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Does Firm Size Matter?
Measuring the Operational Performance Development in Management Buyouts

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Abstract

This thesis seeks to identify the determinants of operational performance in management buyouts (MBOs) and examine whether there are any differences in operational performance for MBOs of different sizes. This is done by analyzing a novel data sample comprising 116 consecutive Swedish MBOs using a linear regression model. We find that private equity (PE) backed MBOs grow at a higher rate than non-PE backed MBOs, but have a negative impact on the operational efficiency within the firm. Additionally, we find that a high management equity stake correlates with a high operational efficiency development. However, the results reveal no differences in operational performance depending on the size of the MBO, suggesting there is no optimal size category in which an MBO can be particularly effective.

Keywords: Management Buyout, Operational Performance, Size, Private Equity
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1. Introduction

1.1. Introduction to buyouts

Management buyouts "MBOs" and leveraged buyouts "LBOs" first emerged in the 1980s (Kaplan and Strömberg, 2009) and have since played a crucial part in the shaping of today's economic landscape. An MBO refers to when the management of a company acquires the shares in the company in which they are employed, thus buying out the existing shareholders. An MBO is in theory very appealing for the management group participating in the transaction, considering they as shareholders will be able to directly reap the rewards of the company's potential success - as opposed to when the management group is merely employed in the company. Thus, the upside for the management is far greater post-buyout. A leveraged buyout is a financial transaction in which the buying party, most often a private equity firm, uses the target's assets as collateral to support a large portion of debt financing. Since the acquiring party finances the transaction with a significant amount of debt, the equity needed to be committed is lower, resulting in a leverage effect on shareholder returns.

Due to the large size of most buyouts, the management group is often not able to commit the equity needed for a pure MBO[1]. Instead, most MBOs are backed by a private equity firm that wants to align the management's interest with their own by investing alongside the incumbent management team. Between 2007 and 2015, private equity buyout investments as a percentage of GDP[2] in Sweden was the second highest out of all the European countries, surpassed only by Luxembourg (Invest Europe[3], 2016). Furthermore, the revenues generated by Swedish private equity backed portfolio companies in 2013 corresponded to 8.4% of the GDP in Sweden (SVCA,[4] 2015).

Considering private equity plays such a major role in the Swedish economy, the area has drawn wide media attention and its impact on different stakeholders has been extensively researched. While most previous studies on the Swedish private equity market have focused on the value creation of leveraged buyouts (see for example; Bergström et al., 2007), this study examines the operational performance development within management buyouts. Although previous research suggests that management buyouts are especially effective in improving the operational performance by reducing agency costs (see for example; Jensen, 1986; Wright et al.,

[1] A pure MBO is what the authors refer to when a company is bought solely by the management team.
[2] Buyout investments as a percentage of GDP by location of the portfolio company, rather than the location of the PE firm.
[3] "Invest Europe, formerly known as EVCA, is the association representing Europe's private equity, venture capital and infrastructure sectors, as well as their investors."; https://www.investeurope.eu/
[4] "SVCA - The Swedish Private Equity and Venture Capital Association is the industry body and public policy advocate for the private equity and venture capital industry in Sweden."; https://www.svca.se/

1994; Cuny and Talmor, 2007), there is limited research on how MBOs perform depending on firm size and the equity stake acquired by the management - which is the focal point of this study. A dataset of 116 Swedish MBOs between 2005 and 2012 is constructed and benchmarked against peer groups, matched by industry and sales, in order to answer the following research questions:

1. *Do management buyouts of different sizes experience different operational performance development post-buyout?*
2. *Does the presence of a private equity firm affect the operational performance development in management buyouts?*
3. *Do management buyouts where the incumbent management acquires a higher equity ownership result in better operational performance development?*

Since the MBOs are benchmarked against industry peers, the descriptive statistics will also give an indication as to whether management buyouts perform better than their respective industry peers.

Whereas previous studies on the operational performance development of management buyouts have mainly been conducted in the U.S. and the U.K. (see for example; Kaplan, 1989; Wright et al., 1994; Singh 1990), this study sheds light on how management buyouts in Sweden perform. Evidence on the operational performance of MBOs on the Swedish market is insightful considering the corporate ownership structure in Sweden differs from that of the U.S. and the U.K. Swedish companies are to a larger extent family-controlled and with much less dispersed corporate ownership (Faccio and Lang, 2002), why the ex-ante agency costs in theory are lower (Vinten, 2007). Since a reduction of agency costs through the alignment of shareholder and management interests is considered to be a pivotal source of value creation in management buyouts (Jensen, 1986; Wright et al., 1994; Cuny and Talmor, 2007), the performance of Swedish MBOs could therefore be different from that of MBOs in other geographies. This theory is in line with the reasoning of Meuleman et al. (2009) and Schulze et al. (2001), who argue that improvement gains attributed to a reduction of agency costs may be limited to companies with low ownership concentration prior to buyout. An additional benefit of studying the Swedish market is the availability and coherence of accounting data, since it minimizes the risk of selection biases in the data which could skew the results.

The study contributes to existing literature on management buyouts and industry practitioners by providing recent evidence on the post operational performance development of MBOs in Sweden in relation to industry peers, finding that management buyouts grow faster than

their respective peers, but perform worse in operational efficiency development. A high portion of management equity ownership is found to have a positive impact on operational efficiency, while MBOs that are backed by a private equity firm perform worse than industry peers in terms of operational efficiency but better in terms of sales growth. Because of these results, we presume that different buyers in management buyouts likely employ different value creation strategies. MBOs where the incumbent management acquires a large equity stake focus on improving the company's operational efficiency, while PE backed buyouts focus on growth to a larger extent. This could provide support to the notion that PE firms today in general have different strategies for value creation, in comparison to during the inception of leveraged buyouts, considering Phan and Hill (1995) find that there is a larger focus on efficiency than growth in LBOs between 1986 and 1989. No clear conclusion regarding how MBOs of different sizes perform in relation to each other can be drawn - although the results indicate that large MBOs perform better in operational efficiency, while small MBOs perform better in sales growth.

1.2. Definitions and delimitations

To provide readers with a necessary understanding of the main concepts referred to throughout the study, following is a list with brief explanations of how each concept is defined and delimited.

i. *A Management buyout* has been defined in this study as a transaction where the incumbent management team acquires an outspoken stake in the company they manage, similar to the definition used by Singh (1990). This definition is also in line with the one used by the global transaction database provider MergerMarket.[5] Other alternative MBO transactions (e.g. Management Buy-In, Buy-In Management Buyout) have been excluded from the sample data and not taken into specific consideration within the study.

ii. *Management stake* is defined as the percentage of total equity within the company that the incumbent management possesses immediately after the acquisition has occurred. The calculation of management stake is mainly based on management's (e.g. CEO, CFO and COO) stake, but broadened in certain cases to include leading executives active within the company if the management stake is not explicitly mentioned in the transaction press releases or annual report. Management stake do not include options or similar derivatives and benefits. Only full equity ownership post transaction has been considered a part of the management's stake in the company.

[5] "MergerMarket is a global provider of corporate financial news, intelligence and analysis."; http://mergermarketgroup.com/

iii. A *private equity backed MBO* is defined as a transaction where a financial sponsor has acquired a significant stake in the target company in conjunction with the company's management. The definition of financial sponsors is delimited to private equity (PE) firms and venture capital (VC) firms.

iv. A *secondary buyout (SBO)* refers to when the target company was previously owned by a financial sponsor, and a new financial sponsor together with the management team acquires a stake in the target company.

v. *Size* is defined in regards to sales. Delimitations on size, further described in the methodology section of the thesis, are based on sales at the year of the buyout.

vi. *Operational growth* is defined as the firm's compounded annual growth rate of sales (sales CAGR). Calculation of this metric is presented in appendix table A2.

vii. *Operational efficiency* is defined using the following common accounting metrics: EBITDA margin, EBIT margin and return on total assets (ROA). How these metrics are calculated is presented in table A2 in the appendix.

viii. *Adjusted operational performance* is the difference between the operational performance development of the MBOs in comparison to their respective industry peers. Excess operational performance or abnormal return is used synonymously to adjusted operational performance throughout the study.

2. Operational value generation in buyouts

Considering a vast majority of all MBO transactions are backed by a PE sponsor[6], in a so called leveraged buyout, it is crucial to understand the value generation process in LBOs in order to hypothesize effectively about the operational performance development in MBOs.

The general consensus on value creation in buyouts is that they exhibit excess operational performance development in relation to industry peers, which is especially in management buyouts (Cumming et al., 2007; Kaplan, 1989; Wright et al., 1996; Acharya and Kehoe, 2008; Singh, 1990). Cuny and Talmor (2007) provide empirical insight into why it could be optimal to consider a private equity buyout of the firm prior to commencing an operational turnaround in an underperforming business, even though the current management would likely be able to bring about the same operational changes. Firstly, a private equity buyout allows for the exploration of all feasible turnaround plans, including replacement of top management, without tension between the board and management. Secondly, private equity can generate stronger managerial incentives

[6] In our sample of 116 Swedish MBOs, 89 are PE backed.

which result in a greater inclination for the current management team to provide information regarding the turnaround opportunities within the firm, which leads to more effective turnaround strategies (Cuny and Talmor, 2007).

The value generation processes in buyout transactions can be divided into three key areas; financial, governance, and operational engineering (Kaplan and Strömberg, 2009). During the emergence of leveraged- and management buyouts in the 1980s, financial and governance engineering were particularly prevalent as sources of operational value generation, but in recent times there has been a shift towards operational engineering as a main source of value creation (Kaplan and Strömberg, 2009; A.T. Kearney, 2014; Brigl et al., 2012).

2.1. Financial engineering

Jensen (1986) as well as Kaplan and Strömberg (2009) identify leverage as a major source of value creation in buyouts, which can be categorized under financial engineering. An ideal LBO target is typically a company with low fixed costs and with a stable free cash flow generation. Hence, in most LBO targets pre-buyout there are significant risks of the agency costs related to free cash flow that Jensen (1986) present. However, by levering up the company and forcing it to support principal and interest payments on debt, managers within the company will be pressured to limit excessive spending, thus mitigating the free cash flow agency costs (Jensen, 1986). However, considering that the risk for financial distress costs and bankruptcy significantly increases with high leverage, there is a tradeoff regarding the optimal level of debt in the buyout company, which participants in buyout transactions need to take into careful consideration. Additionally, due to the tax deductibility of interest payments in most jurisdictions, there are tax benefits of using higher leverage, which PE firms exploit.

2.2. Governance

In addition to financial engineering, Kaplan and Strömberg (2009) identify governance as a key area of value generation within portfolio companies, referring to the active ownership role PE firms take in their portfolio companies. For example, PE firms are to a larger extent than other owners unsentimental about replacing management within portfolio companies that perform poorly. Considering the typically short investment horizon of 3-5 years, there is simply no room for poor decision making capabilities (Rogers et. al, 2002; Gadiesh and MacArthur, 2008; Kaplan and Strömberg, 2009). Cornelli and Karakas (2008) find that LBO targets experience a higher turnover of CEOs and directors, and that the board size of public companies is immensely reduced once a public company is taken private in an LBO transaction. These results are in line

with a study made by Acharya and Kehoe (2008), who find that the CEO (CFO) are 39% (33%) likely to be replaced within the first 100 days after deal completion. Corporate governance as a key category of value creation in buyouts is reinforced in a study by Guo et al. (2011), who find that the improvement in operating cash flows post-buyout is higher in firms where the CEO has been replaced at, or soon after, the completion of the deal.

