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The Effect of Leveraged Buyouts on Employment Growth and Productivity

Evidence From European LBOs

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Summary

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Five key words: Employment growth, Labour productivity, LBO, Private equity, Buyouts

Purpose: The purpose of this thesis is to investigate the post-buyout effect on employment growth in LBOs relative to targets that were not subject to an LBO. Additionally, the study aims to provide an up-to-date insight into the impact of employment productivity post-buyout of the LBOs relative to non-LBOs, as the climate of buyouts have changed since its inception.

Methodology: The econometric methodology used is based upon balanced panel data. Pooled OLS regressions and random effects using clustered standard errors was used to deal with heteroskedasticity and partial endogeneity. Propensity score matching was used to deal with possible selection bias when pairing LBOs with non-LBOs. Clustered standard errors by industry were used to capture potential industry effect that might not have been captured by the initial clustered standard errors.

Theoretical perspectives: The theoretical framework used for the thesis are Agency theory and Jensen's free cash flow hypothesis.

Empirical foundation: The thesis uses a final sample of 439 European LBOs that took place between 2013-2016. Additionally, the matching methodology adds 1128 non-LBOs as a control group.

Conclusions: The paper discovered that on average, European LBOs experienced a rise in employment levels of around 7% in the pooled OLS mode and 3.4% in the random effects model. Furthermore, the study also found that the average European buyout experienced a decrease in labour productivity of around 3.3% and 3.7% within the same three-year period post-buyout. The results were consistent across two different measurements of labour productivity. The results are maintained after controlling for industry, year and firm controls.

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Lund

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1. Introduction

1.1 Background

Private equity is an impactful contributor to the global economy. Since its introduction in the US 50 years ago, private equity remains a major player in the global economy as it continues to grow. In 2021, global buyout deal values reached new heights of approximately $1 trillion in total investments which are up more than four times than a decade earlier (Bain & Company, 2023). The continuous growth of private equity, particularly in the context of buyouts, unquestionably confirms the significant impact and presence it holds on a global scale.

PE firms are commonly associated with leveraged buyouts (LBOs), in which a majority stake is acquired in a mature target company. Such transactions are funded through a combination of debt and equity where debt makes up between 60-90 percent, aiming to generate value in the underperforming target company in 3-8 years (Kaplan & Strömberg, 2009). With the introduction of the new phenomenon of LBOs in the 1980s, target firms of LBOs saw transitions in the capital structure, governance structure, and management incentives. These new changes would ultimately lead to various challenges that affected the firm in different ways and introduced opportunities for improvement (Kaplan & Strömberg, 2009). LBOs are generally distinguished by three features. Firstly, a higher proportion of the company's equity is owned by managers. Secondly, the firm increases leverage which is then secured against the firm's future cash flow or assets. Lastly, PE firms actively monitor and advise the board of directors during the holding period (Amess and Wright, 2013).

However, with the presence of the new phenomenon, critiques also arose. There has been a constant debate questioning whether PE firms participating in LBOs engage in value creation or value destruction. The critics claim that the significantly imposed debt contributes to asset stripping and job destruction and that the short investment horizon ultimately leads to value destruction (Gilligan & Wright, 2020; Froud & Williams, 2007). In 2005, before the global financial crisis (GFC), Franz Müntefering, the German chairman of the Social Democratic Party, stated that financial firms that focused on profit-maximising strategies were a threat to democracy, suggesting that PE firms were "Locusts", that stripped companies before moving on to their next target (The Economist, 2005). The critics increased during the GFC, where the former Danish prime minister, Poul Rasmussen, stated that:

> These “leveraged buy-outs” leave the company saddled with debt and interest payments, its workers are laid off, and its assets are sold. A once profitable and healthy company is milked for short-term profits, benefiting neither workers nor the real economy (Rasmussen, 2008, p.132).

Thus, the question arises of how private equity PE firms, and more specifically, LBOs, stand post the global financial crisis regarding value creation and employee layoffs. The financial crisis posed a major concern for the private equity industry as it experienced an unprecedented surge in deal activity, valuations, and high debt levels before the crisis (Bain & Company, 2023). In the aftermath, PE firms made a significant shift towards lower debt levels in buyouts, prioritising value creation through growth rather than debt paydown (BCG, 2012; Mullin and Panas, 2014). This shift can be seen as an invitation to reconsider certain previously held assumptions regarding the impact of private equity on target firms. The potential effect of shifts on employee layoffs is particularly relevant, which takes a unique perspective when viewed through the lens of different regulatory environments. For instance, nations in the European Union are subject to base-line standards where layoffs require valid justifications in contrast to the US (Malinsky, 2022). The EU legislation, applicable even during the acquisition of a firm by a PE firm, upholds the contracts of the employees with their previous conditions. Thus, an employer is only allowed to make changes to the workforce if there are economic, technical, or organisational reasons (Europa, 2023). With the changed priorities of PE firms post-financial crisis, the effects on employee layoffs and overall value creation might be different in the present market settings.

1.2 Problematisation

Private equity's reputation as a superior governance structure stems from its ability to enforce mechanisms of strict governance and maintain disciplined cash flow management (Jensen, 1989; Kaplan, 1989). Previous studies of private equity and buyouts have mainly focused on the investment performance in order to investigate whether PE funds and PE firms are contributing to value creation or destruction (McGrath and Nerkar, 2023; Kaplan & Strömberg, 2009; Metrick & Yasuda; 2011; Morris & Phalippou, 2020; Harris, Jenkinson & Kaplan, 2014; Cumming, Siegel & Wright, 2007; Harford & Kolasinski, 2014; Boucly et al., 2011; Guo et al., 2011; Lopez-de-Silanes, Phalippou & Gottschalg, 2015). Although the papers above mainly

aim towards value creation and positive returns, questions have arisen at what expense these returns originate from, which consequently introduced a new field of research possibilities (McGrath, 2023).

Shleifer & Summers (1988) claimed that buyouts come at the expense of employees being laid off, questioning if these transactions imposed wealth transfers from the labour force to shareholders rather than value creation. Previous empirical studies have supported the criticism of employment layoffs (Lichtenberg & Siegel, 1990; Davis et al., 2014; Davis et al., 2022; Cressy et al., 2011; Antoni et al., 2019). Nonetheless, whether PE-backed buyouts create or shred jobs has not reached a consensus. Amess and Wright (2012) suggest that PE firms assist target firms in unlocking growth opportunities by contributing with expertise, which could lead to job creation. This notion has also been supported by prior empirical studies (Boucly et al., 2011; Bacon et al., 2013; Toubeau, 2006; Pellon, Zieling & Hera, 2007). More intriguingly, additional studies were not able to show any evidence of increased employment growth or lack thereof (Amess & Wright, 2012; Olsson & Tåg, 2017; Bergström et al., 2007).

There could be several potential explanations for the various outcomes. Firstly, the type of buyout could have implications for the outcome of the transaction. As such, LBOs typically involve high debt that could impact employment growth (Kaplan & Strömberg, 2009). Secondly, the measured period may influence the outcome depending on the prevailing market settings (Davis et al., 2022). Thirdly, the geographical location of the study may also affect the result, such as strict labour regulations where layoffs are difficult to execute (Boucly et al., 2011; Olsson & Tåg, 2017). Additionally, in recent years there are implications that PE firms are involved in a paradigm shift toward a growth strategy rather than a cost-cutting strategy as was suggested in earlier papers (Antoni, Maug & Obernberger 2019; Gompers, Kaplan & Mukharlyamov, 2016).

Another understudied indirect impact of PE firms is their influence on labour productivity. As we are in an era of globalised economy, maintaining and improving productivity is essential for survival because it has been identified as a key driver contributing to the average GDP per capita (OECD, 2023). Despite its importance, there are only a handful of studies in this area, and their findings are inconsistent, leaving us unsure whether the productivity of buyout targets increased relative to non-buyouts (Amess et al., 2009; Amess, 2003; Datta et al., 2013; Davis et al., 2014; Harris et al., 2005; Leslie & Oyer, 2009; Lichtenberg & Siegel, 1990; Scellato &

Ughetto, 2013). It should be noted that many of these studies focus more on management buyouts (MBOs) rather than those with a PE sponsor. They suggest that the positive increase in productivity might originate from the heightened incentives between managers and PE managers.

Furthermore, a study by Datta et al. (2013) indicated that productivity boosts could be attributed to cost reduction strategies such as employee layoffs. However, in contrast, recent studies provide little to no evidence of productivity increase in PE-backed buyouts compared to non-buyouts (Amess et al., 2009; Leslie & Oyer, 2009; Scellato & Ughetto, 2013). It is also worth noting that many of these studies primarily explored buyouts during the 80s, 90s, and the years leading up to the financial crisis. Such a time frame might not accurately reflect the significant changes in PE firms' behaviour over the last two decades, as PE firms have increasingly implemented growth-oriented strategies since then (Kaplan & Strömberg, 2009).

1.3 Purpose and research question

The purpose of this thesis is to investigate the post-buyout effect on employment growth in LBOs relative to targets that were not subject to an LBO. Additionally, the study aims to provide an up-to-date insight into the impact of employment productivity post-buyout relative to non-buyouts, as the climate of buyouts have changed since its inception. To address the purpose of this thesis, the following research questions are formulated:

Research question 1*: How is the employment growth affected in the target firm that was subject to an LBO compared to non-LBO firms?*

Research question 2: *Is the potential effect from employment growth associated with productivity growth in the target firm that was subject to an LBO compared to non-LBO firms?*

1.4 Main findings

This study investigates the employment and labour productivity effect on 439 European LBOs between 2013-2016, by using a pooled OLS and random effects model. The main findings of this paper demonstrate that LBOs have a positive effect on employment growth in target firms but a negative impact on productivity relative to non-LBOs for the European sample. Our findings are inconsistent with the theoretical framework predictions, Agency theory and Jensen’s free cash flow hypothesis. The results are still robust after conducting multiple

robustness tests such as propensity score matching and clustering standard errors at different levels.

1.5 Contribution

This study contributes to the existing literature by building on a comparatively limited subset of studies, with an objective to address the knowledge gap on employment effect post-buyout in contemporary market settings. To the best of our knowledge, this is the first study that examines employment growth and productivity while using a difference-in-difference estimator, which is the interaction term that explains the LBO effect in the years succeeding the buyout. Furthermore, it appears that an apparent shift in PE firm's strategy from cost-cutting to growth-oriented strategy. Thus, this study challenges the previous held assumptions and sheds light on the current PE industry settings.

