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The Operating Impact of Management Ownership

Evidence from Private Equity Buyouts in Sweden

Abstract

Using a novel dataset comprising 161 private equity buyouts in Sweden between 2002 and 2008, this paper investigates the impact of management participation on operating performance in buyouts. The authors compare performance in private equity sponsored management buyouts (MBOs) with other buyouts and also investigate the effect of management ownership in buyout companies. The analysis is carried out using regression analysis over two event windows, the three years following the buyout year and the period from entry to exit. The authors find that a higher management equity stake has a positive effect on profitability in buyout companies, but has a negative impact on growth. Additionally, the study finds that MBOs tend to outperform other buyouts over the full holding period. Looking at employee growth, larger management ownership in buyout companies is found to have a significant positive effect on employment.

Keywords: Private equity, management buyout, MBO, management incentives, operating performance

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1. Introduction

Private equity in its current form traces its roots back to the booming US financial markets of the 1980s, a decade characterised by a thriving junk bond market, hostile takeovers and insider trading scandals. It was in this environment that the leveraged buyout (LBO) emerged. Using large amounts of debt financing, private equity firms would acquire mature public companies with potential for profitable restructuring or expansion. Unfortunately for private equity firms, the very same methods were employed by the ruthless corporate raiders epitomised in Oliver Stone's epic film *Wall Street* (1987). The buyout boom came to an end in the late 1980s as the junk bond market crashed, resulting in political pressure to prohibit high leverage in companies and implement anti-takeover legislation. As a result, several buyout companies filed for bankruptcy and many also predicted the end of private equity.

Fast-forward a few decades and it becomes clear that those predictions could not have been more wrong. Today, the private equity industry is more vibrant than ever before. The amount of capital invested in buyouts reached record heights in 2006 and 2007, rivaling the boom of the 1980s (Kaplan & Strömberg, 2009). The original *modus operandi* of private equity also persists: Acquire a company using large amounts of debt, create value where the previous owners could not and sell it for a profit.

Ever since the emergence of the LBO phenomenon, private equity firms have recognised that management incentives are important drivers of value in buyout companies (Kaplan, 1989b). This is especially evident in buyouts where the incumbent management participates as a part of the bidding group. These buyouts are commonly referred to as management buyouts (MBOs) and used to dominate the private equity realm in the 1980s. However, as the private equity industry has grown and become more sophisticated, the institutional buyout (IBO) has emerged as an important form of buyout. In an IBO, the private equity firm leads the buyout with little or no participation from the management of the company (Robbie & Wright, 1996).

The prevalent notion is that MBOs differ from outsider-driven buyouts in several aspects. Despite this, little research has been conducted to further explore the nature of these differences. Moreover, most studies on buyouts have focused exclusively on public-to-private transactions. However, these transactions only make up a small minority of buyouts, with the vast majority of buyouts targeting private companies (Wright, et al., 2007).

In Sweden, private equity has grown in importance during recent years. Today, Sweden has the second largest private equity industry globally as a percentage of GDP (SVCA, 2013). Although management incentives are regarded as one of the most important sources of value creation in private equity, little research has been conducted on this topic in Sweden. This paper aim to fill this gap by investigating whether management participation affects the operating performance in buyouts. The determinants of employee growth in buyout companies will also be investigated. In order to achieve this purpose, a sample of 161 Swedish private equity buyouts is analysed in an effort to answer the following three questions:

Research question 1: Are improvements in operating performance different between MBOs and other buyouts?

Research question 2: Are improvements in operating performance related to the size of the management's equity stake?

Research question 3: Do employee growth differ between MBOs and other buyouts?

The structure of this paper is as follows: In section 2, an introduction to private equity and different categories of buyouts is provided. Section 3 provides a presentation of the theoretical foundation and previous research on value creation in private equity. In section 4, the hypotheses that will be tested are presented and motivated. Section 5 and 6 outline and discusses the methodology and data sources employed to test the hypotheses. Section 7 presents and discusses the results while section 8 concludes.

2. Background

In this section, the different categories of buyouts that are of interest in this paper are described and defined. Also, a brief overview of how private equity firms operate is presented, followed by a summary of the characteristics of the private equity industry in Sweden.

2.1. Definitions

Distinctions are often made between private equity firms based on the lifecycle stage of companies they invest in. Although differences in terminology abound, investments by private equity firms is commonly divided into two broad categories: venture capital and buyouts. Venture capital provides early-stage financing to start-ups or growth companies, while buyouts target mature companies with potential for restructuring, expansion or other forms of improvement. This paper exclusively focuses on the latter category.

In recent years, some efforts have been made to distinguish between different categories of buyouts. For instance, Emtemark and Olsson (2011) look at buyouts involving more than one private equity firm, so-called club deals. Adler and Norberg (2012) distinguish buyouts by vendor identity and explore the differences between public-to-private buyouts, divisional buyouts and secondary buyouts (SBOs). Another strand of literature, including this paper, distinguish between buyouts based on management participation. Next follows a brief description of various categories of buyout, based on how, and whether, the management participate in the buyout.

During the 1980s, a large proportion of public-to-private transactions were led by the incumbent management, hence the name management buyout (MBO). The rationale behind an MBO is that if management invests a significant proportion of its own wealth in the company, management's incentives will be completely aligned with the interests of other shareholders. Moreover, an MBO might enable management to explore value-creating opportunities that could not be pursued under the previous owners, as well as take advantage of their private information about the company.

If the buyout is led by an external management team, it is usually referred to as a management buy-in (MBI). Since an external management team might not have the same

informational advantage as the incumbent management, MBIs are in general considered to be very different from MBOs (Simons & Renneboog, 2005). For the very same reason, MBIs might also carry greater risks than MBOs (Wright, et al., 2007).

A special case is the BIMBO, which is an acronym for buy-in management buyout. In such a case, the buyout is led by a combination of incumbent and external management. By putting together a hybrid management team, the company may gain both the benefits of the internal knowledge of incumbent management as well as the expertise of the external management (Wright, et al., 2007).

With the rise of dedicated private equity firms, the institutional buyout (IBO) has increased in importance. In an IBO, the private equity firm itself leads the transaction, while management is not involved as a part of the bidding group. In some cases, the continuing effort of the incumbent management is crucial to the success of the IBO, while in other cases, the incumbent management is replaced by an external management team (Simons & Renneboog, 2005).

In section 4-8 of this paper, the terms MBO, MBI, BIMBO and IBO are used to denote different categories of private equity buyouts. These definitions are widely accepted and in line with previous research such as Meuleman, et al. (2009) and Wood and Wright (2009). Note that some previous studies presented in section 3 might define these terms slightly different or use them in contexts where private equity firms have not been involved at all in the transactions.

2.2. Introduction to Private Equity

Private equity firms are essentially investment companies. A typical private equity firm raises capital through one or several closed-end funds. Investors commit a certain amount of capital and cannot withdraw their investment before the termination of the fund. The private equity firm manages the fund, makes investment decisions and takes an active role in the management of the portfolio companies. The outside investors provide the majority of financing, but are otherwise passive. The private equity firm makes most of its money by collecting fixed management fees and a share of profits from the fund, also known as carried interest (Kaplan & Strömberg, 2009).

2.2.1. The Lifecycle of Private Equity Investments

In general, a private equity fund has a fixed life of around ten years. In the first five years or so, the committed capital is used to acquire companies. Subsequently, add-on acquisitions and operational improvements are undertaken before exiting the investments and closing the fund (Kaplan & Strömberg, 2009).

Figure 1 (adapted from Jääskeläinen, 2011) displays the typical structure of a buyout. A new holding company is formed to bid for the target company. The private equity fund, backed by investors, will put up capital to finance part of the transaction. Often, the management of the target company will also make an investment. The remainder of the purchase price is paid by raising debt from banks and other investors.

Figure 1: Structure of a Private Equity Buyout

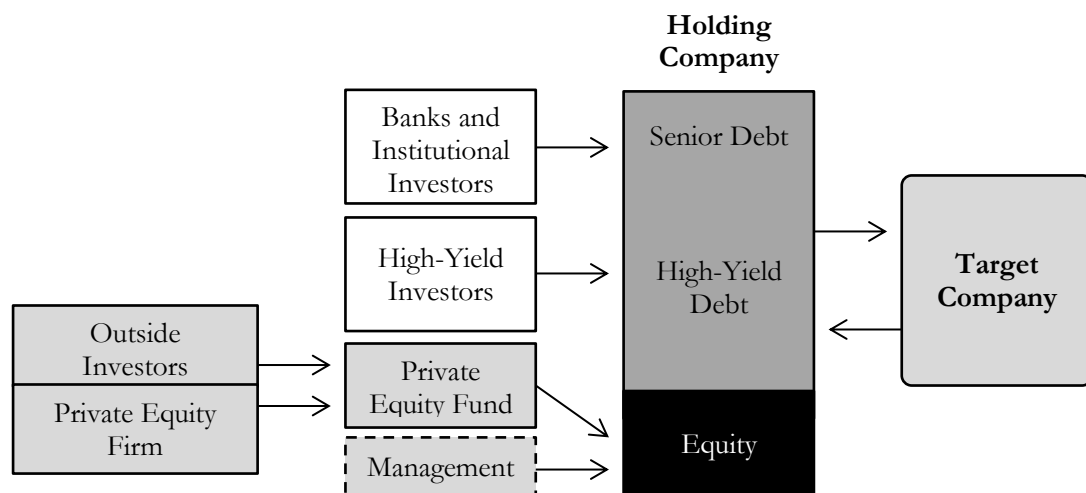


Figure 1 displays the structure of a typical private equity buyout. A holding company is created to bid for the target company. The transaction is partially financed by equity, provided by the private equity fund and sometimes the management of the target company. A large portion is financed by debt, usually in the form of bank loans supplemented with various forms of high-yield debt.

Once the restructuring of a portfolio company is completed, the private equity firm will divest the company. This is commonly known as an exit. According to Kaplan and Strömberg (2009), the most common exit strategy is to sell the portfolio company to an industrial company, also known as a trade sale. The second most common exit strategy is the SBO, where the company is sold to another private equity firm. Listing the company on a stock exchange through an initial public offering (IPO) was a common exit strategy

in the late 1980s and early 1990s. Recently however, the importance of IPOs as an exit route has declined substantially.

2.2.2. Private Equity in Sweden

Sweden has the second largest private equity industry in the world as a percentage of GDP, surpassed only by the United Kingdom (SVCA, 2013). In 2006, as private equity experienced a boom globally, the assets under management dedicated to private equity in Sweden was 210 billion SEK, with portfolio companies posting revenues amounting to almost 10% of Swedish GDP (Bergström, et al., 2007).

In 2010, the Swedish private equity industry was picking up pace after the decline following the American subprime mortgage crisis. Investments in private equity-held portfolio companies in Sweden totalled 3.7 billion SEK, the highest investment level ever registered for the Swedish private equity industry and more than twice the size of the investment level in 2009. Approximately 7.2 billion SEK in capital was raised by private equity funds in 2010, excluding venture capital (SVCA, 2011).

3. Theoretical Foundation and Previous Research

This section outlines the theories underlying the ability of private equity firms to create value in their portfolio companies. This is followed by an overview of the empirical evidence on management ownership and performance, as well as performance improvements in MBOs and other buyouts. The section concludes with empirical findings on employee effects of MBOs.

3.1. Value Creation in Private Equity

For the better part of the 20th century, the public company was perceived as the superior organisational form. Being listed on a stock exchange allows a company to raise financing in the capital markets, increases the liquidity of its shares and allows founders and other investors to diversify their wealth. The visibility and media coverage associated with a stock market listing can discipline managers while also being a marketing tool for the company (Simons & Renneboog, 2005).