Moreover, much like in management buyouts, PE firms performing leveraged buyouts recognize the importance of aligning the interests between management and the shareholders, which is why key managers are often either required or encouraged to co-invest alongside the PE firm by making a significant equity contribution (Acharya and Kehoe 2008; Kaplan and Strömberg, 2009). For example, Phan and Hill (1995) find that the average management equity ownership increased from 14.2% to 35.7% after a leveraged buyout. The increased management equity stake results in both potential upside, should the company perform well, as well as potential downside if the company performs poorly. Since private equity investments are highly illiquid, managers that invest in the company will also hold a more long-term view, which mitigates the risk of earnings management in order to reach short-term performance goals (Kaplan and Strömberg, 2009). Other possible ways of aligning the interests of the management with those of the PE firm's include participation in incentive schemes directly linked to the portfolio company's long-term performance, such as option programs and discretionary bonuses.

Furthermore, Acharya and Kehoe (2008) find that PE firms spend substantial amounts of time working with the management of their portfolio companies - a majority having board meetings at least once per month in addition to frequent informal contact with the CEO.

The notion that private equity firms generate value through the use of proper managerial discipline is supported by the findings of Rogers et al. (2002), who studied over 2,000 PE transactions over a ten-year period. In contrast to public companies, the management in privately owned companies never have to divide their attention between short-term quarterly results and loosely defined long-term targets. For example, PE firms make sure the management within their portfolio companies focuses all their efforts on a few key strategic objectives (Rogers et al., 2002). Jones (1992) and Wright et al. (1992) find that managers performing an MBO implement organizational restructurings in addition to engage in efforts to change accounting control systems post-buyout.

2.3. Operational improvements

Today, much of the operational value creation in LBO transactions stem from the industry expertise and input provided by the PE firms. Following this, there have been more PE hires

with backgrounds in management consulting and other professions with operational industry expertise, instead of the historically typical hires with experience in financial engineering from e.g. investment banking and corporate development. (Kaplan and Strömberg, 2009; A.T. Kearney, 2014; Brigl et al., 2012). Acharya and Kehoe (2008) divide the value creating initiatives into two main categories; productivity and organic growth. Examples of productivity improvements include supply chain efficiency, overhead cost reduction as well as working capital reduction. Organic growth initiatives include e.g. review of pricing, identifying new channels, products and geographies in addition to identification of new customers where the company is already present (Gadiesh and MacArthur, 2008; Acharya and Kehoe, 2008).

Other ways PE firms can add value to their portfolio companies is by identifying and evaluating attractive investment opportunities (Kaplan and Strömberg, 2009). PE firms are known to consolidate industries by making bolt-on acquisitions to their portfolio companies, thus growing inorganically.

2.4. Size as a factor in value generation

There is limited research on the potential differences in operational performance development of leveraged and management buyouts of different sizes. However, Wright et al. (1996) write that smaller and larger buyouts are more prone to failure than medium-sized buyouts. Moreover, size has empirically been proven to affect the governance and financial structure of both U.K. and U.S. buyouts (Singh, 1990; Wright et al., 1994). For example, financial institutions are less likely to be present on the board of small MBOs and small MBOs are more likely to use lower leverage than large ones (Wright et al., 1994). Turner (1983) write that small firms may in theory be more receptive to structural changes than large firms, considering the fact that they exhibit less organizational inertia. Additionally, smaller firms could possibly respond faster to disruptive innovation considering they have less formalization and fewer organizational levels (Turner, 1983). Considering corporate governance is such an important area for the value creation within buyouts[7], the findings of Turner (1983) imply that management, at least in theory, has higher chances of successfully implementing key strategic changes in smaller firms. In conclusion, the findings on the impact of size within buyouts are limited, in particular within MBOs, which is why this thesis aims to shed light on the area.

[7] See section 2.2. "Governance" for an in-depth discussion regarding corporate governance.

2.5. The value-add of management ownership

Cuny and Talmor (2007) write that changes in ownership structure, especially in MBOs, are used to exploit what is referred to as governance arbitrage. By increasing management ownership, agency costs common in public corporations, such as managerial entrenchment and ineffective internal controls, could be mitigated to some extent (Cuny and Talmor, 2007). Wright et al. (1994) provide arguments as to why management buyouts may result in more effective corporate governance and incentive alignment. One aspect of higher equity stakes held by the management team is that horizontal control becomes more prominent within the firm, particularly amongst the managers participating in the MBO, rather than only vertical monitoring which is common in many organizations (Wright et al., 1994). Moreover, Jensen (1986) argues that public-to-private buyouts can reduce agency costs related to free cash flow. Further empirical evidence on buyouts as a way of improving corporate governance and managerial incentives is presented by Wright et al. (1992) and Palepu (1990) for the U.K. and U.S. markets respectively.

One of the reasons why buyouts historically exhibited higher operational performance gains is that many of the buyouts from earlier periods had poor pre-buyout performance (Guo et al., 2011). When evaluating possible operational outperformance of management buyouts in relation to peers it is important to consider the risk of earnings management prior to acquisition. There is a serious risk that the incumbent management performing the MBO act in their own best interest rather than that of the shareholders', by understating the company earnings prior to making a buyout bid - thus being able to acquire the company at a lower price. Even though company managers generally approach investment bankers to perform a fairness opinion and value the company, considering the valuation of the company is based on accounting metrics, management may attempt to depress the pre-buyout earnings (DeAngelo, 1986). This would in turn result in an overstatement of operational performance development post-buyout in relation to industry peers. However, DeAngelo (1986) surprisingly find no evidence of earnings management in MBOs, though the reliability of the results has been criticized (see for example; Perry and Williams, 1994). In contrast to DeAngelo (1986), Perry and Williams (1994) provide statistically significant evidence of negative earnings manipulation in the year preceding the management buyout announcement.

3. Hypothesis development

3.1. Operating performance in MBOs of different sizes

Considering the impact of size on the operational performance in MBOs is ambiguous, below is a discourse on the arguments for operational outperformance of large and small MBOs.

Arguments for operational outperformance within large MBOs

It is plausible to assume that there are more possibilities for implementation of structural changes and divestments of unprofitable business units within mature and large firms. Considering large firms have been shown to have higher managerial hubris in regards to corporate takeovers than small firms (Roll, 1986; Moeller et al., 2004), it is likely that the room for margin improvement is higher in large firms. An additional argument as to why large companies could experience higher operational efficiency development is that they could reap the benefits of economies of scale as they become larger. This is especially true within industries characterized by high fixed cost, such as manufacturing. The agency costs of free cash flow presented by Jensen (1986) are also expected to be more prominent in large firms since they have a higher free cash flow generation than small firms. Considering that agency problems related to free cash flow in theory are reduced post-buyout, it is reasonable to hypothesize that large MBOs exhibit better operational performance development than small MBOs, with the exception of sales CAGR.

Arguments for operational outperformance within small MBOs

Considering the corporate structure within small firms tends to be less complex and bureaucratic, the likelihood of effective restructurings is higher in small firms (Turner, 1983). Another crucial aspect to be taken into account is the equity stake held by management in small and large firms, considering a high management ownership stake has been shown by some research to correlate with high operational performance development (Cuny and Talmor, 2007; Wright et al., 1996; Lichtenberg and Siegel 1990; Thompson et al., 1992; Phan and Hill, 1995). Demsetz and Lehn (1985) find that management ownership is higher within small firms than large, which suggests that smaller firms possess a high probability of outperforming large firms. However, we hypothesize that managers in small firms focus to a greater extent on a buy-and-build strategy than managers in large firms, which draws attention away from cost-control and efficiency within the organizations. Consequently, as discussed above, larger firms are expected to focus on operational efficiency and margin expansion to a larger extent than small firms. Also, we recognize that smaller firms are naturally expected to grow at a higher rate than large firms

considering a small increase in absolute values will have a higher percentage impact on small firms.

The discussion above yields the following hypotheses:

H1 a): Small MBOs will exhibit a higher excess sales CAGR than large MBOs
H1 b) Small MBOs will exhibit a lower excess operational efficiency performance development than large MBOs

3.2. Difference in operating performance of PE backed and non-PE backed MBOs

The operational value creation of LBOs has been previously researched, and the general consensus is that the post-buyout operating performance of LBO targets increases (Smith 1990; Jensen 1989; Kaplan 1989), although some studies suggest that private equity buyouts merely transfer wealth from one stakeholder to another (Perry and Williams 1994; Phalippou, 2009). Vinten (2007) presents evidence that contradicts previous studies regarding positive operational value creation from PE ownership. Within the Danish market, Vinten (2007) finds that during the time period 1991-2004, PE backed buyouts significantly underperform industry peers. However, to the best of our knowledge, no study on management buyouts has included both PE backed and non-PE backed MBOs in their dataset.

Following the discussion on operational value generation in buyouts in section 2, it can be concluded that operational performance development clearly plays a big role in PE firms' strategy to generate adequate returns. Although there is no clear consensus regarding PE firms' ability to generate excess operational performance within their portfolio companies, we hypothesize that PE backed MBOs will generate both a higher sales CAGR as well as better operational efficiency development than non-PE backed MBOs.

H2 a) PE backed MBOs will experience a higher excess sales CAGR than non-PE backed MBOs
H2 b): PE backed MBOs will experience higher development in excess operational efficiency performance than non-PE backed MBOs

3.3. Size of management stake and its implications on the operating performance in MBOs

Some previous research supports the notion that MBOs successfully enhance the operating performance of companies (Kaplan, 1989; Cuny and Talmor, 2007; Wright et al., 1996; Lichtenberg and Siegel 1990; Thompson et al., 1992; Phan and Hill, 1995). For example,

Thompson et al. (1992) find that the size of management's equity stake is highly significant in explaining the operational post-buyout performance in U.K. MBOs, and Phan and Hill (1995) find that an increase in management ownership has an even higher impact on the operational performance than increased debt in a study on large U.S. public-to-private buyouts. However, Bergström et al. (2007) and Guo et al. (2011) surprisingly find no significant correlation between a high management equity stake and excess operational performance in a Swedish and U.S. context respectively. Although there is no clear evidence regarding the impact of management ownership on the operational performance, most research suggests that a higher management stake results in excess operational performance.

In addition to the arguments presented in section 2.5, a higher management stake should in theory incentivize managers to increase the operational performance and sales. Thus, we hypothesize that the sales CAGR as well as operational efficiency performance will be higher in MBOs where the incumbent management possesses a large equity stake post-buyout.

H3 a) MBOs with a higher management stake will experience a higher excess sales CAGR
H3 b): MBOs with a higher management stake will experience a higher development in excess operational efficiency performance

3.4. Difference in operating performance if the MBO is a secondary buyout

There has been a sharp increase in secondary buyouts in the past few years, (Bonini, 2015; Wang, 2012). Out of all the Swedish private equity buyouts in 2015, 30.7% of the firms were exited through a secondary buyout, surpassed only by public offerings which accounted for 36.5% of the divestments (Invest Europe, 2016). Although the prominence of SBOs is significant, the economic rationale behind these transactions is still ambiguous (Bonini, 2015; Wang, 2012).

