Operational Value Creation following Levered Buyouts: Domestic and Cross-Border LBO's Compared

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Abstract

This study examines whether operational value is created for target companies in the first three years following a Levered Buyout (LBO) as compared to their public peers. It further investigates if there are differences in value creation between domestic and foreign Private Equity (PE) acquirers. A novel and hand-collected dataset, consisting of 317 Levered Buyouts in Great Britain, France and Sweden during the 2000-2012 period, is used. This paper provides evidence that PE backed firms do experience better operating performance in the first three years following the buyout than their matched non-buyout peers. Most notably, PE firms are able to increase the Return on Assets and Revenue growth of their portfolio companies as compared to their matched peers. No conclusive evidence is found that supports the existence of operational value creation differences between domestic and cross-border PE acquirers.

1. Introduction

Following the increase of Private Equity buyouts (PE) since the 1980's a vast body of research developed that investigates this phenomenon. Value can be created in a Levered Buyout (LBO's) in broadly two different ways (Baum and Silverman, 2004; Bottazzi, Da Rin, and Hellmann, 2008). The first is through profiting from multiple-arbitrage by means of good target selection, and buying at low prices while selling at high prices. The second way is through post buyout operational value creation, or real efficiency returns, for the portfolio company. The majority of prior studies focus on whether PE firms are able to generate abnormal returns for their investors as compared to the traditional equity markets (Kaplan and Schoar, 2005; Jones and Rhodes-Kropf, 2003 amongst others). However, the post 2007 financial crisis has increased the concerns regarding the real economic effects of LBO's on target firms and society as a whole. Recent cases of PE backed firms going bankrupt attracted a vast amount of media attention, giving the industry a bad name in the eye of the public (the bankruptcy of V&D which was owned by the PE firm Sun Capital is one recent example that attracted a lot of media attention in the Netherlands). This paper focuses on real operational value creation for the target company in Levered Buyouts. There are broadly two views on the effects that PE ownership has on operational value creation. Firstly, there is a group of researchers that agrees with Jensen (1989) who proposes that PE firms create operational value in target firms. He argues that this is achieved through closer alignment of incentives between management and owners, and through using extensive leverage so that companies are forced to cut wasteful expenditures. More recently researchers added an additional way of value creation by PE firms through closely monitoring their investments and leveraging their industry knowledge and connections (Kaplan and Strömberg 2009). Others argue that PE firms destroy operational value by focussing on short term gains (Rappaport 1990), and cutting jobs and wages (Schleifer and Summers 1988). Empirical evidence is inconclusive, but seems to suggest that PE firms are able to improve the operational performance of their target firms somewhat. It is important for target firms to know what effect a potential buyout has on their operating performance. Moreover, additional research in this area helps to improve the public debate on the role of PE firms. Therefore this paper aims to aims to add to the public and academic debate by answering the first research question:

i) Do PE-backed firms show superior operating performance following a LBO as compared to their non-buyout matched peers?

The increasing incidence of cross-border LBO's in which a domestic corporation is taken over by a foreign PE firm is another interesting development in the PE market. Due to differences in legal and regulatory regimes private equity markets developed in relative isolation till the early 2000's (Megginson 2004). However, Aizeman and Kendall (2008) and Cornelius (2011) both show that the global diffusion of private equity is gaining momentum. A result is that the percentage of cross-border PE transactions is increasing. However, little is known about the operational effects of cross border LBO's as compared to domestic LBO's. On the one hand foreign PE acquirers could face disadvantages due to cultural and geographic distance, factors that are known to negatively effect corporate M&A takeovers (Stafford and Miles 2013). On the other hand, internationally operating PE funds might have superior skills and experience in helping their portfolio companies grow to new geographical markets (Cornelius 2011). To my knowledge Scellato and Ughetto (2013) is the only prior paper that compares the operational performance between target firms of domestic and cross-border LBO's. However, this area of research is relevant to all parties involved in LBO's. Therefore, this paper adds to this novel and relevant research topic by answering the following research question:

ii) Do targets of domestically backed LBO's show superior operating performance as compared to targets of cross-border LBO's?

In order to answer these two research questions, I use a unique data set consisting of 317 LBO's completed between 2000 and 2012 in Great Britain, France, and Sweden. This sample period is interesting as it is heavily influenced by the post-2007 economic downturn. I expect that differences in the ability to create operational value become more obvious during this period, as I presume that it is more difficult to create value in an adverse economic environment. All data is hand collected from the databases Zephyr and Orbis. The whole ownership chain, including all NEWCO's[1], is collected in order to accurately determine the post buyout financials of the target, and the leverage used in the deal. I test for three distinct measures of operating performance, namely: operating profitability (Return on Assets = Net Income / Average Total Assets, EBITDA margin, and EBIT margin), operating productivity (Asset Turnover = Revenue / Average Total Assets), and growth (Revenue Growth). Two

[1] NEWCO's are referred to here as all companies that are involved in the ownership chain when a PE firm takes over a target company. They act as intermediate companies between the owner (the PE firm) and the target.

different ways of calculating these measures are used. Firstly, the changes in operational performance measures are calculated from 1 year prior to the buyout (t-1) to the third year following the buyout. Secondly, they are calculated from 1 year prior to the buyout to the average of the first three years following the buyout. Both measures are included in the regressions to test if the results are robust to different calculation methods. All operating performance measures are adjusted for the median industry changes in order to account for country, industry, and year specific developments.

Consistent with prior literature, the model returns some evidence that LBO targets show superior operational performance as compared to their matched non-buyout firms in the first three years following the buyout. Specifically, the two-tailed Wilcoxon rank test of the median performance changes returns that the industry adjusted ROA change is positive (0,62%) and significant (although EBITDA and EBIT margin show the same direction, these results are insignificant). Moreover, the model shows that the matched peers showed a significant decrease in revenues, while the change in revenue for the LBO targets was insignificant. Moreover, it is shown that PE firms improve employment in the first three years following the buyout. These findings can be used to facilitate a more informed public debate on the effect that PE ownership has on operational performance. Moreover, these findings add to the existing studies on the topic.

Contrary to my initial expectations, this study provides no conclusive evidence that there exist differences in operating value creation between domestic and cross-border LBO's. Specifically, targets of cross-border LBO's showed superior changes in Return on Assets as compared to targets of domestic LBO's in the first three years following the buyout. However, targets of domestic LBO's are shown to achieve superior changes in EBITDA margin. More research into this area is encouraged in order to get more robust results. These results are important to both PE firms in choosing their geographical positioning, and to targets in selecting PE acquirers.

This study contributes to literature in several ways. Firstly, there exists very little research on whether domestic and cross border LBO's have different effects on the operational performance of target companies. This study differs from the only other paper in this area (Scellato and Ughetto 2012) that I am aware of in several ways. I use both private-to-private and public to private deals, where Scellato an Ughetto (2012) only use the former. Moreover, their study examines the 1997-2004 pre-recession period, while this study uses deals from the 2000-2012 period. Secondly, this study uses a unique dataset that is collected

at the deal level. The advantage is that the true size of leverage used in deals can be calculated, as all relevant holding companies are known.

The remainder of this paper is organised as follows. The second section describes relevant previous literature and develops the hypotheses from it. The third section describes the data and empirical method. In the fourth section the results are described. Finally the conclusion is presented in section five.

2. Theory and Hypothesis

2.1 Theory on operational value creation / destruction following Levered Buyouts

Theory presents several ways through which LBO's are able to create operational value.

The first one is through reducing the principal agent agency problem. The principal agent problem arises due to the separation of ownership and control, i.e. managers might have different incentives then owners. It was first proposed by Jensen (1989) that PE firms create value by closely aligning incentives of managers with those of the owners. They do so by letting managers co-invest, and by enacting a strong relationship between pay and performance. If management performs well they can earn a large upside through options and stocks. These days, however, this practice is also common amongst public firms; Carter et al. (2007) show that 80 per cent of the public firms in their sample granted stock options. Still, alignment in PE owned firms is likely to be superior to that in public firms for two reasons. Firstly, most PE firms take companies private, meaning that they do not have publicly trading stocks. Therefore, the damaging effect of short term stock price manipulation that stock based compensation in public firms often has as a result is not present in PE backed firms (Jensen 2005). Moreover, management in LBO deals receives on average an equity upside of 15-16%, which is significantly higher then in public corporations (Acharya et al. 2012; Kaplan and Strömberg 2009). Furthermore, PE firms often require management to acquire an equity stake, exposing them to the downside personally (Kaplan and Strömberg 2009). The closer alignment of incentives is likely to reduce wasteful expenditures, and increase operating efficiency and employee productivity according to Jensen (1989). However, Cumming et al. (2007) show that the majority of LBO's takes over private companies, which might have less severe agency problems. The reason is that the manager often has at least some ownership in

these corporations. Still, at least at public companies it is likely that the alignment of incentives has a positive effect on operating performance.

Secondly, PE firms are said to add operational value by more actively monitoring their portfolio companies than boards of public companies do. One way in which this is shown is that PE firms take often take a seat on the board of their portfolio companies. Acharya et al. (2012) show that PE owned company boards meet twelve times per year. This high number of board meetings indicates that PE firms are actively monitoring their companies. Moreover, they show that management is replaced within four years of the LBO in two third of the buyouts in their sample. Therefore, it is likely that PE firms create value by swiftly replacing underperforming managers. Furthermore, Cornelli and Karakas (2008) showed that PE owned companies have smaller boards than comparable public firms. John and Senbet (1998) describe that having small board of around four members is associated with optimal operating performance. All this implies that PE owned firms monitor their investments closely, have efficient boards, and are able to take swift action in the case of underperformance.

Thirdly, some argue that value is created in LBO's through the use of large sums of debt. The high interest and principal payments resulting from this debt ascertain that firms do a better job in managing their cash flows efficiently. Jensen (1989) argues that overleveraging forces managers to free up cash for interest repayments by shrinking overhead, and dispose inefficient assets. He further states that the free cash flow problem, which holds that some managers spend excess cash on wasteful expenditures rather then returning it to investors, is being reduced by significant leverage.

Fourthly, recently PE firms started adding value to portfolio companies through operational engineering (Kaplan and Strömberg 2009). Operational engineering is the act where PE firms lever their industry and operating experience upon their portfolio firm. Unlike the first PE firms in the 1980's that mainly hired dealmakers, PE firms today employ professionals with operating or consulting backgrounds as well. They are able to help develop and implement value creation plans. These plans include cost reductions, changes in strategic positioning, management changes, and buy and build strategies (Kaplan and Strömberg 2009).

Lastly, PE ownership relieves former public companies from short-term share price pressure, and allows them to focus on value creation in the longer term (Gadiesh and MacArthur 2008). Rappaport (2005) finds that investors in public markets mainly focus on quarterly earnings, meaning that companies that forego short-term profit in favour of long-

term value creation will be undervalued. This is likely to bias the decisions of management to wards short term earnings as their reputation and pay package are partly related to stock prices (Rappaport 2005). Although PE firms have relatively short investment horizons of around 5 years, this is still significantly longer than most investors in public equity.

Others propose that LBO's either do not add or destroy operational value.

As described earlier, some propose that LBO's allow managers to focus on long run value creation by relieving them from the short-term pressure of shareholders. However, Rappaport (1990) amongst others argues that PE firms could promote short-term growth at the expense of long-term growth. As their investment horizon is often only around 5 years or shorter, they might encourage management to forego profitable long-term investments in order to boost short-term earnings. Moreover, profitable investment opportunities might be foregone because most cash is needed for debt repayment. In other cases large amounts of debt can even lead to bankruptcy. Indeed, Himmelberg and Petersen (1994) find using a sample of public companies that larger amounts of debt are associated with lower R&D spending. However, the causal relation here is not clear, so it could be that struggling firms have more debt and less spending on R&D.

Another concern is that an LBO leads to a wealth transfer from employees to the investors. Schleifer and Summers (1988) hypothesize that PE firms might increase operating performance following a buyout by reducing wages and reducing the number of employees. For this reason, the total economic effect of the investment could be negative if the costs of employee welfare loss are larger then the operational gains (Kaplan and Strömberg 2009).

Lowenstein (1985) argues that operating income increases following LBO's because managers have private information on the company. Managers can therefore time the moment of the buyouts if they know that operating income will be higher than markets expect. More importantly, managers might manage earnings downwards prior to the buyout, in order to get purchase the company for a lower price. This would indicate that increases in operating performance are not due to the LBO, but are merely due to earnings management. Although this would not directly destroy economic value, it would mean that empirical findings on the operating performance of LBO's are unreliable.

All in all theory suggest that there is some reason to believe that LBO's do add operational value to firms.

2.2 Empirical evidence on operational value creation / destruction following Levered Buyouts

In this section previous studies on operational value creation are described, and the first hypotheses are developed. The vast strand of literature investigates whether PE returns outperform public equity markets, and are therefore outside the scope of this paper.

Early empirical research on the operating effects of Management Buyouts (MBO's) focused on the US and found positive operational results following a LBO. Palepu (1990) summarizes the early research by stating that LBO's create significant operational performance improvements, and that there is little evidence that they lead to employee layoffs or wage reductions. Smith (1990) finds in a sample of 58 buyouts that operating returns per employee and operating returns per asset increase significantly after an LBO as compared to the industry average. He proposes that the increased efficiency is attributable to the better alignment of incentives between the management and the shareholder. Kaplan (1989a) finds similar positive results for buyout target companies in the first three years after a buyout. He finds that following a LBO the market-adjusted increase in value is 96% from two months before a buyout till the exit. This return is driven by lower capital expenditures, and increases in operating income and cashflows following a buyout. Kaplan (1989a) finds a negative but insignificant industry adjusted change in employment, thereby not supporting the employee wealth transfer hypothesis proposed by Schleifer and Summers (1988). Additionally, Kaplan (1989a) finds no evidence that private information is used to manage earnings downward prior to the buyout. Therefore, his findings do not support the private information under-pricing hypothesis as described in Lowenstein (1985).