1.6 Limitations

There are two main limitations that must be considered. First, it is acknowledged that our results may be influenced by endogeneity since there is a lack of suitable exogenous variable that affects the likelihood of engaging in a buyout. As a result, our findings may be seen as descriptive more than casual. Second, there is another concern related to constructing control groups, as buyouts are not random. PE firms may target firms that are expected to experience growth. However, to minimise the risk of selection bias, we have used a propensity score matching in addition to our initial matching approach.

1.7 Outline

The rest of the paper is organised as follows. Section 2 provide an overview of the theoretical framework. Section 3 presents related literature review. Section 4 presents the hypothesis development. Section 5 presents the methodology. Section 6 describes the data. Section 7 presents the empirical results. In Section 8 the analysis is presented and finally in section 9 the conclusion and future research is discussed.

2. Theoretical Framework

2.1 Agency theory

The agency theory, as proposed by Jensen & Meckling (1976), addresses the relationship between principal and agents. The theory suggests that a prevailing conflict of interest may exist due to the separation of ownership and control in a firm, where agents may act in their own interest rather than principals. In order to mitigate divergence and increase alignments, the theory emphasises the need for appropriate incentives and monitoring systems. In terms of LBOs, McGrath & Nerkar (2023) claim that Agency theory is the cornerstone of the research presented in the field of LBOs. In reference to the original theory, PE firms reduce the separation of ownership and control by acquiring a significant amount of equity and using incentives to mitigate the divergence between the management of the LBO target, providing them with an equity stake as well. As such, PE firms are seen as the principal, and the management of the target firm is seen as the agent (McGrath & Nerkar, 2023; Lichtenberg & Siegel, 1990; Hannus, 2015; Gompers, Kaplan & Mukharlyamov, 2016). As a result of reducing the separation between ownership and control, and consequently agency costs, PE firms are seen as organisational optimisers (Krysta & Kanbach, 2022).

From a theoretical perspective, Agency theory also predicts that PE firms acquiring a significant equity stake in the target firms introduce a restructuring process in the board. The theory assumes that the board plays a crucial role in upholding shareholder interests, highlighting the need to primarily focus on its monitoring and control functions (Braun & Latham, 2007; Fama & Jensen, 1983; Amess & Wright, 2007). Additionally, Agency theory also suggests that improved active monitoring practices implemented by PE firms may reduce agency costs in the target firms (Cotter & Peck, 2001; Thompson & Wright, 1992; Chemmanur, Hull & Krishnan, 2021). Reduction of agency costs is particularly evident in those cases where the PE firms acquire significant equity portions of the target firm, as active monitoring reduces the likelihood of value-destructing actions by management (Thompson & Wright, 1992; Cumming, Siegel & Wright, 2007).

2.2 Jensen’s free cash flow hypothesis

Building on the notion of the Agency Theory by Jensen & Meckling (1976), Jensen (1986, 1989) constructed what would later become known as the free cash flow hypothesis. According to Jensens' (1986, 1989) free cash flow hypothesis, LBOs lead to corporate governance

mechanisms that decrease agency costs and enhance firm value by improving operational efficiency, thus, being a superior way to manage firms. These agency costs are mainly present in more mature firms; as such, targets are not randomly selected. Those firms that are not subject to a buyout will have high agency costs of free cash flow and engage in empire building, i.e., value destruction (Jensen, 1986; Wang, 2010). Jensen (1986, 1989) argued that agency costs of free cash flow arise if excess cash is not distributed to shareholders or invested in profitable investments.

As a result of leveraging up a target firm with 60-90% debt (Kaplan & Strömberg, 2009), in combination with increased monitoring and equity ownership by management as stated by Jensen & Meckling (1976), Jensen (1986,1989) argued that managers were less prone to engage in value-destroying activities. The debt mechanism is seen as a way to mitigate agency costs as it creates an obligation for managers to pay recurring interest payments and amortisations. If managers are unable to fulfil these obligations, the company may be forced into liquidation, resulting in job losses for the management as such, debt serves as a motivating factor to enhance efficiency. Additionally, in the case of financial distress, management may also be replaced, which motivates management to pursue high performance (Jensen, 1986; Krysta & Kanbach, 2022). The equity stake the managers receive as an incentive to align interests ties them to the company as their private portfolio is at stake if the firm fails to increase operating efficiency. Additionally, as the companies tend to be private after a transaction, the equity is illiquid, meaning managers cannot sell their equity holdings until an exit transaction. (Robbie, Thompson & Wright, 1992; Krysta & Kanbach, 2022). Consequently, the reduction of agency costs imposed by these mechanisms is seen as crucial factor contributing to value creation of the target firm, increasing operating efficiency and productivity (Jensen, 1989; Gompers, Kaplan & Mukharlyamov; Kaplan, 1989; Sadun & Van Reenen, 2015)

3. Literature review

3.1 Buyout effect on employment

Lichtenberg & Siegel (1990) was one of the first studies to investigate Jensens' Free Cash Flow Hypothesis. They investigated the impact of buyouts between 1981-1986 in the USA. Using employment data for blue- and white-collar workers, they find that non-production workers reduce by approximately 6,5% as a result of an LBO. In a recent study, Davis et al. (2014) investigated whether critics of LBOs and PE firms were justified. They constructed and analysed a dataset of 3200 target firms between 1980 to 2005 in the US, before and after the acquisition as well as their establishments. They find that target firms acquired by PE firms face job loss at establishments operated by target firms in the buyout year. However, in the two consecutive years post-buyout, employment shrinks by 3 percent relative to the control group. They conclude that pre-existing employment positions have a higher risk of job losses as a result of an LBO. Additionally, they find that the job reallocation rate exceeds the control group during the first two years post-buyout, reflecting that PE firms look to increase efficiency. In a follow-up study from Davis et al. (2022), they extend their buyout period to 1980-2013, using the same dataset. When extending their period by eight years, they find that employment rates shrink by 4,4% relative to their control group which is more than when they investigated the period between 1980-2005, indicating that PE firms engage in more substantial employee layoffs in the later years of the follow-up period.

A study from Cressy et al. (2011) has similar findings. With a dataset of 57 British buyouts between 1995-2000, the authors conclude that employment growth decreases relative to the non-buyouts. Antoni, Maug & Obernberger (2019) find that buyouts have a negative impact on employment. They studied the human capital effects of 511 private equity buyouts in Germany between 2002 and 2008. They find evidence that white-collar workers, such as administrative staff, decline in buyouts. However, they argue that PE firms have been modernised, where value creation arises from enhancing growth through organisational, operational and technological improvements, implying a paradigm shift from cost-cutting strategies. Adding to this suggestion, Gompers, Kaplan & Mukharlyamov (2016) investigated the industry of PE firms to find how value is created. In a survey with 79 PE investors that, when combined, managed $750 billion in total assets, they found practical evidence from the industry that PE investors prioritise value creation through growth rather than cost-cutting strategies.

Amess and Wright (2012) have, however, found contradictory results. With a dataset of 533 British LBOs between 1994-2004, the authors analysed the effect of PE firms and the impact of LBO governance structure on employment. Amess and Wright (2012) found that PE-backed LBOs and non-LBOs have no significant effect on employment effects. Two Swedish studies have also made similar findings. Olsson and Tåg (2017) analysed a dataset of 239 buyouts between 2002-2008 and concluded that buyouts do not significantly affect employment. Bergström et al. (2007) also found no significant effect on employment. However, the authors argue that it is debatable whether their results can be generalised to other countries due to differences in labour regulations across countries.

On the other hand, Amess and Wright (2012) argue that PE firms contribute with experience and expertise. Thus, this could help target firms unlock growth opportunities, ultimately driving higher employment growth in PE-backed LBOs than in non-LBOs. This aligns with the study by Boucly et al. (2011), where the authors studied alterations in corporate behaviour using a dataset of 839 PE-backed French LBOs between 1994-2004. Boucly et al. (2011) discovered significant growth in both employment and sales in French LBOs. Whether this increase in employment and sales is only due to a growth strategy implemented by PE firms is debatable. According to Boucly et al. (2011), one possible explanation is the strict French labour laws, meaning that lay-offs would be expensive.

Moreover, Bacon et al. (2013) argue that employment growth in PE-backed European buyouts tends to be positive. Pellon et al. (2007) studied 100 LBOs between 1993-2004 in Spain and finds that employment growth is 4% higher than non-LBOs. Another study by Toubeau (2006), which studies 54 buyouts in Belgium between 1998-2005 suggests that employment growth is higher compared to control groups. These findings could be due to PE firms' crucial role in unlocking growth opportunities (Bacon et al., 2013).

3.2 Buyout effect on productivity

Previous empirical studies have extensively studied how changes in the ownership structure impact productivity (Lichtenberg & Siegel, 1990; Amess, 2003; Harris, Siegel & Wright, 2005; Leslie & Oyer, 2009; Amess et al., 2009; Scellato & Ughetto, 2013). However, Cumming, Siegel & Wright (2007) and Davis et al. (2014) stated that it would be useful to investigate the impact buyouts such as LBOs can have on productivity and that less is known within the field. Lichtenberg and Siegel (1990) investigated 131 undergoing buyouts between 1983-1986. They found that manufacturing plants increased productivity growth post-buyout compared to the

non-pe-backed firms. However, the manufacturing plants for the buyout targets were more efficient prior to the buyout. These results also align with Amess (2003) and Harris, Siegel & Wright (2005). Amess (2003) analysed 78 British buyouts between 1986-1987 and found that the increase in firm-level productivity could be due to mitigating agency costs by utilising incentives and active monitoring. This is also confirmed by Harris, Siegel & Wright (2005), who suggest that buyouts incorporate mechanisms that reduce agency costs and enhance economic efficiency. Another study by Datta et al. (2013) investigates 208 reverse-LBOs between 1978-2006 and finds evidence of labour productivity improvements and argues that the source of these improvements stems from employee reductions and cost-cutting measures. These results align with the findings by Lutz & Achleitner (2009), who argue that productivity arises from the expertise of PE firms, which could be reflected through employment layoffs.