Considering PE firms spend significant amounts of time working to improve the operations of their portfolio companies, as presented in section 2.2, all operational improvement opportunities should in theory already have been captured in the first buyout round, thus making SBOs unattractive. Resolving agency problems within the buyout target in the first round should result in substantial operational improvements (Wright et. al, 2009; Bonini, 2015), but since these are one-off changes, the only additional value a PE firm can add in the second round is through strategic initiatives and new investments (Bonini, 2015).

However, Wang (2012) argues that although efficiency gains and value creation are likely to have been captured in the primary buyout (PBO) there is no reason to believe that efficiency gains in the secondary buyout cannot exist. Two arguments are presented to support this claim

(Wang, 2012): First of all, it is possible that the original buyer did not realize the full efficiency gains in the primary buyout. For example, if the PE firm participating in the PBO had to perform a so called "forced sell"[8], some key strategic initiatives may not have been fully implemented yet, why the operational performance development in the PBO did not reach its full potential. Secondly, PE firms have different industry expertise and sector specializations, why different PE firms could add value to the portfolio companies in different maturity stages (Wang, 2012). For example, the PE firm backing the PBO could be especially good at expanding the operations of the company, while the PE firm backing the SBO could be especially good at minimizing costs and working capital management.

Bonini (2015) finds that primary buyouts significantly outperform their industry peers, while the operational performance of secondary buyouts do not differ from their peers, which is in contrast to the findings of Wang (2012), who does not find any clear differences across the buyout rounds or the peer group. As presented by Bonini (2015), a major reason as to why the results differ may be because Wang (2012) compares heterogeneous buyouts in the first and second round, while Bonini (2015) uses panel data for 163 companies[9]. In line with the findings of Bonini (2015), Eriksson and Wittgren (2014) also use panel data and find that second round buyouts in the Nordic region underperform first round buyouts.

In conclusion, there is no clear consensus on whether there is scope for excess operational performance development in secondary buyout targets. However, we take the view of Bonini (2015) and argue that most of the possible firm improvements are likely captured in the first round. The scenario of a PE firm not being able to extract the majority of the possible efficiency gains in the primary buyout is unlikely and ought to be an exception rather than the general case. Thus, we hypothesize that MBOs that are secondary buyouts exhibit a lower sales CAGR and operational efficiency performance development than other MBOs.

H4 a) MBOs that are SBOs will experience a lower excess sales CAGR

H4 b): MBOs that are SBOs will experience a lower development in excess operational efficiency performance

[8] A "forced sell" is when a PE firm is forced to divest their portfolio company prematurely because of fund constraints (Bonini, 2015). This could e.g. be when the PE firm needs to close the fund within a certain time frame and distribute the remaining funds to their investors.

[9] Equivalent to 326 buyouts on a stand-alone basis, since each company is subject to both a PBO and an SBO.

4. Methodology

4.1. Choice of operating metrics and event window

When choosing which metrics to be used for measuring the operational performance in the buyout sample we strove for comparability with previous research on buyouts. After having examined some of the most cited papers within the subject of buyouts (see for example; Kaplan, 1989; Wright et al., 1996; Barber and Lyon 1996; Bergström et al., 2007), the following accounting performance metrics were chosen: sales CAGR, change in EBITDA margin, change in EBIT margin and change in ROA, where sales CAGR measures the growth, and the other metrics measure the operational efficiency within the firm. How the metrics are calculated is presented in appendix table A2. The operational metrics measure the difference in the year prior to the buyout (t-1) and three years post-buyout (t+3).

The choice of event window (t-1 to t+3) is in line with the approach of Kaplan (1989) and Scellato and Ughetto (2013). Another approach would have been to only look at the difference between the year prior to buyout and the year the company is divested once again. We recognize two main issues in using the latter approach. Firstly, considering the incumbent management does not always intend to sell the company within a certain time frame, in contrast to for example a private equity firm, this would limit the sample of MBOs since many have not yet been exited. Secondly, the approach of comparing the operational performance in the year prior to the MBO with the performance three years afterwards is more common. By using another approach, the comparability of the results would diminish.

4.2. Peer group design

Peer groups have been gathered for each buyout based on industry and size. This has been done in order to adjust for variations across industries and isolate the determinants of excess operational performance. Moreover, it allows for an analysis of whether the MBOs experience abnormal returns in relation to industry peers. When matching a peer group to each individual MBO in the sample data, we have chosen to use the NACE[10] code system and then match by sales. The following framework was used for assigning peers to each buyout:

1. Based in Sweden
2. Minimum 50 MSEK in revenue
3. Same 2-digit NACE code
4. Accounting data available for the entire event window

[10] The NACE code system is a statistical classification of economic activities within the European community; http://ec.europa.eu/

5. Not included in the MBO sample
6. Matched by sales

The peer group companies were collected using the databases Amadeus[11] and Datastream[12], which provide extensive data for private and listed companies. Using the above framework, this yielded a peer group of 2,560 firms.

Each buyout company has been given a two-digit NACE code definition (see table A3 in the appendix for an overview of the NACE code main group distribution). Barber and Lyon (1996) state that the most common method of creating a peer group is by using either a two digit or four-digit industry definition. It can be argued that using a two-digit definition rather than a three- or four-digit definition (which is the maximum) creates a wide peer group, but according to Barber and Lyon (1996), no additional explanatory power is provided by using more than a two-digit definition when creating peer groups.

The databases Valu8[13] and Retriever[14] were used to collect the NACE codes for each company and were cross checked against each other. In a few instances, no official NACE code could be found, and in those cases an appropriate NACE code was assigned using the authors' own discretion. Two other issues were identified when giving the sample companies a certain industry code: Firstly, many of the companies within the buyout sample are holding companies, therefore either having no industry code at all or the code of "Activities of head office" and "Management consultancy activities". Secondly, some companies have multiple different subsidiaries and operations within their corporation, giving them suitability for a variety of different industry codes. To tackle these problems, the NACE code for the main operating subsidiary was used, thus giving companies the industry code that is most suitable for their respective business model. This approach is in line with that used by Bergström et al. (2007), who encountered similar issues.

The peer group was held constant throughout the entire event window, which is in line with the approach taken by Barber and Lyon (1996), i.e. the peer groups do not include companies that have gone bankrupt. This introduces a risk of survivorship bias amongst the peers, which we recognize as a limitation. However, the potential bias is likely to be small considering the peer

[11] Amadeus is a Bureau Van Dijk database containing comprehensive information for European companies; https://amadeus.bvdinfo.com/
[12] Datastream is a Thomson Reuters database; https://www.thomsonreuters.com/
[13] "Valu8 provides intelligent tools for screening and analyzing Nordic company data" http://www.valu8group.com/
[13] SDC Platinum provides data intelligence globally for the financial industry; https://www.thomsonreuters.com/
[14] Retriever is a Swedish database containing financial statements for Swedish companies; https://www.retriever.se/

group is large and since peers with poor operational performance development during the event window are still included.

As the study measures size as the main variable in the regression, we recognize the importance of using size matching in our analysis. One peer group was created for each buyout by matching at the 2-digit NACE code level and then identifying the closest 10 peers by sales at the year of the buyout. If the 2-digit level contained fewer than 10 peers, the framework was stretched to look at the NACE-code main industry level (1-digit), and then matched to each buyout[15]. Out of the 10 firms comprising each peer group, the median value for each operating metric has been used in order to mitigate the risk of extreme values within the peer group.

Barber and Lyon (1996) argue that there are benefits of using peers that have similar pre-event performance, since this makes the analysis more synchronized with the market and reduces the impact of mean reversion[16] in the data. Without these adjustments, there is a risk that the results may be biased for certain firms within the control group. However, in line with Bergström et al. (2007), we have decided to exclude this as criteria when creating the peer group. With a large enough sample, the pre-event performance should have minimal impact on the median that is used as a proxy. By using stricter criteria such as the one regarding synchronization of pre-event performance, the risk of minimizing the peer group sample increases, whereas NACE codes, geography and similar size[17] have been prioritized higher than pre-event synchronization.

After creating the industry peer group, adjusted operational performance have been created for each MBO in order to measure the improvement in operational performance in relation to industry peers and isolate the determinants of operational performance. This eliminates any industry specific events during the time period, and reveals the potential abnormal returns that are realized through a management buyout.

Furthermore, by dividing the companies into different NACE codes and creating a dummy variable that represents the main NACE code industry, it is possible to see if there is a correlation between successful MBOs and certain industries.

Considering the operational performance of financial and real estate companies are evaluated using different accounting metrics than other industries, these companies have been excluded from the buyout sample, reducing the buyout sample from 121 to 116 MBOs.

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[15] The framework was only stretched in a few cases, since only two industries contained fewer than 10 peers ("Mining and quarrying" and "Public administration and defence; compulsory social security").

[16] Pre-event matching reduces the risk of mean reversion, which is when the operating metrics revert back to the mean after having been at a temporarily high or low level. For example, if the company at the start of the event window has a temporarily high performance, a researcher might find that the company performs poorly, when the company is in fact only reverting back to its mean in a predictable manner (Barber and Lyon, 1996).

[17] Peers have similar size in terms of sales.

4.3. Data collection

4.3.1. MBO dataset

When selecting which buyouts to include in the MBO dataset, the first thing to decide upon is which definition to use for an MBO. In broad consideration, there are two versions of an MBO to choose between. These are pure MBOs and "regular" MBOs. A pure MBO is when the management of a company is the only participant in the transaction. There are no additional investors buying shares in the company and no financial sponsor actively engaged from the buyer side of the deal. The other, more common version, is when the management team is participating in the transaction from the buy-side, but does not have to be the only buyer. This is a much broader definition, and includes, but is not limited to, PE backed acquisitions. Within this definition, the management can take on many different management stakes. It could be a majority or a minority stake, but is regardless defined as an MBO.

This broader definition of MBOs is the definition we have chosen to use, and is based on two primary aspects:

1. Sample size and data accessibility – The definition of pure MBOs described above is quite rare, and there have been a limited number of pure MBOs in Sweden, why the MBO sample size would be reduced significantly should this definition of an MBO have been used. Furthermore, most relevant databases do not keep track of pure MBOs, which makes it much more time consuming and difficult to extract from a larger data sample. Bloomberg[18] is an example of a database that keeps track of pure MBOs, while SDC Platinum and MergerMarket do not.
2. Coherency with previous research – While looking at previous research on MBOs, we have found that most studies use the broader version. In fact, many MBO studies use sample data that consists almost exclusively of PE backed MBOs.

As the study examines operational performance and improvements, the financial data have been collected for a five-year period. That is, one year prior to the acquisition and three years after the acquisition (t-1 to t+3). Based on this, MBOs have been collected between the years 2005 and 2012. The latest year is 2012 since it is impossible to collect data for three years post-buyout for transactions later than 2012, due to the 2016 annual reports not yet having been made publicly available for the buyout companies. Buyouts earlier than 2005 are difficult to locate relevant data

[18] Bloomberg is a firm providing news, information and analytics worldwide; www.bloomberg.com/professional/

for. Upon examining other studies, it can be concluded that other studies performed have used similar time frames for their respective buyout samples.