More recent studies on the real effects of levered buyouts investigate deals from the second wave of buyouts occurring in the last decade. These differ from earlier studies by focussing on both US and European buyouts, where the older studies are mainly from the US. Moreover, recent studies are typically more inclusive in comparing the operating performance to a relevant peer group (Scellato and Ughetto 2013). The general conclusion from the recent studies is that LBO's seem to have a positive effect on the performance of target companies, although evidence is more missed than in earlier studies. Wilson et al. (2012), use a sample of over 32.000 UK buyouts over the period 1995-2010. They find that PE backed companies outperform their non-PE backed rivals. More specifically, the PE backed companies experience higher growth, and larger increases in profitability and

productivity than comparable non-PE backed firms. They further show that PE target companies outperform their matched peers by more during the post-2007 recession period, than prior to the crisis period. This result can be explained because PE firms target profitable companies in low risk sectors that are therefore more robust to downturns. One study similar to mine is Scellato and Ughetto (2013). Using a sample of 241 LBO buyouts in the period 1997 till 2004, they found a positive impact of LBO's on the growth of assets and employment. However, they find that operating profitability of LBO backed companies is trailing that of comparable public companies. They do not find a significant effect on productivity. Guo et al. (2011) finds using US buyouts that the operating performance of the PE backed targets is similar to or slightly exceeds that of the benchmark firms. Desbrierres and Schat (2002) show using a sample of French buyouts between 1988 and 1994 that PE firms tend to select high performing companies, but that their operating performance decreases as compared to the peer group after the buyout. They further show that French deals use little leverage as compared to deals in the UK and US. Lower leverage reduces the disciplining effect of the buyout, and could therefore explain why their finding differs from most literature. In a recent study, Paglia and Harjoto (2014) find that PE ownership has a positive impact on the portfolio firms revenue growth. They find that this effect lasts for the first three years following the buyout.

Given these prior studies, I propose the following two hypotheses:

H1 Following a LBO, PE backed firms show superior operational profitability changes as compared to their matched non-buyout peers.

H2 Following a LBO, PE backed firms show higher levels of revenue growth than comparable non-buyout companies.

Another way of operational value creation, in addition to improving profitability, is improving the productivity of assets (Guo et al. 2011). Relatively little research has been done on this form of value creation. Harris et al (2005) assess the total factor productivity of over 35 725 UK manufacturing plants that were involved in a LBO. They find that PE-owned companies experience significant increases in productivity after the buyout, a result that holds across all industries. Jovanovic and Rousseau (2002) found similar results and propose that PE ownership helps firms to shift resources to their most efficient use, and

thereby increases productivity. Wilson et al. (2012) shows similar results for UK target firms in the period 1995-2010.

These studies lead to my third hypothesis:

H3 Following a LBO, PE backed firms show superior productivity changes as compared to comparable non-buyout companies.

As described in the previous section, there is some concern that PE firms improve operating performance measures, while not adding value to the economy. Here I will investigate whether prior empirical research finds evidence for these adverse effects of buyouts. This is important as I aim to test whether PE firms add value to their target firms and the economy as a whole.

There is no empirical evidence that PE firms improve operating profitability in the short term at the expense of the portfolio companies' performance after they exit. Lichtenberg and Siegel (1990) used a small sample of 43 LBO's in the 1980's and found that portfolio companies increase their research spending after a takeover as compared to their peers. Similarly, Lerner et al. (2011) show that former PE portfolio companies do not show a decline in patenting activity, which they use as a proxy for innovation. Therefore, they conclude that PE firms do not sacrifice this form of long-term investment for short-term gains. Amess et al. (2016) study 407 UK deals and find that PE owned firms show a 6 percent increase in quality adjusted patent stock in the three years following the LBO. This indicates that PE firms invest in innovative activity following a buyout. This result further supports the view that PE firms invest in long-term value. Furthermore, Cao and Lerner (2007) find that former PE portfolio companies show positive industry adjusted stock performances after their IPO's. This indicates that PE ownership does not adversely effect companies performance after the exit. Levis (2011) find supporting evidence in 1992-2005 period, and shows that IPO's of PE targets return better operational and market performance in the first three years as compared to non-sponsored IPO's. To summarize, empirical evidence does not support the view that PE firms sacrifice long-term investments for short-term gains.

Empirical studies find mixed evidence supporting that the observed operational improvements following a LBO are the result of manager's private information. Ofek (1994) studies proposed MBO's that do not materialize, and finds no evidence for improved

operational performance in these cases. If management indeed suppressed operational earnings and forecasts in order to profit from their private information, operational improvements should appear regardless of the deal going through. There is however evidence that PE firms are able to time the market in buying firms, allowing them to generate higher returns then those justified solely by operational improvements. Guo et al. (2011) find only modest increases in operational performance following buyouts, while they still record high financial returns for the PE funds. They show that changes in industry valuation are a positive contributor to buyout returns. This seems to be evidence that PE firms are able to identify firms and industries that are undervalued, but is no proof for earnings management. Perry and Williams (1994) and Mao and Renneboog (2015) do find strong evidence of earnings manipulation prior to management buyouts. One should therefore be careful in interpreting the results from studies of operating performance following buyouts, as the effects found might be due to earnings management instead of the PE involvement.

Previous studies show mixed evidence supporting the claim that employees suffer from PE involvement in the form of wage decreases and lower job growth. Kaplan (1989a) finds that although employment increases following an LBO, it does so by less then employment at the matched public firms. In a more recent study, Davis et al. (2011) show that employment at LBO portfolio companies increases by less then in the industry. However, LBO portfolio companies had slower employment growth prior to the takeover as well. Lichtenberg and Siegel (1990) find that although labour declines following a buyout, it does so at a slower pace than prior to the buyout. Moreover, they find that workers wage rates increase following the buyout.

Although the effect relative to peers is ambiguous, evidence suggests that employment grows following a LBO. Therefore, I propose the following fourth hypothesis:

H4 Employment is increased in PE backed firms following a LBO.

2.3 Theory on operational value creation differences between domestic and cross-border LBO's

In this section I will explore different theories that are relevant in examining whether there exist operational value creation differences between domestic and cross-border LBO's.

Firstly, cultural differences between the target and acquirer can make the integration of the two companies a complex task. Indeed, a culture clash is named by managers as the

number one reason for a deal's failure to achieve the promised value in corporate M& transactions (Stafford and Miles 2013). The reason is that culturally different companies are hard to integrate successfully. Although PE target firms are not typically integrated in the acquirer (except in the case of a buy and build strategy), there is still reason to believe that cultural differences will make the monitoring task of PE firms harder, thereby adversely affecting the operational performance of the target. Secondly, domestic PE firms might have superior contacts and insider information as compared to foreign firms (Cornelius 2011). This could help them in selecting better targets. Moreover, their industry and operating experience could be more relevant to the target, as they reside in the same country.

On the other hand, foreign acquirers could improve productivity by more then domestic acquisitions if foreign acquirers transfer superior skills and technologies to the target company (Oldford and Otchere 2016). However, I expect this effect to be less likely in my sample as all target firms are from highly developed countries making it less likely that unknown state of the art technologies are introduces. Moreover, culturally different companies are likely to have different sets of capabilities and resources (Chakrabarti et al. 2009). Sharing these might lead to larger value creation opportunities through PE firms monitoring and operational engineering activities. Lastly, it is plausible that cross-border LBO's have a superior expertise of growing a companies business internationally. This as they are likely to have superior international experience and better international contacts.

2.4 Empirical evidence on differences between domestic and cross border LBO value creation

As there is only little empirical evidence on differences between domestic and cross border LBO's, I start with examining the most relevant findings from corporate takeovers. Although corporate takeovers differ significantly from LBO's as the acquirer and target are never merged in the latter, I believe this is a good starting point.

Gugler et al. (2004), using a sample of 45.000 mergers between 1981 and 1998, found no difference in profitability or sales performance following either a cross border or domestic corporate takeover. Chakrabarti et al. (2009), however, show that for 800 cross border acquisitions that took place between 1991 and 2004, the ones where the target and acquirer are culturally more dispatched perform better. This result stems from post deal cultural synergies by combining the strengths of both firms. Moreover, they hypothesize that pre-deal awareness of cultural differences means that deals will only materialize when there is

abundant economic potential. This finding goes against the experience of managers who name cultural differences as the main reason for cross border acquisitions to fail (Stafford and Miles 2013). An explanation could be that Chakrabarti et al. (2009) only look at national culture and not at corporate culture, although the latter is found to be a more important determinant of deal success (Weber et al. 1996). Oldford and Ochere (2016) found that cross border targets show larger efficiency improvements than targets in a domestic M&A transaction. Moreover, they find that targets from cross border corporate mergers are associated with a larger increase in employment than targets from domestic M&A. All in all empirical evidence based on corporate takeovers suggests that a more culturally dispatched acquirer and target seems to lead to more value creation.

As the number of cross-border LBO transactions increased recently, research on this phenomenon emerged. Most of the studies investigate what factors are important in directing cross border LBO investments. Aizeman and Kendall (2008) studied the internationalization of private equity and venture capital and found that common language, colonial ties, and distance are important in directing cross border LBO's. This suggests that PE and VC firms are aware of the difficulties arising from cultural distance, and chose closely related countries for their cross border investments. They further propose that VC and PE internationalization is an ongoing story, making it an important area of research. Cao et al. (2015) researched the effect that creditor rights have on the likelihood of cross border LBO transactions, and find that PE firms in strong creditor rights countries are more likely to acquire targets in weak creditor right countries. Furthermore, they find that premiums in cross-border LBO deals are significantly lower than in domestic LBO's. This could indicate that foreign PE acquirers generate lower operational improvements, and are therefore unable to pay as high premiums as domestic PE firms. Holloway et al. (2016) find that the costs due to administrative, cultural, and geographic distance for cross-border PE acquisitions differs between PE firms according to their respective strategic profiles. PE firms with hands-on strategies are more adversely affected by the transactions costs of remote ownership, as their strategies are driven by close collaboration between the PE firm's employees and the target management. On the other hand, PE firms that focus on a strategy of consolidation and growth are less impacted by these costs of remote control.

Further, Meuleman and Wright (2011) find that UK PE firms that invest in continental Europe try to mitigate large institutional differences with a target company by syndicating with a local partner. This indicates that foreign PE firms seem to recognize that they have a

disadvantage as compared to domestic PE firms, which they try to mitigate by syndicating. Additionally, they find that foreign PE firms are less likely to syndicate when they have experience with deals in the particular country, which can be seen as evidence that PE firms experience a learning curve. Nahata, Hazarika, and Tandon (2014) find amongst their sample of Venture Capital investments that a larger cultural distance between acquirer and target improves the probability of deal success. However, they measure deal success as an exit, therefore excluding the effects on operational measures. Hence, this study is not directly comparable to mine. Scellato and Ughetto (2013) is to my knowledge the only paper that compares differences in operational performance following domestic and cross-border LBO's. Using a sample of 241 UK LBO's in the period 1997 till 2004, they find that LBO's where the PE firm is in the same country as the target experience superior operating profitability changes as compared to cross-border LBO's.

Although evidence from corporate mergers suggests that cultural diversity leads to more value creation, the sparse empirical evidence on the topic suggests that domestic LBO's create more value than cross border LBO's. Therefore my fifth research question is:

H5 Domestically backed LBO targets show superior operational performance following the buyout as compared to cross border LBO's.

3. Research Design

3.1 Data

In order to answer my hypotheses I use a sample of European buyouts between 2000 and 2012. Specifically a unique data set consisting of 204 UK, 64 Swedish, and 49 French Levered Buyouts completed between 2000 and 2012 is used. The dataset consists of both private-to-private and public-to-private deals. All data is hand collected from Zephyr and Orbis as these databases have better coverage of deals then comparable databases such as the Securities Database Corporation (SDC) mergers and acquisitions database (Wang 2012 following a LexisNexis report). For each deal, the whole ownership structure is collected. This means that the target and all corporations involved in the ownership chain of the takeover (Newco's) are identified. An advantage is that it allows me to accurately determine in which company the post buyout financials are recorded. Moreover, it allows me to give a more accurate description of the leverage used in the deals. In my sample, several Newco's

are likely to have been established for the purpose of financing part of the acquisition. I expect that incorporating the increase in debt of these NEWCO's leads to more reliable leverage figures. Only buyouts where the acquirer is a PE firm that acquires a majority (>50%) stake are selected. A sample with a majority of British deals is chosen for multiple reasons. Firstly, the UK is the second largest private equity market in the world (IBISWorld 2015). Moreover, Great Britain is geographically far away from the largest PE market in the world, the US, and has a different legal system (common law) from other large PE markets in Europe. I believe this makes it a suitable country for studying differences between domestic and cross border PE investment as cultural differences between foreign acquirers and targets are expected to be relatively large. Secondly, ownership and financial data are well available in the UK as private companies are required to submit annual reports, as opposed to other major PE markets. The UK deals are complemented with deals from France and Sweden. An advantage is that this allows for testing whether private equity deals show different operating results in these three countries.

In order to study the operational performance of targets after the LBO sufficient post buyout financial data is needed. Therefore, 187 deals were dropped due to missing data, leaving me with a final sample of 130 deals. Dropping these deals raises the concern of sample selection bias, as the firms that do have post buyout financial data could have different characteristics from those that do not. The Wilcoxon rank-sum (Mann-Whitney) test is used to investigate whether dropping the deals lacking post buyout data results in a sample selection bias. For the tested variables: size (log(Assets)), employees, and profitability margins (EBIT, EBITDA margin) there is no evidence that targets with post deal financials have significantly different mean values from those without post deal financials. Therefore, I conclude that my sample does not suffer from a sample selection bias.

If available, I use consolidated data for the targets. This because they are acquired including all subsidiaries, making consolidated data superior to unconsolidated data for measuring changes in operating performance. In most deals the target keeps reporting the financials. If this is not the case, I look for a clear NEWCO that starts reporting the operational data, but if none appears I drop the deal.

Of the final sample most firms, 32%, is active in the services industry as displayed in APPENDIX A. Table 1 shows that the majority of targets is from the United Kingdom: 68,5%. Furthermore, the table shows that most deals are from the 2006-2011 period, which is heavily influenced by the global financial crisis. This period is deliberately chosen, as I expect that in this difficult economic period PE firm specific effects became more apparent.

This expectation is consistent with the finding of Castellanata and Gottschalg (2016) who show that PE firm specific value creation differences become more apparent when economic conditions are more adverse. Therefore, if being a domestic acquirer has a positive effect on the operating performance of the target as compared to a foreign acquirer, I expect this effect to be more visible in this crisis period. Management participated in 43% of the deals in my final sample.

Table 1
Deal Year and Target Country Specifics

This table presents the 130 deals in the sample based on target country and deal year. It can be seen that 68% of the targets is from Great Britain. Furthermore the table shows that most deals are from the 2006-2011 period. This period is heavily influenced by the 2007 credit crunch and its global outfall. Therefore, I expect this was a difficult period to create value, making PE firm specific differences more visible.