Despite the many advantages of the public company, the emergence of the LBO in the 1980s prompted scholars to review their stance. In one of the most cited papers on the subject, Jensen (1989) argues that the public company has outlived its usefulness due to the inevitable conflict between shareholders and management. In a limited liability company, the shareholders bear the full risk of their investment, while trusting the management to manage the risks and maximise shareholder wealth. However, the management will strive to maximise its own benefits and wealth, which may lead to perverse outcomes such as excessive spending, risk taking or shirking behaviour – often at the expense of the shareholders (Jensen, 1989).

In order to mitigate the conflicts of interest plaguing public companies, private equity firms typically implement a new financial structure and a set of governance mechanisms in the companies they acquire. Kaplan and Strömberg (2009) classify the changes implemented by private equity firms into three broad categories: financial engineering, governance engineering and operational engineering.

3.1.1. Financial Engineering

In a typical buyout, the transaction is to a large extent financed by debt. Kaplan and Strömberg (2009) find that the ratio of debt to total assets in buyouts is usually 60-90%. There are several reasons why buyouts typically are highly levered. Firstly, since interest payments are non-discretionary, as opposed to dividends, debt reduces the free cash flow available to the management. In theory, excess cash should be returned to shareholders, e.g. in the form of dividends, unless it can be used for profitable investment opportunities. However, management have few incentives to do so since it will benefit from keeping resources under its own control and finance projects that increase the private benefits of the management itself (Jensen, 1989). By forcing management to pay out excess cash in the form of interest payments, a high leverage mitigates the free cash flow problem and ensures a more effective use of available resources.

Secondly, a high leverage can be motivated for purely financial reasons. An important feature of interest payments is that they are tax deductible. Kaplan (1989a) finds that the value of tax benefits in 76 buyouts has a lower bound of 21% and an upper bound of 143% of the premium paid to pre-buyout shareholders. For buyouts undertaken in the 1990s and 2000s, the benefits have been lower, since both the corporate tax rate and the proportion of leverage in buyouts have declined to a certain extent (Kaplan & Strömberg, 2009). Nevertheless, most studies agree that tax benefits remain an important value driver in buyouts.

Another way that private equity firms avoid tax payments is by introducing corporate structures that employ shareholder loans between holding companies and the operating subsidiaries. Such shareholder loans have been a major source of controversy in Sweden (Svensson & Almgren, 2013).

The benefits of a highly levered capital structure must be weighed against the increased probability of bankruptcy due to the company defaulting on its interest payments. A higher risk of bankruptcy comes with indirect costs in the form of strained relationships with customers and suppliers. There is plenty of evidence that private equity firms take this issue seriously. In a study of 2,156 buyouts, Strömberg, et al. (2012) find that buyout companies are no more likely to enter financial distress than comparable companies. When financial distress does occur, buyout companies are more likely to survive as

independent companies. Kaplan and Strömberg (2009) find that the average annual default rate of leveraged buyouts is as low as 1.2%.

3.1.2. Governance Engineering

In addition to the disciplining effects introduced by leverage, private equity firms employ a variety of governance mechanisms to mitigate agency problems. Following a buyout, the private equity firm often requires the management to make a significant investment in the company and also implements a compensation system that is more closely linked to the performance of the company (Jensen, 1989). The compensation often takes the form of an equity ratchet that increases management's equity stake when meeting specified performance goals. By linking compensation to performance, private equity firms align the interests of management with the interests of the shareholders. Beroutsos, et al. (2007) argue that this is the single most important source of value creation in private equity.

Kaplan (1989b) finds that the equity stake of management increases by a factor of four in US public-to-private buyouts. In a study of 59 buyouts in the United Kingdom during the period 1997-2004, Acharya, et al. (2013) find that the median chief executive officer receives 6% of equity in the company and that the median management as a whole receives 15% of equity. Kaplan and Strömberg (2009) find similar results in their study of 43 buyouts in the United States during the period 1996-2004. They find that the median chief executive officer receives 5.4% of equity in the company while the median management as a whole receives 16% of equity. Berg and Gottschalg (2003) also find that private equity firms have a better ability to identify and replace underperforming management, which in turn enable them to improve the operational performance of the acquisition and create firm value.

Since the private equity boom of the 1980s, public companies have also adopted stock- and option-based compensation systems similar to those of private equity firms. However, the equity stake held by management remains greater in buyouts than in public companies (Kaplan & Strömberg, 2009).

While a significant equity stake creates strong incentives for management to make decisions that benefit the owners of the company, there might be drawbacks with a too

high equity stake. With a large portion of their own wealth invested in the company, management might be overly cautious when pursuing investment opportunities. In other words, a large equity stake might increase the risk aversion of managers (Holthausen & Larcker, 1996).

3.1.3. Operational Engineering

In addition to financial and governance engineering, private equity firms have in recent years adopted what Kaplan and Strömberg (2009) refer to as operational engineering, i.e. actively seeking to improve the operations of the buyout company. Accordingly, private equity firm usually implement significant cost reduction programs and organisational restructuring in conjunction with the buyout (Muscarella & Vetsuypens, 1990).

Many large private equity firms today have industry-specialised teams and some firms have made the conscious decision to focus on only a selected few industry sectors. To successfully restructure buyout companies, private equity firms are today recruiting senior industry executives or employing advisory boards. Although research on this topic is relatively scarce, there is evidence that a focus on industrial expertise pays off. Cressy, et al. (2007) investigate a large sample of buyouts in the United Kingdom and conclude that private equity firms with a high degree of industry specialisation are superior at creating value in their portfolio companies.

3.2. The Impact of Management Ownership

In a buyout, the private equity firm usually requires senior management to invest a significant share of their wealth in the company. As mentioned above, this is an effort by the private equity firm to realign the incentives of management and reduce agency costs. It further ensures that management faces a considerable downside risk if the company performs poorly, since they can effectively lose their entire investment.

Several international studies find that these incentives do seem to be effective. Thompson, et al. (1992) examine 31 divisional MBOs in the United Kingdom and find that management ownership has a large positive effect on excess return on capital. Phan and Hill (1995) find that management ownership increases focus on efficiency and limits wasteful spending in buyout companies. The authors support this claim by studying 214 buyouts in the United States during the period 1986-1989 and find that management

ownership has a positive impact on operating efficiency and performance during the first three and five years following the buyout.

Nikoskelainen and Wright (2007) examine a sample of 321 buyouts in the United Kingdom and find that management ownership has a significant positive effect on the internal rate of return (IRR) of the buyout from entry year to exit year. This effect is particularly strong for large buyouts. Renneboog, et al. (2007) examine abnormal stock market returns following public-to-private buyout announcements and find that a low management ownership stake prior to the buyout is associated with higher abnormal returns. They argue that this reflects expectations of larger gains from incentive realignment following the buyout. Contradicting these results, Guo, et al. (2011) find no statistically significant evidence that an increased management ownership stake leads to increased operating performance in buyouts.

Sanders (2001) provide further nuance to the effects of management ownership by discovering large differences between direct ownership and other equity-based compensation. He concludes that companies with a high CEO ownership stake are far less likely to engage in acquisitions and divestitures. Conversely, granting stock options induces management to take greater risks and aggressively pursue acquisitions and divestitures.

There are currently few studies on buyouts in Sweden that examine the effects of management ownership. Bergström, et al. (2007) examine determinants of operating performance for a sample of 73 buyouts occurring in Sweden during the period 1993-2005, but find no evidence of performance gains attributable to increased management ownership.

3.3. MBOs versus Other Buyouts

Previous research on the heterogeneity of different categories of buyouts is scarce. In academia, the prevailing notion is that the MBO might, in some respects, be a superior form of buyout. Cumming, et al. (2007) articulate this in their synthesis on the existing buyout literature, stating that there is *“a general consensus across different methodologies, measures and time periods regarding a key stylized fact: LBOs and especially MBOs enhance performance and have a salient effect on work practices.”*

3.3.1. Performance and Value Creation

While the effects of incentive realignment and reduced agency costs are captured by the literature focusing on management ownership, the explanation for differences in performance across categories of buyouts is not examined to the same extent. Wright, et al. (2001) argue that in MBOs, the incumbent management is motivated by entrepreneurial opportunities that could not be pursued under the previous owners. Moreover, they argue that MBOs are better suited for pursuing entrepreneurial opportunities than outsider-driven buyouts. Meuleman, et al. (2009) also argue that entrepreneurial opportunities is an important driver of buyouts.

Another strand of literature discusses undervaluation of the target company as a major reason for MBOs. The incumbent management might have private information about the company not available to the shareholders. In such a scenario, management has a strong incentive to participate in a buyout if they believe that the price paid will be lower than the actual value of the company (Weir, et al., 2005). Studies on this topic invariably focus on public-to-private buyouts, due to difficulties in determining information asymmetries in private companies. Nevertheless, this undervaluation hypothesis can easily be applied to private companies as well.

Previous studies that disaggregate buyouts by management participation support the notion that MBOs are superior to other buyouts. Lichtenberg and Siegel (1991) examine productivity at 1,100 manufacturing plants in the United States involved in buyouts during the period 1981-1986 and find that MBOs lead to substantially higher productivity growth than other buyouts. Renneboog, et al. (2007) examine public-to-private MBOs, MBIs and IBOs and find that pre-buyout undervaluation has a positive effect on excess returns, with the effect being strongest for MBOs and weakest for MBIs. Hence, they argue that MBOs are superior to other categories of buyouts at exploiting undervaluation due to information asymmetries. Nikoskelainen and Wright (2007) find that MBOs have a positive impact on IRR from entry year to exit year in comparison to externally initiated buyouts such as IBOs and MBIs. These findings are somewhat contradicted by Goossens, et al. (2008). In their study of 167 buyouts in Belgium, they find no significant differences between private equity-backed MBOs and other private equity buyouts.

3.3.2. Employment Effects

During the first buyout wave in the 1980s, lower wages and reductions in the workforce were important components of the operational changes carried out by private equity firms. For instance, Kaplan (1989b) and Lichtenberg and Siegel (1991) find that buyouts undertaken during the 1980s have a negative effect on employment and wages. However, more recent studies indicate that this might no longer be true.

Boucly, et al. (2011) show that buyouts have a positive effect on employment, particularly in companies that are cash constrained prior to the buyout. Bruining, et al. (2005) examine a large sample of MBOs in the Netherlands and the United Kingdom. They find that MBOs result in higher levels of employment, employee empowerment and wages. Amess, et al. (2007) find that employees in MBOs in the United Kingdom have more discretion over their work practices than in comparable companies. Moreover, they find that high-skilled employees have less supervision in MBOs.

Compelling evidence that MBOs might lead to higher employee growth than other buyouts is provided by Amess and Wright (2007). They argue that management teams participating in MBOs are more focused on employee preservation to maintain employee commitment and loyalty. In order to test their hypotheses, they examine 1,340 buyouts in the United Kingdom and find that employee growth is 0.51 percentage points higher for MBOs after the ownership change. Outsider-driven buyouts, on the other hand, experience employee reductions of 0.81 percentage points following the buyout.

Research on buyouts in Sweden and their effect on employment and work practices have so far shown inconclusive results. For instance, Bergström, et al. (2007) find no evidence of increases or reductions in the number of employees following a buyout. Gulliksen, et al. (2008) find that Nordic buyout companies experience higher employee growth than peers. In a recent study, Olsson and Tåg (2012) examine 322 buyouts in Sweden during the period 1994-2004 and find that buyouts do not lead to neither an increase nor a decrease in the number of employees. However, they do find that the risk of becoming unemployed is lower for employees in buyout companies than in comparable companies.

