied operational performance measures is not consistent throughout the study period. ROIC and EBITDA margin show industry-adjusted outperformance during 2008-2009, but show no outperformance for the latter period of 2009-2010. For sales growth and FCF/sales, the pattern is reversed.

We also study a number of factors which in theory could have explanatory power of improvements in firms' operating performance, but find no evidence of movements in line with our hypotheses (H2-H4). Furthermore, we find no consistent relationships between these factors and the operating performance measures (H5). Although we fail to explain why the improvements are sustained and why we observe instability in these improvements, we identify a number of factors pertaining to the specific study period used in our thesis, which may have had a potential effect on our observations.

Firstly, as Axelson et al. (2010) describe, we may be observing lower-quality buyout transactions than average over time, due to GPs overinvesting in beneficiary debt market conditions. The median year of investment for our sample firms is 2006 and out of the 39 buyouts in our sample, 26 have been acquired during 2007 or 2006. Our dataset is heavily based on transactions just prior to the crisis, when the industry saw a booming debt market.

On the other hand, during the credit crisis the number of new investments and exits made by private equity firms was lower than during the period before the crisis. Therefore the private equity firms may

have had more time to spend on existing portfolio companies and thereby increase the value added by the private equity firm as compared to boom periods when probably much more time is spent on live deals end exits.

Additionally, the crisis in itself is bound to affect external market conditions which will have an impact on the firms in our sample as well as their peers.

Suggestions for future research

While our study suggests persistence in the operational performance increases generated by private equity sponsors, it does not explain why this persistence occur, neither do we explain why there is inconsistency in the industry-adjusted performance over the study period. A comparison with the same metrics studied during the boom years prior to the crisis would have been beneficial. We see this as our main suggestion for future research – to delve deeper into the factors unique for periods of constrained markets and pinpoint the reasons for why improvements are sustained.

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Appendix A. Buyouts in Sample

Table A 1. The table lists our sample target firms, their buyout sponsors and year of investment as well as the selected peers.

Private equity sponsor	Private equity target company	Year of investment	Peer company
Triton Advisers	Alimak Hek Group AB	2007	BT Products AB
Triton Advisers	Bravida AB	2006	YIT Sverige AB
Altor Equity Partners	BYGGmax Group AB	2006	K-rauta AB
Altor Equity Partners	Dustin AB	2007	Netonnet AB
Altor Equity Partners	Nimbus Boats Holding AB	2006	N-W Yacht AB
Altor Equity Partners	Piab AB	2006	IMO AB
Altor Equity Partners	Q-MATIC Group AB	2007	NEMO-Q International AB
EQT	Candyking International AB	2007	Leaf Finance AB
EQT	Gambro AB	2006	GE Healthcare Bio-Sciences AB
EQT	Lundhags Skomakarna AB	2006	Peak Performance Production AB
EQT	Munksjö AB	2005	Billerud AB
EQT	Scandic Hotels AB	2007	Nordic Hotels in Stockholm AB
EQT	Aleris AB	2005	Danderyds Sjukhus AB
FSN Capital	Alignment Systems AB	2006	Stoneridge Electronics AB
FSN Capital	Aura Light International AB	2006	Nordic Light AB
FSN Capital	Actic AB	2007	SATS Sports Club Sweden AB
Procuritas	North Trade Stockholm AB	2006	Tulip food company AB
Segulah	Kemetyl AB	2007	Petrolia AB
Segulah	S:t Eriks AB	2005	Benders Sverige AB
Ratos	Anticimex AB	2005	Silvandersson Sweden AB
Ratos	Bisnode Business Information Group AB	2005	Itella Information AB
Ratos	Camfil AB	2000	systemair ab
Ratos	EuroMaint AB	2007	Swemaint AB
Ratos	Hafa Bathroom Group AB	2001	Ido Badrum AB
Ratos	Haglöfs Scandinavia AB	2001	INTERSPORT AB
Ratos	Inwido AB	2004	BorDörren AB
Ratos	RH Form AB	2007	EFG European Furniture Group AB
Nordic Capital	Aditro AB	2004	Qbranch Stockholm AB
Nordic Capital	Atos Medical AB	2005	Otto Bock Scandinavia AB
Nordic Capital	Capio AB	2006	Södersjukhuset AB
Nordic Capital	Finnveden AB	2005	Würth Svenska AB
Nordic Capital	Menigo Foodservice AB.	2006	Axfood Närlivs AB
Nordic Capital	Nefab Holding AB	2007	T-Emballage Thureson AB
Nordic Capital	Permobil AB	2005	Invacare Rea AB
Accent Equity Partners	Crem International Holdings AB	2007	Green & Cool World Refrigeration AB
Accent Equity Partners	Jetpak Group AB	2006	United Parcel Service Sweden AB
Accent Equity Partners	Mont Blanc Industri AB	2007	Lear Corporation Sweden AB
Accent Equity Partners	Scandbook Holding AB	2006	Printley AB
Accent Equity Partners	Tesab Svenska AB	2006	AB P.J. Jonsson och Söner

Appendix B. Summary statistics

Table B 1. The table displays summary statistics for the metrics studied, for our sample of target firms and their peers, respectively. The metrics are shown both for the first and last year in our analysis. All monetary values are in k SEK.

A: Portfolio companies companies

	2007				2009			
	N	Mean	Median	Std. Dev	*N*	Mean	Median	Std. Dev
Sales	39	2 386 263	762 386	3 399 441	39	2 695 318	833 616	3 842 336
Debt ratio	39	70.9%	74.9%	22.0%	39	65.3%	65.8%	19.2%
EBITDA margin	39	15.8%	10.0%	30.3%	39	14.0%	12.5%	10.1%
ROIC	39	5.9%	4.1%	7.3%	39	7.6%	6.0%	7.7%
FCF / sales	30	7.3%	4.9%	19.9%	39	9.5%	6.9%	13.6%
NWC	39	287 072	97 000	803 909	39	341 833	126 966	827 101
NWC / sales	39	16.4%	16.6%	14.3%	39	18.4%	16.0%	14.6%
Capex	39	284 438	22 325	1 146 879	39	73 681	22 031	194 740
Capex / sales	39	37.5%	3.7%	202.8%	39	2.8%	1.9%	3.0%
N.o. Employees	39	1 764	327	3 167	39	1 796	352	3 286
Wages / employee	39	470	428	492	39	469	483	117

B: Peer companies

	2007				2009			
	N	Mean	Median	Std. Dev	*N*	Mean	Median	Std. Dev
Sales	39	1 389 608	507 437	1 889 184	39	1 393 982	501 542	1 935 364
Debt ratio	39	40.6%	42.2%	28.8%	39	40.3%	34.5%	29.9%
EBITDA margin	39	9.3%	6.8%	6.9%	39	8.6%	7.5%	6.4%
ROIC	39	42.4%	15.9%	150.4%	39	42.3%	10.8%	174.9%
FCF / sales	30	4.3%	2.6%	11.0%	39	3.4%	2.3%	9.2%
NWC	39	224 718	56 245	522618	39	305 502	70 063	719 914
NWC / sales	39	16.1%	11.9%	14.9%	39	19.2%	16.1%	14.8%
Capex	39	60 937	9 129	153 340	39	31 803	6 038	58 540
Capex / sales	39	4.6%	2.8%	7.8%	39	2.6%	1.5%	3.5%
N.o. Employees	39	760	249	1 123	39	741	278	1 129
Wages / employee	37	450	467	109	38	494	491	115