The MBOs used in the study have been collected using a combination and cross checking of three different databases; MergerMarket, SDC Platinum and Bloomberg - all having detailed records of the Swedish buyout market.

Certain adjustments were deemed necessary in order to improve the sample data and its reliability. Firstly, adjustments were made to eliminate those companies that for a particular reason had no (t-1) or (t+3) values available. Examples of when companies had to be excluded due to lack of data include companies that reported their group figures in a foreign parent company prior to the buyout. Other examples include: (1) when the company was bought by a foreign company during the three-year period after the MBO had taken place, resulting in the group data being made available only in the foreign parent company, and (2) when the company was acquired and merged into another business during the three year period. We identify the unavailability of data for certain companies as a potential source of selection bias. However, we did not encounter that either large or small firms have data available to a larger extent than the other, which reduces our concerns of potential bias regarding the availability of accounting data.

Secondly, all companies that have gone into bankruptcy during the time period were excluded from the data sample. We recognize that this introduces a bias in the results, as it only affects companies that have performed poorly, as there is no exclusion of companies that have grown remarkably.

Thirdly, adjustments were made to eliminate companies that had sales below 50 MSEK (approx. 5 MEUR), as they have been deemed to be too small to be a part of the analysis. Healthcare companies, for example, can be very large although having little current revenue, but for coherency reasons, all companies below 50 MSEK have been excluded from the sample data.

In line with Kaplan (1990) and Smith (1990) we have restricted the final dataset to consist of firm MBOs rather than divisional MBOs[19], considering complete divisional accounting data is seldom reported, even amongst public companies (Lichtenberg and Siegel, 1990). We recognize the lack of divisional MBOs in the dataset as a limitation and potential source of bias towards poorly performing MBOs, considering empirical evidence suggest divisional MBOs experience higher operational improvements than firm MBOs (Singh, 1990; Muscarella and Vetsuypens, 1990). Singh (1990) suggests that the main reasons divisional MBOs experience higher sales growth and increases in operational improvement is because these MBOs exhibit the highest change in governance and manager incentives post-transaction.

[19] A divisional MBO is when a division of the company is divested to its responsible management team, whereas a firm MBO is when the entire firm is sold.

4.3.2. Operating metrics

The financial data for the MBOs have been hand-collected from the companies' financial statements. Tracking the companies post-buyout proved to be a difficult and time consuming process, but was made possible by thoroughly scrutinizing the annual reports for the organizational number of each new parent company post-transaction. In total, over 1,000+ annual reports were downloaded from the Retriever database. For some of the more recent transactions, the database Valu8 was used to collect the necessary accounting data, in order to reduce the time spent hand-collecting data. In cases where Valu8 were used, the data was checked at random with the respective annual reports to make sure there were no errors.

In a few cases, a few of the buyout companies changed fiscal reporting year either in the year prior to transaction (t-1) or three years afterwards (t+3), resulting in a shorter or longer fiscal year than the standard 12 months. In these cases, adjustments have been made to enhance the comparability. This was done by dividing the number of months reported and multiplying by 12, thus simulating what the results would have looked like on a 12 month-basis. Although this does not give a completely accurate picture of how the company performed, it gives a fairer picture of the operational performance than a shorter or longer reported period than 12 months. Additionally, when the average assets were unavailable for the calculation of ROA, the outgoing balance of total assets was used.

4.3.3. Control variables

In addition to collecting accounting data for the operational metrics, data for control variables were collected in order to test all of the hypotheses. The collection of data on the management equity stake was collected using MergerMarket, annual reports and press releases. In total, 71 observations were collected for the management stake out of the total sample of 116 MBOs. Information regarding if the MBOs were backed by a private equity firm or not have been collected mainly using MergerMarket, SDC Platinum and Bloomberg. If these databases have not contained the relevant information, annual reports from Retriever or press releases have been used. The same sources were used to collect information regarding if the MBOs were secondary buyouts. In total, the dataset contains 89 PE backed buyouts, and 30 secondary buyouts.

4.4. Regression model and statistical tests

Descriptive statistics

Two primary statistical tests have been performed, apart from the regressions. These are descriptive statistics and Welch's t-test (see tables B3-B6 in the appendix for Welch's t-test). These tests have been constructed in a way so that the results will give preliminary results and an indication of what the regression models seek to test. A size dummy, containing 50% of the largest MBOs by sales at the year of the buyout, defined as "large" and the 50% smallest MBOs defined as "small", was used as a base for the descriptive statistics to get a first indication as to whether hypothesis 1, regarding size differences in MBOs, is true. Other variables were also created in order to explain the other hypotheses.

The different operating metrics used to define operational performance and value creation was segmented into two categories, raw data and adjusted data. This creates a more descriptive picture of the performance of the sample data based on the independent variables, both in raw format as well as adjusted for industry effects, creating an adjusted variable that represents abnormal returns.

Through this, we receive key statistics of the different independent variables:

Table 1. Descriptive statistics for independent variables

Large MBOs	**N**	**Mean**	**Median**	**S.D.**
Size	58	1 384.9	645.7	1 830.2
PE backed	50	1 482.1	658.2	1 946.6
SBO	21	2 029.7	782.7	2 531.5
Management Stake	35	23.8%	18.3%	23.2%

Small MBOs	**N**	**Mean**	**Median**	**S.D.**
Size	58	150.7	145.0	61.4
PE backed	39	156.5	149.6	64.7
SBO	9	172.9	161.1	65.9
Management stake	36	42.3%	26.0%	34.0%

The table presents descriptive statistics for independent variables, distributed over large and small MBO sub-groups. All variables refer to the sales (MSEK) at the year of the buyout, except management stake which refers to the percentege of total equity held by management post-buyout.

Specification of regression model

In order to test each hypothesis, linear regressions have been performed. Certain differences exist between the different regressions, all of which will be described in greater detail below. The specifications of the regressions that will be run to test the hypotheses are the following:

Specification 1

$$\Delta OP = \alpha + \beta_1 * Size_{Dummy} + \beta_2 * PE\ Backed_{dummy} + \beta_3 * SBO_{dummy} + \beta_4 * Industry_{dummy} + \varepsilon$$

Specification 2

$$\Delta OP = \alpha + \beta_1 * Size_{Dummy} + \beta_2 * PE\ Backed_{dummy} + \beta_3 * Management\ Stake + \beta_4 * SBO_{dummy} + \beta_5 * Industry_{dummy} + \varepsilon$$

Please refer to table A1 in the appendix for a description of each variable in the regression models. Since we have four different metrics for measuring improved operational performance, sales CAGR, change in EBITDA margin, change in EBIT margin and change in ROA, we need to perform at least four different regression to test the dependent variables in regards to each metric.

The main variable that is of interest in the thesis and in the regression is the dummy variable for size. As seen in the formula, simultaneously as we test the correlation between different performance metrics together with the dummy variable for size, we also test the influence of other independent variables. The first of these variables is whether the transaction was PE backed, second being the percentage of the total equity that the management owns post-buyout, thirdly whether the transaction was a secondary buyout, and lastly a control variable for the industry in which the company operates.

In total, 71 observations were collected for the management stake out of the total sample of 116 MBOs. This minimizes the sample substantially when performing the regression, why two separate regressions have been performed as to not neglect the value of a larger buyout sample.

4.5. Robustness tests and limitations to the thesis

The data contains a number of outliers for the different operational metrics used that could skew the results of the analysis. Previous studies have handled this in different ways. One way is to use a trimming method of the data set by plotting the different observations and manually excluding observations that are outliers based on certain specified criteria. Another potential way of dealing with this is by using a logarithmic function to neutralize outliers and create a normalized distribution of the sample data.

We have chosen not to correct for any outliers in the main regressions and descriptive statistics. This as it has been verified that no incorrect data exists in the buyout sample, and after performing different robustness test, we could not find any large improvement in regards to significance or explanatory power by performing adjustments to the data set. However, as a robustness check, a regression with winsorized variables at the 5th and 95th percentiles have been

included in the appendix nevertheless (see tables B1-B2[20]). This method of treating outliers is in line with Barber and Lyon (1996).

In order to test the data and its significance, different tests have been performed in order to analyze its reliability. Firstly, a multicollinearity test was performed to evaluate the correlation and the dependency of different variables within the regression model. Although a tendency to correlation could be seen between certain variables at first sight, by performing a variance inflation factor analysis (VIF), it could be concluded that no tendency to multicollinearity existed in the data sample among the dependent variables. None of the variables, or the total mean, exceeded the value 4, which is commonly the value when one might suspect that there could be a multicollinearity problem within the dataset (O'brien, 2007). The results from the VIF analysis are presented in tables C3-C4 in the appendix.

Tests for heteroscedasticity have also been performed, both through scattering and Breusch-Pagan testing. No noticeable problem was found with the data in regards to heteroscedasticity, but robust regressions have nevertheless been made in order to adjust and correct for any potential impact of this.

We acknowledge that there might be certain issues and bias in regards to the accounting data and sample selection. Firstly, we have only studied a certain time period as event window, potentially creating misguiding results due to the typical investment horizon of 3-5 years of private equity firms. To examine this further, one would need to do a robustness test and evaluate the same operational metrics between inception and exit for all companies within the sample data. Secondly, the study only measures a limited number of operational metrics that have been deemed through research and literature to be the most prevalent. However, there are many other metrics available, some of which previous studies have used as proxies for measuring the operational performance. ROIC[21] is an example of this. Thirdly, as the data has been hand-collected manually, we have certified it ourselves that all accounting data is correct, although the risk for human error cannot be fully disregarded.

Through different tests and made analysis, we are confident that the potential biases in the data ought to have a very minor impact on the results and not distort the regressions.

5. Results and analysis

Tables 2-4 report the descriptive statistics and regression results.

[20] The winsorized regressions have no major improvement in regards to the significance levels and results in comparison to the untreated regressions.
[21] ROIC stands for return on invested capital.