4. Hypotheses

This section outlines the hypotheses that will be investigated. The hypotheses have been formulated based on the theories and empirical findings presented in the previous sections and aim to examine the effects of MBOs and management ownership on operating performance and employment.

4.1. Hypothesis I: Operating Performance in MBOs

Part of the purpose of this paper is to understand whether MBOs are superior at improving company performance compared to other categories of buyouts. While previous research on the differences between MBOs and outsider-driven buyouts such as IBOs is scarce, the prevalent notion is that several differences exist. Firstly, management teams that choose to participate in an MBO might have private information not available to the existing shareholders of the company. This is known as the undervaluation hypothesis (Weir, et al., 2005). Secondly, management teams who participate in buyouts might be more entrepreneurial and therefore more prone to develop the company following the buyout (Wright, et al., 2001). Hence, the case can be made that companies acquired through an MBO should perform better in comparison to other categories of buyouts. To test these claims, the following hypotheses have been formulated:

H1: MBOs generate higher abnormal operating performance than other private equity buyouts

H1 a: MBOs generate larger improvements in profitability than other buyouts

H1 b: MBOs generate higher sales growth than other buyouts

4.2. Hypothesis II: Operating Performance and Management Ownership

Management ownership has long been recognised as an important tool to align management's interests with those of the shareholders (Jensen, 1989). Its value lies in the fact that it mitigates the fundamental conflict between shareholders who bear the risk and management who manage the risk. Beroutsos, et al. (2007) argue that management ownership is the single most important source of value creation in private equity. While there is no consensus on the optimal stake of management ownership, it is generally accepted that a higher equity stake gives management more incentives to improve

company performance (Jensen, 1989). To assess whether these arguments hold true in recent buyouts in Sweden, the following hypotheses have been formulated:

H2: Larger management ownership yields higher operating performance in buyout companies

H2 a: Larger management ownership improves profitability in buyout companies

H2 b: Larger management ownership increases sales growth in buyout companies

4.3. Hypothesis III: Employee Growth in MBOs

Recently, evidence has emerged that buyouts have a positive impact on employment in the target companies. In addition, there are compelling reasons to believe that MBOs in particular are associated with more employee friendly policies. The incumbent management might be less likely to lay off employees than an external management team. Since MBOs are also expected to perform better, it is reasonable to believe that this has a positive effect on employee growth. To find out whether these arguments hold for the buyouts included in this study, the following hypothesis has been formulated:

H3: MBOs generate higher employee growth than other private equity buyouts

5. Methodology

In this section, the methodology is outlined and discussed. This section begins with a description of the operating metrics used to measure performance and the rationale underlying their design. Subsequently, the design of event windows and benchmark peer groups are described. The section concludes with the regression models used to evaluate the hypotheses introduced in section 4.

5.1. Operating Metrics

Previous studies have used three broad approaches to measure value creation in buyouts: stock market returns following the buyout announcement, the internal rate of return on the investment, and changes in firm-level accounting measures. The first two are not particularly useful for this study since (1) only a small minority of buyouts target publicly traded companies and (2) purchase and selling amounts are not always disclosed. Therefore, in line with Bergström, et al. (2007); Gulliksen, et al. (2008); Jääskeläinen (2011) and other recent studies on buyouts in the Nordic countries, this study will use changes in certain operating metrics as measures of value creation.

The choice and design of operating metrics when assessing operational performance is thoroughly evaluated by Barber and Lyon (1996). They favour using measures of operating income rather than earnings for two reasons. Firstly, operating income is unaffected by interest expenses, tax rates and other special items. As such, it provides the best measure for comparing companies with different capital structures and across industries. Secondly, events like buyouts are associated with significant changes in capital structure that can heavily affect earnings, but does not impact operating income. Barber and Lyon (1996) also show that the chosen operating measure must be scaled using total assets or sales, in order to be comparable across companies.

Subsequently, a choice needs to be made between using a level measure of operating performance or the change over a period of time. This study uses the change over two different time periods: the three years following the buyout and the period from entry to exit. This is preferable to a level measure for two reasons. Firstly, Barber and Lyon (1996) find that changes in performance produces more powerful test statistics than using level measures. Secondly, it is the most widely used approach and therefore provides the best comparability with previous studies.

5.1.1. EBITDA Margin

Nearly all comparable studies such as Bergström, et al. (2007); Gulliksen, et al. (2008) and Jääskeläinen (2011) employ earnings before interest, taxes, depreciation and amortisation (EBITDA) as the main operating metric. The main benefit of this measure is that it is unaffected by interest expenses, tax rates, depreciation and special items such as impairment of goodwill. As such, it provides the best measure for comparing companies with different capital structures and composition of assets. Moreover, it is also the best proxy of actual cash flow that is widely available in databases and financial disclosures. Because of these traits, EBITDA is also widely used by private equity firms to value target companies, making it highly relevant as a measure of value creation (Bergström, et al., 2007). In line with previous studies and the recommendations by Barber and Lyon (1996), the EBITDA is scaled by sales to provide direct comparability across companies. Henceforth, EBITDA/sales will be used interchangeably with the term EBITDA margin¹.

5.1.2. ROA

Another widely used metric is the return on assets (ROA). Barber and Lyon (1996) recognise ROA as one of the most powerful metrics for measuring operating improvement. ROA is defined as the operating income scaled by total assets. As such, it is a good proxy for how efficiently the assets of the company are used to create value. In contrast to the EBITDA margin, it also takes into account improvements in working capital as well as depreciation of assets. The most appropriate measure of ROA uses the assets from the previous year to calculate the ratio. However, since pre-buyout data is unavailable for a large number of buyouts, constructing this measure using lagged assets would significantly reduce the number of observations. For this reason, the assets for the current year are used to calculate ROA.

5.1.3. Sales Growth

In terms of value, sales growth creates value insofar that it is a driver of operating profits. For this reason, sales growth is seen as an important indicator of company performance in buyouts. However, caution should be taken when drawing conclusions from this measure. Many buyout companies pursue add-on acquisition as part of their growth

¹ Full definitions of the financial ratios used in this study are supplied in Appendix A

strategy. In this paper, no adjustments for acquisitions are made for two reasons. Firstly, growth through acquisitions is an important strategic choice faced by managers, measuring differences in unadjusted growth figures is therefore highly relevant for the topic of this paper. Secondly, it is virtually impossible to reliably disentangle acquisitive growth from organic growth, given the prevailing reporting requirements.

5.2. Event Window

In this study, two different event windows are used to measure change in operating performance. The first is a simple three-year period, occurring between the entry year t and year $t+3$. A similar event window is used in several previous studies such as Bergström, et al. (2007) and Emtemark and Olsson (2011). This period is highly relevant as several studies have shown that substantial improvements in operating performance occur within three years of the buyout. For example, Kaplan (1989b) reports improvements of 45.5%, 72.5% and 28.3% in industry-adjusted cash flow/sales during the first three years following a buyout. Additional studies (e.g. Cao and Lerner, 2009; Adler and Norberg, 2012) find that the median holding period for private equity firms is between three and four years.

The second event window is defined as the entry year to the exit year, henceforth referred to as the holding period. Using the entire holding period ensures that all operational improvements carried out by the private equity firm are accounted for. This period is also important due to the J-curve effect discovered by Burgel (2000). Contrary to some studies, Burgel (2000) finds that buyouts tend to underperform in the early phase of the investment cycle, while yielding high positive returns and cash flows in the later stages, hence the expression J-curve.

The entry year was selected as the benchmark year due to a lack of reliable data prior to the buyout for a large number of observations. In many cases, the buyout company is a division of another company or formed through a merger of two or more companies. In these cases, consolidated accounting data is not available prior to the entry year. Using the pre-buyout year would therefore at best reduce the sample size significantly or even produce unreliable results. Some previous studies (e.g. Emtemark and Olsson, 2011) use a six-month cut-off to assign the entry year. However, during the buyout year the transfer

of ownership sometimes entails that consolidated accounts are only available for parts of the year. Therefore, this study does not use an arbitrary six-month threshold, but the first reporting year with twelve-month financials following the buyout. In most cases, this is analogous to the buyout calendar year and in some cases the following year. The exit year is defined as the last available reporting year when the private equity firm owned the company during at least part of the year. Obviously, there will be a lag between the buyout and exit dates and the actual reporting dates. However, since data is unavailable for fractions of years, a more detailed approach is unfeasible.

5.3. Peer Group Design

Since the purpose of this study is to measure the determinants of excess performance following buyouts, an appropriate benchmark is required to isolate the excess performance resulting from the buyout event. Barber and Lyon (1996) evaluate various designs of peer groups as the benchmark and come to three relevant conclusions. Firstly, analysing changes in operating performance relative to the median of companies in the same industry produces test statistics that are well specified and powerful. Secondly, for small companies with abnormal pre-event performance, it is desirable to also match on asset size and pre-event performance. Thirdly, peer groups should be held constant during the entire event window.

In this study, peer group matching has been based on industry and geography. Each buyout company is assigned a peer group consisting of the 20 largest, in terms of revenue, Nordic companies with the same two-digit NACE² code. The reason for not using a more detailed, four-digit industry code matching is twofold. Firstly, in many cases there are less than 20 companies operating in any given industry. Secondly, Barber and Lyon (1996) find that matching on four-digit industry codes provides no improvement in explanatory power compared to two-digit matching. Nordic companies are used since most sample companies have pan-Nordic operations. Moreover, limiting the peer group geography to Sweden would have yielded significantly fewer peers. When constructing the peer groups, private equity-owned companies as well as companies included in the sample of buyouts were systematically excluded.

² Nomenclature Generale des Activites Economique dans l'Union Europeenne

Since this study only uses peers that have available financials during the entire study period, there is a risk for survivorship bias, which would lead to an overestimation of industry performance and consequently an underestimation of the excess performance of buyouts. This is mitigated by the large number of peers in each group, which should produce a fairly unbiased proxy for industry performance during the sample period. Bergström, et al. (2007) also make the argument that the largest companies operate closer to a steady state and therefore serve as the most useful benchmark. Another potential problem raised by Jääskeläinen (2011) is that some companies in the peer groups are local subsidiaries of international companies. Whether or not this introduces any biases is unclear, but the effect is likely small.

5.4. Determinants of Changes in Operating Performance

To measure performance changes, previous studies either look at the compounded annual growth rate (CAGR) or a simple percentage point change between two years. The choice of method depends on the performance measure in question. For ratios such as the EBITDA margin and ROA, which may take negative values, any observation where the ratio has changed sign between periods will be nonsensical if the CAGR method is used. Therefore, the percentage point change between the first and last year in the event window is used. Unadjusted performance change is thus calculated by taking the difference between the performance in year t and the benchmark year $t=0$, for each company i :

$$\Delta P_{i,0+t} = P_{i,0+t} - P_{i,0}$$

The adjusted performance change is calculated as the actual performance change subtracted by the expected performance change:

$$\Delta AP_{i,0+t} = \Delta P_{i,0+t} - E(\Delta P_{i,0+t}) \rightarrow \Delta AP_{i,0+t} = P_{i,0+t} - P_{i,0} - (PG_{i,0+t} - PG_{i,0})$$

As previously mentioned, the expected performance equals the median change in performance of the relevant peer group (PG).