However, studies have also found results that are not aligned with the previously mentioned results. Leslie and Oyer (2009) studied 144 reverse-LBOs between 1996-2005 and also suggest that PE firms utilise strong incentives with the purpose of reducing agency costs. Nonetheless, the authors found very little evidence that the target firm outperformed its peers regarding productivity. The weak presence of productivity outperformance compared to non-buyout peers has also been observed in two additional studies by Scellato and Ughetto (2013) and Amess et al. (2009). Scellato and Ughetto (2013) investigated 241 European buyouts between 1997-2004 and could not show any statistical significance in terms of positive impact on productivity compared to non-buyout peers.

3.3 Discussing theoretical perspectives and buyouts

There could be various explanations for the different outcomes of employment growth and productivity which are built upon the notion of Agency theory and Jensens' free cash flow hypothesis. Previous literature regarding employment effects from LBOs is mostly focused from the perspective of corporate governance. Jensen (1989) emphasises the crucial role of LBO structures in dealing with the previously mentioned agency problems, i.e., managerial incentives, increase in leverage, and PE firms' active participation in the board. Amess and Wright (2012) argue that these governance structures allow LBOs to generate superior performance compared to non-LBOs that do not have these structures in place. The absence of these governance structures, as emphasized by Amess and Wright (2012), is also argued to have a detrimental impact as they could lead to sub-optimally large firms. From the scope of agency theory, PE firms' objective could be to increase efficiency by minimising sub-optimal investments such as those that tend to build unnecessary large firms. Based on this, it could be

argued that LBO firms tend to have lower employee levels than non-LBO firms. PE-backed buyouts use incentives to reduce agency costs that could result in value-destroying activities such as over employment or investments in unprofitable projects caused by managers with excess cash holdings (Bacon et al., 2010; Meuleman et al., 2009). Meuleman et al., (2009) further argue that performance improvements introduced by PE firms are strengthened through value-creating activities related to growth and efficiency enhancements.

These value creating incentives and efficiency improvements may, however, also include job destruction. On the other hand, Bacon et al. (2010), suggests that concentrated ownership and improved strategic and operational capabilities lead to reduced agency costs and, consequently, positively impact employment, stressing that buyouts may be beneficial for employment. Olsson & Tåg (2017) argue that there is an ongoing automatisation process for jobs built on routines, indicating that technological progress may play a role in the impact of employment. Their argument that PE firms reduce agency costs is a result of investments in routine jobs that lead to offshoring, suggesting that PE firms should overall lead to employee layoffs.

Lutz & Achleitner (2009) add that agency theory suggests that to align the interest between the management and owners, workers receive a compensation increase once a buyout occurs. Accordingly, employees see an increase in their responsibilities, thus contributing to performance, which enhances productivity. Scellato & Ughetto (2013) add that with interest alignments between the managers and owners, as a result of reduced separation in ownership and control, corporate restructurings such as LBOs are more likely to be successful, which lead to improved efficiency of the target firm. Contrarily, Meuleman et al. (2009) state that the efficiency buyouts introduced is measured by input and output ratios which means that management may look to engage in activities that improve performance by cutting costs, such as employees. As a result, LBOs may lead to increased efficiency through cost reductions rather than operating performance.

4. Hypothesis development

Although researchers have investigated different areas related to LBOs, there is an uneven consensus in which direction employment is impacted in target firms following the buyout. From an agency theory perspective, LBOs can lead to increased profitability through efficiency improvements as agency costs are reduced following better alignment of incentives between managers and the PE firms (Bacon et al., 2010; Meuleman et al., 2009). With the nature of the increased debt LBOs incur, management looks to reduce unnecessary agency costs as instructed by the PE firms to mitigate value-destroying activities. Consequently, these restructuring changes that LBOs impose may lead to job layoffs (Meuleman et al., 2009) or, in some cases lead to employment growth as a result of enhancing the efficiency of the target firm (Scellato & Ughetto, 2013; Bacon et al., 2010). Nonetheless, Amess & Wright (2012) argue that an LBO could lead to efficiencies in the sense that PE firms will contribute to minimized sub-optimal investments, referring to empire building of unnecessary large firms, indicating that employment growth decreases.

On one hand, studies suggest a positive impact of buyouts as a result of the improved governance structure on employment growth (Boucly et al. 2011; Bacon et al. 2013; Pellon et al., 2007; Toubeau, 2006) find positive employment growth. Their findings suggest that the governance structure of concentrated ownership improved the efficiencies of the target firms (Meuleman et al., 2009) and reduced agency costs which could lead to increased employment opportunities (Bacon et al., 2010).

Contrarily, several studies have found negative or insignificant effects of buyouts on employment growth. Davis et al. (2014, 2022), Cressy et al. (2011), Anotoni, Maug & Obernberger (2019) find a negative impact on employment growth in target firms while Amess & Wright (2012), Olsson & Tåg (2017) and Bergrström et al. (2007) find no significant effect on employment. These studies highlight the complexity of the interrelationship between LBOs and employment growth, suggesting that industry or regional economic climate may influence the outcome.

Furthermore, there are also arguments suggesting that there is a paradigm shift in the buyout sphere. Antoni, Maug & Obernberger (2019) argue that PE firms have modernised, focusing on growth rather than cost-cutting strategies which is also supported by Gompers, Kaplan & Mukharlyamov (2016). Applying the suggestions of Cressy et al. (2011), employment growth

could increase as more efficient firms generate higher revenues, suggesting that increased employment will follow with larger firm size.

Additionally, it is stressed that European countries, especially those included in the European Union, have stricter labour laws (Bacon, et al. 2013; Antoni, Maug & Obernberger 2019; Boucly et al., 2011; Olsson & Tåg, 2017), suggesting that PE firms are more likely to engage in growth strategies as argued by Antoni, Maug & Obernberger (2019) and private equity reports (Bain & Company, 2023; Mullin & Panas, 2014). Based on the argumentation, we formulate our first hypothesis accordingly:

Hypothesis 1: *Firms subject to LBOs have a significant positive post-buyout employment growth relative to Non-LBOs*

Jensen's free cash flow hypothesis and the agency theory suggest that PE firms increase operating performance, productivity and shareholder value with their unique governance structure. In terms of productivity, empirical papers have investigated productivity through operating performance as suggested by the thorough analysis by Schütt & Ayash (2016). Buyouts trigger changes in corporate ownership, effectively strengthening the incentives between managers and owners. As Jensen (1989) suggests, the change in ownership in a buyout can lead to enhanced firm performance. This can be attributed to PE firms' heightened motivation to reduce agency costs and enhance efficiency (Scellato & Ughetto, 2013; Bacon et al., 2010; Meuleman, 2009). Scellato and Ughetto (2013) suggest that buyouts tend to instigate solid monitoring frameworks through suitable governance structures, which further leads to a more efficient allocation of resources, thereby boosting the target firms' performance and efficiency. Building on the notion that the sample of this thesis only studies LBOs, where the PE firm has acquired >50% of the target firm, it can be argued that this leads to a strengthened alignment of incentives between the two parties.

Previous research has yet to agree upon the productivity impact of target firms. The most recent research by Davis et al. (2022) finds that increased productivity is correlated with increased revenues. Their findings are focused on previous market conditions, suggesting that PE target firms achieve higher productivity in bust periods relative to controls. Lichtenberg & Siegel (1990) find that manufacturing plants increased productivity growth post-buyout compared to their control group. Harris, Siegel & Wright (2005) find that target firms experience increased productivity due to operational changes by management as a result of employee reduction. Contradictory, Leslie & Oyer (2009) and Amess et al. (2009) find weak evidence that

productivity increases in target firms relative to the control group. Lastly, Scellato & Ughetto (2013) could not find any significance at all on productivity in relation to non-buyout peers.

Drawing on the understanding that LBOs create a stronger alignment of incentives between the target firm and the PE firm, as suggested by Jensen (1989) and the agency theory, it is expected that LBOs positively impact the productivity of target firms. Previous empirical research has yielded mixed results regarding the productivity effects. However, considering the unique governance structure and the increased growth-oriented approach of PE firms seeking to enhance efficiency and achieve growth, the following hypothesis is formulated:

***Hypothesis 2**: Firms subject to LBO have a significant positive post-buyout productivity growth relative to Non-LBOs*

5. Methodology

5.1 Multivariate regressions

Several factors must be considered when making the decision to choose the appropriate econometric method for testing the formulated hypothesis. The dataset used in this study is structured as panel data, providing us with the opportunity to employ a range of methods to examine the impact of employment growth on PE-backed buyout targets. Within this field, previous empirical studies have mainly used pooled OLS and fixed effects (Amess and Wright, 2012; Antoni et al., 2019; Boucly et al., 2011; Cressy et al., 2011; Scellato and Ughetto, 2013). This study will begin with pooled-OLS, followed by addressing potential endogeneity issues through a random effects model. To adhere to empirical standards, the potential presence of heteroskedasticity is addressed by clustering standard errors.

5.1.1 Pooled OLS, FE and RE Models

Firstly, the pooled-OLS model comes with important limitations that must be addressed. Firstly, pooled OLS fails to consider the panel structure of the data, leading to the pooling of observations across both time and cross-sectional units. This can however be addressed by including a year dummy that captures variations in the sample distribution across periods (Woolridge, 2016). Another limitation that must be addressed is the fact that pooled OLS could generate estimators that suffer from heterogeneity. This is particularly problematic since it could produce both biased and inaccurate results. As an example, consider the following regression model:

$$y_{it} = \beta_0 + \beta_1 x_{it} + a_i + u_{it,} t = 1,2$$

In the regression above, (i) represents data units, (t) denotes time period, (β) is the coefficient, (x) is the explanatory variable, (ai) is the unobserved effect and ($u_{it,}$) is the time-varying error impacting the models dependent variable (y_{it}). For pooled OLS to yield a reliable estimate of (β_1), the unobserved effect (a_i) must remain uncorrelated with (x_{it}). Otherwise, the pooled OLS estimation will exhibit bias, inconsistency, and subsequently lead to heterogeneity.

Heteroskedasticity is an additional concern when using pooled OLS regression, indicating that the variance of the error term and the explanatory variable is not constant, resulting in invalid standard errors. To deal with this, we have conducted white tests and used clustered robust standard errors in all of the regressions (Woolridge, 2016).