Table 2. Descriptive statistics of operational performance metrics

	Total sample		Large sub-sample		Small sub-sample		PE backed		Non-PE backed		Large equity stake		Small equity stake		SBO		Non-SBO	
	Raw	Adj.	Raw	Adj.	Raw	Adj.	Raw	Adj.	Raw	Adj.	Raw	Adj.	Raw	Adj.	Raw	Adj.	Raw	Adj.
Sales CAGR																		
N	116	116	58	58	58	58	89	89	27	27	36	36	35	35	30	30	86	86
Mean	0.106	0.037	0.084	0.023	0.122	0.051	0.127	0.058	0.037	-0.033	0.106	0.041	0.108	0.041	0.055	-0.015	0.123	0.055
S.D.	0.176	0.175	0.129	0.145	0.201	0.201	0.183	0.180	0.129	0.141	0.178	0.189	0.215	0.208	0.112	0.117	0.191	0.189
Median	0.076	0.019	0.072	0.018	0.097	0.032	0.097	0.043	0.024	-0.039	0.069	0.032	0.073	-0.014	0.045	-0.032	0.097	0.048
Max	1.150	1.025	0.385	0.629	1.150	1.025	1.150	1.025	0.381	0.205	0.686	0.629	1.150	1.025	0.403	0.321	1.150	1.025
Min	-0.201	-0.439	-0.115	-0.195	-0.201	-0.439	-0.164	-0.222	-0.201	-0.439	-0.201	-0.439	-0.164	-0.222	-0.150	-0.195	-0.201	-0.439
Δ EBITDA Margin																		
N	116	116	58	58	58	58	89	89	27	27	36	36	35	35	30	30	86	86
Mean	-0.022	-0.010	-0.015	0.006	-0.031	-0.026	-0.028	-0.013	-0.003	0.001	0.006	0.009	-0.019	0.010	-0.028	-0.021	-0.020	-0.006
S.D.	0.090	0.106	0.063	0.115	0.096	0.094	0.093	0.113	0.078	0.077	0.068	0.072	0.090	0.129	0.125	0.135	0.075	0.094
Median	-0.009	-0.004	-0.005	0.005	-0.013	-0.019	-0.013	-0.005	-0.005	-0.003	-0.005	0.013	-0.004	0.005	-0.014	-0.001	-0.006	-0.010
Max	0.315	0.383	0.093	0.383	0.229	0.189	0.315	0.383	0.229	0.189	0.229	0.189	0.315	0.383	0.315	0.335	0.229	0.383
Min	-0.357	-0.361	-0.231	-0.361	-0.357	-0.346	-0.357	-0.361	-0.153	-0.155	-0.153	-0.155	-0.261	-0.252	-0.357	-0.361	-0.269	-0.250
Δ EBIT Margin																		
N	116	116	58	58	58	58	89	89	27	27	36	36	35	35	30	30	86	86
Mean	-0.036	-0.028	-0.032	-0.019	-0.040	-0.037	-0.048	-0.038	0.003	0.007	0.005	0.008	-0.037	-0.016	-0.040	-0.040	-0.034	-0.024
S.D.	0.106	0.117	0.078	0.120	0.116	0.115	0.106	0.121	0.100	0.099	0.086	0.088	0.102	0.129	0.137	0.144	0.094	0.107
Median	-0.021	-0.016	-0.011	-0.009	-0.029	-0.033	-0.026	-0.027	-0.014	-0.008	-0.012	-0.002	-0.020	-0.001	-0.002	-0.013	-0.026	-0.020
Max	0.301	0.310	0.094	0.310	0.301	0.298	0.241	0.310	0.301	0.298	0.301	0.298	0.241	0.310	0.241	0.251	0.301	0.310
Min	-0.431	-0.476	-0.268	-0.476	-0.371	-0.354	-0.431	-0.476	-0.184	-0.188	-0.184	-0.188	-0.341	-0.336	-0.431	-0.476	-0.290	-0.286
Δ ROA Margin																		
N	116	116	58	58	58	58	89	89	27	27	36	36	35	35	30	30	86	86
Mean	-0.088	-0.064	-0.079	-0.049	-0.097	-0.079	-0.107	-0.083	-0.026	-0.002	-0.050	-0.015	-0.099	-0.071	-0.068	-0.055	-0.095	-0.067
S.D.	0.181	0.201	0.117	0.148	0.228	0.243	0.172	0.198	0.202	0.201	0.191	0.224	0.156	0.162	0.170	0.189	0.186	0.206
Median	-0.047	-0.052	-0.048	-0.026	-0.047	-0.069	-0.052	-0.061	-0.028	-0.008	-0.076	-0.021	-0.032	-0.040	-0.037	-0.028	-0.078	-0.071
Max	0.356	0.498	0.212	0.304	0.356	0.498	0.237	0.498	0.356	0.387	0.356	0.498	0.023	0.271	0.237	0.498	0.356	0.387
Min	-0.835	-0.814	-0.432	-0.497	-0.835	-0.814	-0.835	-0.814	-0.432	-0.346	-0.432	-0.497	-0.681	-0.653	-0.681	-0.653	-0.835	-0.814

The table reports descriptive statistics for all independent variables related to the hypotheses. Descriptive statistics have also been created for the entire data sample of MBOs. Total sample represents the entire dataset and are general descriptives of the data. Large & small sub-samples represent the size dummy and is the total data sample divided into one group for all large firms and one group for all small firms. PE backed & non-PE backed contain descriptive statistics for all firms belonging to the respective category. Large and small equity stake is divided into two groups of the firms that contained relevant shareholder data (71 firms in the sample). SBO & non-SBO is structured similarly to 'PE backed' and 'non-PE backed'.

Table 3. Regression 1 - all variables except management stake

VARIABLES	(1) Sales CAGR	(2) Sales CAGR Adj.	(3) Delta EBITDA	(4) Delta EBITDA Adj.	(5) Delta EBIT	(6) Delta EBIT Adj.	(7) Delta ROA	(8) Delta ROA Adj.
Size	-0.0435	-0.0377	0.0259	0.0389*	0.0189	0.0298	0.0260	0.0403
	(0.0321)	(0.0313)	(0.0176)	(0.0207)	(0.0204)	(0.0225)	(0.0375)	(0.0422)
PE backed	0.110***	0.117***	-0.0267	-0.0192	-0.0552**	-0.0509**	-0.106**	-0.116**
	(0.0390)	(0.0399)	(0.0182)	(0.0203)	(0.0227)	(0.0240)	(0.0450)	(0.0475)
SBO	-0.0896***	-0.0954***	-0.00751	-0.0186	0.00629	-0.00813	0.0530	0.0380
	(0.0312)	(0.0318)	(0.0252)	(0.0288)	(0.0287)	(0.0314)	(0.0404)	(0.0451)
Industry	0.00503***	0.00394***	-0.000520	0.000317	-0.000498	0.000133	3.96e-05	0.00272
	(0.00143)	(0.00147)	(0.000800)	(0.000873)	(0.000955)	(0.00101)	(0.00179)	(0.00210)
Constant	-0.0372	-0.0906***	-0.00173	-0.0165	0.00556	-0.00438	-0.0341	-0.0610
	(0.0310)	(0.0323)	(0.0233)	(0.0238)	(0.0278)	(0.0280)	(0.0507)	(0.0535)
Observations	116	116	116	116	116	116	116	116
R-squared	0.206	0.178	0.035	0.038	0.051	0.042	0.059	0.066

The table presents the coefficients and robust standard errors (in parentheses) from a robust regression of the operational performance change one year prior to buyout (t-1) and three years afterwards (t+3). Adj. refers to the adjusted changes in operating performance of the MBOs in relation to their respective peer groups. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

Table 4. Regression 2- all variables

VARIABLES	(1) Sales CAGR	(2) Sales CAGR Adj.	(3) Delta EBITDA	(4) Delta EBITDA Adj.	(5) Delta EBIT	(6) Delta EBIT Adj.	(7) Delta ROA	(8) Delta ROA Adj.
Size	-0.0218	-0.0182	0.0234	0.0453*	0.0142	0.0348	0.00198	0.0328
	(0.0548)	(0.0538)	(0.0195)	(0.0256)	(0.0226)	(0.0264)	(0.0423)	(0.0474)
PE backed	0.154**	0.212**	0.0223	0.00629	0.0119	-8.39e-05	0.0623	0.0707
	(0.0758)	(0.0820)	(0.0229)	(0.0278)	(0.0312)	(0.0337)	(0.0657)	(0.0677)
Management Stake	0.0785	0.167	0.0972**	0.0546	0.130***	0.101*	0.298***	0.365***
	(0.0997)	(0.113)	(0.0402)	(0.0493)	(0.0463)	(0.0513)	(0.0931)	(0.0906)
SBO	-0.0801	-0.0728	0.0279	0.0162	0.0399	0.0251	0.0810	0.0864
	(0.0500)	(0.0513)	(0.0305)	(0.0352)	(0.0324)	(0.0357)	(0.0534)	(0.0592)
Industry	0.00654***	0.00502**	0.000402	0.00137	0.00123	0.00204**	0.00213	0.00474**
	(0.00206)	(0.00218)	(0.000761)	(0.000845)	(0.000824)	(0.000903)	(0.00164)	(0.00205)
Constant	-0.135	-0.247**	-0.0807**	-0.0659	-0.107**	-0.0999**	-0.280***	-0.345***
	(0.0902)	(0.103)	(0.0360)	(0.0424)	(0.0455)	(0.0485)	(0.0848)	(0.0877)
Observations	71	71	71	71	71	71	71	71
R-squared	0.201	0.186	0.095	0.081	0.134	0.107	0.171	0.238

The table presents the coefficients and robust standard errors (in parentheses) from a robust regression of the operational performance change one year prior to buyout (t-1) and three years afterwards (t+3). Adj. refers to the adjusted changes in operating performance of the MBOs in relation to their respective peer groups. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

Descriptive statistics of total MBO sample

The results indicate that MBOs grow at a substantially higher rate than industry peers, which is quite interesting considering the MBOs have been matched to the 10 closest industry peers by sales at the point of entry. It suggests that management buyouts are much better than industry peers at expanding.

Descriptive statistics reveal that the total MBO sample experiences an abnormal return for sales CAGR of 3.7 percentage points on average and a median value of 1.9 percentage points above the industry peer groups. There are several possible explanations as to why MBOs experience considerably higher sales growth than peers. Firstly, the most likely explanation is related to acquisitions. This as a majority of the sample data consist of MBOs that are PE backed, and thus influenced by the principles and techniques employed by private equity firms to increase the value of the firm prior to divestment. This includes bolt-on acquisitions and strategic growth initiatives, resulting in higher sales growth than the general market.

Upon examining the operational efficiency metrics, e.g. EBITDA margin, EBIT margin and ROA, the results reveal that the Swedish management buyouts between 2005 and 2012 underperform their respective industry peers, which stands in contrast to some previous findings (see for example; Cumming et al., 2007; Kaplan, 1989; Wright et al., 1996; Acharya and Kehoe, 2008), but is in line with the results of Vinten (2007) and Desbrières and Schatt (2002) who study buyouts within the Danish and French market respectively. Following is a discourse as to why the operational efficiency performance of the buyouts is worse than for comparable firms within the same industries.

One of the reasons why operational performance development in the dataset differs from some older studies could be because the buyout landscape has changed in the time period between those studies and today (see for example; Wang, 2012; Kaplan and Strömberg, 2009). Guo et al. (2011), for example, find that the value creation in more recent deals is substantially lower overall. Desbrières and Schatt (2002) identified a large portion of family-owned firms within their dataset, i.e. where the pre-buyout ownership concentration is high, as one of the main reasons for operational underperformance. This study has made no distinction as to whether the MBOs were family-owned pre-buyout, but considering the family ownership within the Swedish market is high and companies overall are more closely held than in e.g. the U.K and U.S. (Faccio and Lang, 2002), this might explain the low operational efficiency performance development in the dataset. Additionally, Vinten (2007) suggests that perhaps the private equity governance model is not as suitable for countries in which the corporate ownership is concentrated.

Another possible explanation as to why the results differ from a few of the other studies (see for example; Wright et al., 1996) is the choice of event window. In this study, we chose an approach in line with Kaplan (1989) and Scellato and Ughetto (2013), who measure the operational performance change in the year prior to acquisition (t-1) to three years afterwards (t+3). It is possible that the benefits associated with a management buyout have not been fully realized within this time span, which could be why the MBOs in our dataset do not show the same operational outperformance in relation to industry peers as some other studies find in regards to operational efficiency development. Wright et al. (1996), for example, find that MBOs outperform their benchmark particularly three-year post-buyout and beyond, i.e. after the event window that this study examines.