	Number	%
Target Country:		
Great Britain	89	68,5%
French	18	13,8%
Swedish	23	17,7%
Total	130	100%
Foreign	35	27%
PEI 50	30	23%
Management	56	43%
Deal Year		
2000	1	0,8%
2001	2	1,5%
2002	0	0,0%
2003	0	0,0%
2004	5	3,8%
2005	4	3,1%
2006	19	14,6%
2007	35	26,9%
2008	20	15,4%
2009	19	14,6%
2010	13	10,0%
2011	10	7,7%
2012	2	1,5%
Total	130	100%

From Table 1 it can be seen that 35 of the 130 targets were acquired in a cross-border LBO. Moreover, the table shows that 23% of the targets were acquired by a PE firm that is listed in the first 50 places of the PEI300. A total of 100 different PE firms are involved in my sample, of which none invested in more than10 buyouts as shown in Appendix B. Although Lloyds Development Capital accounts for 7% of the acquisitions in my sample, the top 50 most active PE firms combined account for 65% of the deals in my sample. Therefore, I believe that I have a sample that consists of a wide variety of acquirers.

3.2 Variables

In this section the variables used in the empirical tests will be specified and described. I use several variables to proxy for operational performance. Firstly, I specify the following profitability measures: (1) Return on Assets (ROA) is calculated as Net Income/ Average Assets, and (2) EBITDA Margin is calculated as EBITDA/Revenue. To check for robustness the EBIT Margin, calculated as EBIT/Revenue, is included as an additional profitability proxy. Even if profitability is not increased, value can be created through improving the productivity of assets (Guo et al. 2011). Therefore, Asset Turnover (ATO), calculated as Sales/ Average Total Assets, is used as a productivity measure. Lastly, revenue growth is used to measure if firms are able to grow their business. Please refer to Appendix C for a more inclusive description of the way all variables are calculated and the sources used. Following Scellato and Ughetto (2013) two different calculations of the dependent variables are used. The first calculates the changes of the operating measure between 1 year prior to the buyout and the mean value of the three years following the buyout[2]. Secondly, the changes between 1 year prior to the buyout and the third year following the buyout are calculated[3]. The advantage of the first measure is that it is less sensitive to the wild year-to-year shocks as it averages the values of the three years following the buyout. However, operational improvements are likely to take some time to materialize, which would suggest that the second measure is more accurate as it measures the results after three years. It seems reasonable that operational improvements take time to materialize. Therefore, I refer to the

[2] The first measure is calculated as follows: Unadjusted ΔROA= $\frac{ROA_t + ROA_{t+1} + ROA_{t+2}}{3} - ROA_{t-1}$, where time t is the year of the buyout. The operating performance of the first three years following the buyout is averaged, and the beginning value is subtracted. The calculation for the other operating performance measures are identical to that of ROA.

[3] The second measure is calculated as follows: Unadjusted ΔROA = $ROA_{t+2} - ROA_{t-1}$

second measure as my main results and use the first measure for robustness purposes. All these data are obtained from the Bureau van Dijk Orbis database.

I calculate unadjusted changes in the operational variables as well as industry adjusted changes. The latter allows me to control for industry, year, and country specific conditions. The unadjusted change in ROA is defined as $\Delta Unadj.\ ROA = ROA_{last} - ROA_{t-1}$, where ROA_{last} is calculated using the two different ways as described in the previous paragraph and footnotes 2 and 3. A value of $\Delta Unadj.\ ROA$ of +4 calculated from year -1 to the third year following the buyout indicated that the target firm increased the Return on Assets by four percentage points from the first year prior to the buyout to the third year following the buyout. Following Smit and Volosovych (2013) the adjusted change in ROS is calculated as follows: $\Delta\ Adj.ROA = \Delta\ Unadj.ROA - \Delta\ Industry\ ROA = (ROA_{last} - ROA_{t-1}) - (ROA_{last}^{Industtry} - ROA_{t-1}^{Industry})$. The other dependent variables are calculated in a similar manner as ROA. The industry variables are calculated as follows. Using Compustat Global the operating variables are extracted for all firms that existed throughout the 2000-2012 period. Then the operating ratios, ROA, EBIT margin, ect. are calculated for all firms in each year. Using three-digit SIC codes, industry medians are matched to the target firms in my sample (two digit SIC codes are used if there are insufficient matched firms with three digit SIC codes). This method ensures that the operational changes of each LBO target are matched to ratios of firms active in the same industry and country, and that the ratios are calculated over the same years.

The main independent variable is the dummy Foreign, which takes a value of 1 if the acquiring PE firm does not have an office in the country that the target firm is headquartered, and 0 otherwise. Using information in the deal comments and deal rationale from Zephyr I identify the acquirer. Online sources allow me to determine whether this acquirer has an office that is active in the same country as the target is headquartered. If the acquirer does not have an office in the same country, then I assign it a dummy variable of 1. I do not use the data Zephyr returns on acquirer country, as it is not correct in all cases. For example, Blackstone and Carlyle are recorded as US acquirers, while they have large London offices. I assume that in these cases the domestic offices were involved in the deal, and therefore count them as domestic deals.

The acquirer name further helps me to construct several acquirer dependent control variables. Following Wang (2012) I check whether the acquirer is listed in the first 50 places of the PEI300 index as a proxy for reputation. The PEI 300 index ranks private equity firms

worldwide on the funds raised. Demiroglu and James (2010) find that reputable private equity firms pay lower spreads on their bank loans, and are able to get longer maturities on their loans. These lower interest payments are likely to have a direct effect on operating performance. Moreover, a PE firm listed in the first 50 places of the PEI300 index is likely to be more experienced than the average PE firm. More experienced PE firms might select targets with greater value creation potential (Cumming and Zambelli 2010). To control for these factors PE reputation is included in all regressions.

Following Engel, Braun, and Achleitner (2012), who find a positive relation between debt levels and returns, I include both pre-deal leverage and leverage increase as control variables. Most of the positive effect of debt is due to the debt tax shield. However, I expect that part of the positive relation arises from the disciplining effect of debt. Therefore, I include leverage as it could influence operational performance. I take leverage as the sum of long term and short term debt over assets. In previous literature a common measure for leverage is debt over EBITDA, but I deviate from this method of calculation as a large part of my sample had negative EBITDA measures at some point in time, making this measure of leverage unreliable[4]. Similarly leverage change ($\Delta Leverage$) is calculated as the increase in leverage from1 year prior to the deal, to the deal year. In all regressions leverage change includes the change in leverage in the whole ownership chain of the deal. This means that it includes the debt changes in the target as well as the debt changes in all relevant NEWCO's[5].

Furthermore, operating performance measures prior to the deal ($ROA\ (t-1)\ ect$) are included as further margin expansion might be less likely for already highly profitable firms (Achleitner and Figge 2014).

The log of assets in the year prior to the acquisition is included as a control variable as target size effects the way in which operational value is created. Margin improvements are found to be the main driver of operational improvements for larger transactions, while sales growth is most important in smaller transactions (Achleitner et al. 2010). LOG(Assets) is a widely used measure of target size in literature (Wang 2010, Castellanata and Gottschalg 2016 and others).

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[4] Using this measure a company that has a constant value of debt of 100, but a value of EBITDA of 100 in year 1 and -50 in year 2 returns leverage measures of $\frac{100}{100} = 1$ in year 1, and $\frac{100}{-50} = -0.5$ in year 2. This is strange as the relative leverage increases from year 1 to 2, but the leverage measure falls.

[5] Relevant Newco's are identified as firms involved in the buyout ownership structure and take on large amounts of debt without reporting relevant operating measures. This as it is likely that these firms were used in the financing the takeover. Mathematically this calculation of leverage change looks as follows: $\Delta Leverage = \frac{Total\ Target\ debt\ (t) - Total\ Target\ Debt\ (t-1) + Total\ Newco1\ debt\ (t) - Total\ Newco1\ debt\ (t-1) \ldots}{Total\ Target\ Assets\ (t-1)}$, where t denominates the deal year. See Appendix C for all variable descriptions.

I further control for the target country by using a country dummy France that takes a value of 1 when the target is French, and a country dummy Swedish that takes a value of 1 when the target is headquartered in Sweden. The reason is that the PE industry characteristics in Great Britain, France, and Sweden can differ (i.e. it could be that the PE environment in Great Britain is more competitive, or that loans are less easily available in Great Britain than in the other countries, thereby affecting operational performance).

Lastly, dummies for acquisition year specific effects are included. These vintage year dummies are included as different acquisition years might have different characteristics that influence operating performance such as the availability of debt financing. Vintage years are clustered in the following periods based on the number of available deals in each year: 2000-2005, 2008-2009, and 2010-2012. These dummies compare the year effects to the 2006-2007 period. This period is chosen as acquisitions during these two years were executed in a favorable economic period, while all of the operating performance changes had to be reaped in a difficult economic environment. Therefore, deals during the 2006-2007 period are expected to show larger PE firm specific differences in performance. Moreover, following Wilson et al. (2012) it is expected that PE target companies improve their performance relative to their matched peers in this difficult economic period.

This results in the following formula to test my fifth hypothesis:

$$\Delta\, Adj.ROA = \propto\ + \beta_1 * Foreign + \beta_2 * Management + \beta_3 * PEI50 + \beta_4 * EntryLeverage + \beta_5 * \Delta Leverage + \beta_6 * Assets\ (t-1) + \beta_7 * ROA\ (t-1) + \beta_8 * French + \beta_9 * S\square edish + \beta_{10} * Year\ Dummies + \epsilon \quad (1)$$

Note that $\Delta\, Adj.ROA$ and $ROA\ (t-1)$ are interchangeable with the other operating profitability measures. Also year dummies represents the three dummies for the 2000-2005, 2008-2009, and 2010-2012 period which are included separately. For a complete list of variable definitions and sources, please see Appendix C.

Furthermore, it is interesting to test whether value creation differences between domestic and cross border PE acquirers differ per target country. For this purpose two interaction variables are added, namely Foreign*Swedish and Foreign*France. These variables change the interpretation of the variables Foreign, Swedish, and France, but I am mainly interested in the coefficients of the interaction variables. The interaction variables

Foreign*Swedish for instance indicates whether foreign acquirers of Swedish targets achieve better or worse results than they do in the rest of the sample. The following formula is proposed including these interaction variables:

$$\Delta\, Adj.ROA = \propto + \beta_1 * Foreign + \beta_2 * (Foreign * Swedish) + \beta_3 * (Foreign * French) + \beta_4 * Management + \beta_5 * PEI50 + \beta_6 * EntryLeverage + \beta_7 * \Delta Leverage + \beta_8 * Assets\ (t-1) + \beta_9 * ROA\ (t-1) + \beta_{10} * French + \beta_{11} * Swedish + \beta_{12} * Year\ Dummies + \epsilon \quad (2)$$

3.3 Summary Statistics

Table 2 presents the different variables that are used in the empirical analysis. The way in which these variables are calculated is described in the previous section and in Appendix C. Next to the variable definitions, the mean, median, standard deviation, 1st percentile, and 99th percentile are displayed for each variable. The number that stands out is the negative mean and median changes in leverage of the target (ΔLeverage Target). From previous research it is expected that large amount of leverage are used in LBO transactions. However, in my sample both the mean and median leverage changes are negative for the target companies, indicating that the debt in the targets is reduced following the buyouts. A plausible explanation is that not all debt is recorded in the target companies. In investigating the deal structures (the target and all Newco's used to acquire it) I came across several firms with names similar to Financing Corporation that were erected right before the deal. These entities usually do not report much revenue, but carry a vast amount of debt. It is likely that these corporations are used to take on the debt in the deals. Therefore, I calculate a more inclusive measure of leverage change (ΔLeverage Whole Chain), which includes the debt changes in all relevant Financing Newco's as well as debt changes in the target. Table 2 shows that the leverage change for this more inclusive measure shows a median increase of debt equal to 9,5% of assets, and a mean increase of 20,1% of assets. These figures are more in line with leverage increases hat previous research found. For these reasons I use the leverage change of the whole ownership chain in my regressions.

Table 2
Definitions and Summary Statistics of the Main Variables

This table presents the variables used in the regressions and their summary statistics (mean, median, standard deviation, the 1st and 99th percentile). It can be seen that a sample is used with a wide variety of financial characteristics The relatively large difference between mean and median encourages me to use median values in my test.

Variables	Definition:	Mean	Median	St. Dev.	1st %tile	99th %tile
Profitability	ROA = Net Income/ Average Total Assets	5,723	3,800	11,393	-16,238	39,724
	ROS = Net Income/ Sales	1,575	4,526	321,961	-63,617	151,375
	Revenue per Employee = Revenue/ Employees	435,714	244,065	663,853	42,603	3900,458
	EBIT margin = Net Income/ EBIT	8,796	7,775	14,531	-29,749	46,549
	EBITDA margin = Net Income/ EBITDA	15,013	13,253	14,613	-13,566	48,661
Productivity	ATO = Sales/Average Total Sales	1,044	0,779	1,024	0,007	5,947
Employees (t-1)	LOG(Employees)	2,291	2,378	0,854	0,000	3,799
Revenue (t-1)	Revenue Growth	26,918	8,456	109,692	-92,065	311,624
Assets (t-1)	LOG(Total Assets)	4,762	4,807	0,884	1,420	6,556
Leverage (t-1)	Total Debt / Total Assets	0,367	0,233	0,379	0,000	1,331
ΔLeverage Target	(Target Total Debt t - Target Total debt t-1)/ Assets t-1	-0,024	-0,002	0,285	-0,924	0,374
ΔLeverage Whole Chain	(Whole Chain Debt t - Target debt t-1)/ Target Assets t-1	0,095	0,201	0,341	-0,341	1,467
Foreign	Dummy variable that equals 1 if the PE fund is from the same country as the target; 0 otherwise	0,257	0	0,439	0	1
Management	Dummy variable that equals 1 if management co-invests with the PE firm; 0 otherwise	0,412	0	0,494	0	1
PEI50	Dummy variable that equals 1 if the PE fund is listed in the PEI50; 0 otherwise	0,221	0	0,416	0	1

Furthermore, it becomes apparent from Table 2 that my sample includes firms with a wide variety of financial characteristics. This can be seen from the large standard deviations of for instance return on assets, or the fact that the 1st% firm has a -16% ROA, while the 99th percentile firm reports a ROA of almost 40%. The large differences between mean and median values encourage me to use the latter in the two-tailed Wilcoxon rank test.Also, firms of various sizes are used, ranging from a Log(Assets) of 1,42 to 6,556.