For absolute measures such as sales or number of employees, the CAGR from the first to the last year in the event window will be used instead. The unadjusted change in performance is then calculated by:

$$\Delta P_{i,0+t} = \left(\frac{P_{i,0+t}}{P_{i,0}} \right)^{1/t} - 1$$

Accordingly, the adjusted performance change is calculated by subtracting the expected performance change, i.e. that of the peer group:

$$\Delta AP_{i,0+t} = \Delta P_{i,0+t} - E(\Delta P_{i,0+t}) \rightarrow \Delta AP_{i,0+t} = \left[\left(\frac{P_{i,0+t}}{P_{i,0}} \right)^{1/t} - 1 \right] - \left[\left(\frac{P_{G_{i,0+t}}}{P_{G_{i,0}}} \right)^{1/t} - 1 \right]$$

5.5. Regression Models

To assess the determinants of operating performance, ordinary least-squares (OLS) regressions are performed. The independent variables are the adjusted changes in operating performance during the two event windows:

$$\Delta P = \alpha + \beta_1 MBO + \beta_2 Stake + \beta_3 Size + \beta_4 Leverage + \beta_5 SBO + \beta_6 Employee + \beta_7 Exit + Year + \varepsilon$$

The main variables of interest for this study are *MBO* and *Stake*. *MBO* is a dummy variable taking the value 1 if the buyout is classified as an MBO and 0 otherwise. *Stake* is the fraction of total equity held by the management.

To isolate the effects of MBOs and management ownership, it is important to control for additional factors that might influence operating performance. Therefore, a number of control variables are included in the regression model. The variable *Size* is the logarithm of total assets in the entry year and is used as a proxy for company size, ensuring that performance differences between small and large companies are accounted for. *Leverage* is the ratio of net debt to total assets in the entry year and is included in accordance with the theory that debt might have a disciplining effect on management, thus affecting performance.

Jääskeläinen (2011) finds evidence that secondary buyouts perform differently from other buyouts. For this reason, the model includes the variable *SBO*, a dummy variable taking

the value 1 if the company has been acquired from another private equity firm and 0 otherwise. The variable *Employee* is the industry-adjusted CAGR in number of employees during the event window. It is included since previous literature on private equity have emphasised changes in employment policies as a value driver in buyouts. *Exit* is a dummy variable taking the value 1 if the company has been sold during the period (only applicable in the three-year event window) and 0 otherwise. Since the general economic climate has undergone dramatic changes during the sample period, all regressions are estimated using year fixed effects, denoted by *Year*.

In order to assess whether MBOs have a positive effect on employee growth, the same approach as above is used. OLS regressions are run with industry-adjusted employee CAGR as the dependent variable:

$$\Delta Emp = \alpha + \beta_1 MBO + \beta_2 Stake + \beta_3 Size + \beta_4 Leverage + \beta_5 SBO + \beta_5 Sales + \beta_6 Exit + Year + \varepsilon$$

The model is almost identical to the one used to investigate operating performance, since factors explaining operating performance likely carries explanatory power for employee growth as well. For instance, a high leverage imposes spending discipline on management, which might discourage hiring. Company size might affect employment through stability of business or bargaining power with unions (Amess, et al., 2007). Due to the high correlation between sales growth and employee growth found by Emtemark and Olsson (2011), industry-adjusted sales CAGR is included as an explanatory variable.

Before running the regressions, any nonsensical and obviously erroneous observations are eliminated from the dataset. To avoid extreme values having a disproportionate effect on the results, all continuous variables are winsorized at the 5th and 95th percentiles. All regressions are estimated using heteroskedasticity-consistent standard errors. Once the results are obtained, a number of robustness tests will also be carried out to examine the strength of the results. These are further detailed in section 7.

6. Data

This section provides a description of the data used to test the hypotheses. A general overview of the data is provided and the sources are detailed and discussed. This section also discusses potential issues in the dataset and their implications for the analysis.

6.1. Buyout Sample

To compile a list of relevant buyouts, several sources have been used. The primary source is MergerMarket, a global database covering all corporate mergers and acquisitions larger than 5 million USD going back to 1998. The main advantage of this database pertaining to this study is that it includes information on the shares acquired by different investors, where publicly disclosed. In order to complement the transaction list, Capital IQ, Zephyr and the websites of Swedish and international private equity firms were used. By relying on multiple sources, rather than looking solely at transactions listed on the websites of private equity firms, biases due to selective reporting were avoided. Since the focus of this paper is buyouts, venture capital investments were systematically excluded³.

The time period was defined to include buyouts during the period 2002-2008⁴. This period was selected for two reasons. Firstly, the databases used to gather accounting data only offer reliable information dating back ten years. Secondly, at least three years of financial data after the buyout was required to conduct the analysis. The final transaction sample included 174 buyouts. In a few cases, the same company has been the target in several transactions and is therefore included more than once.

The buyout category was systematically determined by going through press releases, news articles, annual reports and the websites of private equity firms. In all but a few cases, the buyout could be reliably classified as either an MBO or an IBO. Buyouts were classified as MBOs if they met the following two criteria:

- 1. The press release or equivalent stated that the transaction was an MBO.*
- 2. The incumbent management significantly increased its ownership stake in the company in conjunction with the buyout.*

³ Transactions in which the stated purpose was to provide growth capital or equivalent

⁴ For buyouts taking place in 2002, the entry year was set to 2003 due to availability of financial information

Conversely, the buyout was classified as an IBO if the incumbent management did not acquire a stake, held on to an existing stake or even reduced its stake in the company. It should be noted that the IBOs include several transactions in which an outside management team has been brought in, hence making it an MBI. However, since IBOs and MBIs are both outsider-driven transactions, they are grouped together for the purpose of this study. Companies that could not be reliably classified were excluded from the sample. A small number of transactions were classified as BIMBOs. However, due to the small sample of such transactions (<5), these were excluded from the study as well.

The same methodology was used to determine the proportion of total equity held by the management. Although disclosure of ownership stakes is voluntary, data could be obtained for most transactions by carefully examining annual reports, press releases, news articles and company websites. When determining the management ownership stake, equity-based incentive programs such as stock option programs are not accounted for. The decision to exclude these follows Sanders (2001), who finds that the incentives created by equity ownership and option-like compensation are very different. Bergström, et al. (2007) also note difficulties in reliably measuring the implied equity stake included in these kinds of compensation packages. For these reasons, only direct equity ownership is considered in this study. Table 1 displays summary statistics for management ownership in the sample companies.

Table 1: Management Equity Ownership (% of Total Equity)

	N	5%	95%	Median	Mean
Management ownership	146	0.0%	40.0%	4.0%	10.0%

The equity stake held by management varies considerably across the sample companies, with the median stake being 4% of total equity. In many cases, the stake is considerably higher with several observations between 30% and 49%.

After excluding transactions that could not be classified and for which financial data could not be obtained, the sample consists of 161 buyouts performed during the period 2002-2008. The management ownership stake was obtained for 146 of these companies. The sample is similar in size to several other recent studies on Nordic private equity (e.g. Jääskeläinen, 2011; Emtemark & Olsson, 2011) and twice as large as the sample used by

Bergström, et al. (2007). Figure 2 provides a description of the sample companies by buyout type, investment year and exit year (if applicable).

Figure 2: Annual Distribution of Entries and Exits

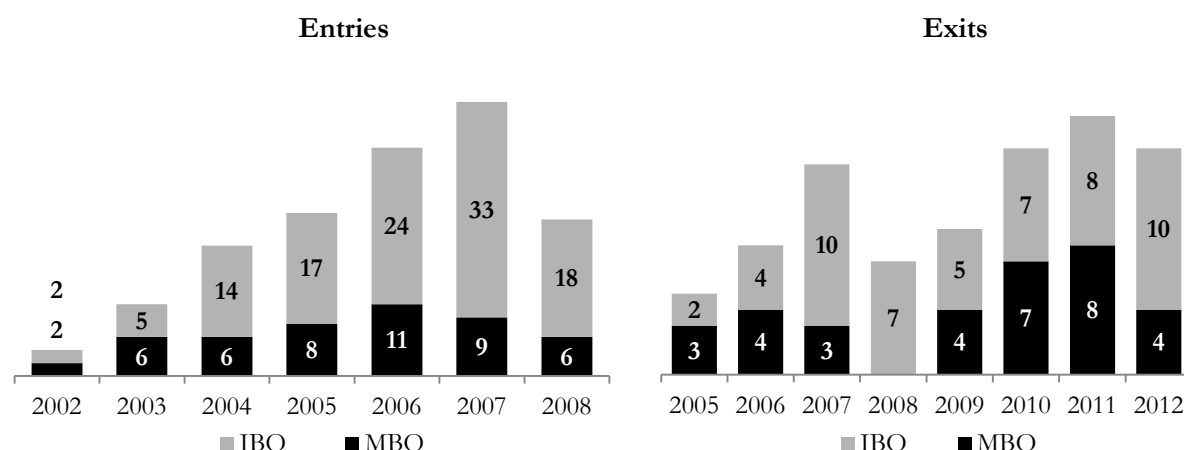


Figure 2 displays the distribution of buyouts with respect to the buyout year and exit year, if applicable. The years denote actual calendar years.

As illustrated in Figure 2, there is a marked increase in the number of buyouts during the period 2002-2007. In 2008, the American subprime mortgage crisis had a profound impact on the private equity industry with a sharp drop in the number of buyouts. Out of the full sample, 48 buyouts are classified as MBOs while the remaining transactions are classified as IBOs. The sample includes companies that have been exited by the private equity firm as well as currently held portfolio companies. In total, 86 companies have been exited while 75 have not.

The relatively large proportion of unrealised investments could pose a problem since the restructuring actions imposed by the private equity firm have not been completed. However, the market for mergers and acquisitions has been severely impacted by the financial crises in recent years. It is therefore likely that the large proportion of unrealised investments is attributable to the general economic climate, rather than incomplete restructuring efforts. To ascertain whether exited and currently held companies differ, the hypotheses will be tested using both the full sample as well as the subsample of exited companies.

6.2. Accounting Data

Under Swedish law, all limited liability companies are required to file annual reports, making it relatively easy to obtain accounting data for the selected companies. The publicly available data goes back at least ten years or to the founding of the company. This also includes bankrupt or inactive companies, reducing the risk of survivorship bias in the buyout sample. Accounting data was obtained using Retriever, a database containing financial information on all Swedish companies dating back to 2003. Missing information was supplemented using the databases Affärsdata and Orbis.

The data required to calculate the operating metrics are sales, EBITDA, operating profit and total assets. The number of employees was also collected. In order to construct a measure of leverage, the net debt of the company was used. The net debt is defined as the sum of interest-bearing liabilities subtracted by cash and cash equivalents. The accounting data was obtained from consolidated statements. This is particularly important for balance sheet figures, since the capital structure is only representative at the consolidated level. Table 2 displays summary statistics of operating metrics for the full sample of buyout companies.

Table 2: Unadjusted Operating Metrics, Entry Year

	N	5%	95%	Median	Mean
Sales	161	78,410	5,743,252	527,303	1,481,205
<i>EBITDA margin</i>	<i>161</i>	<i>-2.1%</i>	<i>24.2%</i>	<i>8.9%</i>	<i>9.2%</i>
Total assets	161	53,049	10,255,000	482,120	2,071,461
<i>ROA</i>	<i>161</i>	<i>-8.4%</i>	<i>23.6%</i>	<i>4.4%</i>	<i>5.4%</i>
<i>Net Debt / Total Assets</i>	<i>161</i>	<i>-25.8%</i>	<i>60.9%</i>	<i>20.4%</i>	<i>17.9%</i>
No. of employees	159	31	4,436	253	996

Table 2 displays unadjusted operating metrics for the full sample of buyout companies. The table shows number of observations (N), the 5th and 95th percentiles as well as the medians and averages. All figures are from the entry year. Financials are denoted in SEK.