Another aspect that might make the data biased is the revaluation of assets after an acquisition, which might have a negative effect on a metric like ROA.

Operating performance in MBOs of different sizes

Upon examining the differences based on size, the descriptive statistics indicate that small firms experience a considerably higher growth rate in sales than large firms that are subject to an MBO, which is in line with hypothesis (1 A). This is hardly surprising, considering it is easier to grow at a larger percentage rate each year if the absolute starting value is small. The relatively higher standard deviation of small firms is also to be expected, considering their business model, products and organizational structure are presumably not as developed as for larger firms.

When examining the large vs small sub-groups, it is possible to distinguish that large MBOs indeed deliver a better performance when it comes to EBITDA margin, whereas smaller firms do not. This is also in line with expectation and the fact that smaller firms experience higher sales growth. Larger firms focus more on efficiency and operational performance through margins than smaller firms that have presumably higher ambitions to grow their businesses.

However, the regression reveals no clear differences in performance development for management buyouts of different sizes, as the overall results of the size variable are not statistically significant. The only metric that shows significance is the peer adjusted EBITDA margin change, which is on average higher for the large MBOs in comparison to the small firms below the 6.3% (8.1%) level[22], providing support for hypothesis (1 B).

[22] 6.3% (8.1%) significance level depending on if management stake is included (excluded) in the regression.

Difference in operating performance of PE backed and non-PE backed MBOs

The regression reveals that management buyouts backed by a Private Equity firm experience higher sales growth than non-PE backed MBOs below the 1% significance level, supporting hypothesis (2 A). This result was expected based on the different strategies used by PE-firms to increase the value of their target firms, and is in line with the findings of previous research on the subject. A major reason as to why the PE backed MBOs grow at a significantly higher rate than their industry peers and non-PE backed MBOs is likely due to bolt-on acquisitions to portfolio companies that PE firms conduct. Both in terms of merging businesses and making large investments to grow portfolio companies.

In contrast to hypothesis (2 B), our results show that PE backed MBOs have negative EBIT and ROA development below the 5% significance level. This stands in contrast to the findings of Smith (1990), Jensen (1989) and Kaplan (1989) but is in line with the findings of Vinten (2007), who find that private equity ownership is associated with a negative operational performance in relation to industry peers. The results also support the suggestions made by Perry and Williams (1994) and Phalippou (2009), who argue that buyouts only transfer wealth between different stakeholders – not increase the operational performance of the buyout company.

Important to take into consideration, however, is that the data only covers the year prior to the buyout until three-years afterwards. Many PE firms have longer investment horizons than 3 years, and the data could therefore be misleading compared to if one were to examine the operational development at the exit date. Based on the results, it is likely that PE backed MBOs focus more on growth in the first three years following the buyout, rather than operational efficiency in order to increase the value of the firm.

Size of management stake and its implications on the operating performance in MBOs

When examining the impact of management stake on operational performance in MBOs, no significant result was possible to retrieve from the made regression for sales CAGR. However, a tendency can be seen that higher percentage rate owned by management at the time of the transaction increases the firm's sales CAGR, albeit not statistically significant. In the sample data, companies defined as having a high management stake have a median abnormal return of 3.2 percentage points above that of its industry peers, whereas firms belonging to the group defined as having a small management stake underperform. As it is not statistically significant, no clear conclusion can be drawn from the regression, however the positive value of 0.167 still gives an indication of the impact of management stake on the sales growth.

Unlike for sales CAGR, the regression reveals significant result on multiple different metrics for operational efficiency (both adjusted EBIT and adjusted ROA). We receive a value of 0.101 at the 10% significance level for change in EBIT margin and 0.365 at the 1% significance level for change in ROA margin. What this proves is that there exists a strong correlation between the size of the management stake in an MBO and the operational efficiency within the firm. The results support the suggestions made by Jensen (1986) and Cuny and Talmor (2007), who argue that increased management ownership reduces free cash flow agency costs and managerial entrenchment. The results are also in line with the findings of Thompson et al (1992) and Phan and Hill (1995).

What is interesting to take notice of, however, is that even though a larger management stake is better when it comes to operational efficiency in MBOs, according to the descriptive statistics, the median adjusted value for both EBIT margin and ROA is lower than for the industry peer group, regardless of management stake size. This would indicate that MBOs in general perform worse than their industry peers on operating efficiency metrics. The regression was not able to find any statistical significant results for the adjusted value of EBITDA margin. It did however find that a higher management stake leads to a higher operational raw EBITDA[23] margin development at the 5% significance level.

In conclusion, the results highlight the importance of incentivizing the incumbent management through co-investments, as it results in a better use of resources and reduced agency costs.

Difference in operating performance if the MBO is a secondary buyout

The regression and descriptive statistics provide support to our hypothesis that the likelihood of a PE firm being unable to realize the majority of all the possible efficiency gains in the first round is low, and that SBOs therefore are likely to underperform in comparison to primary buyouts. Both the descriptive statistics and regression model reveal results that support hypothesis (4 A); MBOs that are secondary buyouts experience a lower sales CAGR than other MBOs below the 1% significance level. These results are in line with the findings of Bonini (2015), who find that primary buyouts perform significantly better than secondary buyouts. A possible explanation as to why the performance of SBOs differ to that of PBOs is that the companies experience a substantial one-off reduction in agency costs in the first round, thus resulting in operational outperformance in comparison to the secondary buyout. This reasoning is in line with the suggestions made by Meuleman et al. (2009). Although Wang (2012) argues that there is scope for

[23] Raw data refers to the performance unadjusted for industry peers.

efficiency gains in SBOs as well, the descriptive statistics indicate that SBOs experience worse operational efficiency development overall in comparison to primary buyouts. These results support hypothesis (4 B), that MBOs that are SBOs will experience a lower development in operational efficiency.

6. Conclusion

This thesis has sought to answer the impact of size on the post-buyout operational performance development of Swedish management buyouts. Previous research has been done on LBOs and fund size, but to the best of our knowledge, no research on the impact of size has been made on MBOs. Consideration has also been taken to other factors, such as the size of the management equity stake post-buyout and whether the transaction was private equity backed or a secondary buyout. In total, 116 MBOs were included in the analysis whereof information about management stake was collected for 71 of these. In order to isolate the determinants of excess operational performance, each buyout was matched to its ten closest peers from a sample of 2,560 Swedish firms.

Table 5 – Summary of hypotheses tests

Hypotheses	Support	Significance
H1 - Operating performance in MBOs of different sizes		
H1A: Small MBOs will exhibit a higher excess sales CAGR than large MBOs	**TRUE**	**NO**
H1B: Small MBOs will exhibit a lower excess operational efficiency performance development than large	**TRUE**	**NO**
Small MBOs will exhibit a lower change in EBITDA margins	*TRUE*	*YES*
Small MBOs will exhibit a lower change in EBIT margins	*TRUE*	*NO*
Small MBOs will exhibit a lower change in ROA	*TRUE*	*NO*
H2 - Difference in operating performance of PE backed and non-PE backed MBOs		
H2A: PE backed MBOs will experience a higher excess sales CAGR than non-PE backed MBOs	**TRUE**	**YES**
H2B: PE backed MBOs will experience higher development in excess operational efficiency performance than non-PE backed MBOs	**FALSE**	**YES/NO**
PE-backed MBOs will exhibit a higher change in EBITDA margins	*FALSE*	*NO*
PE-backed MBOs will exhibit a higher change in EBIT margins	*FALSE*	*YES*
PE-backed MBOs will exhibit a higher change in ROA	*FALSE*	*YES*
H3 - Size of management stake and its implications on the operating performance in MBOs		
H3A: MBOs with a higher management stake will experience a higher excess sales CAGR	**TRUE**	**NO**
H3B: MBOs with a higher management stake will experience a higher development in excess operational efficiency performance	**TRUE**	**YES/NO**
MBOs with higher management stake will exhibit a higher change in EBITDA margins	*TRUE*	*NO*
MBOs with higher management stake will exhibit a higher change in EBIT margins	*TRUE*	*YES*
MBOs with higher management stake will exhibit a higher change in ROA	*TRUE*	*YES*
H4 - Difference in operating performance if the MBO is a secondary buyout		
H4A: MBOs that are SBOs will experience a lower excess sales CAGR	**TRUE**	**YES**
H4B: MBOs that are SBOs will experience a lower development in excess operational efficiency	**TRUE/FALSE**	**NO**
MBOs that are SBOs will exhibit a lower change in EBITDA margins	*TRUE*	*NO*
MBOs that are SBOs will exhibit a lower change in EBIT margins	*TRUE*	*NO*
MBOs that are SBOs will exhibit a lower change in ROA	*FALSE*	*NO*

The table reports the hypothesis results reached through the made regressions and descriptive statistics. In the column support, "TRUE" indicates that the data favors the made hypothesis, whereas "FALSE" indicates the opposite. All significance data is from regression 1 except for H3 which is from regression 2. Significance denotes whether the results are significant at either the 1%, 5% or 10% level.

The study finds limited significant support for the existence of differences in operational performance development for MBOs of different sizes. This is interesting since it implies that perhaps there is no optimal size category in which an MBO can be particularly effective, and that previous suggestions that restructurings are more effective in small organizations (see for example; Turner, 1983) may be incorrect. Considering that Wright et al. (1996) write that smaller and larger buyouts are more prone to failure than medium-sized buyouts, our findings of no clear differences depending on firm size calls for further research on the area.

Additionally, the thesis reveals that a high management equity stake significantly correlates with a high operational efficiency development, providing support to the notion that an alignment of interests between managers and shareholders improves firm performance.

Private equity backed management buyouts are found to grow at a significantly higher rate than non-private equity backed MBOs, in line with what was hypothesized. This is likely due to the strategic growth initiatives employed by PE firms, as well as the higher rate of bolt-on acquisitions amongst PE backed MBOs. Surprisingly, the results also reveal that the backing of a PE firm has a significantly negative impact on the operational efficiency of the buyout target, which is in line with the findings of Vinten (2007). This is interesting, considering it suggests that the PE governance model perhaps is not as suitable for countries where the overall company ownership concentration is high – since the ex-ante agency costs in theory are lower.

The study also sheds light on the long-term impact of private equity ownership by examining the operational performance of MBOs that are secondary buyouts. The results reveal that secondary buyouts experience significantly lower sales growth than primary buyouts, further strengthening the notion that most of the value creation is captured in the first buyout round.

By providing recent evidence on the Swedish buyout market, the study contributes to existing literature as well as industry practitioners. The results support the notion that it is important to incentivize top management through co-investments, since it results in a better use of resources. It would be interesting to investigate this further in future research, for example by measuring the executive pay as well as take into account potential option schemes used to incentivize the management team.

Additionally, the study suggests that there is no clear size category in which management buyouts perform particularly well, and that management buyouts in Sweden seem to underperform their respective industry peers in terms of operational efficiency. In order to isolate the size factor and confirm the results found in this thesis, future research could look at a more homogeneous buyout sample, by looking at e.g. only pure MBOs or only PE backed MBOs.