3.3 Data Tests

I tested the data for the following assumptions in order to confirm that it fits the multiple OLS model used in the regressions. In this section the variables in the $\Delta Adj.ROA$ regression are used, but the conclusions are representative for all my regressions. First, scatter plots are observed in order to check the data for normality and outliers. The scatterplot

in Appendix D shows that there exists a linear relation between the dependent and independent variables. Only for $\Delta Adj.ROA$ and $LN(ASSETS)_{-1}$ this relationship is not clear. However, when plotting the Regression Standardized Residuals against the Standardized Predicted Values it becomes apparent that these observations are scattered equally around the null line, and that no pattern is observed (See Appendix E). This provides evidence that no linearity problem is observed in the data. Moreover, this indicated that the successive residuals are independent. Hence, I conclude that the data shows no signs of auto correlations. Studying the charts, however, gives reason to believe there are significant outliers present in the data. Therefore regressions with robust standard errors are used in this paper. From Appendix E it can further be observed that the data is homoscedastic, meaning that the variation in predicted values is constant, regardless of whether the predicted values are large or small.

Next, the data is tested for multicollinearity. Appendix F shows that none of the independent variables are highly linearly correlated. All correlations are lower than 0.4 except for the variables entry leverage and leverage change which have a negative correlation of -0.52 (and in the case of the ATO regression -0.64). However, none of the Variance Inflaton Factors (VIF) exceeds 1.5 and all tolerance factors exceed 0.2, indicating that standard errors are not inflated (see Appendix G). Therefore, the data does not suffer from multicollinearity, and the beta values are not inflated.

To check for normally distributed errors, the residuals are plotted in a normal PP Plot in Appendix H. It can be observed that the residuals generally follow a normal distribution. The histogram in Appendix H confirms this observation. Furthermore, the null of normally distributed residuals was not rejected in the Jarque-Bera test. Therefore, I conclude that the errors are normally distributed, and that the data fits the multiple OLS regressions model.

As visual inspection of Appendix D and E shows that there are some extreme outliers present in the data, the boxplots for the measures of adjusted changes in ATO, ROA, and EBIT margin are showed in Appendix I. These boxplots provide strong evidence that all operating performance measures suffer from outliers. I Winsorize my dataset as outliers might have a disproportionately strong effect on the parameters estimates and can reduce the power of statistical tests[6]. More specifically, I replace the most extreme observations in my sample with the values at the 95th and 5th percentile respectively. Although some argue that in the case of legitimate outliers not removing them represents the population better (Orr,

[6] See Rasmussen (1988) and Osborne and Overbay (2004) amongst others.

Sackett, & DuBois, 1991), Osborne and Overbay (2004) show that removing outliers increases the accuracy of estimates in the majority of analyses. Winsorizing at the 95th and 5th percentile is chosen as inspection of the boxplots shows that there are multiple possible outliers present in the data. Furthermore, R-squared values show that winsorizing the model at the 95th and 5th percentile produces a model that is better fitted than when winsorizing at the 97.5th and 2.5th, or 99th and 1st percentile. Moreover, winsorizing at the 95th and 5th percentile is not uncommon for studies similar to mine (See Castellanata and Gottschalg 2016 for instance).

4. Results

First this section presents the analysis to show whether target firms show superior operational performance following a LBO as compared to non-buyout firms. Then the observed operating performance changes are related to variables that could explain these changes, such as a domestic PE buyer, the disciplining effect of debt, a reputable PE firm, alignment of incentives between the management and the owner, and pre-buyout firm characteristics.

4.1 Changes in Operating Performance

Table 3 presents the median changes of the three different operating performance measures in the first three years after being acquired in an LBO. The two-tailed Wilcoxon rank test is used to determine if these median changes are significantly different from zero. For each operating performance indicator three different measures are reported: (1) a measure of unadjusted median changes of the target performance indicators, (2) a measure of the matched industry median changes (Control Change), (3) a measure of the industry adjusted change, which reports the median of the differences in changes in operating performance between the target sample group and the industry control group. The median changes are calculated both from the last full year prior to the buyout to the average of the three years following the buyout, and from the last full year prior to the buyout to the third year after the buyout.

Panel A.1. of Table 3 presents the results for the three different measures of profitability: Return on Assets (ROA), EBITDA margin, and lastly EBIT margin which is used as a robustness check. From the table, it can be observed that the industry adjusted change is mostly positive for all different measures of profitability and time, although only significant for ROA. The industry adjusted median change in ROA of 0,62% is significant at the 5% level. This indicates that the PE-owned firms in my sample increased their ROA with a median of 0,62 percentage points over the change in the industry in the three years following the buyout. However, this result is not robust on the way of measuring ROA, as the direction of the result stays the same but the significance disappears when measuring ROA from 1 year prior to the buyout to the average of the first three years following the buyout. The relative improvement in ROA is mainly due to the significant decrease of this measure in the control group of -0,25% (-0,27%). Given that most firms in my sample were bought just prior to the 2007 crash, it is intuitive that the profitability of most firms decreases. The change in EBITDA margin shows a similar pattern, although less significant. The unadjusted change of the EBITDA margin in my buyout sample is slightly negative but insignificant. The industry median change in EBITDA margin is considerably more negative: -0,46% and -0,72% where the latter one is weakly significant at the 10% level. EBIT margin is included for robustness purposes and confirms the conclusions from the other two measures. Although all changes are insignificant, it can be seen that the median EBIT margin improved for the PE target firms, while the matched companies saw decreasing margins. Therefore, the industry adjusted median changes are positive, although insignificant. The analysis seems to provide some weak evidence that PE portfolio companies perform better on profitability measures following the buyout than their peers in my sample. Therefore, I find evidence in support of my first hypothesis. This result is comparable to Wilson et al. (2012) who, using a sample of post 2007 data, find that PE backed companies in the UK experience higher profitability growth than comparable non PE backed firms. However, they find a profitability increase of 3-5% in their sample, which is stronger than the result in this paper. Others, such as Guo et al. (2006) find no significant different operational performance between PE owned and non PE owned firms. A possible explanation is that Guo et al. (2006) use a sample from 1990 till 2006, a period of relatively stable economic growth, while the sample in my paper is strongly influenced by the post 2007 recession period. It could be that PE firms are able to add more industry adjusted profitability to firms in more adverse economic times. The results in Wilson et al. (2012) support this assumption as they report that PE backed firms outperform their peers more clearly during the recession periods than in other periods. The hypothesis that PE

firms are better able to improve the profitability of their targets over that of the industry in economically difficult times would be a nice area for future research.

In Panel A.2. changes in Asset Turnover (ATO) are reported, which is used as a proxy for productivity. The industry adjusted median change in ATO equals -0,153, or -0,150 depending on the measurement, and is significant at the 1% level. This provides robust and significant evidence that PE backed underperform their matched non-buyout peers. This result is contrary to my expectations as others such as Wilson et al. (2012) find strong productivity improvements for buyout firms. Hence, I do not find evidence for my second hypothesis in the sample.

Panel A.3. shows the median changes in revenue growth. Both measures of *control change* return a negative revenue growth, significant at the 1% level. The PE owned firms (*unadjusted changes)* in my sample show larger negative median values, but these are insignificant. Both industry adjusted measures show that PE backed firms were able to improve their revenues by 1,58% (2,62%) as compared to the matched industry median. However, this result is insignificantly different from zero. Still, the control group experiences a significant reduction in revenue, while the LBO target revenue growth was insignificantly different from zero. Therefore, I conclude that I find some evidence in favour of my third hypothesis. The result that revenue growth in non-PE backed firms is lower than in PE backed firms is consistent with Paglia and Harjoto (2014), who find that PE firms have a positive impact on their portfolio companies' revenue growth that lasts till 3 years after the buyout.

Table 3
Changes is Operating Performance from Pre-buyout to Post-buyout period

This table reports median changes in the operating performance indicators as compared to the year prior to the buyout. The leftmost panel displays the median change of the values from the year prior to the buyout to the average of the first three years following the buyout. The rightmost panel displays the median change of the values from the year prior to the buyout to the third year following the buyout. Panel A.1. shows the median changes for various profitability measures. Panel A.2. displays the median changes for the productivity measure. Panel 3 reports the median changes for the growth measure. *Unadjusted change* presents the median unadjusted changes is performance measures of the target companies. *Control changes* are calculated as the median change in performance measures for the median of the matched industry control group. *Industry adjusted change* is the median of the difference between the change in the PE-target performance measure and the change in the control group. Data are obtained from Bureau van Dijk Orbis and Zephyr Databases, and Compustat Global. Significance levels are based on a two-tailed Wilcoxon rank test, with ***, **, and * denoting the levels of significance at the 1%, 5%, and 10% level, respectively.

Percentage Changes in Operating Performance from year i to year j (# Observations, # Positive)		
	-1 to mean 0-2	-1 to +2
A.1. Profitability		
Return on Assets		
Net Income / Average Total Assets		
Unadjusted change	0,61%(125,69)	-0,54%(113,53)
Control change	-0,25%** (113,47)	-0,27%** (96, 43)
Industry adjusted change	1,17% (106,58)	0,62%** (81,43)
EBITDA Margin		
EBITDA / Revenue		
Unadjusted change	-0,17%(103, 47)	-0,02%(92, 45)
Control change	-0,46% (114,56)	-0,72%* (114,48)
Industry adjusted change	0,36% (91,51)	-0,6% (81,40)
EBIT Margin		
EBIT / Revenue		
Unadjusted change	0,09%(111, 56)	0,31% (99, 52)
Control change	-0,35% (114,53)	-0,57% (114,46)
Industry adjusted change	0,22% (96,53)	0,63% (86,48)
A.2 Productivity		
Asset Turnover		
Sales / Average Total Assets		
Unadjusted change	-0,133*** (108,32)	-0,135*** (100,25)
Control change	-0,555*** (113,42)	-0,550 (114, 50)
Industry adjusted change	-0,153*** (94,32)	-0,150*** (87,32)
A.3 Growth		
Revenue Growth		
Unadjusted change	-8,17%(93, 35)	-8,17%(78, 33)
Control change	-4,79%*** (115,58)	-5,74%*** (113,48)
Industry adjusted change	1,58%(77,39)	2,62%(65,35)

The results indicate that PE backed firms are able to increase their profitability slightly but decrease productivity as compared to their matched non-buyout peers in my sample. In order to establish whether PE firms add overall operational value to companies, the DuPont analysis is used (See Palepu, Healy, and Peek 2013) to establish which effect dominates. This analysis holds, amongst other things, that ROA is composed of Net Income and Total Assets. This can be further split out in an efficiency component and a productivity component (ATO):

$$ROA = \frac{Net\ Income}{Average\ Total\ Assets} = \frac{Net\ Income}{Sales} * \frac{Sales}{Average\ Total\ Assets} = \frac{Net\ Income}{Sales} * ATO$$

My results show that PE owned firms underperform their matched non-buyout targets on productivity (ATO). However, the profitability measure, ROA, is broader and incorporates the productivity effect. As PE owned firms outperform their peers based on ROA, this analysis provides evidence that operational value is added following LBO's. It can be concluded that PE firms are able to create significantly more income from each sale, which has a larger effect on operating performance than the decrease in productivity. Moreover, revenue is decreased insignificantly for PE backed firms, while the revenue reduction for comparable non PE backed firms is significant at the 1% level. Therefore, the results show some evidence that PE firms are able to increase overall performance of target firms over that of their industry peers. These results are very similar to Wilson et al. (2012) who finds that during the post 2007 recession period PE backed firms experienced higher growth in revenue and profitability than comparable non PE backed firms.

One concern, however, is that PE firms improve the profitability of targets at the expense of the target's employees (Schleiffer and Summers 1988), thereby not adding real value to the economy as a whole. To investigate if this is the case in my sample, Table 4 presents the mean percentage changes in labour related variables. The first line shows that the firms in my sample grew their number of employees by a median of 17.7% (7.7%) in the first three years following the buyout. This result is robust over the different measures of employee growth, and significant at the 1% level. However, as these variables are not industry adjusted, we cannot draw the conclusion that PE backed companies add more jobs to the economy than non PE backed companies. Nonetheless, this provides strong evidence that PE firms do not destroy jobs in order to improve operating ratios. Therefore, I find strong

evidence in support of my fourth hypothesis which holds that employment is increased in PE backed firms following the buyout. This result is consistent with the findings of Scellato and Ughetto (2013) who found that LBO's had a positive impact on employment in their sample.

Table 4 further shows that PE backed companies are able to grow their revenue per employee by 8,74%, significant at the 1% level. However, this result is not robust on the way of measurement as it becomes insignificantly different from zero when changing the way of measurement. Smith (1990) found similar, but more robust evidence that PE firms are able to increase operating returns per employee. The third line provides some weak evidence that PE backed firms are able to reduce their working capital per employee, but this result is not robust on the way of measurement.

All in all the analyses presented suggests that the answer to my first research is that there exists some evidence that PE-backed firms outperform their matched peers following a buyout.

Table 4
Changes in Employee Related Variables

This table reports the median changes of various labour related variables as compared to 1 year prior to the buyout. The leftmost column display the median changes from 1 year prior to the buyout to the mean of the first three years following the buyout. The rightmost column displays the changes from 1 year prior to the buyout to 2 years after the buyout. The first row displays the median percentage increase in employees. The second row shows the median percentage change in revenue per employee. The third row reports the median percentage changes in working capital per employee. These figures are not industry adjusted. Data are obtained from Bureau van Dijk Orbis and Zephyr Databases. Significance levels are based on a two-tailed Wilcoxon rank test, with ***, **, and * denoting the levels of significance at the 1%, 5%, and 10% level, respectively.

	Percentage Changes in Operating Performance from year i to year j (# Observations, # Positive)	
	-1 to mean 0-2	-1 to +2
Employee Growth		
Unadjusted change	7,70%*** (101,66)	17,70%*** (81,55)
Revenue per Employee		
Unadjusted change	8,74%*** (95,60)	-0,63% (76,37)
Working Capital per Employee		
Unadjusted change	-1,83% (76,30)	-2,00%* (68,26)

4.2 Explanations for post buyout operational performance

The previous analysis presents evidence of operational improvements in target companies over the industry mean changes following PE buyouts. In this section I will examine the relationship between the different operating performance measures and nine factors related to operational gains. I am mostly interested to investigate whether PE firms are able to achieve better operational performance at domestic then at cross-border targets in order to test my fifth hypothesis and answer my second research question. Following literature the following control variables, which were thoroughly described under the section 'variables', are included[7].

1. PE firm characteristics. I include a dummy Foreign which takes a value of 1 if the acquirer does not have an office in the same country as the target's headquarter, and 0 if it does. Of all buyouts in my sample, 27% were cross border (Table 1). The coefficient of this dummy is expected to be negative, as cultural and geographical distance are likely to adversely influence the monitoring of the target by the PE firm. I further include a dummy PEI50 that equals 1 if the lead PE acquirer is listed in the first 50 places of the PEI300, and 0 otherwise. A listing in the PEI50 is expected to have a positive influence on the operating performance of the target. In 23% of the buyouts the lead acquirer was listen in the first 50 places of the PEI300 index (Table 1).