One approach to address the concerns outlined above is to utilise a fixed-effect model. The fixed-effect model considers the relationship between the explanatory variables and the unobserved effects to be random. This fixed-effect transformation eliminates time-constant explanatory variables. Consequently, this ensures unbiased estimators by mitigating partial endogeneity concerns (Woolridge, 2016).

However, the elimination of the time-constant explanatory variables comes with complications. In cases where the explanatory variable remains constant over time, it will automatically be omitted. This can be problematic in our study for two reasons. First of all, one of the main explanatory variables in this study is an LBO dummy, indicating whether the company is a buyout target or not. This does not change as if a company is an LBO target, it will always remain as an LBO target. Secondly, if the LBO dummy gets omitted, the fixed effect model will not be able to capture the specific effect of being an LBO target on the actual outcome variable. Thus, the fixed effect model will not be able to consider the unique characteristics of LBOs. Hence, due to one of our main explanatory time-constant variables, LBO, utilising a fixed effect model in order to address endogeneity concerns would perhaps not be appropriate.

In this case, a better approach to deal with endogeneity would be to utilise a random effect model. In the random effect model, it is assumed that the unobserved effect and the explanatory variable are uncorrelated throughout the entire period, thus, the time-constant main explanatory variable LBO will not be omitted. Moreover, when deploying random effect estimation, generalized least squares (GLS) are applied to address potential serial correlation present in the composite error terms. Contrary to pooled OLS, where serial correlation is ignored, which could lead to the risk of inaccurate test statistics and standard errors. Consequently, if the equation incorporates strong controls and any disregarded heterogeneity solely encompasses serial correlation within the error term, the random effects model is a more appropriate choice in comparison to pooled OLS and fixed effects model (Woolridge, 2016). Thus, the following models have been formulated to test our hypothesis:

Pooled OLS (H1)

$$Log(Employees)_{i,t} = \beta_0 + \beta_1 LBO_{i,t} + \beta_2 Post_{i,t} + \beta_3 LBO_{i,t} \times Post_{i,t} + \beta_4 Log(Revenue)_{i,t} + \beta_5 Log(EBITDA)_{i,t} + \beta_6 Leverage_{i,t} + \beta_7 Log\left(\frac{CAPEX}{Revenue}\right)_{i,t} + \varepsilon_{i,t}$$

Pooled OLS (H2)

$$Log(Revenue/Employees)_{i,t} = \beta_0 + \beta_1 LBO_{i,t} + \beta_2 Post_{i,t} + \beta_3 LBO_{i,t} \times Post_{i,t} + \beta_4 Log(Revenue)_{i,t} + \beta_5 Log(EBITDA)_{i,t} + \beta_6 Leverage_{i,t} + \beta_7 Log\left(\frac{CAPEX}{Revenue}\right)_{i,t} + \varepsilon_{i,t}$$

$$Log(EBITDA/Employees)_{i,t} = \beta_0 + \beta_1 LBO_{i,t} + \beta_2 Post_{i,t} + \beta_3 LBO_{i,t} \times Post_{i,t} + \beta_4 Log(Revenue)_{i,t} + \beta_5 Log(EBITDA)_{i,t} + \beta_6 Leverage_{i,t} + \beta_7 Log\left(\frac{CAPEX}{Revenue}\right)_{i,t} + \varepsilon_{i,t}$$

Random Effects (H1)

$$Log(Employees)_{i,t} = \beta_0 + \beta_1 LBO_{i,t} + \beta_2 Post_{i,t} + \beta_3 LBO_{i,t} \times Post_{i,t} + \beta_4 Log(Revenue)_{i,t} + \beta_5 Log(EBITDA)_{i,t} + \beta_6 Leverage_{i,t} + \beta_7 Log\left(\frac{CAPEX}{Revenue}\right)_{i,t} + \upsilon_{i,t}$$

Random Effects (H2)

$$Log(Revenue/Employees)_{i,t} = \beta_0 + \beta_1 LBO_{i,t} + \beta_2 Post_{i,t} + \beta_3 LBO_{i,t} \times Post_{i,t} + \beta_4 Log(Revenue)_{i,t} + \beta_5 Log(EBITDA)_{i,t} + \beta_6 Leverage_{i,t} + \beta_7 Log\left(\frac{CAPEX}{Revenue}\right)_{i,t} + \nu_{i,t}$$

$$Log(EBITDA/Employees)_{i,t} = \beta_0 + \beta_1 LBO_{i,t} + \beta_2 Post_{i,t} + \beta_3 LBO_{i,t} \times Post_{i,t} + \beta_4 Log(Revenue)_{i,t} + \beta_5 Log(EBITDA)_{i,t} + \beta_6 Leverage_{i,t} + \beta_7 Log\left(\frac{CAPEX}{Revenue}\right)_{i,t} + \nu_{i,t}$$

5.1.2 Interaction term

Interaction terms are useful to investigate whether the effect of an explanatory variable on a dependent variable, is contingent on the magnitude of another explanatory variable (Woolridge, 2016). To illustrate, consider the following model:

$$\gamma_{i,t} = \beta_0 + \beta_1 x_{i,t} + \alpha_i + u_{i,t} t = 1,2$$

The effect of x_1 on $\gamma_{i,t}$ is:

$$\frac{\Delta y_{it}}{\Delta x_1} = \beta_1 + \beta_3 x_2$$

This means that x_1 is contingent on x_2 as long as $\beta 3 \neq 0$.

To be able to test both of our hypotheses, we have constructed an interaction term between LBO and POST in order to understand the combined employment effect of being an LBO target and the time following the buyout.

$$\gamma_{i,t} = \beta_0 + \beta_1 LBO_{i,t} + \beta_2 Post_{i,t} + \beta_3 LBO_{i,t} \times Post_{i,t} + \varepsilon_{i,t}$$

5.2 Robustness tests

Our primary matching methodology, which is based on specific firm characteristics carries an risk of selection bias. To mitigate this risk, we have applied a propensity score matching (PSM) methodology as a robustness check, in line with Scellato and Ughetto (2013). Our first step was to establish a sample group with potential matching companies. These potential matches belonged to the same four-digit NACE code. Subsequently, we applied a propensity score to the sample. In line with our primary matching methodology, we controlled for size-based *ex-ante* conditions of buyouts firms and their potential matches, using revenue and employees as indicators. To reduce the likelihood of biased matches, we implemented a matching process that allowed for replacement as well as nearest neighbour criterion for matching. Second, we have also clustered the standard errors at industry level in order to capture any industry effects that clustered standard errors by firm may not capture.

6. Data

The data collection is structured in three stages; constructing the buyout sample, retrieving firm data and constructing the control group.

6.1 Sample Universe

6.1.1 Construction of buyout sample

The buyout sample has been collected from Capital IQ (CIQ) and Refinitiv Eikon. This paper will study buyouts that occurred between 2013-2016. This timeframe was chosen for two main reasons. Firstly, as previously mentioned, previous empirical evidence has mainly investigated buyouts pre-global financial crisis. In addition, there are reasons to believe that private equity firms have changed behaviour which means that a buyout sample post-financial crisis better reflects current market settings. Secondly, the chosen time frame allows us to measure changes in the corporate behaviour over time, since changes in target firms require time to materialise.

The selection of countries for this study was primarily based on the criteria of having reliable and consistent firm data over the entire time period. Thus, the chosen countries are: United Kingdom, Sweden, Spain, Portugal, Norway, Netherlands, Italy, Ireland, Germany, France, Finland, Denmark and Belgium.

The data pertaining to transactions includes information such as the closing date of the transaction and the name of the relevant parties, including the acquiror(s), the target and the seller(s). The CIQ sample is constructed by choosing closed or effective transactions that involve majority stakes labelled as "Leveraged buyout" and excludes "Management Buyout" or "Secondary Buyout". The exclusion of MBOs is based on the objective of this study, which aims to comprehend the impact of private equity firms. Amess and Wright (2007) discovered variations in employment growth depending on whether the transaction is driven by management or private equity firms. Including management buyouts in our study could potentially impact the accuracy of our results, leading to an overestimation or underestimation of the employment effect resulting from a buyout. Similarly, secondary buyouts are also excluded in this study as the primary focus is investigating the impact of initial private equity ownership. This approach ensures that any potential cost-cutting measures implemented by the first private equity owner are not already accounted for, aligning with the findings of Olsson and Tåg (2017). Divisional buyouts and public-to-private buyouts have also been excluded due to lack of data. Lastly, our buyout samples were extended by using Refinitiv Eikon with similar criteria outlined above.

6.1.2 Collection of firm data

All the accounting data was collected from the private companies database Orbis. The buyout sample was matched in Orbis by names, which then linked all relevant accounting information. In the case of name changes, we manually check other sources such as company websites, annual reports or private equity firm websites. If no match is found, the buyout is excluded. As a result of matching the complete buyout sample, the buyout sample shrinks significantly. The time window studied is two years pre-buyout to three years post-buyout, in line with Scellato and Ughetto (2013). This means the collected accounting data is between 2011-2019. The idea behind collecting data two years pre-buyout and three years post-buyout lies in the objective to understand pre-buyout conditions and allow changes in the target firm to materialise. It is reasonable to assume that LBO holding period exceeds three years according to Bergström et al. (2017), but the value creation process through employee layoffs is likely to occur primarily in the early stages, aligned with Davis et al. (2014) findings. Additionally, extending the buyout timeframe would encompass the period affected by the covid pandemic, which is not the primary purpose of this study. The main focus of this study is to understand the role of private equity firms under normal market conditions.

To maximise accuracy in the sample, we exclusively include firms that have predominantly complete accounting data for each year. In instances where data is missing, we complement it with information from national company registers. We use Companies House for English companies, Bundesanzeiger for German companies, Retriever for Swedish companies, Virk for Danish companies and Brønnøysundregistrene for Norwegian companies. The final sample consists of 439 buyouts in total.