The table shows a large dispersion in the buyout sample, both in terms of size, profitability and leverage. The average of sales and total assets are quite different from the median, due to the presence of a few very large buyouts. For the profitability ratios, the medians and averages are fairly close, as is the case with the leverage. It is somewhat surprising that the median leverage ratio is fairly low, approximately 20%. Gulliksen, et al. (2008) also make this observation in their dataset and attributes this to the complex

financing schemes employed by private equity firms. The common definition of net debt might therefore not give a fully accurate picture of debt levels in buyout companies.

The sample of buyouts is also spread across a variety of industries. Table 3 displays the distribution of the buyout companies by NACE main industry sector.

Table 3: Buyout Sample Distribution by Industry

NACE Rev. 2 main sector	No. of observations	% of total sample
Manufacturing	67	42%
Wholesale and retail trade	43	27%
Information and communication	14	9%
Professional, scientific and technical activities	9	6%
Human health and social work activities	9	6%
Administrative and support service activities	6	4%
Construction	3	2%
Transportation and storage	3	2%
Accommodation and food service activities	2	1%
Arts, entertainment and recreation	2	1%
Financial and insurance activities	1	1%
Real estate activities	1	1%
Education	1	1%
Total	161	100%

As Table 3 shows, the buyout sample covers 13 of the 21 NACE main sectors, with the majority of companies belonging to either *Manufacturing* or *Wholesale and Retail Trade*. As previously mentioned, the NACE system was used to assign peer groups to each buyout company in the sample. The peer group data was obtained from Orbis in line with the approach employed by Bergström, et al. (2007), using two-digit NACE industry codes. Data obtained for the peer groups comprises the same operational metrics as in the sample of buyout companies.

6.3. Treatment of Outliers and Missing Values

Since the accounting data has been assembled from third-party databases and sometimes by combining financials from different legal entities, there are a small number of missing or nonsensical figures in the dataset. In these cases, the entire company has not been discarded from the sample, but the individual data point has been removed. Hence, the number of observations in the regression models varies slightly across different operating metrics.

7. Results and Analysis

In this section, the sample of buyouts is analysed to determine the drivers of operating performance. The section begins with a description of the adjusted performance change in the buyout companies. Subsequently, the results from the regressions used to test hypotheses 1-3 are presented and analysed, followed by a discussion on robustness checks. The section concludes with an overview of remaining concerns in interpreting the results.

7.1. Summary Statistics

Recent studies on buyouts in the Nordic countries have shown that buyout companies tend to outperform relative to peer groups (e.g. Jääskeläinen, 2011; Adler & Norberg, 2012). Table 4 reports adjusted and unadjusted changes in operating performance for the sample of buyouts used in this study⁵.

Table 4: Changes in Operating Performance and Employment

	Full sample		Exited sample			
	(3 years)		(3 years)		(Entry-Exit)	
	Raw	Adjusted	Raw	Adjusted	Raw	Adjusted
Operating performance						
ΔEBITDA Margin	-1.03%	-1.05%	0.13%	-0.40%	0.41%	0.00%
ΔROA	-0.39%	0.32%	-0.89%	-0.78%	0.30%	0.84%
Sales CAGR	8.39%	3.48%	8.54%	2.80%	6.09%	0.68%
Employment						
Employee CAGR	4.77%	2.92%	4.36%	1.83%	4.38%	2.29%

Table 4 displays the average change in operating performance and employment. Raw changes are not adjusted for peer groups. EBITDA Margin and ROA are percentage points. The changes are displayed for the three years following the entry year and the period from entry to exit. The full sample constitutes all 161 buyouts included in the study. The exited sample comprises the 85 companies that have been exited by the private equity firm.

It seems evident that the buyout companies have higher sales growth than their peers. This reinforces the notion that an important strategy for private equity firms is to grow the portfolio companies. It also supports the findings of Jääskeläinen (2011), although the magnitude of the abnormal sales growth is smaller in this study. Looking at the profitability ratios, the full sample of buyouts seems to underperform somewhat during the first three years following the buyout. Although this contradicts some earlier studies, it lends support to the J-curve effect discovered by Brugel (2000). Looking at the full holding period, the results are quite different as the change in adjusted and unadjusted EBITDA margin are both slightly positive. The change in ROA is also positive when

⁵ For a more detailed comparison of the buyout sample versus peer groups, see Appendix B

looking at the entire holding period. Employee CAGR is 2.2 – 2.6 percentage points higher in buyout companies than in peer groups. These figures are very similar to those obtained by Gulliksen, et al. (2008) who find that buyout companies have a 2.4 percentage point higher employee growth than peers.

7.2. Determinants of Operating Performance

In order to test hypotheses 1-2, multivariate OLS regressions are used on the adjusted performance metrics. The analysis is carried out on both the full buyout sample as well as the subsample of exited companies. Table 5 displays the results of cross-sectional regressions using the full buyout sample, with adjusted performance changes as the dependent variable.

Table 5: Regressions for Operating Performance – Full Sample

	(1) Δ EBITDA Margin (3 years)	(2) Δ ROA (3 years)	(3) Sales CAGR (3 years)
MBO dummy	-0.006 (0.640)	-0.012 (0.563)	-0.026 (0.180)
Management stake	0.082* (0.067)	0.108* (0.076)	-0.073 (0.222)
Size	0.008 (0.116)	0.001 (0.852)	0.001 (0.909)
Leverage	-0.025 (0.420)	-0.004 (0.921)	0.005 (0.906)
SBO dummy	0.009 (0.568)	0.026 (0.254)	0.057*** (0.008)
Employee CAGR	0.046 (0.455)	0.001 (0.990)	0.692*** (0.000)
Exit dummy	0.032** (0.015)	0.026 (0.186)	0.019 (0.299)
Constant	-0.225*** (0.006)	-0.077 (0.468)	-0.013 (0.869)
No. of obs.	136	135	136
R-square	0.136	0.109	0.485

Table 5 reports the coefficients and p-values (parentheses) from multivariate OLS regressions for adjusted changes in operating performance during the first three years after the buyout. In specification (1) and (2), the dependent variable is the percentage point change of each measure during the period. In specification (3), the dependent variable is the cumulative annual growth rate (CAGR) over the period. All continuous variables are winsorized at the 5th and 95th percentiles. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively. Regressions have been run using heteroskedasticity-consistent standard errors and year fixed effects (omitted in the table).

The regressions show that, for the three-year period following the buyout, companies with a high management ownership stake do seem to perform better. For a 1 percentage

point increase in management ownership, EBITDA margin and ROA increases by approximately 0.08 and 0.1 percentage points, respectively. The coefficients are both significant below the 8% level. For this sample, profitability does not seem to be impacted by the *MBO* dummy, since the coefficients are highly insignificant. The regression on sales CAGR reveals no significance for *MBO* or management ownership. Even so, it is interesting to note that the coefficients are negative, contrary to the hypotheses. Another interesting observation is that the *SBO* dummy has a positive effect on sales CAGR, with significance at the 1% level. As expected, employee CAGR and sales CAGR are highly correlated with each other.

Table 6 presents the results of the same cross-sectional regressions as above, but for the subsample of exited companies. In addition to the three-year period, the regressions have also been run using the period from the entry year to the exit year.

Table 6: Regressions for Operating Performance – Exited Sample

	(1) Δ EBITDA Margin (3 years)	(2) Δ EBITDA Margin (entry - exit)	(3) Δ ROA (3 years)	(4) Δ ROA (entry-exit)	(5) Sales CAGR (3 years)	(6) Sales CAGR (entry-exit)
MBO dummy	-0.014 (0.462)	0.036** (0.023)	-0.017 (0.591)	0.045* (0.069)	-0.026 (0.298)	0.048* (0.066)
Management stake	0.104* (0.055)	0.024 (0.709)	0.168* (0.063)	0.035 (0.740)	-0.156* (0.084)	-0.063 (0.548)
Size	0.013* (0.084)	0.003 (0.613)	0.004 (0.708)	0.005 (0.630)	0.008 (0.424)	0.001 (0.956)
Leverage	-0.032 (0.443)	-0.011 (0.722)	-0.048 (0.431)	-0.003 (0.959)	-0.091* (0.074)	-0.072 (0.262)
SBO dummy	0.015 (0.544)	0.018 (0.320)	0.031 (0.413)	0.015 (0.656)	0.094** (0.012)	0.064 (0.111)
Employee CAGR	-0.029 (0.749)	0.158** (0.017)	-0.067 (0.626)	0.181 (0.149)	0.785*** (0.000)	0.830*** (0.000)
Exit dummy	0.019 (0.360)	- -	0.048 (0.151)	- -	0.018 (0.517)	- -
Constant	-0.300*** (0.007)	-0.075 (0.340)	-0.134 (0.420)	-0.081 (0.542)	-0.106 (0.398)	-0.095 (0.539)
No. of obs.	72	70	69	68	72	72
R-square	0.260	0.357	0.166	0.254	0.565	0.469

Table 6 reports the coefficients and p-values (parentheses) from multivariate OLS regressions for adjusted changes in operating performance. In specifications (1)-(4) the dependent variable is the percentage point change of each measure during the period. In specifications (5)-(6) the dependent variable is the cumulative annual growth rate (CAGR) over the period. All continuous variables are winsorized at the 5th and 95th percentiles. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively. Regressions have been run using heteroskedasticity-consistent standard errors and year fixed effects (omitted in the table).

For the three-year period, the results are to a large extent similar to those obtained for the full sample, although the predictive power of the models has increased. EBITDA margin and ROA are both positively impacted by a higher management ownership stake, with coefficients significant at the 4% and 6% levels, respectively. Company size seems to have a positive impact on EBITDA margin during the three-year period. It is also evident that management ownership has a negative impact on sales CAGR. In contrast to the full sample, the coefficient is now significant at the 9% level. The *SBO* variable remains significant in the regression on sales CAGR.

Looking at the period from entry to exit year, there are large differences in comparison to the three-year period. It seems that over the entire holding period, MBOs outperform comparable buyouts both in terms of profitability and growth, with significant positive coefficients. Management ownership, on the other hand, has no significant impact on the operating metrics over the entire holding period. As with the three-year period, SBOs seem to have a positive impact on sales growth, although it is not significant below the 10% level.

Overall, the results from the regressions suggest support for hypothesis 1a, since EBITDA margin, ROA and sales CAGR are all positively affected when the company is acquired in an MBO. The effect is only significant when considering the full holding period, but nonetheless support the hypothesis that MBOs have superior performance in comparison to other categories of buyouts. In line with Lichtenberg and Siegel's (1991) findings on operating efficiency, the management of MBOs seem to find ways to improve margins and utilise the company's assets more efficiently in order to create value. The findings also support the entrepreneurial motivations behind MBOs suggested by Wright, et al. (2001), since MBOs seem more prone to grow sales than comparable buyouts.

The evidence on management ownership and its impact on operating performance are similar to those observed for MBOs, lending support to hypothesis 2a. A higher management ownership stake positively affects profitability ratios during the first three years after the buyout. These results are in line with previous studies, such as Phan and Hill (1995) and Nikoskelainen and Wright (2007), who find that a higher management

ownership stake is an important source of value creation in private equity. Furthermore, it provides an interesting contrast to Bergström, et al. (2007) who fail to find any relationship between ownership and performance.