2. Management incentives. I include the dummy Management that takes a value of 1 if management is co-investing in a deal, and zero otherwise. Management co-invested in 43% of the deals in my sample (Table 1). Management participation further aligns the incentives between the management and the owners. As this is likely to reduce self-entrenchment and to improve the effort managers put in, the beta is expected to be positive.

3. Benefits of increased debt: I include the variable entry leverage which equals total debt in the year prior to the buyout divided by Assets in the year prior to the buyout. The median entry leverage in my sample has a value of 0,23 times Assets.

[7] See section 3.2 "Variables" for a more inclusive description of the literature that encouraged me to include these variables, and that helped me form expectations on the signs of the beta coefficients.

Further, I include Δ Leverage Chain, which is equal to the increase in debt of all relevant financing NEWCO's and the target, divided by the target's assets prior to the buyout. The median (mean) leverage increase is 9.5% (20.1%) of assets (Table 2). The coefficient of Δ Leverage Chain is expected to be positive as the disciplining effect of debt can improve operating performance by eliminating wasteful expenditures and forcing the firm to focus on the most efficient uses of funds.

4. Other Pre-buyout characteristics. I include a measure of firm size prior to the buyout: log(assets). Moreover, I include the operating profitability measure of the year prior to the buyout. It is expected that the coefficient of this operating profitability measure will be negative as it might be harder to achieve improvements in already highly efficient firms.

5. Home country and year dummies. I include two dummies that take a value of 1 if the target was French or Swedish respectively. I do so in order to check if there are any different characteristics between the home countries that the model did not account for. Moreover, I include year dummies to control for year specific characteristics. All year dummies are compared to the 2006-2007 period.

The regressions for all measures of adjusted changes in post buyout operating performance are presented in Table 5. All operating performance measures are adjusted for the matched industry performance. In the uneven models the change in performance is taken from 1 year prior to the buyout to the average of the three years following the buyout. The uneven models specify the change in performance from 1 year prior to the buyout to the third year following the buyout. All regressions are highly significant, and R squared values range between 0,21 and 0,58. These values are common in similar studies.

Table 5 provides no evidence that targets of domestic buyouts outperform targets of cross-border buyouts. On the contrary, model (1) in table 5 indicates that foreign PE acquirers were able to improve their target's industry adjusted ROA by 7,25% following the buyout as compared to domestic PE acquirers in my sample, keeping all other variables fixed. This result is significant at the 5% level, but the significance is not robust to changes in the

calculation method as the insignificant coefficient in model (2) shows. Model (5) provides some evidence, significant at the 10% level, that targets of domestic LBO's perform better based on EBITDA margin than those of foreign acquisitions. However, although the sign of the coefficient stays the same, it becomes insignificant when the way of measurement is changed (model 10). This inconclusive result does not support the outcome of the only study directly comparable to mine, Scellato and Ughetto 2012, who find that domestic PE acquirers are able to add more operational value than foreign PE acquirers. However, their results are only weakly significant. In the Venture Capital setting Nahata, Hazarika, and Tandon (2014) find that a larger cultural distance between acquirer and target improves the probability of deal success. It must be noted however that their measure of deal success is an exit, but does not include operational measures. Chakrabarti et al. (2009) found that corporate M&A transactions in which the acquirer and target are more culturally dispatched show better returns. Therefore, the question of whether domestic or foreign buyers are able to add more operational value to their targets is far from resolved. The analysis does not provide evidence for my fifth hypothesis, and further research into this area is encouraged.

It is interesting to investigate whether differences in the ability to create value between domestic and foreign PE acquirers are dependent on the target country. Therefore, in Appendix J the regression output including two dummy cross terms, one for Foreign*Swedish and one for Foreign*French, is shown. Equation (7) and (8) in this Appendix show that Swedish targets that are acquired in a cross border LBO transaction show worse revenue growth then the other deals in the sample, significant at the 1% level. Future research is encouraged to investigate the operational performance implications of cross border PE transactions in different target countries.

Model (1) of Table 5 shows that on average the deals where management participates are able to improve industry-adjusted ROA by 7,32 percentage point as compared to deals where management does not participate, keeping the other variables fixed. This result is significant at the 5% level, but becomes insignificant in model (2). However, models (9) and (10) provide robust evidence that buyouts where management participates show worse EBITDA margin performance then deals where management does not participate. Therefore, the regressions do not confirm my theory-based expectation that management participation leads to better operating performance in LBO's.

The regressions show no evidence that an increase in leverage improve the operating performance of targets in my sample. This result is contrary to previous literature, which

finds that the disciplining effect of leverage increases operating performance (Engel, Braun, and Achleitner 2012 amongst others). A possible explanation is that part of the PE firms in my sample put too much leverage in the target company, forcing them to forego profitable investment opportunities. This seems a valid explanation as the 99th percentile leverage increase in my sample is 1,46 times assets (See Table 2).

Model (5) and (6) show highly significant and robust evidence that PE firms are able to achieve superior ATO improvements at larger firms, a result that similar to what Scellato and Ughetto (2012) found in their study.

An interesting result is that PE targets in Great Britain seem to show superior operational performance as compared to targets in France and Sweden. Both model (5) and (6) for instance present strong evidence that ATO performance is superior for targets in Great Britain as compared to Sweden. Moreover, model (9) presents some evidence that changes in EBITDA margin are worse for Swedish then for Great British targets. The results indicate that there are more opportunities to improve industry adjusted performance at British then at French or Swedish firms. This seems striking as Great Britain is viewed as a more developed PE market, and one therefore would expect that there exists less low hanging fruits in that market.

Furthermore, the regressions show that adjusted ROA performance was superior in deals with the vintage years 2006-2007, as compared to the other buyout years. This can be viewed as evidence that PE-owned firms are able to add more adjusted operational value in adverse economic conditions. This result is consistent with Wilson et al. (2012) who find that PE backed target companies improve their performance as compared to their matched non-buyout peers when value has to be created in difficult economic times.

The operational performance measures 1 year prior to the buyout are statistically significant and robust in all tested models. As expected all coefficients are negative, as increasing the performance of already high performing firms might be more difficult. Only in model (3) and (4) the coefficient of ATO is positive, although weakly significant at the 10% level. Contrary to my expectations this indicated that the PE firms in my sample were able to improve ATO of already highly productive firms by more than that of firms that were less productive prior to the buyout. As this finding is counter-intuitive, further research into this phenomenon is encouraged.

The results are robust to changes in the calculation of Leverage Change. In Appendix K the same regression results are shown using the leverage change in the target (the more narrow calculation method). It can be seen that the main results do not change with the exception that variable Δ Leverage becomes weakly significant in models (1) and (2).

Table 5
Regression of Post Buyout Performance

This table shows the regression results of the adjusted post buyout performance in my sample. All operating performance measures are adjusted by subtracting the performance of firms matched on industry, country and year from the LBO target companies' performance. In the uneven models the change in performance is taken from 1 year prior to the buyout to the average of the three years following the buyout. The uneven models specify the change in performance from 1 year prior to the buyout to the third year following the buyout. The uneven models are added as a robustness check. The dependent variable in the first two models is the Change in Adjusted Return on Assets. The dependent variable in the in the models (2) and (3) is the Change in Adjusted Asset Turnover. The dependent variable in the models (5) and (6) is the Change in Adjusted Revenue Growth. The dependent variable in models (7) and (8) is the Change in Adjusted EBITDA. And the dependent variable in the models (9) and (10) is the Change in Adjusted EBIT. The independent variables are specified as follows: Foreign is a dummy variable that takes a value of 1 if the PE acquirer is from the another country than the target and 0 otherwise. The other variables are specified in Appendix C. All regressions are multiple OLS with robust standard errors. Data are obtained from Bureau van Dijk Orbis and Zephyr Databases, and Compustat Global. Significance levels are denoted as ***, **, and * indicating significance at the 1%, 5%, and 10% level, respectively. Standard deviations are reported between brackets.

VARIABLES	(1) ΔAdj.ROA	(2) ΔAdj.ROA to +2	(5) ΔAdj.ATO	(6) ΔAdj.ATO to +2	(7) ΔAdj.REV GROWTH	(8) ΔAdj.REV GROWTH to +2	(9) ΔAdj.EBITDA	(10) ΔAdj.EBITDA to +2	(11) ΔAdj.EBIT	(11) ΔAdj.EBIT to +2
Foreign	**7.253****	2.143	0.0546	-0.0368	16.97	11.05	**-4.097***	-4.033	-0.311	-0.701
	(3.006)	(4.133)	(0.0801)	(0.0932)	(18.34)	(17.62)	(2.394)	(3.620)	(2.501)	(4.123)
Management	**7.318****	-1.083	-0.0403	-0.103	13.29	16.99	**-5.262****	**-6.697***	-0.646	-0.593
	(2.981)	(3.939)	(0.0717)	(0.0975)	(14.33)	(15.57)	(2.550)	(3.809)	(2.644)	(4.300)
PEI50	**5.450***	0.160	0.156	0.0812	14.17	-0.633	-0.281	-7.990	-0.966	**-10.11***
	(3.175)	(5.116)	(0.0975)	(0.125)	(16.11)	(15.88)	(2.996)	(5.077)	(3.804)	(5.871)
EntryLeverage	3.280	4.180	0.0795	0.137	4.715	-0.587	**4.416***	5.528	0.475	3.011
	(3.557)	(5.577)	(0.0941)	(0.108)	(16.44)	(18.45)	(2.579)	(3.336)	(3.228)	(4.905)
Δ Leverage Chain	-3.410	-2.513	0.0432	-0.0181	-17.50	-34.67	-1.722	2.693	-4.529	-3.034
	(4.074)	(4.415)	(0.0700)	(0.0839)	(22.23)	(21.88)	(3.697)	(3.925)	(3.283)	(4.749)
Assets (t-1)	**-2.095***	-1.284	**0.109*****	**0.140****	6.199	**13.49***	-0.369	-1.953	0.309	1.608
	(1.192)	(1.478)	(0.0350)	(0.0620)	(8.830)	(7.780)	(1.057)	(2.149)	(1.081)	(2.163)
France	-2.422	-1.189	-0.0490	-0.0478	11.42	3.693	-3.900	**-9.085****	-1.824	-6.216
	(3.737)	(4.886)	(0.106)	(0.148)	(17.56)	(18.73)	(2.515)	(3.873)	(3.400)	(4.401)
Swedish	5.498	-0.474	**-0.256****	**-0.259****	7.335	-4.048	**-6.554***	-9.675	-2.898	-6.069
	(3.713)	(5.789)	(0.119)	(0.121)	(23.21)	(29.47)	(3.784)	(6.033)	(3.377)	(5.278)

Table 5 – Continued

VARIABLES	(1) ΔAdj.ROA	(2) ΔAdj.ROA to +2	(5) ΔAdj.ATO	(6) ΔAdj.ATO to +2	(7) ΔAdj.REV GROWTH	(8) ΔAdj.REV GROWTH to +2	(9) ΔAdj.EBITDA	(10) ΔAdj.EBITDA to +2	(11) ΔAdj.EBIT	(11) ΔAdj.EBIT to +2
2000-2005	**-6.670***	**-9.959***	0.0829	**0.370*****	19.22	16.91	**-7.026****	-6.004	**-6.283****	-7.680
	(3.863)	(5.360)	(0.108)	(0.134)	(23.22)	(23.41)	(2.816)	(5.842)	(3.120)	(7.102)
2008-2009	**-5.738****	-1.649	-0.0385	-0.00809	2.180	-11.32	2.016	1.101	2.521	-0.0905
	(2.712)	(3.432)	(0.0730)	(0.0952)	(16.72)	(20.92)	(2.483)	(3.555)	(2.724)	(4.066)
2010-2012	**-12.50*****	4.890	-0.0555	-0.0481	2.002	11.82	-0.708	2.758	-5.031	-1.962
	(4.563)	(8.542)	(0.151)	(0.154)	(23.68)	(25.21)	(2.404)	(4.245)	(3.720)	(5.329)
ROA (t-1)	**-0.248***	**-0.319****								
	(0.134)	(0.157)								
ATO1 (t-1)			**0.0501***	**0.0707***						
			(0.0279)	(0.0361)						
Revenue Growth (t-1)					**-0.267*****	**-0.298*****				
					(0.0665)	(0.0746)				
EBITDAMargin (t-1)							**-0.186****	**-0.184***		
							(0.0845)	(0.109)		
EBITMargin (t-1)									**-0.428*****	**-0.474*****
									(0.104)	(0.140)
Constant	9.146	12.07	-0.671***	-0.886**	-38.26	-64.32	10.01	19.63	6.068	2.813
	(6.241)	(7.455)	(0.202)	(0.346)	(45.36)	(44.35)	(6.005)	(11.84)	(5.562)	(10.70)
Observations	89	70	82	73	69	59	79	71	82	75
R-squared	0.340	0.214	0.239	0.277	0.435	0.583	0.309	0.284	0.397	0.389

4.3 Discussion

This study finds evidence that PE targets are able to achieve better profitability-, employment-, and to some extend revenue changes than their matched non-buyout peers. This result is in line with most previous literature. However, the significant decrease in Asset Turnover of PE backed companies as compared to their matched peers is a novel result. All in all this study seems to provide some evidence that leverage buyouts add value to target companies. No conclusive evidence is found to support the hypothesis that domestic LBO's add more operational value to their target firms than cross-border LBO's. However, the results indicate that this effect differs per country, and targets of domestic LBO's in Sweden are found to outperform the other LBO targets.

To my knowledge there is only one prior study that investigates differences in the ability to create operational value between domestic and foreign PE firms. This paper by Scellato and Ughetto (2013) finds that domestic PE firms add more operational value to target firms then cross border PE firms do. Contrary to this finding, my results do not find robust and significant differences. It is however showed that the differences in the ability of foreign and domestic PE firms to create value seem to differ per target country. To my knowledge this is the first study to formally show this. Therefore, more research is encouraged in this area. The results to the research questions of this study are important as Aizeman and Kendall (2008) and Cornelius (2011), amongst others, find that the number of cross country PE transactions is increasing. Additionally, they expect this type of transactions to gain further momentum in the future. For various stakeholders it is important to know what the effects of cross-border LBO's are as compared to domestic buyouts. Potential targets of PE firms would be interested to know what type of PE investor is in the best position to help them improve their operations, keeping all else equal. Moreover, PE funds might want to rethink in which geographic regions they can develop a competitive advantage. Lastly, the public and sponsors of PE firms might be interested in the effects that cross border and domestic PE investments have on the operations of firms.