6.1.3 Construction of Control Group

In order to obtain a precise estimation of the employment effect of buyouts, it is necessary to compare the growth in employment of our buyout targets with comparable non-PE-backed competitors. We have followed the same methodology as previous studies (Bergström et al., 2007; Boucly et al., 2011; Amess and Wright, 2012; Davis et al., 2014). By conducting a control cell match, we are able to match buyout targets with peers that share similar characteristics. The matching can be divided into two steps. First, the matched company must have the same or similar four-digit NACE code in order to maximize accuracy. If the NACE code is unavailable, we manually research the firm and its operations and apply the most appropriate NACE code. Secondly, the matched company and the buyout target must be of similar size. The control firm number of employees has to be in the ±50% range of the target

company one year prior to the buyout, which is in line with Boucly et al. (2011) approach. Net sales services as the second measure of company size, adopting a similar range of ±50%, as observed in Cressy et al. (2011). Net sales as a proxy offers the advantage of mitigating the potential influence of accounting differences across countries. Lastly, we match at least two control firms per buyout target, and if not found, the buyout is dropped (Amess and Wright, 2012).

6.2 Main Variables

6.2.1 Dummy Variables

In our regressions, two dummy variables are incorporated. The first dummy variable, LBO, differentiates between companies that undergo a buyout and the control group. If firm x, is a buyout company, the variable takes the value of 1; otherwise, it is set to 0. The second dummy variable, Post, divides our sample into two distinct periods: the period prior to the buyout and the period following the buyout. The dummy variable is assigned a value of 1 when firm x, whether a buyout or a matched control company, is in the years subsequent to the buyout, and 0 otherwise.

6.2.2 Dependent Variables

Since the focus in this study is on employment growth post-buyouts. Our first dependent variable is employment. To address any skews in the variable, employment will be log-transformed in all regressions. Our second hypothesis aims to capture the productivity effect post-buyout. In line with previous empirical research (Amess, Girma and Wright, 2014; Amess, Stiebale and Wright, 2016; Datta et al., 2013; Davis et al., 2022), the ratio revenue to employees will be used to measure labour productivity. This ratio will also be log-transformed to deal with potential skews. Previous literature has also used a different metric to measure productivity. Labour productivity, as measured by Opler (1992) is assessed by using the ratio EBITDA to employees. The EBITDA to employee ratio, unlike the revenue to employee ratio, captures the underlying ability of the company to generate profitability from its core operations per employee.

6.2.3 Firm Controls

Regarding firm characteristics, we control for firm size, profitability, leverage and CAPEX to Revenue. The natural logarithm of revenue is a proxy for firm size, in line with Amess and Wright (2007) and Amess et al. (2016). Profitability is measured as the natural logarithm of EBITDA, aligned with Boucly et al. (2011), and Leverage is defined as total debt to total assets.

Moreover, in line with Smith (1990), we use CAPEX to Revenue to control for variations in investment decisions that may affect employment growth. All chosen variables are summarized in table 1.

7. Empirical Results

7.1 Descriptive statistics and Correlation

7.1.1 Descriptive statistics

Table 2 presents the complete sample of European buyouts, distributed by year, country and sector. It also contains the control group for the respective categories. The total buyout sample yields 439 buyouts between 2013-2016. Our matching methodology adds 1128 control firms, approximately 2.6 control firms per buyout. In addition, it can be observed that many of our buyouts are based in the United Kingdom, however, that is not surprising as the UK is the most active PE market in Europe. Table 3 presents the summary statistics for both the treatment group as well as the control group, 1 year prior to each buyout. First, the results indicate that both the treatment group as well as the control group have similar sizes in terms of number of employees and revenue, which aligns with our matching methodology. Specifically, the median of employees in the treatment group is 114, while 127 in the control group. Similarly, the median revenue is $37578th in the treatment group and $40735th in the control group. Compared to previous studies (Boucly et al., 2011; Cressy et al., 2011; Olsson and Tåg, 2017; Scellato and Ughetto, 2013), our sample size of revenue and employment is somewhat larger. This suggests that our sample consists of larger buyout target firms. However, this would unlikely pose a concern for our analysis since the findings from Amess and Wright (2012) indicate that effects on employment are not dependent on firm size. Moreover, as seen in Table 3, there are extreme values among most of the variables. Consequently, to enhance accuracy and mitigate the impact of outliers in the regressions, we have winsorized all ratios at the 1st and 99th percentiles. This approach ensures increased accuracy and reliability. Additionally, our dependent and firm controls also show indications of extreme values. Thus, all variables will be logarithmized before running the regressions. This approach is in line with previous empirical research (Amess and Wright, 2012; Boucly et al., 2011; Scellato and Ughetto, 2013).

As seen in Table 3, our first dependent variable for the control group “Employees” has a wide range of values, between 2 and 42365 with an average of 415. This observation suggests that our sample includes firms with a range of sizes. The control group also exhibits similarities but with a maximum number of employees reaching 266661 with an average of approximately 334 employees. Our second dependent variable, revenue to employees, shares similar features. The range is between $1667th and $27251th. This suggests a substantial variation in the revenue generated per employee across our target firms. This also applies to our third dependent

variable, EBITDA to employees, where the minimum is $296th and the maximum is $19323th. In order to increase accuracy, these aforementioned variables will be logged before running regressions.

Moreover, table 3 also presents our control variables. The variable Leverage indicates that the average target firm has a leverage ratio of approximately 57.5%. Regarding Revenue, huge spreads between the firms are also observed, with a minimum of $411th and a maximum of $5495539th. The average target firm has a revenue of $96880th. Our third control variable, EBITDA, shows that the average target firm generated an average EBITDA of $10449th, with a minimum of $-69172th and a maximum of $241642th. This implies that our buyout sample comprises firms that experience operating losses in the year preceding the buyout. Lastly, our control variable CAPEX to Revenue has a rather range between $-2402th and $5075th. The average target firm has a CAPEX to Revenue of $1029th.

7.1.2 Correlation analysis

Table 4 displays Pearson's correlation matrix of the variables used in the study. Looking at the dependent variable Employees for our first hypothesis, it is revealed that there are three highly statistically significant correlations. Firstly, there is a high correlation between employment and revenue as well as employment and EBITDA, these positive correlations indicate that as employment increases in the target firms, both revenue and EBITDA increases. As revenue is a proxy for size, the correlation could be interpreted as that larger target firms tend to have an increased amount of employees. There is a higher correlation between revenue and employees than it is for employees and EBITDA. This could be due to the fact that EBITDA considers operating costs, which if a firm increases its revenues it may be that costs do not increase proportionally. For our second hypothesis, it is revealed that as employment increases, Revenue-to-Employees decrease at a highly statistically significant level, although the effect is small there is a negative correlation. This result could be interpreted as when the number of employees in the target firm increases, the revenue generated per employee tends to decrease. When investigating EBITDA-to-employee, it is revealed that only EBITDA is highly statistically significant which suggests that when the target firm has a higher EBITDA, the EBITDA per employee tends to increase. For the variable CAPEX-to-Revenue, there is only weak negative correlation with leverage, indicating a slight tendency for firms that have higher leverage to have lower CAPEX-to-revenue and vice versa. EBITDA-to-employee is also highly statistically significant with LBO x Post, suggesting that firms that engage in an LBO increase their EBITDA-to-employee ratio compared to controls. There is a high statistically significant

correlation between Revenue and EBITDA which is not surprising as the only difference is that EBITDA considers operating costs. As for the correlation matrix itself, there are no highly correlated variables that exceed 0.7 which suggests that there is a low probability of multicollinearity (Pallant, 2013).

7.2 Post-buyout effect on Employment

Table 5 presents our base model with the number of employees as a dependent variable. The standard errors have been clustered on a firm level across all regressions, to address any potential heteroskedasticity. Table 5 presents model 1-6, where the interaction between the LBO dummy and the Post dummy is employed to capture the specific effect of LBOs on employment growth post-buyout. First, model 1 presents a pooled OLS model without any year, industry and firm controls. The main interaction variable LBO x Post shows statistical significance at 5% with a positive coefficient of 0.0501. This implies that on average, firms subject to LBOs experience 5% higher employment growth post-buyout compared to non-PE-backed peers. Our second model controls for both industry and year. The main interaction variable LBO x Post remains statistically significant at 5% and the coefficient is unchanged. This is an indication the positive LBO effect on employment growth is robust, even after controlling for year and industry. Lastly, model 3 includes firm controls. When controlling for firm controls, the statistical significance has increased to the 1% level. In addition, the coefficient increases to 0.0696, indicating an increase in employment growth of 6.96% for buyout targets relative to non-LBOs. This implies that firm-specific characteristics influence employment growth. Regarding the firm controls, our first control variable, Revenue is positive and highly statistical significance. Given that revenue is a proxy for firm size in this study, the findings indicate a positive relationship between firm size and employment growth. More specifically, larger firms are more likely to observe higher levels of employment growth. Moreover, Leverage also shows statistical significance at 5% level, however, the coefficient is negative. This implies that firms with higher levels of leverage tend to experience lower levels of employment growth compared to firms with lower levels of leverage. The rest of the control variables, EBITDA and CAPEX to Revenue are statistically insignificant. In conclusion, all models from pooled OLS regression support our first hypothesis.

Moreover, model 4-6 presents our random effects model. Firstly, model 4 does not control for either year, industry or firm controls. The main explanatory dummy remains statistically significant at 5%, and the coefficient remains unchanged. When controlling for industry and year, the statistical significance and coefficient are identical to the pooled OLS regression,

model 2. Moreover, when we control for firm controls, the main explanatory variable is also statistically significant, but at a 5% level. In addition, the coefficient decreases to 0.0341. This means that, on average, European buyout targets experience employment growth of 3.4% relative to non-LBOs. Nonetheless, these results continue to support our first hypothesis, that firms that undergo LBO experience higher employment growth compared to control groups. Moreover, these changes in the result could be to any unobserved heterogeneity. In summary, both the pooled OLS and random effects model provides support for our initial hypothesis.