We hypothesize that one of the main reasons management buyouts underperform is due to the high ownership concentration in Sweden, which would be interesting to investigate further in future research. Other studies could aim to confirm whether the pre-buyout concentration of ownership, and whether the firm was family owned, indeed affects the operational performance development post-buyout. Another suggestion for further research is to conduct a similar study outside of Sweden. The operational performance development in contemporary management buyouts in other geographies may differ from the results in this study, considering the Swedish private equity market is very mature. Moreover, we encourage future studies to research the operational performance development of MBOs on a longer time frame, considering the long-term results and value creation may differ from the first three years post-buyout.

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Appendices

Appendix A

Table A1. Description of dependent and independent variables

Variable	Description
Δ OP	Change in operating performance for the chosen metric
Management Stake	Variable capturing the fraction of the total equity held by management post-buyout
$Size_{dummy}$	Variable capturing whether the firm is large or small, measured by sales (50% quartile)
PE $Backed_{Dummy}$	Variable capturing whether the MBO is PE backed
SBO_{Dummy}	Variable capturing whether the MBO is a secondary buyout
$Industry_{Dummy}$	Variable capturing which 2-digit NACE code the MBO is categorized under

The table presents definitions of dependent and independent variables in the regressions.

Table A2. Formulas for operational performance metrics

$$Sales\ CAGR = \left(\frac{Sales_{t+3}}{Sales_{t-1}}\right)^{\frac{1}{4}} - 1$$

$$\Delta\ EBITDA\ Margin = \frac{EBITDA_{t+3}}{Sales_{t+3}} - \frac{EBITDA_{t-1}}{Sales_{t-1}}$$

$$\Delta\ EBIT\ Margin = \frac{EBIT_{t+3}}{Sales_{t+3}} - \frac{EBIT_{t-1}}{Sales_{t-1}}$$

$$\Delta\ ROA = \frac{EBIT_{t+3}}{Average\ assets_{t+3}} - \frac{EBIT_{t-1}}{Average\ assets_{t-1}}$$

The table reports calculations for operational performance metrics.

Table A3. NACE code grouping of sample data

NACE Code - Main Group Definition	N	Percentage of Total Sample
Manufacturing	43	37%
Whole sale and retail trade; repair of motor vehicles and motorcycles	22	19%
Information and communication	10	9%
Human health and social work activities	10	9%
Construction	9	8%
Administrative and support service activities	6	5%
Education	5	4%
Proffesional, scientific and technical activities	4	3%
Transportation and storage	4	3%
Water supply; sewage, waste management and remediation activities	2	2%
Accommodation and food service activities	1	1%
Total	**116**	**100%**

The table presents the distribution of MBOs across different industries based on their respective NACE main group code.

Appendix B

Table B1. Regression of all variables included as operational metrics in the data, excluding the variable management stake, winsorized robustness check at the 5th and 95th percentiles

VARIABLES	(1) Sales CAGR	(2) Sales CAGR Adj.	(3) Delta EBITDA	(4) Delta EBITDA Adj.	(5) Delta EBIT	(6) Delta EBIT Adj.	(7) Delta ROA	(8) Delta ROA Adj.
Size	-0.0366	-0.0321	0.0209	0.0258	0.0175	0.0247	0.0138	0.0326
	(0.0245)	(0.0231)	(0.0146)	(0.0160)	(0.0172)	(0.0189)	(0.0305)	(0.0342)
PE backed	0.0871***	0.0838***	-0.0206	-0.0227	-0.0429**	-0.0477**	-0.0821**	-0.103**
	(0.0311)	(0.0283)	(0.0157)	(0.0177)	(0.0175)	(0.0207)	(0.0396)	(0.0444)
SBO	-0.0736***	-0.0786***	-0.00586	-0.00487	0.0139	0.00710	0.0590*	0.0366
	(0.0265)	(0.0271)	(0.0191)	(0.0206)	(0.0222)	(0.0239)	(0.0323)	(0.0344)
Industry	0.00454***	0.00362***	-0.000292	0.000527	-0.000287	0.000245	0.000434	0.00254
	(0.00121)	(0.00112)	(0.000663)	(0.000717)	(0.000778)	(0.000836)	(0.00144)	(0.00169)
Constant	-0.0247	-0.0723***	-0.00989	-0.0184	-0.0112	-0.0104	-0.0525	-0.0596
	(0.0264)	(0.0253)	(0.0186)	(0.0201)	(0.0212)	(0.0236)	(0.0426)	(0.0492)
Observations	116	116	116	116	116	116	116	116
R-squared	0.252	0.219	0.032	0.036	0.047	0.046	0.056	0.071

The table presents the coefficients and robust standard errors (in parentheses) from a robust regression of the operational performance change one year prior to buyout (t-1) and three years afterwards (t+3). Adj. refers to the adjusted changes in operating performance of the MBOs in relation to their respective peer groups. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively. The data for the operational performance metrics have been winsorized at the 5th and 95th percentile level.

Table B2. Regression of all variables included as operational metrics in the data, winsorized robustness check at the 5th and 95th percentiles

VARIABLES	(1) Sales CAGR	(2) Sales CAGR Adj.	(3) Delta EBITDA	(4) Delta EBITDA Adj.	(5) Delta EBIT	(6) Delta EBIT Adj.	(7) Delta ROA	(8) Delta ROA Adj.
Size	-0.000719	-6.11e-05	0.0186	0.0283	0.0119	0.0261	-0.00279	0.0345
	(0.0345)	(0.0331)	(0.0161)	(0.0191)	(0.0189)	(0.0215)	(0.0353)	(0.0372)
PE backed	0.113*	0.139**	0.0277	0.0146	0.0284	0.0115	0.0736	0.0696
	(0.0635)	(0.0532)	(0.0216)	(0.0244)	(0.0239)	(0.0279)	(0.0604)	(0.0635)
Management Stake	0.0791	0.130*	0.0889***	0.0744*	0.122***	0.110**	0.278***	0.341***
	(0.0757)	(0.0727)	(0.0321)	(0.0382)	(0.0376)	(0.0446)	(0.0837)	(0.0840)
SBO	-0.0556	-0.0503	0.0137	0.0187	0.0339	0.0318	0.0938**	0.0829**
	(0.0385)	(0.0397)	(0.0210)	(0.0237)	(0.0245)	(0.0279)	(0.0401)	(0.0411)
Industry	0.00548***	0.00411***	0.000704	0.00153**	0.00126*	0.00191**	0.00182	0.00391**
	(0.00160)	(0.00154)	(0.000614)	(0.000685)	(0.000684)	(0.000783)	(0.00147)	(0.00174)
Constant	-0.112	-0.187***	-0.0868***	-0.0831**	-0.121***	-0.111***	-0.276***	-0.319***
	(0.0690)	(0.0664)	(0.0326)	(0.0354)	(0.0379)	(0.0412)	(0.0747)	(0.0773)
Observations	71	71	71	71	71	71	71	71
R-squared	0.267	0.225	0.116	0.127	0.164	0.147	0.194	0.255

The table presents the coefficients and robust standard errors (in parentheses) from a robust regression of the operational performance change one year prior to buyout (t-1) and three years afterwards (t+3). Adj. refers to the adjusted changes in operating performance of the MBOs in relation to their respective peer groups. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively. The data for the operational performance metrics have been winsorized at the 5th and 95th percentile level.

Table B3. Welch's t-test of differences between Small and Large sub-groups

Difference between Small and Large sub-groups	N	Mean	Std. Error	Significance
Sales CAGR (small - large)	116	2.87%	3.25%	37.98%
Δ EBITDA margin (small - large)	116	-3.20%	1.95%	10.40%
Δ EBIT margin (small - large)	116	-1.87%	2.18%	39.39%
Δ ROA (small - large)	116	-3.06%	3.73%	41.44%

The table reports all observations in the sample, no observations have been dropped due to missing values. Sales CAGR mean represents the difference in average compounded annual growth of sales rate during the event window between companies defined large and small (a size dummy variable was created). EBITDA, EBIT and ROA represent the difference in average absolute percentage change during the entire event window. All data is industry adjusted.

Table B4. Welch's t-test of differences between Small and Large management stake

Difference between Large and Small sub-groups	N	Mean	Std. Error	Significance
Sales CAGR (small - large)	71	-0.01%	4.73%	99.77%
Δ EBITDA margin (small - large)	71	0.14%	2.48%	95.48%
Δ EBIT margin (small - large)	71	-2.37%	2.62%	37.03%
Δ ROA (small - large)	71	-5.65%	4.62%	22.61%

The table reports all observations containing information regarding management stake. 45 observations have been dropped due to missing values. Sales CAGR mean represents the difference in average compounded annual growth rate of sales during the event window between companies defined as having large and small management stake (a management stake dummy variable was created for the 50% largest management stake observations). EBITDA, EBIT and ROA represent the difference in average absolute percentage change during the entire event window. All data is industry adjusted.

Table B5. Welch's t-test of differences between non-PE backed and PE backed MBOs

Difference between classification sub-groups	N	Mean	Std. Error	Significance
Sales CAGR (non PE-backed - PE-backed)	116	-9.18%	3.31%	0.75%
Δ EBITDA margin (non PE-backed - PE-backed)	116	1.38%	1.91%	47.39%
Δ EBIT margin (non PE-backed - PE-backed)	116	4.51%	2.29%	5.43%
Δ ROA (non PE-backed - PE-backed)	116	8.10%	4.40%	7.24%

The table reports all observations in the sample, no observations have been dropped due to missing values. Sales CAGR mean represents the difference in average compounded annual growth rate of sales during the event window between companies defined as PE backed and non-PE backed (a PE backed dummy variable was created). EBITDA, EBIT and ROA represent the difference in average absolute percentage change during the entire event window. All data is industry adjusted.

Table B6. Welch's t-test of differences between non-SBO and SBO MBOs

Difference between classification sub-groups	N	Mean	Std. Error	Significance
Sales CAGR (non SBO - SBO)	116	6.99%	2.95%	2.00%
Δ EBITDA margin (non SBO - SBO)	116	1.42%	2.66%	59.66%
Δ EBIT margin (non SBO - SBO)	116	1.61%	2.88%	57.88%
Δ ROA (non SBO - SBO)	116	-1.16%	4.11%	77.82%

The table reports all observations in the sample, no observations have been dropped due to missing values. Sales CAGR mean represents the difference in average compounded annual growth rate of sales during the event window between companies defined as SBOs and non-SBOs (an SBO dummy variable was created). EBITDA, EBIT and ROA represent the difference in average absolute percentage change during the entire event window. All data is industry adjusted.

Appendix C

Table C1. Correlation between all independent variables, excluding management stake

Regression 1	Size	PE backed	SBO	Industry
Size	1.000			
PE backed	0.224	1.000		
SBO	0.236	0.325	1.000	
Industry	0.045	0.189	-0.034	1.000

The table reports the correlation between the independent variables included in regression 1. Values close to 1 (-1) indicate highly positive (negative) correlation between the independent variables. Values around 0, indicate low to zero correlation.

Table C2. Correlation between all independent variables

Regression 2	Size	PE backed	Mgmt Stake	SBO	Industry
Size	1.000				
PE backed	0.380	1.000			
Mgmt Stake	-0.307	-0.723	1.000		
SBO	0.180	0.302	-0.315	1.000	
Industry	0.135	0.165	-0.186	0.077	1.000

The table reports the correlation between the independent variables included in regression 2. Values close to 1 (-1) indicate highly positive (negative) correlation between the independent variables. Values around 0, indicate low to zero correlation.