Although this study was conducted with great care, it suffers from some flaws. Most importantly, the operational results of the targets could be influenced by earnings management prior to the buyout. In my sample management co invests in 58 of the buyouts. In these deals, a conflict of interest could have existed prior to the buyout, as management

might have been induced to understate earnings prior to the buyout. The reason is that earnings management could help them acquire the company more cheaply in an LBO, and therefore reap higher returns on their equity investments. This would represent a serious issue in my analysis, as the evidence for profitability improvements in buyouts that I found could be merely due to earnings management. In initial studies on this topic, Kaplan (1989a) and Lee (1992) do not find evidence for earnings management prior to management buyouts. Wu (1997) on the other hand finds that management reports lower earnings prior to an MBO. He shows that the potential benefits from earnings manipulation is on average 50 million US$ in his sample. This creates serious incentives for management to manage earnings prior to a buyout. Perry and Williams (1994) find similar results as they show that management manipulates accruals prior to management buyout offers. In a recent study Mao and Renneboog (2015) find that firms engaged in an MBO engage in negative earnings management in the years prior to the buyout, while the average non buyout firm engaged in positive earnings manipulation. They use data from the second buyout wave; from 1997 onwards, which makes the results even more surprising as corporate governance regulation tightened in this period. All in all there is evidence for earnings manipulation prior to levered buyouts. One should therefore take into account that my study does not control for earnings management. However, this is only a potential problem for the 58 deals where management participates. Still, earnings management could have influenced the first four hypothesis of this paper, but it does not pose a problem for the fifth hypothesis, as there is no reason to believe that either domestic or foreign MBO's engage in more earnings management.

Secondly, of the final sample of 130 deals, only 35 deals have foreign acquirers. Although my sample is not smaller than similar studies, research with a larger availability of cross border acquisitions is encouraged to get more significant and robust results.

Further, no exit dates are taken into account in this study. Therefore, it is assumed that all PE firms hold on to their investments for at least two years after the buyout. In reality however, it is likely that some investments are exited earlier. However, I do not believe that this popes a serious threat to my study as it is likely that the impact of the PE firm extends for at least two years after the buyout. Still, it is encouraged that holding periods are taken into account in future studies.

Also, one should be careful in applying the results obtained in this study to other countries. It is likely that deals where the acquirer is from a highly developed country and the target in a developing country have different characteristics from the results in this paper where typically both the acquirer and target are from highly developed countries. On the one

hand, it is to be expected that cross border LBO's into developing countries can achieve large operational improvements due to superior skills and experience. On the other hand, the larger cultural difference in these deals could pose a problem. Therefore, further research into this area is recommended.

5. Conclusion

This study investigates whether PE-owned firms outperform their matched peers in the first three years following the buyout. Moreover, it is tested if targets of domestic LBO's show superior operational performance as compared to targets of cross-border LBO's. I use profitability, productivity, and growth as operational performance metrics. A sample of 317 buyouts in the period 2000-2012 is used in this study, with targets from Great Britain, France, and Sweden.

This paper finds evidence that PE firms are able to achieve superior profitability changes (Return on Assets) for their portfolio companies as compared to their matched non-buyout peers. Further, the results show that the revenues of PE-owned companies did not show a significant drop in my sample, while the matched non-buyout firms did face a significant revenue drop. However, the difference in revenue growth between the PE owned companies and their peers was not significant. The results provide significant and robust evidence that the PE backed companies in my sample saw their productivity (measured as Asset Turnover) drop by more than that of their peers. However, following the DuPont analysis, this reduced productivity is incorporated in the Return on Assets. Therefore, this paper provides some evidence that PE firms are adding operational value to their target firms by increasing the amount of net income that that their portfolio company generates from each sale. This result is consistent with Wilson et al. (2012) amongst others. Moreover, this study shows significant evidence that PE firms do not improve profitability measures at the expense of employees. The regressions show the opposing result that PE firms increase employment at their portfolio companies in the first three years following the buyout.

Secondly, this paper finds inconclusive results when testing whether domestic LBO's add more operational value to their target firms then cross border buyouts. Evidence is presented that foreign PE firms are able to facilitate superior changes in Return on Assets at their target companies as compared to domestic PE firms. However, targets of domestic LBO's are shown to achieve superior changes in EBITDA margin, although this result is only

weakly significant. Further, it is shown that differences in performance between targets of domestic and foreign buyouts differ per target country. More specifically, domestic PE firms were found to facilitate superior operational performance in Sweden. The only previous paper on this topic by Scellato and Ughetto (2013) finds evidence that domestic PE firms facilitate superior operational performance for their target companies over foreign PE firms. However, my study differs from Scellato and Ughetto (2013) as they only consider private-to-private buyouts in the period prior to the 2007 crash. On the other hand this paper considers both private-to-private and public-to-private deals, and most of the deals are from the post 2007 recession period.

Although I tried to be very inclusive, this study suffers from some flaws. Firstly, only 35 of the deals in my final sample have foreign PE acquirers. Future research is encouraged using larger samples in order to get more robust results. Secondly, because management participates in 58 deals in my sample, the results might suffer from earnings management prior to the buyout. The existence of earnings management would bias the results, and could invalidate the result that PE backed firms show superior operating performance over their matched public peers. Future research into ways to deal with potential earnings management is encouraged.

Further research into the operating performances of domestic LBO-backed and foreign LBO-backed firms is needed due to the limited and conflicting evidence from existing studies. As cross border LBO's are becoming more common, the results become increasingly important to both potential targets and investors.

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7. Appendix

Appendix A: Industry Distribution of Deals.

SIC Code:		Number:	Percentage:
01-09	Agriculture, Forestry, Fishing	0	0%
10-14	Mining	3	2%
15-17	Construction	3	2%
20-39	Manufacturing	25	19%
40-49	Transportation & Public Utilities	10	8%
50-51	Wholesale Trading	5	4%
52-59	Retain Trade	9	7%
60-67	Finance, Insurance, Real Estate	34	26%
70-89	Services	41	32%
91-99	Public Administration	0	0%
Total:		130	100%

This table presents the industries that the different the targets are active in. Industry classification as displayed is based on the two digid SIC codes. In the regressions the three digid SIC codes are used in matching targets to comparable companies if available.

Appendix B: Top 50 Private Equity Investors

Rank:	PEI50:	Acquirer Name:	
1		Lloyds TSB Development Capital	10
2		3i Group	6
3	1	Blackstone Group	4
4		Charterhouse Capital Partners	3
5		ABN Amro Capital	3
6		BNP Paribas Développement SA	2
7	41	Bridgepoint Capital Ltd	2
8		Vitruvian Partners LLP	2
9		BS Private Equity	2
10		Lion Capital LLP	2
11	10	EQT Partners AB	2
12		Macquarie Bank	2
13		August Equity LLP	2
14		Zeus Private Equity LLP	2
15		Palamon Capital Partners	1
16		Alinda Capital Partners LLC	1
17		CapMan Capital Management	1
18		Hastings Funds Management Ltd	1
19		Ethos Private Equity Ltd	1
20		Avalon Acquisition	1
21		Investcorp Technology Partners	1
22		Exponent Private Equity	1
23		Electra Partners LLP	1
24		Terra Firma	1
25		Duke Street Capital	1
26		Graphite Capital Management Ltd	1
27		Silverfleet Capital Partners LLP	1
28		Sagard SAS	1
29		Electra Partners Europe Ltd	1
30		Investcorp SA Holding	1
31		Launet Finance SAS	1
32		AVMK Holding SAS	1
33		Holding Michaud Développement	1
34		ACCENT EQUITY PARTNERS AB	1
35		Bayard Capital Partners Pty Ltd	1
36		Candover Investments plc	1
37		Ferd Equity Partners AS	1
38	20	Goldman Sachs	1
39		Reiten & Co ASA	1
40		Barclays	1
41		TAV AB	1
42		CapMan Capital Management	1
43		ECI partners	1
44		Herkules Capital AS	1
45		Perusa GmbH	1
46		The Riverside Company	1
47		Ion Equity Ltd	1
48		Oak Hill Capital Partners	1
49		Rutland Partners LLP	1
50		Dubai International Capital LLC	1

This table presents the 50 most active private equity firms in my sample, ranked on the number of executed deals. It is indicated if the private equity fund was amongst the 50 top private equity funds in the latest PEI300 index.

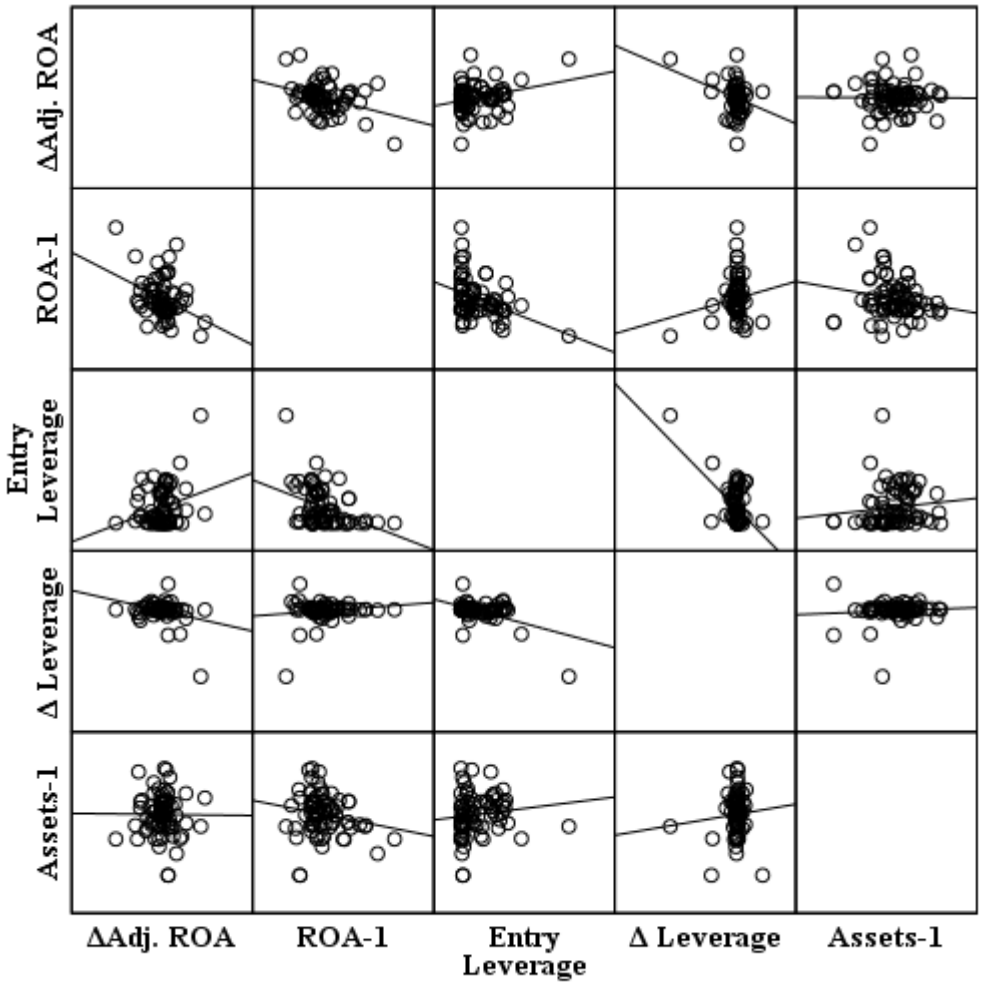
Appendix C: Variable Definitions and Sources

Variable	Definition	Source
Δ Leverage Target	Difference between long and short term debt of the target at the buyout and 1 year prior to the buyout, divided by Assets -1.	Bureau van Dijk: Orbis and Zephyr
Δ Leverage Whole Chain	The increase in long and short term debt of all relevant Financing Newco's and the Target between the year of the buyout and 1 year prior to the buyout divided by the Target Assets 1 year prior to the buyout. Relevant Financing Newco's are identified as firms involved in the buyout that have been erected in the year of the buyout and take on large amounts of debt without reporting relevant operating measures. This as it is likely that these firms were solely founded for the purpose of financing the takeover.	Bureau van Dijk: Orbis and Zephyr
ΔAdj.ATO	The percentage point change in revenue divided by total assets of the PE backed firm from 1 year prior to the buyout to average of the first three years following the buyout minus the matched median percentage point change in revenue divided by total assets of the non-PE backed firms	Bureau van Dijk: Orbis and Zephyr ; Compustat Global
ΔAdj.ATO to +3	The percentage point change in revenue divided by total assets of the PE backed firm from 1 year prior to the buyout to the third year after the buyout minus the matched median percentage point change in revenue divided by total assets of the non-PE backed firms	Bureau van Dijk: Orbis and Zephyr ; Compustat Global
ΔAdj.EBIT	Similar to ΔAdj.ATO, but then for EBIT divided by revenue in the same year	Bureau van Dijk: Orbis and Zephyr ; Compustat Global
ΔAdj.EBIT to +3	Similar to ΔAdj.ATO to +3, but then for EBIT divided by revenue in the same year	Bureau van Dijk: Orbis and Zephyr ; Compustat Global
ΔAdj.EBITDA	Similar to ΔAdj.ATO, but then for EBITDA divided by revenue in the same year	Bureau van Dijk: Orbis and Zephyr ; Compustat Global
ΔAdj.EBITDA to +3	Similar to ΔAdj.ATO to +3, but then for EBITDA divided by revenue in the same year	Bureau van Dijk: Orbis and Zephyr ; Compustat Global
ΔAdj.REV Growth	Similar to ΔAdj.ATO, but then for the percentage change in revenue	Bureau van Dijk: Orbis and Zephyr ; Compustat Global
ΔAdj.REV Growth to +3	Similar to ΔAdj.ATO to +3, but then for the percentage change in revenue	Bureau van Dijk: Orbis and Zephyr ; Compustat Global
ΔAdj.ROA	Similar to ΔAdj.ATO, but then for Net Income divided by Average total assets	Bureau van Dijk: Orbis and Zephyr ; Compustat Global
ΔAdj.ROA to +3	Similar to ΔAdj.ATO to +3, but then for Net Income divided by Average total assets	Bureau van Dijk: Orbis and Zephyr ; Compustat Global
Assets (t-1)	The total assets of the target 1 year prior to the buyout	Bureau van Dijk: Orbis and Zephyr
ATO (t-1)	Revenue 1 year prior to the buyout divided by total assets in the same year	Bureau van Dijk: Orbis and Zephyr
EBITDAMargin (t-1)	EBITDA 1 year prior to the buyout divided by total revenue in the same year	Bureau van Dijk: Orbis and Zephyr
EBITMargin (t-1)	EBIT 1 year prior to the buyout divided by total revenue in the same year	Bureau van Dijk: Orbis and Zephyr
Employee Growth	Percentage change in employees between 1 year prior to the buyout to the average of the first 3 years following the buyout	Bureau van Dijk: Orbis and Zephyr
Employee Growth to +2	Percentage change in employees between 1 year prior to the buyout to the third year following the buyout	Bureau van Dijk: Orbis and Zephyr
EntryLeverage	Long term and short term debt 1 year prior to the buyout divided by EBITDA 1 year prior to the buyout	Bureau van Dijk: Orbis and Zephyr