7.3 Post-buyout effect on Productivity

In order to test our second hypothesis, we perform pooled OLS and random effects models as well. The same interaction variable, LBO x Post will be used to measure the LBO effect post-buyout (Table 6). First, a pooled OLS model with no year, industry, or firm controls has been tested. The main interaction term is statistically significant at a 5% level, with a negative coefficient of -0.0362. Given that the dependent variable, Revenue to Employees, serves as a proxy for productivity, the findings indicate that the average post-buyout effect of LBOs is associated with a 3.6% decline in productivity relative to non-LBOs. Our second model controls for industry and year effects. The interaction term is still statistically significant at a 5% level, and the coefficient remains unchanged, identical to the first model. Lastly, we control for firm characteristics. The statistical significance increases to 1%, while the coefficient decreases to -0.0666. This implies that, after controlling for firm characteristics, the average LBO effect on productivity decreases by approximately 6.6% relative to controls. Regarding the firm controls, the variable revenue is statistically significant at a 1% level with a positive coefficient of 0.139. This implies that higher sales are associated with higher levels of sales generated per employee, which could be an indication of improved productivity in utilising sales resources. The second control variable Leverage is also statistically significant at 5% with a coefficient of 0.165. The model suggests that higher leverage in firms is associated with a higher level of sales generated per employee. The results from the pooled OLS do not support our second hypothesis but rather indicate that LBO targets experience decreasing productivity post-buyout.

Moreover, our random effects model (model 10-12) presents similar results regardless of whether we include year and industry controls. The interaction terms remain statistically significant at a 5% level, and its coefficient remains unchanged. However, there is a slight change observed in model 12. The main interaction term is still statistically significant at a 5% level but the coefficient decreased to 0.0334. This still suggests that the average LBO targets

experience 3.34% decrease in productivity compared to non-LBOs. The control variable Revenue is still statistically significant at a 1% level, however, the coefficient increased to 0.0395. More interestingly, the variable EBITDA is now statistically significant at a 1% level with a positive coefficient of 0.0294. This implies that as profitability increases, productivity tends to increase as well. The rest of the control variables, Leverage and CAPEX to Revenue, are not statistically significant. Based on the results from our pooled OLS and random effects model, we cannot find any support for our second hypothesis.

Previous research has also used alternative ratios to measure labour productivity such as EBITDA to Employees. Thus, we have conducted additional regressions to test for EBITDA to employees (Table 7). Similar to previous models, model 13 includes no year, industry and firm controls. The interaction variable LBO x Post is statistically significant at a 5% level, with a negative coefficient of -0.106. When adding year and industry controls, there is a slight change in the magnitude of the coefficient, from -1.06 to -1.02. Lastly, firm controls are added to the model 15. LBO x Post is statistically significant at a 1% level, with a coefficient of negative 0.0722. This implies that all models in the pooled OLS indicate that the post-buy productivity effect on LBO-targets are negative.

Similar results are also observed in the random effects model, but with slight variations in the magnitudes. We still find negative statistical significance in the random effects model, whether we control for year and industry or not (table 7). When including firm controls, the interaction variable remains 5% statistically significant and negative. The negative effect is however smaller compared to the pooled OLS model (model 18). Nonetheless, based on the results, we still cannot find any support for our second hypothesis.

7.4 Robustness Tests

As mentioned earlier, we have employed a PSM methodology alongside our initial matching approach to address potential selection bias. In Appendix, Table 8, we can observe the regression analysis for the propensity score sample, where the number of employees serves as the dependent variable. The same primary explanatory variables and firm controls from our base models are included. Notably, the key interaction term, Treatment x Post, remains statistically significant at a 5% significance level, with a slightly increased effect size. The firm controls also exhibit a similar pattern, maintaining statistical significance with comparable magnitudes. Interestingly, in the random effects model (Model 25), the firm control variable EBITDA now shows statistical significance, suggesting a negative correlation between the

number of employees and EBITDA. The second base model, incorporating labour productivity measures, demonstrates a similar pattern to our initial base model. Overall, the results obtained from our initial matching methodology appear to be robust even after conducting the PSM methodology.

As an additional test to ensure the robustness of our findings, we have employed clustered standard errors at the industry level to capture industry-specific effects that may not be accounted for by our initial clustering at the firm level (Table 9-11). The first base model, which uses the number of employees as the dependent variable, continues to exhibit statistical significance, with coefficients of similar magnitude. Notably, the random effects model is now statistically significant at a 1% level, whereas our initial model showed significance at a 5% level. Regarding our firm controls, the variable Leverage is no longer statistically significant, indicating a lack of evidence for a correlation between the number of employees and leverage. As for our next base model, which includes two different measures of labour productivity, the results remain statistically significant, with coefficients of similar magnitude. Overall, the results obtained from our primary base model appear to be robust even after considering the clustering of standard errors at the industry level.

8. Analysis

8.1 Post-buyout effect on Employment

All the model specifications consistently point towards a positive post-buyout effect on employment growth compared to non-LBOs These results remain steady even when standard errors are grouped by sector. Specifically, it is observed that the average European buyout experiences 3.4% increase in employment in the three years following the buyout. These findings acknowledge that the entrance of PE firms into target firms does indeed lead to job creations, rather than job shredding, in line with Bacon et al., (2013); Boucly et al., (2011); Pellon et al., (2007); Toubeau, (2006).

The interpretation of the results can be three-fold. Firstly, building on the argument of Amess & Wright (2012), the increased employment growth could be interpreted as an absence of governance structures which ultimately lead to excessively large firms, questioning if the LBO-firms managed to reduce agency costs rather than engaging in empire building. Thus, the empirical results from the data are in contrast to what the agency theory predicts. Additionally, on the notion of Jensen's (1986) free cash flow hypothesis, firms that are not subject to a buyout should in practice be the ones engaging in value-destruction, and consequently see an increase in employment growth rather than LBO firms. Meulman et al., (2009) also suggests that the restructuring process introduced by LBOs should in theory lead to employment layoffs, which can be supported by the argument of Olsson & Tåg (2017) who claim that PE firms try to enhance value by laying off employees that are conducting repetitive tasks, replacing these workers with automation or through outsourcing. Consequently, our results are contradictory to theory.

Secondly, the period post-financial crisis may have shifted the PE industry norms towards growth-oriented strategies rather than cost-cutting measures, as suggested by Antoni et al. (2019) and Gompers et al. (2016). This transition could prompt PE firms to actively seek to boost operational performance, often requiring them to invest in human capital, i.e., increase employment levels. Interestingly, through the lens of the agency theory, this may indicate a shift from focusing on cost cutting and agency cost reductions, as proposed by Jensen (1989). However, it could be argued that the shift in strategy still aligns with the broad principles of the agency theory, which outlines the alignment of incentives structure between the managers and PE firms for efficiency enhancement. This viewpoint may align with Jensen's free cash flow hypothesis, where the growth-oriented strategy can be seen as a more productive

deployment of a firm's free cash flow. Rather than potentially wasteful spending on "empire building", these resources might be redirected towards investments in employee expansions, aligning with a growth-focused agenda. Therefore, although our results may suggest a shift away from traditional cost-cutting, the underlying principles of agency theory and Jensen's hypothesis regarding the effective use of free cash flow could still remain relevant.

Thirdly, labour regulations in Europe may also play a part in the employment effects observed. Boucly et al. (2011) have suggested that due to high costs associated with employee layoffs due to strict labour laws, PE firms are forced to focus more on growth strategies, which could lead to increase in employment levels. This could explain the mixed results in the literature, where studies conducted in the USA, where labour laws are comparatively lenient, have found that firms targeted for buyouts experience a decline in employment levels post-buyout (Lichtenberg & Siegel, 1990; Davis et al., 2014). In contrast, studies conducted in Europe (Boucly et al., 2011; Pellon et al. 2007; Scellato and Ughetto, 2013; Toubeau, 2006) have found positive employment growth. As our results are aligned with previous studies conducted in Europe, it appears that PE firms do not show a greater tendency to carry out extensive restructuring strategies, involving significant reductions in employment.

8.2 Post-buyout effect on Productivity

All model specifications indicate that the average European buyout experienced a decline in labour productivity in the span of three years after initiated buyout. The average buyout experienced a decline in the range of 3.3% and 3.67% accounting for both revenue and EBITDA (see table 6 & 7), implying no support for our second hypothesis.

The sample used to construct the data only includes LBOs where the PE firm acquired a majority stake (>50%). From a theoretical perspective of agency theory this should reduce the agency costs significantly. As suggested by McGrath & Nerkar (2023), PE firms reduce the separation of ownership and control by acquiring a significant amount of equity, and should subsequently, according to Krysta & Kanbach (2022) be organisational optimisers. Additionally, as argued by Jensen (1986, 1989), the governance mechanism by LBOs increases firm value and improves operational efficiency. As our results indicate statistically significant results of negative productivity, our results are not in line with the predictions of the theoretical framework as negative productivity suggest increased agency costs (Cotter and Peck, 2001; Thompson & Wright, 1992; Chemmanur, Hull & Krishnan, 2021; Cumming, Siegel & Wright, 2007). Thus, one could question whether the monitoring and control functions are on par with what would be expected from the PE firm according to agency theory (Braun and Latham,

2007; Fama and Jensen, 1983; Amess & Wright, 2007). The results are pointing towards the results of what should be subject for non-LBO firms, who are said to have high agency costs, resulting in empire building rather than value creation (Jensen, 1986; Wang, 2010).

There could be various reasons for the outcome of negative productivity. According to Agency theory, buyouts tend to lead to more efficient use of a firm's resources and argues that a solid corporate governance structure along with a monitoring framework incentivizes managers towards efficiency enhancement. This aforementioned notion has been supported by previous empirical evidence where Amess (2003) and Harris et al. (2005) findings suggest that increased incentive alignment between managers and PE firms can drive efficiency enhancement. Additionally, both Amess (2003) and Harris et al. (2005) primarily studies MBOs. Hence, it is plausible that the impact on productivity could vary depending on whether the buyout is driven by the management or private equity firms. This is also in line with Lichtenberg and Siegel (1990) findings, where MBO targets tend to have higher productivity compared to LBOs. The authors argue that such a pattern could result from an abrupt shift in organisational structure, which might initially disrupt productivity because of its unexpected nature. However, this effect might diminish over time as employees adjust to the new organisational structure. Same argument might also explain why Leslie and Oyer (2009) and Scellato and Ughetto (2013) did not find strong evidence indicating any notable efficiency improvements in PE-backed buyouts.

Secondly, Datta et al. (2013) findings suggest that productivity improvements often come from employee lay-offs and other cost-cutting measures. However, our analysis of European buyouts between 2013-2016 paints a different picture. We observed an increase in employees on average during this period, which could potentially explain the simultaneous decrease in productivity.