Contrary to hypothesis 2b, sales CAGR seems to be negatively correlated with management ownership. The coefficient for ownership stake is negative in all regressions, with significance in one out of three specifications. While these findings contradict some earlier studies, it lends support to the argument put forward by Holthauser and Larcker (1996) stating that a high management ownership stake might lead to increased risk aversion. It is also in line with the findings of Sanders (2001) regarding management's reluctance to carry out acquisitions when they own a significant equity stake in the company. Overall, the findings on the effects of management ownership suggests that a large ownership stake induces management to focus on improving operational efficiency rather than pursuing add-on acquisitions and growth.

Some additional observations are also worth mentioning. In line with the findings of Jääskeläinen (2011), SBOs seem to generate higher sales growth than other categories of buyouts. A plausible explanation is that the previous private equity owners have already implemented cost savings and other operational engineering to improve profitability. Hence, the best remaining way to create value is through expansion and/or add-on acquisitions.

The differences between the two event windows are also noteworthy. There are substantial differences in terms of significant variables between the three-year period and the entry-exit period. While the authors of this paper have no satisfying explanation for this, it might be a manifestation of the J-curve effect mentioned earlier (Burgel, 2000).

7.3. Determinants of Employee Growth

In order to examine hypothesis 3 covering the employment effect of MBOs, the same approach as above has been used. The result of multivariate regressions on employee growth is presented in Table 7.

Table 7: Regressions for Employee Growth

	<i>Full sample</i>	<i>Exited sample</i>	
	(1) Employee CAGR (3 years)	(2) Employee CAGR (3 years)	(3) Employee CAGR (entry-exit)
MBO dummy	0.005 (0.771)	0.016 (0.450)	-0.027 (0.233)
Management stake	0.069 (0.189)	0.151** (0.014)	0.123** (0.047)
Size	-0.006 (0.243)	-0.004 (0.655)	0.000 (0.950)
Leverage	0.030 (0.365)	0.067 (0.143)	0.095** (0.034)
SBO dummy	-0.022 (0.242)	-0.050* (0.086)	-0.050** (0.049)
Sales CAGR	0.547*** (0.000)	0.546*** (0.000)	0.501*** (0.000)
Exit dummy	-0.005 (0.727)	0.011 (0.594)	- -
Constant	0.111 (0.151)	0.034 (0.779)	0.076 (0.465)
Number of observations	136	72	72
R2	0.458	0.524	0.515

Table 7 reports the coefficients and p-values (parentheses) of multivariate OLS regressions for adjusted employee CAGR during the first three years after the buyout, as well as the entire holding period. In specification (1), the full sample of buyouts is used. In specifications (2)-(3), the subsample of exited companies is used. All continuous variables are winsorized at the 5th and 95th percentiles. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively. Regressions have been run using heteroskedasticity-consistent standard errors and year fixed effects (omitted in the table).

The results from the regression do not show any significant impact of MBOs on employee CAGR. Hypothesis 3 is therefore not supported by these results. Interestingly, however, the coefficient for management ownership is positive and highly significant for the sample of exited investments. The coefficient is also positive, although not significant, for the full sample of buyouts. It seems that management with a high equity stake in the company is more prone to increase the number of employees – or alternatively, less prone to fire people. A plausible explanation is that the management ownership stake tends to be relatively high in buyouts of family-owned companies, where

the CEO is also one of the founders. In these cases, management might be more reluctant to lay off employees than in other companies. As expected, sales CAGR has a large explanatory power on employee CAGR. If sales CAGR is removed from the model the effect of higher management ownership remain positive, but the significance drops to the 15% level. Therefore, these results should be interpreted with caution.

7.4. Robustness Tests

In order to ascertain the strength of the results, the results are subjected to a battery of robustness tests. The issue of heteroskedasticity is handled by using heteroskedasticity-consistent standard errors in all regressions. The results are found to be robust to changes in model specification. Particular attention has been paid to the high correlation between sales CAGR and employee CAGR. All specifications are estimated with and without these explanatory variables. As mentioned above, the significance of determinants of employee growth disappear when sales CAGR is excluded from the model. When removing employee CAGR from the regressions on operating performance, the overall results remain significant. Various other combinations of the explanatory variables have been tested without any major impact on the overall results.

Another issue is potential flaws in peer group design, which can have a large effect on the power of statistical tests and the quality of the results. The results are therefore obtained using performance metrics adjusted for average, rather than median, peer performance and are determined to be robust to this change as well. The regressions are also run using unadjusted performance metrics with similar results⁶.

It is also desirable to check whether the results are driven by outliers. One concern is that the period from entry to exit differs between observations. It is therefore possible that results for this sample are driven by large improvements in companies with longer holding periods. The regressions are thus estimated without companies held longer than five years. This decreases significance in some specifications, but not to a large extent. In the main specifications, continuous variables are winsorized at the 5th and 95th percentiles to account for extreme observations. Using non-winsorized data has no effect on the results apart from slightly more significant test statistics.

⁶ Regression outputs for unadjusted performance changes are supplied in Appendix C-E

Multicollinearity between independent variables is another issue that might substantially bias the results. The correlation matrix in Appendix F shows the pairwise correlation between all independent variables. As expected, sales CAGR and employee CAGR are highly correlated. Moreover, the *SBO* dummy is fairly highly correlated with *Size* and *Leverage*. A useful way to check for multicollinearity is to change the model specification and check for major effects on the results. As previously mentioned, the results are robust to such changes except in the employee CAGR model.

7.5. Caveats

The main concern regarding the validity of the results is their generability to other time periods and buyout samples. A large proportion of the buyouts in this study occurred just prior to, or during, the US subprime mortgage crisis that erupted in 2008 – a very different economic climate than earlier parts of the decade. However, by adjusting the performance metrics using industry peers and estimating all models with entry year fixed effects, the time dimension should be sufficiently accounted for.

Whether the results can be applied to other buyout samples is also a highly relevant question. Previous studies on performance in Nordic buyouts have yielded varying and sometimes contradictory results. Therefore, caution should be taken before making the assumption that the results of this study will hold in a wider sample. However, it is the view of the authors that the comprehensive sample of buyouts examined in this study gives an accurate picture of the performance of buyouts in Sweden in recent years.

Another concern is whether the results are attributable to the explanatory variables or due to inherent differences between the buyout companies. It might be the case that companies targeted for MBOs are fundamentally different from other categories of buyout targets. For instance, private equity firms may seek out cooperation from existing management in companies that show prospects for organic expansion and bring in an outside management team in companies that would benefit from add-on acquisitions. While this might be the case, no previous studies have been found by the authors to support this theory.

A final concern is that the results from the regression models might be biased due to omitted variables. Most regression models employed carry limited explanatory power, with R-squares of approximately 0.1-0.2. Hence, a large portion of the variation of performance changes is not captured. The authors have attempted to minimise this problem by including relevant control variables based on previous findings. Moreover, since the results are robust to changes in model specification, it is the view of the authors that omitted variable bias has a limited effect on the results.

8. Conclusion

In this section, the results and contributions of this paper are briefly summarized, followed by a summary of remaining questions and suggestions for future research.

In this paper, the effects of management participation in private equity buyouts in Sweden have been examined. While previous research largely treats buyouts as a homogenous group, this paper aims to contribute to the research on how different types of buyouts perform. In order to accomplish this, a novel dataset with deal characteristics, ownership data and accounting figures covering 161 buyouts in Sweden during the period 2002-2008 has been collected. This paper covers three classes of hypotheses related to management participation in buyouts. Table 8 provides summary of the hypotheses and the findings of this study.

Table 8: Summary of Hypotheses

Hypotheses	Supported?
H1: MBOs generate higher abnormal operating performance than other private equity buyouts	Yes
<i>H1a: MBOs generate larger improvements in profitability than other buyouts</i>	<i>Yes</i>
<i>H1b: MBOs generate higher sales growth than other buyouts</i>	<i>Yes</i>
H2: Larger management ownership yields higher operating performance in buyout companies	Yes
<i>H2a: Larger management ownership improves profitability in buyout companies</i>	<i>Yes</i>
<i>H2b: Larger management ownership increases sales growth in buyout companies</i>	<i>No</i>
H3: MBOs generate higher employee growth than other private equity buyouts	No

The study provides support for the prevalent notion that MBOs lead to superior value creation in comparison to other buyouts. Over the full holding period, MBOs outperform other categories of buyouts both in terms of profitability and growth. The explanation might be found in entrepreneurial motivations of managers who participate in buyouts, as well as their superior information about the company and its prospects.

Contributing to the research on management ownership as an incentive tool, a higher management equity stake is found to be positively correlated with profitability, but negatively correlated with sales growth. In line with previous research, this implies that a large equity stake incentivises management to streamline operations and improve

profitability. However, it also seems to discourage growth efforts which might be attributable to an increase in management risk aversion.

No significant results are found when investigating differences in employee growth between MBOs and other categories of buyouts. However, management ownership is found to have a significant positive effect on employee growth. It is unclear whether this is linked to higher performance in these companies, or different management behaviour. Nevertheless, the results contribute to a further understanding of employment effects in buyouts.

The results of this study provide several insights that need to be further investigated. Firstly, to confirm that the results are generally true for buyouts, it would of course be interesting to extend this study to a wider dataset. Secondly, further studies on the motivations of managers who pursue buyouts are needed to reveal why MBOs seem to outperform other buyouts. Thirdly, it is of interest to both academics and practitioners to further explore the effects of management incentives. For instance, it would be interesting to consider other aggregates of management ownership, such as the invested amount as a proportion of the manager's own wealth. It would also be very interesting to assess whether direct ownership and performance based pay have different effects on management performance in buyouts. Finally, it is the view of the authors that timing effects in buyouts should be further investigated. This study reveals several differences in operating performance over the two event windows. Further insight in how operating performance changes over the holding period would be beneficial in other future studies on this subject.

As the Swedish private equity industry grows, it is of great importance to understand the drivers of value creation in private equity. By disaggregating buyouts based on management participation, this study provides further insight in the determinants of performance in buyout companies. By extending the literature on management incentives to Swedish private equity, this study also confirms that giving managers a stake in the company remain a key value driver in buyouts. The results are of interest of academics and practitioners alike and open up for further studies on the motivations of managers in private equity-backed buyouts.

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Appendix

Appendix A – Definition of Accounting Figures and Ratios

Figure	Definition
<i>Sales</i>	The total sales of the company during the fiscal year
<i>EBITDA</i>	Earnings before interest, taxes, depreciation and amortisation
<i>Operating profit</i>	Profit from operations, equivalent to earnings before interest and taxes (EBIT)
<i>Total assets</i>	Book value of current and long-term assets
<i>Net debt</i>	Book value of interest-bearing debt, subtracted by cash and cash equivalents
<i>EBITDA margin</i>	$EBITDA\ Margin_t = \frac{EBITDA_t}{Sales_t}$
<i>ROA</i>	$ROA_t = \frac{Operating\ Income_t}{Total\ Assets_t}$
<i>Leverage ratio</i>	$Leverage_t = \frac{Net\ Debt_t}{Total\ Assets_t}$

This table displays the accounting figures used to calculate the performance metrics used in the empirical analysis.