Foreign	Dummy variable indicating that the Acquirer is from a different country then the target	Bureau van Dijk: Orbis and Zephyr
Management	Dummy variable indicating that the management is co-investing in the buyout	Bureau van Dijk: Orbis and Zephyr
PEI50	Dummy variable indicating that the PE acquirer is listed in the first 50 places of the PEI300 index	Bureau van Dijk: Orbis and Zephyr
Revenue Growth (t-1)	Percentage change in revenue from the third year following the buyout to 1 year prior to the buyout	Bureau van Dijk: Orbis and Zephyr
Revenue per Employee	Amount of total revenue divided by the number of employees in the same year	Bureau van Dijk: Orbis and Zephyr
ROA (t-1)	Net income 1 year prior to the buyout divided by the average total assets in the same year	Bureau van Dijk: Orbis and Zephyr
French	Dummy variable that takes the value of 1 if the target is headquartered in France, and 0 otherwise	Bureau van Dijk: Orbis and Zephyr
Swedish	Dummy variable that takes the value of 1 if the target is headquartered in Sweden, and 0 otherwise	Bureau van Dijk: Orbis and Zephyr
2000-2005	Dummy variable that takes the value of 1 if the acquisition was completed between 2000 and 2005 and 0 otherwise	Bureau van Dijk: Orbis and Zephyr
2006-2007	Dummy variable that takes the value of 1 if the acquisition was completed between 2006 and 2007 and 0 otherwise	Bureau van Dijk: Orbis and Zephyr
2008-2009	Dummy variable that takes the value of 1 if the acquisition was completed between 2008 and 2009 and 0 otherwise	Bureau van Dijk: Orbis and Zephyr
2010-2012	Dummy variable that takes the value of 1 if the acquisition was completed between 2010 and 2012 and 0 otherwise	Bureau van Dijk: Orbis and Zephyr
Working Capital per Employee	Working capital used in the firm divided by the number of employees in the same year	Bureau van Dijk: Orbis and Zephyr

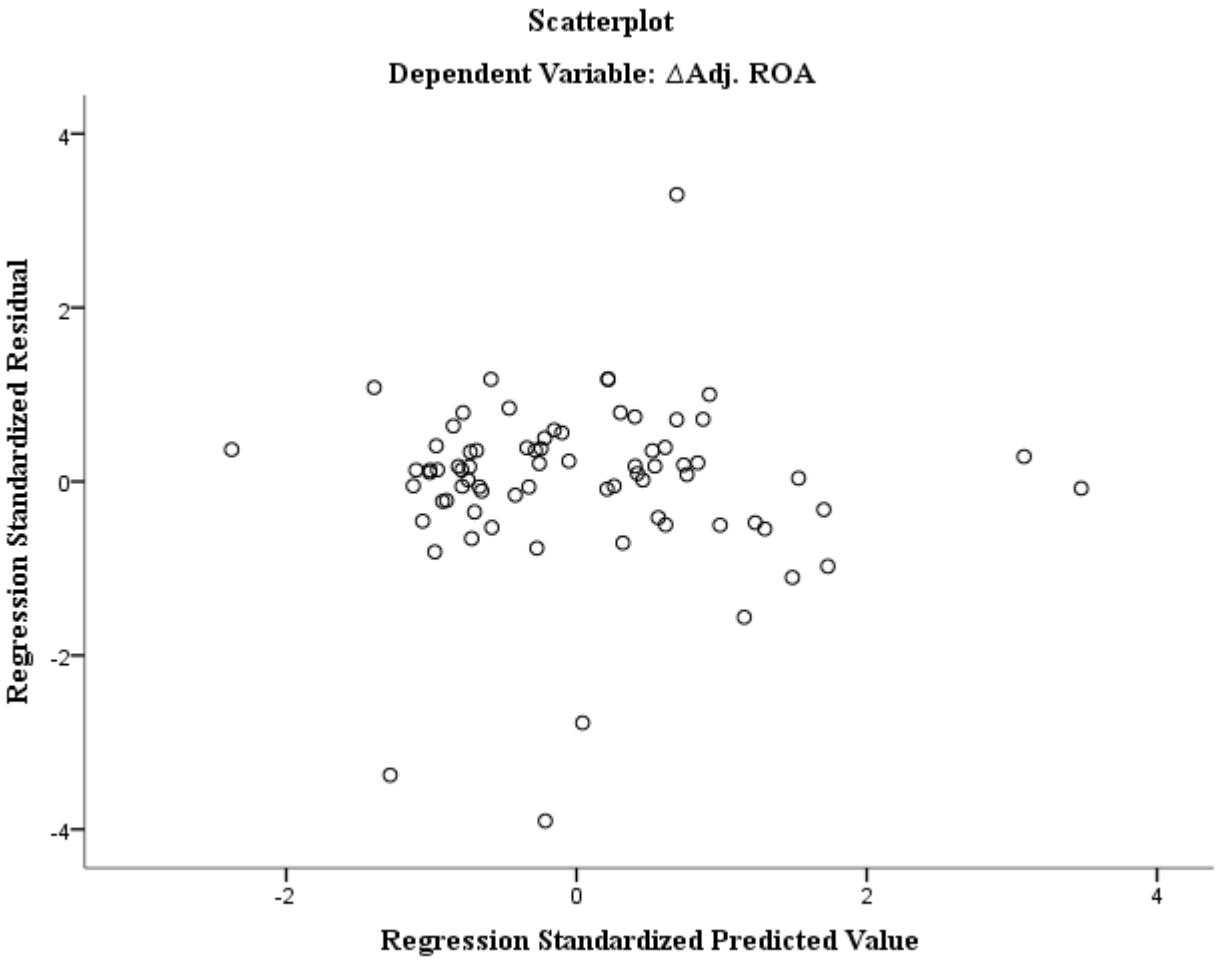
This table presents all variables used, their definitions, and their sources.

Appendix D: Scatter Plots



The scatterplot helps to determine if the model if linear. There seems to exist a linear relation between the dependent and the independent variables except for assets-1, but as can be seen in the scatterplot of the residuals this does not pose a problem for the regressions.

Appendix E: Scatter Plot of Standardized and Predicted Residuals



This scatter plots test for linearity by plotting the standardized predicted residual against the standardized predicted value. No pattern can be observed, and the observations are equally distributed below and above the null line. Therefore the data has no non-linearity problem. This confirms the observation from the scatter plot. The plots for the other regressions return similar results.

Appendix F: Correlations between all regression variables

	ΔAdj. ROA	ROA (t-1)	Foreign	PEI50	EntryLev.	ΔLeverage	Assets (t-1)
ΔAdj. ROA	1.00						
ROA (t-1)	-0.3600	1.00					
Foreign	0.0705	-0.2075	1.00				
PEI50	0.0685	0.1492	-0.2336	1.00			
EntryLev.	0.2696	-0.3880	-0.1415	-0.0575	1.00		
ΔLeverage	-0.3113	0.1464	0.0714	0.0585	-0.5233	1.00	
Assets (t-1)	-0.0077	-0.1866	0.1656	0.1755	0.1180	0.0817	1.00

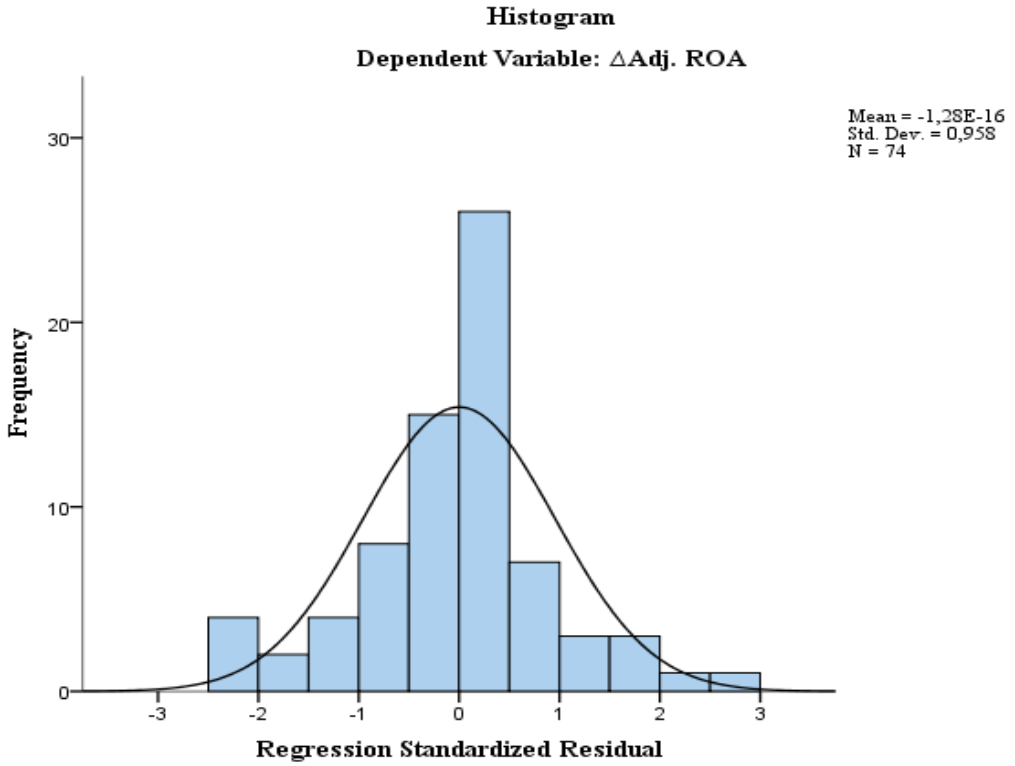
This table shows the correlations between the different variables used in the base regression. The correlation between all variables is low. The highest correlation, -0.52, exists between Entry Leverage and Leverage change. This negative correlation is to be expected as an already highly levered firm cannot take on much more debt. The results give no reason to believe that there exists multicollinearity in my sample.

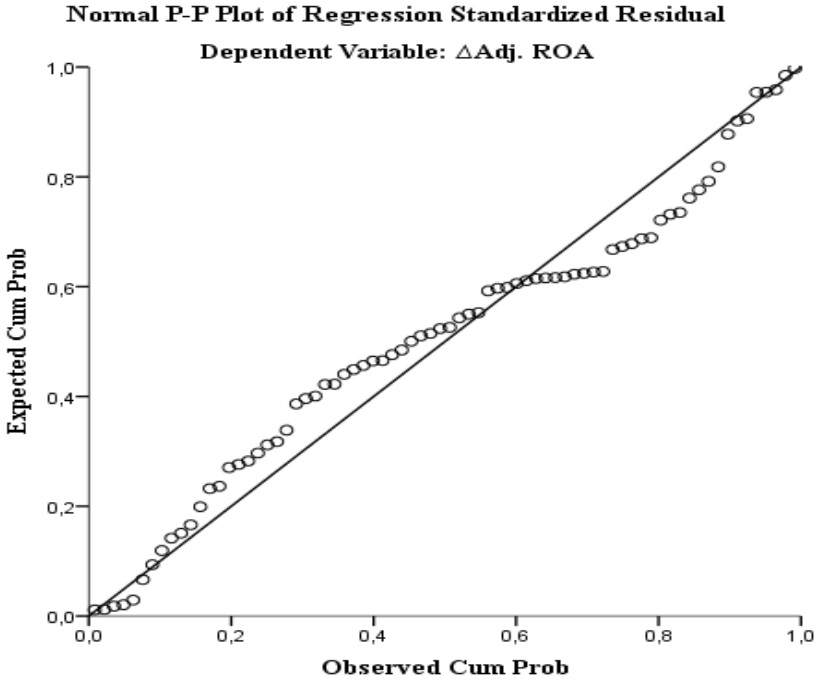
Appendix G: VIF factors

Variable	VIF	1/VIF
EntryLev.	1.51	0.662041
ΔLeverage	1.46	0.686238
PEI50	1.16	0.858820
Foreign	1.15	0.869533
Assets (t-1)	1.13	0.885115
ROA (t-1)	1.08	0.925410
Mean VIF	1.25	

This table shows the VIF factors of the different variables.

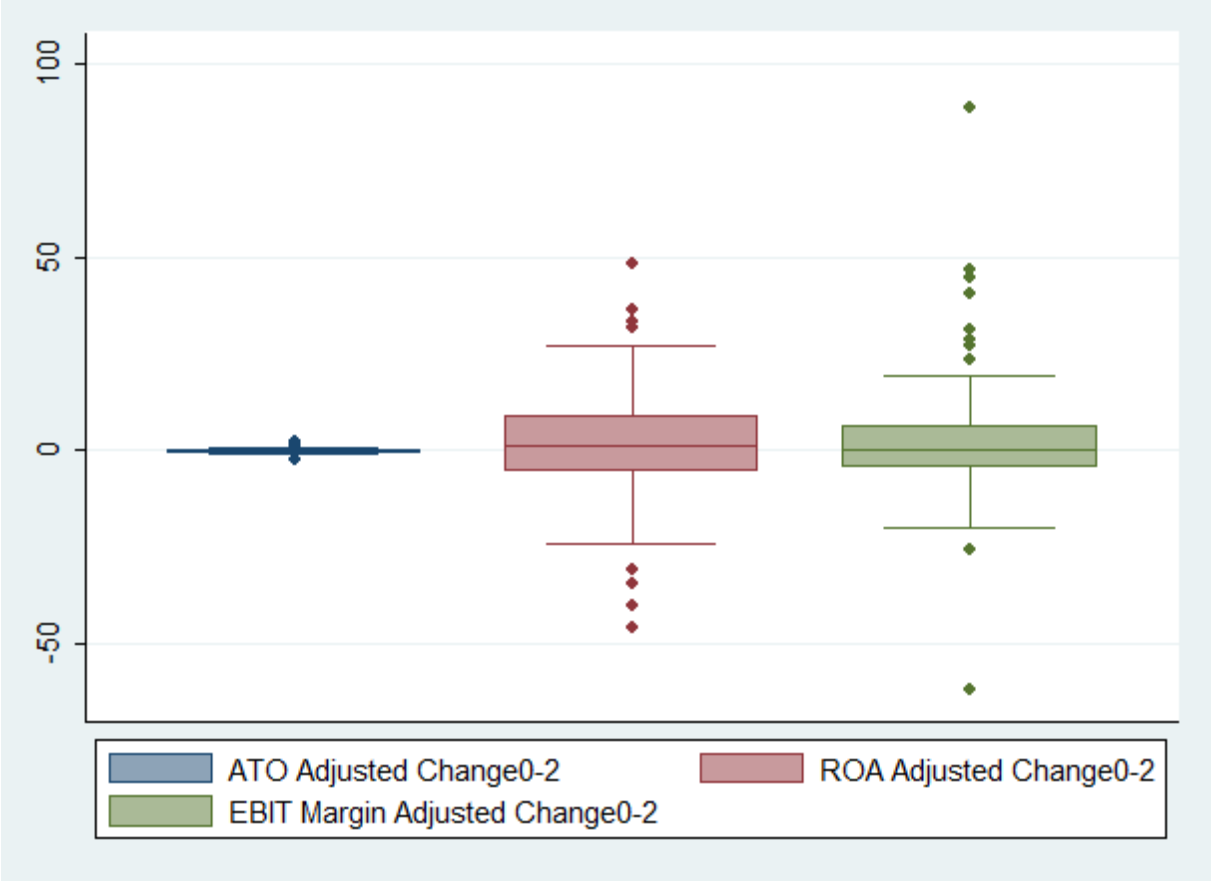
Appendix H: Histogram and Normall P-Plot of the standardized residuals.