This apparent contradiction can be reconciled when we consider the historical context. The previously mentioned studies focus on buyouts that occurred in the 80s, 90s and up to 2013 at an aggregated level at latest (Davis et al. 2022). Previous studies argue that the PE industry has undergone a significant paradigm shift since then. As such, our study period potentially captures a more contemporary portrayal of the PE market, suggesting a shift in PE firms' focus towards value creation rather than value extraction. The transformation within the PE industry might have different implications for labour productivity, depending on the time frame considered.

While the traditional “buy it, strip it, flip it” strategy could incentive short-term gains that impact immediate labour productivity, the new growth-oriented approach might involve strategies that take time to yield benefits as suggested by Lichtenberg & Siegel (1990). This could include implementation changes by the PE firms of new processes, technology or a shift in the business model which might cause an initial drop in productivity as employees adjust. However, it is important to consider that the productivity gains from this shift in strategy may not become apparent within the three-year timeframe post-buyout. Thus, our observations do not necessarily contradict the agency theory; rather they might indicate that the benefits of PE buyouts, in terms of labour productivity, are realised over a longer time frame than our study investigates.

9. Conclusion and future research

Private equity and LBOs continue to be a hot topic as its economic significance continues to increase every year. Since its inception, the depth and scope have continuously been growing. In recent decades, critics have questioned the impact LBOs have on the economy, and more specifically on the society as a whole, claiming that employees are at expense to PE firms. While this may have been true when the phenomenon of LBOs was introduced in the 80's, critics seem to ignore that time changes.

This study has investigated the impact of employment on European PE-backed LBOs between 2013-2016 and evaluated the job productivity effect on the target firms three years post-buyout from a theoretical scope of agency theory and Jensen's free cash flow hypothesis. By applying clustered standard errors in a pooled OLS and random effects regression model to deal with heteroskedasticity and partial endogeneity, we discovered that, on average, European LBOs experienced a rise in employment levels of around 7% in the pooled OLS model and 3.4% in the random effects model. Furthermore, the study also found that the average European buyout experienced approximately 3.4% decrease in labour productivity within the same three-year period post-buyout. The results were consistent across two different measurements of labour productivity. The results are maintained after controlling for industry, year and firm controls. To further strengthen the study's results, propensity score matching was used to deal with possible selection bias when pairing LBOs with non-LBOs, and clustered standard errors by industry were used to capture potential industry effects that might not have been captured by the initial clustered standard errors. The results indicate that the way the theories were constructed in the 70's and 80's may not be applicable to the same extent as they used to be. The reasons for this could be explained by labour regulations differing between US and European countries, a shift from cost-cutting strategies to growth-oriented strategies as well as the investigated market settings.

The results are valuable for PE firms, corporations, and the stakeholders. PE firms may perceive the findings as interesting; the results indicate that they do enhance employment growth relative to non-LBO firms, contradictory to what the critics claim. As a result, the shareholders of a target firm subject to an LBO does not necessarily have to be concerned with the risk of reputational backlash as a result of selling a majority stake to PE firms. Stakeholders such as the government, tax agencies and trade unions may benefit as increased employment increases tax incomes and less unemployment. As such, for society, PE firms seem to be a

value contributor. From the perspective of productivity, PE firms and corporations may however want to investigate potential areas for improvement, such as technological investments or integration processes.

There are few limitations in our study that must be addressed. First, it is acknowledged that our results may be subject to endogeneity since there is no proper external exogenous variable influencing the likelihood of participating in a deal. Consequently, our findings may be viewed as descriptive more than casual. Secondly, another issue arises when constructing control groups because buyouts are not random due to the fact that PE firms may target companies that are anticipated to undergo growth. However, to mitigate this selection bias, we have used a propensity score matching method in addition to our initial matching methodology.

In terms of future research, it would be worthwhile to further investigate the idea that the investment approach of PE firms has evolved. Specifically, research could focus on assessing whether there have been significant changes in metrics related to cost-cutting or growth during the period when this shift is believed to have occurred. Another interesting aspect would be to investigate the underlying factors to productivity, and if there is a specific industry disproportionately affected by these factors. Lastly, previous research has found evidence of transitory effects on productivity, and it would be interesting to investigate whether these short-term decreases in productivity are part of a long-term growth strategy. This can be done by examining a more extended period following the buyouts.

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Appendix

Table 1 – Dummy and firm variables

Variable	Description
LBO Dummy	Dummy variable. Value of 1 equals buyout and value of 0 equals firm of the control group that is not subject to a buyout
Post Dummy	Dummy variable. Value of 1 equals three-year post buyout for both matching and control group. Value of 0 equals the years prior to the buyout
Log(Employees)	The logarithm of number of employees
Log(Revenue)	The logarithm of revenue
Log(EBITDA)	The logarithm of EBITDA.
Leverage	Defined as $\frac{Total\ debt}{Total\ assets}$
$\text{Log}(\frac{CAPEX}{Revenue})$	The logarithm of the ratio between capital expenditures (CAPEX) and revenue. CAPEX refers to the net change in fixed assets after accounting for depreciation and amortization
$\text{Log}(\frac{EBITDA}{Employees})$	The logarithm of the ratio between EBITDA and employees
$\text{Log}(\frac{Revenue}{Employees})$	The logarithm of the ratio between revenues and employees

Table 2 - Descriptive Statistics

Deal Year	LBO	Non-LBO	Total
2013	97	232	329
2014	120	302	422
2015	98	250	348
2016	124	344	468
Total	**439**	**1128**	**1567**

Country	LBO	Non-LBO	Total
Belgium	21	70	91
Denmark	6	1	7
Finland	22	30	52
France	49	109	158
Germany	40	161	201
Ireland	3	16	19
Italy	51	205	256
Netherlands	4	9	13
Norway	17	3	20
Portugal	6	27	33
Spain	58	149	207
Sweden	45	99	144
United Kingdom	117	249	366
Total	**439**	**1128**	**1567**

Sector	LBO	Non-LBO	Total
Banking, Insurance & Financial Services	14	26	40
Business Services	89	232	321
Communications & Media	14	29	43
Construction	19	49	68
IT & Technology	28	71	99
Industrial, Electric & Electronic Machinery	35	96	131
Manufacturing	77	202	279
Metals & Metal Products	23	55	78
Public Admin, Education, Health Social Services	13	42	55
Transport, Freight & Storage	21	58	79
Travel, Personal & Leisure	35	83	118
Wholesale & Retail	71	185	256
Total	**439**	**1128**	**1567**

***Note**: The table illustrates our sample between 2013-2016 by deal year, country and sector. Sectors are based on two-digit NACE codes.*

Table 3 - Summary Statistics

LBO	Mean	Median	SD	Min	Max	N
LBO	1	1	0.000	1	1	439
Employees	415.116	114	2135.098	2	42365	439
Leverage (%)	.593	.575	0.335	.005	2.939	439
Revenue ($th)	96880.376	37578.232	306033.306	411.653	5495539.5	439
EBITDA ($th)	10449.471	3828.158	24954.025	-69172.168	251642.17	439
Revenue/Employees ($th)	605.093	275.654	1906.431	1.667	27521.59	439
EBITDA/Employees ($th)	137.748	27.389	1019.076	-296.124	19323.396	439
CAPEX/Revenue ($th)	1.029	1.016	0.389	-2.402	5.075	439
Non-LBO						
LBO	0	0	0.000	0	0	1128
Employees	333.663	127	956.425	2	26661	1128
Leverage (%)	.566	.559	0.346	.001	5.303	1128
Revenue ($th)	92904.432	40735.509	251698.049	529.347	5681209.7	1128
EBITDA ($th)	10490.912	2497.133	58038.003	-73335	1108387.2	1128
Revenue/Employees ($th)	521.993	285.845	1176.138	18.977	20145.588	1128
EBITDA/Employees ($th)	58.517	19.304	481.146	-789.626	15157.103	1128
CAPEX/Revenue ($th)	1.153	1.015	4.490	-14.193	149.147	1128

***Note**: Overview of all variables. All variables are expressed one year preceding the buyout. LBO equals 1 if firm is LBO target, 0 otherwise.*

Table 4 - Pearson Correlation's Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) LBO	1.000									
(2) Post	0.000	1.000								
(3) LBO x Post	0.647***	0.404***	1.000							
(4) Employees	0.015	0.000	0.014	1.000						
(5) Revenue	0.012	0.006	0.014	0.510***	1.000					
(6) EBITDA	0.010	0.001	0.013	0.198***	0.524***	1.000				
(7) Leverage	0.047***	-0.022**	0.028***	-0.015	-0.008	-0.028***	1.000			
(8) CAPEX/Revenue	0.016	-0.014	-0.004	-0.002	-0.005	-0.001	-0.017*	1.000		
(9) EBITDA/Employees	0.054***	0.004	0.035***	-0.015	0.004	0.121***	-0.012	-0.009	1.000	
(10) Revenue/Employees	0.018*	0.002	0.007	-0.035***	0.028***	0.043***	0.057***	-0.004	0.622***	1.000

***Note**: The table illustrates correlations between variables. All variables in $th, except Leverage (%). The main explanatory variable LBO is a dummy variable, where LBO targets equal 1 and non-LBOs equals 0. Post dummy equals 1 for a LBO or non-LBO three years post-buyout, 0 otherwise. LBO x Post equals 1 if LBO target and three years post-buyout, 0 otherwise.*