Appendix B – Overview of Tested Variables, Buyout Companies and Peer Groups

Average of Tested Variables – All Observations

Variables	<i>Full sample (3 years)</i>			<i>Exited sample (3 years)</i>			<i>Exited sample (entry-exit)</i>		
	Buyouts	Peer group	N	Buyouts	Peer group	N	Buyouts	Peer group	N
ΔEBITDA Margin	-1.0%	0.0%	155	0.1%	0.1%	83	0.4%	0.3%	79
ΔROA	-0.4%	-0.7%	154	-0.9%	-0.2%	80	0.3%	-0.5%	77
Sales CAGR	8.4%	4.6%	155	8.5%	5.5%	83	6.1%	5.4%	81
Employee CAGR	4.8%	1.8%	154	4.4%	2.2%	79	4.4%	2.1%	79
Total Assets (Entry)	2,071,461	347,212	161	2,222,739	376,599	86	2,222,739	376,599	86
Leverage (Entry)	17.9%	2.7%	161	15.0%	2.6%	86	15.0%	2.6%	86
Management ownership	10.0%	-	146	10.6%	-	79	10.6%	-	79
<i>No of MBOs</i>	<i>48</i>	<i>-</i>	<i>161</i>	<i>33</i>	<i>-</i>	<i>86</i>	<i>33</i>	<i>-</i>	<i>86</i>
<i>No of SBOs</i>	<i>39</i>	<i>-</i>	<i>161</i>	<i>18</i>	<i>-</i>	<i>86</i>	<i>18</i>	<i>-</i>	<i>86</i>

Average of Tested Variables - Manufacturing

Variables	<i>Full sample (3 years)</i>			<i>Exited sample (3 years)</i>			<i>Exited sample (entry-exit)</i>		
	Buyouts	Peer group	N	Buyouts	Peer group	N	Buyouts	Peer group	N
ΔEBITDA Margin	-2.1%	-0.3%	66	0.6%	-0.1%	33	1.5%	0.0%	28
ΔROA	-0.7%	-1.8%	64	1.2%	-1.2%	32	2.0%	-1.7%	28
Sales CAGR	4.2%	2.8%	65	3.7%	4.0%	33	3.7%	3.3%	29
Employee CAGR	0.7%	0.3%	65	0.9%	0.9%	32	0.9%	0.6%	32
Total Assets (Entry)	2,065,761	193,014	67	2,422,256	258,499	34	2,422,256	258,499	34
Leverage (Entry)	22.7%	6.2%	67	20.3%	6.1%	34	20.3%	6.1%	34
Management ownership	11.7%	-	36	9.1%	-	20	9.1%	-	20
<i>No of MBOs</i>	<i>15</i>	<i>-</i>	<i>43</i>	<i>10</i>	<i>-</i>	<i>23</i>	<i>10</i>	<i>-</i>	<i>23</i>
<i>No of SBOs</i>	<i>8</i>	<i>-</i>	<i>43</i>	<i>3</i>	<i>-</i>	<i>23</i>	<i>3</i>	<i>-</i>	<i>23</i>

Average of Tested Variables – Wholesale and Retail Trade

Variables	<i>Full sample (3 years)</i>			<i>Exited sample (3 years)</i>			<i>Exited sample (entry-exit)</i>		
	Buyouts	Peer group	N	Buyouts	Peer group	N	Buyouts	Peer group	N
ΔEBITDA Margin	-0.9%	0.3%	42	-1.0%	0.1%	22	-0.9%	0.4%	23
ΔROA	0.3%	0.0%	40	0.9%	-0.4%	20	0.9%	0.3%	21
Sales CAGR	7.8%	5.6%	42	9.7%	6.1%	22	7.6%	6.5%	23
Employee CAGR	5.6%	3.2%	41	5.8%	3.3%	21	5.8%	3.4%	21
Total Assets (Entry)	1,874,176	864,658	43	2,686,634	866,266	23	2,686,634	866,266	23
Leverage (Entry)	19.1%	2.9%	43	11.1%	2.7%	23	11.1%	2.7%	23
Management ownership	9.1%	-	62	12.4%	-	30	12.4%	-	30
<i>No of MBOs</i>	<i>22</i>	<i>-</i>	<i>67</i>	<i>16</i>	<i>-</i>	<i>34</i>	<i>16</i>	<i>-</i>	<i>34</i>
<i>No of SBOs</i>	<i>22</i>	<i>-</i>	<i>67</i>	<i>11</i>	<i>-</i>	<i>34</i>	<i>11</i>	<i>-</i>	<i>34</i>

These tables displays the average values of tested variables sample of buyout companies and associated peer groups. The tables describe the full sample of companies, as well as for the two largest industry sectors in the sample. Figures for EBITDA margin and ROA are percentage point changes between the first and last year in the event window. Sales and Employee CAGR are the cumulative annual growth rates over the event windows. Leverage is the ratio of Net Debt/Total Assets. Total assets and Leverage are given for the first year in the event window. Total assets are denominated in SEK.

Appendix C – Regression Outputs for Unadjusted Performance Changes, Full Sample

	(1) ΔEBITDA Margin (3 years)	(2) ΔROA (3 years)	(3) Sales CAGR (3 years)
MBO dummy	-0.002 (0.863)	-0.009 (0.632)	-0.021 (0.265)
Management stake	0.074 (0.106)	0.138** (0.017)	-0.089 (0.115)
Size	0.007 (0.215)	0.007 (0.267)	0.003 (0.632)
Leverage	-0.020 (0.527)	-0.017 (0.643)	0.001 (0.978)
SBO dummy	0.008 (0.610)	0.018 (0.387)	0.051** (0.015)
Employee CAGR	0.040 (0.489)	0.044 (0.508)	0.741*** (0.000)
Exit dummy	0.035*** (0.009)	0.030* (0.093)	0.014 (0.440)
Constant	-0.152* (0.058)	-0.150 (0.118)	0.032 (0.687)
No. of obs.	139	135	136
R-square	0.090	0.118	0.568

This table reports the coefficients and p-values (parentheses) from multivariate OLS regressions for changes in unadjusted operating performance during the first three years after the buyout. In specification (1) and (2), the dependent variable is the percentage point change of each measure during the period. In specification (3), the dependent variable is the cumulative annual growth rate (CAGR) over the period. All continuous variables are winsorized at the 5th and 95th percentiles. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively. Regressions have been run using heteroskedasticity-consistent standard errors and year fixed effects (omitted in the table).

Appendix D – Regression Outputs for Unadjusted Performance Changes, Exited Sample

	(1) ΔEBITDA Margin (3 years)	(2) ΔEBITDA Margin (entry - exit)	(3) ΔROA (3 years)	(4) ΔROA (entry-exit)	(5) Sales CAGR (3 years)	(6) Sales CAGR (entry-exit)
MBO dummy	-0.002 (0.895)	0.026* (0.076)	-0.006 (0.844)	0.042* (0.096)	-0.023 (0.350)	0.044* (0.083)
Management stake	0.098* (0.061)	0.005 (0.934)	0.196** (0.030)	0.026 (0.803)	-0.141 (0.105)	-0.075 (0.484)
Size	0.013* (0.095)	0.001 (0.847)	0.011 (0.293)	0.007 (0.454)	0.010 (0.291)	0.003 (0.810)
Leverage	-0.018 (0.674)	-0.017 (0.550)	-0.044 (0.402)	-0.030 (0.555)	-0.085* (0.098)	-0.095 (0.176)
SBO dummy	0.001 (0.954)	0.016 (0.358)	0.015 (0.673)	0.023 (0.499)	0.078** (0.036)	0.052 (0.220)
Employee CAGR	-0.067 (0.432)	0.119* (0.057)	-0.099 (0.428)	0.199 (0.109)	0.803*** (0.000)	0.845*** (0.000)
Exit dummy	0.021 (0.317)	- -	0.052 (0.106)	- -	0.016 (0.565)	- -
Constant	-0.239** (0.038)	-0.013 (0.854)	-0.220** (0.143)	-0.100 (0.436)	-0.073 (0.552)	-0.043 (0.796)
No. of obs.	71	70	68	68	71	72
R-square	0.155	0.271	0.165	0.218	0.602	0.491

This table reports the coefficients and p-values (parentheses) from multivariate OLS regressions for unadjusted changes in operating performance. In specifications (1)-(4) the dependent variable is the percentage point change of each measure during the period. In specifications (5)-(6) the dependent variable is the cumulative annual growth rate (CAGR) over the period. All continuous variables are winsorized at the 5th and 95th percentiles. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively. Regressions have been run using heteroskedasticity-consistent standard errors and year fixed effects (omitted in the table).

Appendix E – Regression Outputs for Unadjusted Employee Growth

	<i>Full sample</i>	<i>Exited sample</i>	
	(1) Employee CAGR (3 years)	(2) Employee CAGR (3 years)	(3) Employee CAGR (entry-exit)
MBO dummy	0.000 (0.995)	0.013 (0.534)	-0.025 (0.239)
Management stake	0.101* (0.052)	0.156** (0.013)	0.119* (0.073)
Size	-0.007 (0.229)	-0.006 (0.551)	-0.001 (0.869)
Leverage	0.020 (0.553)	0.067 (0.149)	0.104** (0.027)
SBO dummy	-0.022 (0.230)	-0.042 (0.152)	-0.038 (0.178)
Sales CAGR	0.589*** (0.000)	0.570*** (0.000)	0.500*** (0.000)
Exit dummy	-0.007 (0.659)	0.003 (0.880)	- -
Constant	0.081 (0.273)	0.037 (0.767)	0.055 (0.609)
Number of observations	136	71	72
R2	0.522	0.558	0.541

This table reports the coefficients and p-values (parentheses) of multivariate OLS regressions for unadjusted employee CAGR during the first three years after the buyout, as well as the entire holding period. In specification (1), the full sample of buyouts is used. In specifications (2)-(3), the subsample of exited companies is used. All continuous variables are winsorized at the 5th and 95th percentiles. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively. Regressions have been run using heteroskedasticity-consistent standard errors and year fixed effects (omitted in the table).

Appendix F – Correlation Between Explanatory Variables

Full sample – 3 years

	MBO	Stake	Size	Leverage	SBO	Employee CAGR	Sales CAGR	Exit
MBO	1.000							
Management stake	0.171	1.000						
Size	0.087	-0.172	1.000					
Leverage	0.083	0.133	0.404	1.000				
SBO	0.051	0.026	0.348	0.243	1.000			
Employee CAGR	-0.051	0.095	-0.107	0.072	-0.014	1.000		
Sales CAGR	-0.126	-0.030	0.005	0.102	0.164	0.638	1.000	
Exit	0.079	0.060	-0.062	-0.104	-0.131	0.081	0.088	1.000

Exited sample – 3 years

	MBO	Stake	Size	Leverage	SBO	Employee CAGR	Sales CAGR	Exit
MBO	1.000							
Management stake	0.181	1.000						
Size	0.049	-0.168	1.000					
Leverage	0.067	0.018	0.501	1.000				
SBO	0.101	-0.037	0.518	0.350	1.000			
Employee CAGR	0.031	0.170	-0.011	0.100	-0.049	1.000		
Sales CAGR	-0.109	-0.087	0.088	0.015	0.184	0.619	1.000	
Exit	-0.054	0.063	-0.125	0.012	-0.213	0.163	0.145	1.000

Exited sample – entry to exit

	MBO	Stake	Size	Leverage	SBO	Employee CAGR	Sales CAGR
MBO	1.000						
Management stake	0.190	1.000					
Size	0.028	-0.165	1.000				
Leverage	0.015	0.005	0.474	1.000			
SBO	0.040	-0.038	0.491	0.322	1.000		
Employee CAGR	-0.013	0.185	0.055	0.171	-0.014	1.000	
Sales CAGR	0.131	0.084	0.061	0.032	0.184	0.588	1.000