This table shows the histogram and P-plot of the regression standardized resisuals.

Appendix I: Boxplots of ATO, ROA, and EBIT margin



From these graphs it can be observed that all three measures of adjusted changes in operating performance suffer from outliers. These are more wide-spread for ROA and EBIT margin then for ATO. The measure for revenue growth is excluded in the graph at it suffers from such extreme outliers that it makes the other boxplots hard to read.

Appendix J
Regression for Post Buyout Performance – Dummy Cross Terms Included

This table shows the results of the multiple OLS models of the adjusted post buyout performance of the LBO backed firms in my sample. All operating performance measures are adjusted by subtracting the performance of firms matched on industry, country and year from the LBO target companies' performance. In the uneven models the change in performance is taken from 1 year prior to the buyout to the average of the three years following the buyout. The uneven models specify the change in performance from 1 year prior to the buyout to the third year following the buyout. The uneven models are added as a robustness check. The dependent variable in the first two models is the Change in Adjusted Return on Assets. The dependent variable in the in the models (2) and (3) is the Change in Adjusted Asset Turnover. The dependent variable in the models (5) and (6) is the Change in Adjusted Revenue Growth. The dependent variable in models (7) and (8) is the Change in Adjusted EBITDA. C. All regressions are multiple OLS with robust standard errors. Data are obtained from Bureau van Dijk Orbis and Zephyr Databases, and Compustat Global. Significance levels are denoted as ***, **, and * indicating significance at the 1%, 5%, and 10% level, respectively. Standard deviations are reported between brackets.

VARIABLES	(1) ΔAdj.ROA	(2) ΔAdj.ROA to +2	(5) ΔAdj.ATO	(6) ΔAdj.ATO to +2	(7) ΔAdj.REV GROWTH	(8) ΔAdj.REV GROWTH to +2	(9) ΔAdj.EBITDA	(10) ΔAdj.EBITDA to +2	(11) ΔAdj.EBIT	(11) ΔAdj.EBIT to +2
Foreign	**9.617*** **	2.829	0.223	0.171	31.84	**40.18** **	**-5.558***	-5.775	-1.176	-1.549
	(3.623)	(5.328)	(0.138)	(0.136)	(23.49)	(19.42)	(2.927)	(4.055)	(3.398)	(5.646)
Foreign * Swedish	-2.978	2.599	-0.280	-0.249	**-78.25** **	**-137.1*** **	4.525	-3.131	5.779	0.276
	(6.646)	(10.21)	(0.266)	(0.273)	(38.76)	(28.13)	(6.934)	(12.05)	(5.836)	(9.766)
Foreign * France	**-11.88***	-6.816	-0.144	-0.490	-16.97	-25.84	3.946	12.29	-0.389	5.098
	(7.077)	(8.738)	(0.381)	(0.324)	(41.34)	(38.46)	(5.213)	(8.114)	(6.440)	(10.67)
France	0.0385	0.0200	0.0852	0.124	14.38	9.352	-4.781	**-11.83** **	-1.892	-7.379
	(4.250)	(5.393)	(0.164)	(0.206)	(19.91)	(20.09)	(3.175)	(4.762)	(4.222)	(5.486)
Swedish	**6.693***	-2.355	-0.160	-0.227	**39.25** **	**66.16*** **	**-8.602*** **	-8.024	-6.047	-6.049
	(3.779)	(4.598)	(0.206)	(0.178)	(19.25)	(23.63)	(3.176)	(5.614)	(4.435)	(6.948)
Management	**7.427** **	-1.247	-0.0631	-0.107	15.28	**27.19***	-5.426**	-6.555	-0.990	-0.536
	(3.065)	(4.161)	(0.0956)	(0.117)	(14.12)	(14.96)	(2.645)	(3.932)	(2.792)	(4.593)
PEI50	**5.808***	0.0921	**0.241***	0.173	14.33	7.606	-0.704	-8.344	-1.404	-10.31
	(3.264)	(5.665)	(0.129)	(0.152)	(15.07)	(14.27)	(3.221)	(5.229)	(4.033)	(6.187)
EntryLeverage	3.512	4.112	0.113	0.216	7.304	5.671	4.221	**5.883***	0.306	3.086
	(3.619)	(5.521)	(0.133)	(0.137)	(17.42)	(16.08)	(2.620)	(3.331)	(3.211)	(4.963)
Δ Leverage Chain	-3.714	-2.848	0.00341	-0.00867	-15.48	-30.64	-1.698	3.610	-4.614	-2.780
	(4.285)	(4.513)	(0.107)	(0.102)	(22.38)	(19.04)	(3.812)	(4.145)	(3.347)	(4.959)

Appendix J - Continued

VARIABLES	(1) ΔAdj.ROA	(2) ΔAdj.ROA to +2	(5) ΔAdj.ATO	(6) ΔAdj.ATO to +2	(7) ΔAdj.REV GROWTH	(8) ΔAdj.REV GROWTH to +2	(9) ΔAdj.EBITDA	(10) ΔAdj.EBITDA to +2	(11) ΔAdj.EBIT	(11) ΔAdj.EBIT to +2
Assets (t-1)	-1.798	-0.992	**0.232*****	**0.219*****	6.654	**13.70***	-0.358	-2.644	0.419	1.406
	(1.192)	(1.545)	(0.0854)	(0.0783)	-8.636	-6.974	(1.139)	(2.256)	(1.186)	(2.358)
2000-2005	-4.243	-8.163	-0.0737	**0.503*****	22.75	19.18	**-7.843****	-8.647	**-6.137***	-8.819
	(3.617)	(6.164)	(0.257)	(0.185)	(28.33)	(26.41)	(3.365)	(6.843)	(3.618)	(8.359)
2008-2009	**-5.239***	-1.430	0.0602	0.0715	0.776	-15.87	1.818	0.424	2.666	-0.368
	(2.654)	(3.406)	(0.105)	(0.122)	(16.96)	(20.04)	(2.517)	(3.580)	(2.773)	(4.154)
2010-2012	**-12.60*****	4.795	-0.119	-0.0798	7.143	14.24	-0.736	3.454	-5.121	-1.810
	(4.454)	(8.628)	(0.197)	(0.175)	(21.07)	(18.63)	(2.521)	(4.198)	(3.805)	(5.373)
ROA (t-1)	**-0.243***	**-0.317****								
	(0.133)	(0.157)								
ATO1 (t-1)			**0.194*****	**0.230*****						
			(0.0702)	(0.0587)						
Revenue Growth (t-1)					**-0.280*****	**-0.336*****				
					(0.0538)	(0.0476)				
EBITDAMargin (t-1)							**-0.180****	-0.166		
							(0.0862)	(0.109)		
EBITMargin (t-1)									**-0.421*****	**-0.471*****
									(0.105)	(0.146)
Constant	6.614	10.54	-1.477***	-1.537***	-45.89	-78.99*	10.55*	23.13*	5.983	4.068
	(6.225)	(7.857)	(0.422)	(0.437)	(44.94)	(41.36)	(6.263)	(12.31)	(6.112)	(11.88)
Observations	89	70	82	73	69	59	79	71	82	75
R-squared	0.356	0.221	0.425	0.480	0.470	0.664	0.315	0.305	0.401	0.391

Appendix K
Regression for Post Buyout Performance – Target Leverage Change

This table shows the results of the multiple OLS models of the adjusted post buyout performance of the LBO backed firms in my sample. All operating performance measures are adjusted by subtracting the performance of firms matched on industry, country and year from the LBO target companies' performance. In the uneven models the change in performance is taken from 1 year prior to the buyout to the average of the three years following the buyout. The uneven models specify the change in performance from 1 year prior to the buyout to the third year following the buyout. The uneven models are added as a robustness check. The dependent variable in the first two models is the Change in Adjusted Return on Assets. The other variables are specified in Appendix C. All regressions are multiple OLS with robust standard errors. Data are obtained from Bureau van Dijk Orbis and Zephyr Databases, and Compustat Global. Significance levels are denoted as ***, **, and * indicating significance at the 1%, 5%, and 10% level, respectively. Standard deviations are reported between brackets.

VARIABLES	(1) ΔAdj.ROA	(2) ΔAdj.ROA to +2	(5) ΔAdj.ATO	(6) ΔAdj.ATO to +2	(7) ΔAdj.REV GROWTH	(8) ΔAdj.REV GROWTH to +2	(9) ΔAdj.EBITDA	(10) ΔAdj.EBITDA to +2	(11) ΔAdj.EBIT	(11) ΔAdj.EBIT to +2
Foreign	**7.790****	2.283	0.0811	-0.0262	21.33	11.23	**-4.464***	-3.591	0.0536	0.166
	(3.089)	(4.155)	(0.0787)	(0.111)	(20.49)	(21.20)	(2.465)	(3.508)	(2.625)	(4.199)
Management	**5.799****	-0.913	-0.0308	-0.114	6.883	12.95	**-5.860****	**-6.940***	-1.138	-0.937
	(2.862)	(4.024)	(0.0764)	(0.103)	(15.75)	(17.14)	(2.370)	(3.705)	(2.571)	(4.215)
PEI50	5.181	-0.226	0.139	0.0887	11.34	-5.660	0.890	-6.606	-0.0694	-9.200
	(3.410)	(5.579)	(0.0987)	(0.126)	(15.81)	(15.71)	(2.974)	(4.861)	(3.665)	(5.814)
EntryLeverage	0.709	0.749	0.133	0.207	29.86	27.43	2.955	3.822	1.117	2.731
	(4.081)	(5.034)	(0.105)	(0.152)	(20.37)	(18.55)	(3.941)	(5.641)	(3.408)	(5.812)
Δ Leverage Target	**-7.848***	**-9.359***	0.119	0.104	24.70	5.302	-5.297	-0.454	-4.377	-4.817
	(4.281)	(4.685)	(0.111)	(0.171)	(24.14)	(9.744)	(4.713)	(6.770)	(3.734)	(5.915)
Assets (t-1)	-1.474	-0.153	**0.0899****	**0.135****	4.405	**11.60****	-1.005	-3.004	-0.414	1.471
	(1.396)	(2.165)	(0.0428)	(0.0653)	(8.642)	(5.484)	(1.328)	(2.627)	(1.185)	(2.472)
France	-2.341	-1.016	-0.0629	-0.0545	16.49	11.24	**-4.665***	**-8.361****	-2.511	-6.405
	(3.574)	(4.720)	(0.111)	(0.149)	(18.66)	(20.02)	(2.562)	(3.747)	(3.499)	(4.413)
Swedish	5.521	-1.120	-0.307	**-0.329***	-11.85	-21.77	**-9.890*****	**-15.39*****	-5.290	-9.128
	(4.604)	(6.870)	(0.186)	(0.184)	(35.98)	(38.32)	(2.874)	(4.989)	(3.448)	(5.791)

Appendix K- Continued

VARIABLES	(1) ΔAdj.ROA	(2) ΔAdj.ROA to +2	(5) ΔAdj.ATO	(6) ΔAdj.ATO to +2	(7) ΔAdj.REV GROWTH	(8) ΔAdj.REV GROWTH to +2	(9) ΔAdj.EBITDA	(10) ΔAdj.EBITDA to +2	(11) ΔAdj.EBIT	(11) ΔAdj.EBIT to +2
2000-2005	-6.369	**-11.11***	0.115	**0.370*****	21.21	29.53	**-5.658****	-5.436	-4.218	-7.300
	(3.885)	(6.033)	(0.112)	(0.129)	(24.53)	(24.78)	(2.807)	(5.736)	(3.065)	(7.118)
2008-2009	**-5.914****	-1.521	-0.0311	-0.0385	4.228	-0.947	1.416	1.958	0.805	-1.118
	(2.963)	(3.604)	(0.0790)	(0.111)	(18.79)	(24.38)	(2.614)	(3.802)	(2.633)	(4.254)
2010-2012	**-10.85****	5.788	-0.00128	-0.0331	16.80	29.98	-0.789	3.354	-3.687	-0.918
	(4.855)	(8.120)	(0.148)	(0.163)	(24.56)	(27.72)	(2.540)	(3.914)	(3.727)	(5.300)
ROA (t-1)	-0.202	**-0.292***								
	(0.139)	(0.160)								
ATO1 (t-1)			**0.0579****	**0.0724***						
			(0.0264)	(0.0382)						
Revenue Growth (t-1)					**-0.261*****	**-0.285*****				
					(0.0882)	(0.0998)				
EBITDAMargin (t-1)							**-0.205****	**-0.214***		
							(0.0853)	(0.119)		
EBITMargin (t-1)									**-0.430*****	**-0.477*****
									(0.0962)	(0.128)
Constant	5.786	6.361	-0.592**	-0.872**	-41.53	-79.00**	13.78*	24.90*	8.697	2.734
	(7.053)	(10.36)	(0.230)	(0.361)	(41.43)	(34.31)	(6.968)	(13.99)	(5.638)	(11.76)
Observations	81	66	74	67	63	54	72	64	75	68
R-squared	0.311	0.228	0.240	0.287	0.456	0.555	0.402	0.352	0.444	0.431

This Appendix shows the same regressions as in Table 5, but only uses leverage change in the Target company The results are robust to this alternative measure of leverage, with the exception that Δ Leverage which becomes insignificant in models (1) and (2) using the less extensive measurement of leverage.