Table C3. Multicollinearity testing on regression 1 – Variance Inflation Factor

Variance Inflation Factor - Regression 1

Variable	VIF	1/VIF
PE backed	1.20	0.83
Size	1.17	0.86
SBO	1.09	0.92
Industry	1.05	0.95
Mean	1.13	

The table presents the variation inflation factor for regression 1, performed in order to test for multicollinearity. The lower the values in the VIF column, the lower the probability of multicollinearity. No indication of multicollinearity is found.

Table C4. Multicollinearity testing on regression 2 – Variance Inflation Factor

Variance Inflation Factor - Regression 2

Variable	VIF	1/VIF
PE backed	2.24	0.45
Management Stake	2.16	0.46
Size	1.18	0.84
SBO	1.13	0.89
Industry	1.04	0.96
Mean	1.55	

The table presents the variation inflation factor for regression 2, performed in order to test for multicollinearity. The lower the values in the VIF column, the lower the probability of multicollinearity. No indication of multicollinearity is found.

Appendix D

Table D1. Management Buyout Sample

Target	Buyer	Entry year	NACE rev. 2 code	SBO	PE backed
AB Annas Pepparkakor	Accent Equity Partners AB	2005	10	NO	YES
AB Vastanfors Industrier	AB Vastanfors Industrier	2011	25	NO	NO
Academic Work Sweden AB	Academic Work	2006	78	NO	NO
Addici Holding AB	Danske Bank, Management Group	2008	80	NO	NO
Aditro Logistics AB	Valedo Partners	2012	52	NO	YES
Akademikliniken AB	Valedo Partners	2011	86	NO	YES
Aleris Holding AB	EQT III fund	2005	87	NO	YES
Ambea AB	Triton Partners	2010	87	YES	YES
Anticimex AB	Ratos AB	2006	81	YES	YES
Apelns Express AB	Investor Group	2011	38	NO	YES
APSIS International AB	Norvestor V, L.P.	2010	58	NO	YES
Aptilo Networks AB	Norvestor V, L.P.	2011	62	NO	YES
Ariterm Group AB	Management Group	2011	28	NO	NO
Aspen AB	Valedo Partners	2007	46	NO	YES
Attendo AB	Bridgepoint Advisers Limited	2005	87	NO	YES
Aura Light Group AB	FSN Capital II, L.P	2006	27	YES	YES
Automation Press and Tooling AP&T	Fairford Holdings Scandinavia AB	2009	28	YES	YES
Benify	Vitruvian Partners LLP	2011	69	NO	YES
Bergteamet AB	Polaris Private Equity	2011	42	YES	YES
Boomerang International AB	Priveq Investment	2006	46	NO	YES
BS Elcontrol AB	BS Elcontrol AB(MBO Vehicle)	2008	27	NO	NO
BYGGmax AB	Altor 2003 Fund	2006	47	NO	YES
ByggPartner i Dalarna Holding AB	Priveq Investment; Ytna AB	2006	41	NO	YES
Cambio Healthcare Systems AB	Valedo Partners Fund II AB	2012	58	YES	YES
Componenta Albin AB	Componenta Albin AB (MBO Vehicle)	2007	28	NO	NO
Coromatic Group AB	EQT Expansion Capital II	2011	71	YES	YES
Crem	Accent Equity Partners AB	2007	28	NO	YES
Crem International AB	SEB Venture Capital; Priveq Investment Fund IV L.P.	2012	28	YES	YES
Cross Country Systems AB	CrossCo Investment AB, Management Group	2005	26	YES	YES
Eco-Borastapeter AB	Litorina Kapital	2010	17	NO	YES
El & Industrimontage Svenska AB	Goodtech Intressenter AB	2007	43	NO	NO
Elkapsling AB	Management Group	2007	27	NO	NO
Eltel AB	3i Group Plc	2007	61	NO	YES
Emotron AB	Polaris Private Equity II K/S, Management Group	2007	28	NO	YES
Enfo Z	Enfo Z	2011	62	NO	NO
Envirotainer AB	AAC Capital Partners	2010	29	YES	YES
Espresso House Sweden AB	Palamon Capital Partners LP	2006	56	NO	YES
eTRAVELi AB	Segulah IV, L.P.	2010	63	YES	YES
Etteplan Tech AB	Private Investor	2009	71	NO	NO
Euroflorist Sverige AB	Litorina Kapital	2007	46	YES	YES
EuroMaint AB	Ratos AB	2007	33	NO	YES
Exotic Snacks AB	Segulah III, L.P.	2008	46	NO	YES
Exotic Snacks AB	Credelity Capital AB	2011	46	YES	YES
F.O.V. Fabrics AB	FOV Fabrics	2008	13	NO	NO
Fiskarhedenvillan AB	Litorina IV L.P.	2012	46	YES	YES
Five Seasons AB	EQT Opportunity Fund	2006	46	NO	YES

Table D1. Management Buyout Sample (cont'd)

Target	Buyer	Entry year	NACE rev. 2 code	SBO	PE backed
Flexlink AB	AAC Capital Partners	2005	46	YES	YES
Flextrus AB	A&R Carton AB	2011	17	YES	YES
Forvaltnings AB CJ Bjornberg	Björnberg Group	2009	43	NO	NO
GCE Gas Control Equipment AB	Argan Capital Advisors LLP	2005	46	YES	YES
Gycom AB	Management Group, Credelity Capital AB	2007	47	NO	YES
Hansen Conference & Event AB	2E Group AB	2007	79	NO	NO
Hermods AB	Strukturfonden II	2008	85	YES	YES
Hilding Anders AB	Candover Investments Plc; MV Credit;	2009	31	YES	YES
Hooks Hastsport AB	Accent Equity Partners AB	2011	47	NO	YES
Human Care HC AB	GGC Health Care	2008	86	NO	YES
Humana AB	Argan Capital Advisors LLP	2008	87	NO	YES
Inflight Service Europe AB	CapMan Oyj, Maneq, Management Group	2005	52	NO	YES
Intrac Group AB	Catella Investments; Baltic Investment Fund III	2007	46	NO	YES
IV Produkt AB	Götalandsexpressen	2005	28	NO	NO
JB Education AB	Axcel Industriinvestor A/S	2008	85	NO	YES
Jetpak Group AB	Polaris Private Equity	2006	52	NO	YES
Joy Shop AB	Management Group	2009	47	NO	NO
Karosseriverken I Urbanusson	Backarydsgruppen SPV	2011	29	NO	NO
Kellve AB	Reiten & Co Capital Partners VII L.P.	2008	28	YES	YES
Kendrion Mefa AB	Management Group	2007	29	NO	NO
Kungsörs Plast AB	KPS Petrol Pipe System (Management vehicle)	2009	22	NO	NO
Lekolar AB	3i Group Plc	2007	46	YES	YES
Lensway AB	Investor Group	2010	46	NO	NO
Metals & Powders Trading AB	CapMan Mezzanine IV Fund; CapMan Buyout IX	2009	24	NO	YES
Molnlycke Health Care AB	Investor AB; Morgan Stanley Principal Investments	2007	46	YES	YES
Mont Blanc Industri AB	Accent Equity 2008, L.P.	2007	29	NO	YES
mySafety Forsakringar AB	Litorina Kapital	2007	80	NO	YES
Nackademin AB	Nackademin Holding AB	2008	85	NO	YES
Nefab AB	Nordic Capital Fund VI LP, Management Group,	2007	16	NO	YES
Nimbus Boats Sweden AB	Altor Equity Partners AB	2006	30	NO	YES
Nordic Brass Gusum AB	Nordic Brass Gusum AB	2011	24	NO	NO
Nordic Water Products AB	Privista Capital AB; Management Group	2008	46	NO	YES
Oral Care AB	Procuritas Capital Investors IV LP	2010	86	NO	YES
Osby Glas AB	Procuritas AB	2012	23	NO	YES
Pallco AB	Polstiernan Industri AB	2006	31	NO	YES
Permascand AB	Mittkapital i Jämtland och Västernorrland AB	2012	24	NO	YES
Perstorp	PAI Partners	2005	43	YES	YES
Perten Instruments Group AB	Valedo Partners	2010	46	NO	YES
PIAB Invest AB	Altor Fund II GP limited	2006	28	NO	YES
Polarica AB	Hartwall Capital Oy AB, Intera Fund I	2010	10	YES	YES
PPS Power Planning System AB	The Riverside Company	2011	85	NO	YES
Projectplace International AB	Investor; InnovationsKapital; Via Venture Partners	2009	58	NO	YES
Proxima AB Nacka Narsjukhus	CapMan Plc	2007	86	NO	YES
Pysslingen Forskolor och Skolor AB	Polaris Private Equity III	2009	85	NO	YES
Samres AB	PEO AB	2010	52	NO	YES
Samsa AB	CapMan Life Science IV Fund LP	2009	43	NO	YES
San Sac AB	Priveq Investment Fund III	2008	38	NO	YES
ScandBook AB	Accent Equity Partners AB	2006	18	NO	YES
Scandinavian Track Group AB	Polaris Private Equity III	2011	42	NO	YES
Scienta Scientific AB	InnovationsKapital	2010	26	YES	YES
Semantix AB	Litorina Kapital III. L.P.	2009	74	YES	YES
Skandinavisk Kommunalteknik AB	Litorina IV L.P.	2011	46	YES	YES
Skanska Byggvaror AB	Polaris Private Equity	2012	25	NO	YES
Solhagagruppen AB	Valedo Partners	2007	87	NO	YES
SoliferPolar AB	Mikael Colebring, Mikael Engström, Kaisa Engström	2011	29	NO	NO
SRG Online AB	Norvestor IV LP, Management Group	2007	63	NO	YES
Structo AB	Lyckes Förvaltning AB	2005	24	NO	NO
Sveab AB	Management Group,ITP Invest	2009	42	NO	YES
Svenskt Konstsilke AB	Svenskt Konstsilke AB (MBO Vehicle)	2007	46	NO	NO
Svenssons i Lammhult AB	Investor Group	2007	47	NO	NO
Svdtotal AB	Priveq Investment Fund III	2007	43	NO	YES
Team Olivia AB	Procuritas AB	2008	86	NO	YES
The Chimney Pot AB	Boiling Water AB	2011	59	NO	NO
Tolerans AB	Litorina Kapital	2006	28	YES	YES
Troax Group AB	Accent Equity 2008, L.P.	2010	25	NO	YES
Unfors RaySafe AB	Unfors Holding	2006	26	NO	YES
Verisure Holding AB	Hellman & Friedman LLC; Bain Capital LLC	2011	80	YES	YES
Water Jet Sweden AB	Vega Ronneby AB	2009	28	NO	NO
Xlent Consulting Group	Neqst Partner AB	2009	62	YES	YES
Zetterbergs Produkt AB	Eriksson & Erfäldt Holding AB; Management Group	2005	29	NO	NO

The table contains the entire sample data of target firms, acquiring firms, year of the transaction, NACE code definition of each target firm, and whether the transaction was PE backed or an SBO.