This table displays the pairwise correlation between all explanatory variables. A high positive number indicates high positive correlation between variables. A high negative value indicates high negative correlation between variables. A value close to zero implies little or no correlation between variables. Employee CAGR and sales CAGR are adjusted for peer group performance

Appendix G – Buyout Sample

Company	Entry	Exit	PE firm	Transaction type	NACE Rev. 2 industry code
Actic Sverige	2007	2012	FSN Capital Partners	IBO	93
Addici	2006	2008	Argan Capital Advisors	IBO	70
AddPro	2005	-	Polaris Private Equity	IBO	62
Aditro	2006	-	Nordic Capital	IBO	62
Ahlsell	2006	-	Cinven, GS Capital Partners	MBO	46
Åkers	2008	-	Altor Equity Partners	IBO	28
Aleris	2005	2010	EQT	MBO	87
Alignment Systems	2006	2012	FSN Capital Partners	IBO	26
Alimak Hek	2007	-	Triton Partners	IBO	28
Almondy	2008	-	Segulah	IBO	10
Annas Pepparkakor	2005	2008	Accent Equity Partners	IBO	10
Anticimex	2006	2012	Ratos	MBO	81
Atelje Margaretha	2005	-	Litorina Kapital	IBO	47
Atos Medical	2005	2011	Nordic Capital	IBO	32
Attendo	2005	2007	Bridgepoint Capital	MBO	87
Attendo	2007	-	IK Investment Partners	IBO	87
Aura Light	2006	-	FSN Capital Partners	IBO	27
Balco	2003	2010	3i Group	IBO	25
Bewator	2002	2005	EQT	MBO	46
Bindomatic	2008	-	Valedo Partners	IBO	46
Bluestep	2008	-	Englefield Capital	IBO	66
Boomerang International	2006	-	Priveq Investment	MBO	46
Bravida	2006	2012	Triton Partners	IBO	43
Bring Frigoscandia	2002	2005	Triton Partners	MBO	52
Broadcast Text International	2008	-	Valedo Partners	IBO	59
BTJ Group	2003	-	Litorina Kapital	IBO	46
BYGGmax	2006	2010	Altor Equity Partners	MBO	47
C More Group	2003	2005	Nordic Capital, Baker Capital	IBO	59
Candyking	2007	-	EQT, Accent Equity Partners	MBO	46
Capio	2006	-	Apax Partners, Nordic Capital	IBO	86
Carema	2005	2010	3i Group	IBO	87
CCS	2003	2005	Segulah	MBO	20
Cederroth	2008	-	CapMan, Litorina Kapital	IBO	46
Com Hem	2003	2005	EQT Partners	IBO	61
Com Hem	2006	2011	Carlyle Group, AXA Private Equity	IBO	61
Connode	2004	-	CapMan	IBO	62
Coor Service Management	2007	-	Cinven	IBO	81
Coor Service Management	2004	2007	3i Group	IBO	81
Coromatic	2008	2011	Litorina Kapital	MBO	46
Crem International	2007	2012	Accent Equity Partners	IBO	28
Crucell	2004	2006	3i Group, SEB Venture Capital	MBO	72
CTEK	2008	2011	FSN Capital Partners	IBO	46
Danfoss Värmepumpar	2004	2011	Procuritas Partners	IBO	71
Diaverum	2007	-	Bridgepoint Capital	IBO	86
Disab Vacuum Technology	2007	-	ACAP Invest	IBO	71
Dometic	2005	2009	BC Partners	IBO	82
Driconeq	2007	-	Axcel Industriinvestor	IBO	28
Dustin	2006	-	Altor Equity Partners	IBO	47
Dynapac	2004	2007	Altor Equity Partners	MBO	28
Elfa	2006	2008	IK Investment Partners	IBO	46
Emotron	2007	2011	Polaris Private Equity	MBO	26
Energo	2006	2010	Bure Equity	MBO	68
EpiServer	2007	2010	Amadeus Capital	MBO	62
Espresso House	2006	2012	Palamon Capital Partners	IBO	56
Euroflorist	2007	-	Litorina Kapital	IBO	46
Euroflorist	2004	2007	Accent Equity Partners	IBO	47
EuroMaint	2007	-	Ratos	IBO	33
European Furniture Group	2007	-	Herkules Capital	IBO	31
Exotic Snacks	2008	2011	Segulah	MBO	46
Fameco Group	2005	-	Credelity Capital	IBO	25
Findus	2006	2008	CapVest Equity Partners	IBO	10
FinnvedenBulten	2005	2010	Nordic Capital	IBO	25
Fiskarhedenvillan	2007	2012	Polaris Private Equity	IBO	46
Five Seasons	2006	2009	EQT Partners	IBO	46
Flexlink	2005	2011	AAC Capital Partners	MBO	46
Flextrus	2008	-	Accent Equity Partners	MBO	22
Frösunda	2007	2010	Polaris Private Equity	IBO	88
Gambro	2006	2012	Investor, EQT Partners	IBO	46
Gant	2003	2006	3i Group, L Capital Management	MBO	46
Gas Control Equipment	2005	-	Argan Capital Advisors	MBO	46
Grangården	2008	-	EQT Partners	IBO	47
Grycksbo Paper	2006	2009	Accent Equity Partners	MBO	17

Company	Entry	Exit	PE firm	Transaction type	NACE Rev. 2 industry code
Gunnebo Industrier	2008	-	Segulah	IBO	25
Gycom	2007	-	Credelity Capital	MBO	46
Heatex	2007	-	Odin Equity Partners	IBO	28
Hilding Anders	2003	2006	Investcorp	MBO	31
Hilding Anders	2006	2011	Candover Investments	MBO	31
HMS Industrial Networks	2004	2006	Segulah	IBO	26
Humana Group	2008	-	Argan Capital Advisors	MBO	88
Inflight Service Europé	2005	2009	CapMan	MBO	47
INR	2007	2010	Accent Equity Partners	IBO	23
Intrac Group	2007	-	Catella, Baltic Investment Fund	IBO	46
Inwido	2004	-	Ratos	IBO	16
Isaberg Rapid	2007	2010	Segulah	IBO	25
J. D. Stenqvist	2003	2007	Triton Partners	MBO	17
J.Lindeberg	2007	2011	Proventus	IBO	46
Jetpak Group	2005	-	Polaris Private Equity	MBO	52
Johnson Metall	2007	-	Norvestor Equity	MBO	24
Joy Shop	2006	2009	Segulah	IBO	47
Kemetyl	2007	-	Segulah	IBO	20
Keybroker	2008	-	Investor	IBO	62
KMW Energi	2007	2009	CapMan	IBO	28
Kwintet	2005	-	IK Investment Partners	IBO	14
Lekolar	2004	2007	Procuritas Partners	IBO	46
Lekolar	2007	-	3i Group	IBO	46
Liber Hermods	2008	-	Strukturfonden	MBO	85
Life	2005	-	Norvestor Equity	IBO	47
Ljunghäll	2003	-	CapMan	MBO	24
Lundhags Skomakarna	2007	2012	EQT Partners	IBO	46
Mantacore	2008	-	Verdane Capital	IBO	62
Menigo Foodservice	2006	-	Nordic Capital	IBO	46
Mobile Climate Control	2007	-	Ratos	IBO	29
Molnlycke Health Care	2005	2007	Apax Partners	IBO	46
Molnlycke Health Care	2007	2010	Investor, Morgan Stanley	MBO	46
Mont Blanc Industri	2007	-	Accent Equity Partners	MBO	29
MQ	2006	2010	CapMan, RPE Capital Management	MBO	14
Multicom Security	2005	-	GMT Communications Partners	IBO	61
Munksjö	2005	-	EQT Partners	MBO	17
Myresjöhus	2005	2007	IK Investment Partners	IBO	16
mySafety	2007	-	Litorina Kapital	IBO	71
Nefab	2007	-	Nordic Capital	IBO	16
Neoventa Medical	2006	-	CapMan	IBO	32
Nils Hansson Logistics	2005	2011	Nordstjernan	IBO	52
Nimbus Group	2006	2012	Altor Equity Partners	MBO	30
Nordic Heat & Vent	2005	-	Litorina Kapital	IBO	27
Nordic Modular Group	2005	2007	3i Group	IBO	77
Nordic Service Partners	2004	2008	European Digital Partners	IBO	74
North Trade	2006	2012	Procuritas Partners	IBO	46
NVS Installation	2006	2008	Triton Partners	IBO	43
Ownit Broadband	2008	-	Stikla	IBO	61
Pahlen	2007	2012	Litorina Kapital	MBO	28
Pallco	2006	-	Ledstiernan	IBO	31
Papyrus	2008	-	Altor Equity Partners	IBO	17
Pelly Industrier	2006	-	Litorina Kapital	IBO	46
Permobil	2006	-	Nordic Capital	IBO	30
Perstorp Group	2005	2008	PAI Partners	IBO	20
Phadia	2007	2011	Cinven	IBO	20
Phadia	2004	2007	Silverfleet Capital, Triton Partners	IBO	20
Pharmadule Emtunga	2004	2011	3i Group	MBO	25
PIAB Invest	2006	-	Altor Equity Partners	IBO	28
Plastal Group	2005	2009	Nordic Capital	MBO	22
Point International	2004	2011	Nordic Capital	MBO	46
Previa	2004	2007	Segulah	IBO	86
Q-Matic	2004	2007	3i Group Plc, Litorina Kapital	IBO	27
Q-Matic	2007	-	Altor Equity Partners	IBO	27
R-man i Varnamo	2007	-	Ledstiernan	IBO	25
Rosti	2004	-	Nordstjernan	IBO	22
Saddler Scandinavia	2006	-	Credelity Capital	IBO	46
San Sac	2008	-	Priveq Investment	IBO	46
Sandberg & Söner	2008	-	Volati	IBO	28
SATS	2002	2006	Nordic Capital	IBO	93
ScandBook	2006	2009	Accent Equity Partners	MBO	18
Scandic Hotels	2007	-	EQT, Accent Equity Partners	IBO	55
Scandinavian Business Seating	2007	-	Ratos	IBO	31
Semper	2003	2006	Triton Partners	MBO	10
Silva	2004	2006	Amplico Kapital	IBO	74
SKV Service	2004	2006	Segulah	IBO	82

Company	Entry	Exit	PE firm	Transaction type	NACE Rev. 2 industry code
Smoke Free Systems	2007	2012	Credelity Capital	IBO	28
SOBI Swedish Orphan Biovitrum	2004	2010	Investor, Skandia Investment	MBO	20
Sonera Smarttrust	2002	2009	GE Capital	IBO	62
Sydtotal	2007	2011	Priveq Investment	IBO	43
Team Olivia	2008	-	Procuritas Partners	MBO	69
Teknikmagasinet	2004	2011	3i Group	MBO	47
Teleca	2008	-	Symphony Technology Group	IBO	62
Tesab Svenska	2006	-	Accent Equity Partners	IBO	73
Thule	2007	-	Nordic Capital	MBO	29
TitanX	2008	-	EQT Partners	IBO	29
Tolerans	2006	2012	Litorina Kapital	MBO	28
Unisport Scandinavia	2008	-	Priveq Investment	IBO	46
Videokonferensbolaget	2007	2010	NorgesInvestor	IBO	46
Wermland Paper	2003	2007	Procuritas Partners	IBO	17

This table displays the companies included in the study. Entry and exit years are calendar years. PE firm is the private equity firm(s) backing the buyout. Buyout type is determined at the discretion of the authors based on press releases and other official records. Industry sector as reported in official records. If not available for the ultimate owner, the industry sector has been determined by looking at the main operating subsidiary.