****p<0.01, **p<0.05, *p<0.1*

Table 5 - Base Models for Employment Growth

	Model 1 POLS	Model 2 POLS	Model 3 POLS	Model 4 RE	Model 5 RE	Model 6 RE
Dependent variable	**Log(Employees)**	**Log(Employees)**	**Log(Employees)**	**Log(Employees)**	**Log(Employees)**	**Log(Employees)**
LBO	-0.0529	-0.0478	-0.0151	-0.0529	-0.0478	0.000901
	(0.0768)	(0.0747)	(0.0489)	(0.0768)	(0.0747)	(0.0524)
Post	0.153***	0.249***	0.0631***	0.153***	0.249***	0.145***
	(0.00979)	(0.0153)	(0.0209)	(0.00979)	(0.0153)	(0.0140)
LBO x Post	0.0501**	0.0501**	0.0696***	0.0501**	0.0501**	0.0341**
	(0.0215)	(0.0215)	(0.0214)	(0.0215)	(0.0215)	(0.0158)
Log(Revenue)			0.850***			0.549***
			(0.0314)			(0.0374)
Log(EBITDA)			-0.00827			-0.0151
			(0.0258)			(0.0105)
Leverage			-0.180**			-0.0115
			(0.0814)			(0.0380)
Log(CAPEX/Revenue)			0.0661			0.0289
			(0.0506)			(0.0181)
Constant	4.891***	4.246***	-4.500***	4.891***	4.246***	-1.404***
	(0.0400)	(0.0901)	(0.206)	(0.0400)	(0.0901)	(0.337)
Observations	9,402	9,402	8,500	9,402	9,402	8,500
R-squared	0.004	0.066	0.600			
Year controls	No	Yes	Yes	No	Yes	Yes
Industry controls	No	Yes	Yes	No	Yes	Yes
Standard errors	Clustered Robust	Clustered Robust	Clustered Robust	Clustered Robust	Clustered Robust	Clustered Robust
Number of unique_id				1,567	1,567	1,554

***Note**: This table illustrates pooled OLS (Model 1-3) and random effects regression models (Model 4-6) with **Log(Employees)** as dependent variables. Model 1 and 4 reports a POLS and RE model with no controls, model 2 and 5 illustrates a POLS and RE model with industry and year controls, lastly model 3 and 6 reports an POLS and RE model with year, industry and firm controls. The decrease in number of observations in models 3 and 6 is a result of negative EBITDA values, which were excluded during the application of natural logarithm. All models are run with error terms clustered at firm level. The main explanatory variable **LBO** is a dummy variable, where LBO targets equal 1 and non-LBOs equals 0. **Post** dummy equals 1 for a LBO or non-LBO three years post-buyout, 0 otherwise. **LBO x Post** equals 1 if LBO target and three years post-buyout. Leverage, defined by Total debt to Total assets have been winsorized at the 1st and 99th percentile.*

Robust standard errors in parentheses
**** p<0.01, ** p<0.05, *p<0.1*

Table 6 - Base Models for Labour Productivity

	Model 7 POLS	Model 8 POLS	Model 9 POLS	Model 10 RE	Model 11 RE	Model 12 RE
Dependent variable	**Log(Revenue/Employees)**	**Log(Revenue/Employees)**	**Log(Revenue/Employees)**	**Log(Revenue/Employees)**	**Log(Revenue/Employees)**	**Log(Revenue/Employees)**
LBO	-0.0162	-0.0190	0.00970	-0.0162	-0.0190	-0.00757
	(0.0490)	(0.0462)	(0.0464)	(0.0490)	(0.0462)	(0.0487)
Post	-0.0104	-0.0154	-0.0632***	-0.0104	-0.0154	-0.137***
	(0.00948)	(0.0143)	(0.0188)	(0.00948)	(0.0143)	(0.0105)
LBO x Post	-0.0362**	-0.0362**	-0.0666***	-0.0362**	-0.0362**	-0.0334**
	(0.0172)	(0.0172)	(0.0196)	(0.0172)	(0.0172)	(0.0143)
Log(Revenue)			0.139***			0.395***
			(0.0283)			(0.0242)
Log(EBITDA)			0.0126			0.0294***
			(0.0230)			(0.00662)
Leverage			0.165**			0.0165
			(0.0766)			(0.0345)
Log(CAPEX/Revenue)			-0.0456			-0.0158
			(0.0471)			(0.0148)
Constant	5.714***	6.203***	4.594***	5.714***	6.203***	1.887***
	(0.0254)	(0.0576)	(0.195)	(0.0254)	(0.0576)	(0.237)
Observations	9,402	9,402	8,500	9,402	9,402	8,500
R-squared	0.001	0.123	0.159			
Year controls	No	Yes	Yes	No	Yes	Yes
Industry controls	No	Yes	Yes	No	Yes	Yes
Standard errors	Clustered Robust	Clustered Robust	Clustered Robust	Clustered Robust	Clustered Robust	Clustered Robust
Number of unique_id				1,567	1,567	1,554

***Note**: This table illustrates pooled OLS (Model 7-9) and random effects regression models (Model 10-12) with **Log(Revenue/Employees)** as dependent variables. Model 7 and 10 reports an POLS and RE model with no controls, model 8 and 11 illustrates a POLS and RE model with industry and year controls, lastly model 9 and 12 reports an POLS and RE model with year, industry and firm controls. The decrease in number of observations in models 3 and 6 is a result of negative EBITDA values, which were excluded during the application of natural logarithm. All models are run with error terms clustered at firm level. The main explanatory variable **LBO** is a dummy variable, where LBO targets equal 1 and non-LBOs equals 0. **Post** dummy equals 1 for a LBO or non-LBO three years post-buyout, 0 otherwise. **LBO x Post** equals 1 if LBO target and three years post-buyout. Leverage, defined by Total debt to Total assets have been winsorized at the 1st and 99th percentile.*

Robust standard errors in parantheses
**** p<0.01, **p<0.05, *p<0.1*

Table 7 - Base Models for Labour Productivity

	13 POLS	14 POLS	15 POLS	16 RE	17 RE	18 RE
Dependent variable	**Log(EBITDA/Employees)**	**Log(EBITDA/Employees)**	**Log(EBITDA/Employees)**	**Log(EBITDA/Employees)**	**Log(EBITDA/Employees)**	**Log(EBITDA/Employees)**
LBO	0.321***	0.312***	0.00373	0.278***	0.267***	-0.0153
	(0.0703)	(0.0693)	(0.0460)	(0.0715)	(0.0702)	(0.0490)
Post	0.0118	-0.00232	-0.0650***	0.0116	0.000106	-0.142***
	(0.0223)	(0.0324)	(0.0191)	(0.0198)	(0.0292)	(0.0139)
LBO x Post	-0.106**	-0.102**	-0.0722***	-0.0961**	-0.0949**	-0.0367**
	(0.0447)	(0.0443)	(0.0209)	(0.0394)	(0.0394)	(0.0154)
Log(Revenue)			-0.830***			-0.568***
			(0.0293)			(0.0375)
Log(EBITDA)			0.984***			1.011***
			(0.0226)			(0.0106)
Leverage			0.163**			0.00737
			(0.0735)			(0.0369)
Log(CAPEX/Revenue)			-0.0770*			-0.0429**
			(0.0460)			(0.0173)
Constant	3.110***	3.061***	4.484***	3.064***	3.008***	1.641***
	(0.0365)	(0.0753)	(0.200)	(0.0371)	(0.0772)	(0.336)
Observations	8,501	8,501	8,500	8,501	8,501	8,500
R-squared	0.009	0.053	0.615			
Year controls	No	Yes	Yes	No	Yes	Yes
Industry controls	No	Yes	Yes	No	Yes	Yes
Standard errors	Clustered Robust	Clustered Robust	Clustered Robust	Clustered Robust	Clustered Robust	Clustered Robust
Number of unique_id				1,554	1,554	1,554

***Note**: This table illustrates pooled OLS (Model 13-15) and random effects regression models (Model 16-18) with **Log(EBITDA/Employees)** as dependent variables. Model 13 and 16 reports an POLS and RE model with no controls, model 14 and 17 illustrates a POLS and RE model with industry and year controls, lastly model 15 and 18 reports an POLS and RE model with year, industry and firm controls. The decrease in number of observations in models 15 and 18 is a result of negative EBITDA values, which were excluded during the application of natural logharithm. All models are run with error terms clustered at firm level. The main explanatory variable **LBO** is a dummy variable, where LBO targets equal 1 and non-LBOs equals 0. **Post** dummy equals 1 for a LBO or non-LBO three years post-buyout, 0 otherwise. **LBO x Post** equals 1 if LBO target and three years post-buyout. Leverage, defined by Total debt to Total assets have been winsorized at the 1st and 99th percentile.*

Robust standard errors in parentheses
**** p<0.01, **p<0.05, *p<0.1*

Table 8 - Propensity Score Matching

	24 POLS	25 RE	26 POLS	27 RE	28 POLS	29 RE
Dependent variable	**Log(Employees)**	**Log(Employees)**	**Log(Revenue/Employees)**	**Log(Revenue/Employees)**	**Log(EBITDA/Employees)**	**Log(EBITDA/Employees)**
Treatment	-0.0185	-0.0142	0.0151	0.00912	0.00916	-0.00194
	(0.0532)	(0.0511)	(0.0511)	(0.0485)	(0.0510)	(0.0479)
Post	0.0479	0.120***	-0.0503	-0.118***	-0.0552	-0.124***
	(0.0438)	(0.0183)	(0.0421)	(0.0177)	(0.0427)	(0.0182)
Treatment x Post	0.0800**	0.0399**	-0.0778**	-0.0409**	-0.0747**	-0.0393**
	(0.0382)	(0.0182)	(0.0370)	(0.0179)	(0.0374)	(0.0180)
Log(Revenue)	0.888***	0.666***	0.115***	0.315***	-0.857***	-0.678***
	(0.0398)	(0.0321)	(0.0368)	(0.0269)	(0.0351)	(0.0315)
Log(EBITDA)	-0.0464	-0.0323***	0.0402	0.0341***	1.010***	1.028***
	(0.0341)	(0.00920)	(0.0306)	(0.00899)	(0.0269)	(0.00888)
Leverage	-0.204*	0.00663	0.178*	0.00566	0.163*	-0.0155
	(0.105)	(0.0520)	(0.0957)	(0.0474)	(0.0867)	(0.0493)
Log(CAPEX/Revenue)	0.0131	-0.00309	-0.00175	0.00531	-0.0105	-0.00778
	(0.0615)	(0.0210)	(0.0581)	(0.0207)	(0.0560)	(0.0179)
Constant	-4.559***	-2.504***	4.598***	2.684***	4.542***	2.674***
	(0.254)	(0.312)	(0.246)	(0.266)	(0.246)	(0.304)
Observations	4,137	4,137	4,137	4,137	4,137	4,137
R-squared	0.608		0.163		0.639	
Year controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes
Standard errors	Clustered Robust	Clustered Robust	Clustered Robust	Clustered Robust	Clustered Robust	Clustered Robust
Number of unique_id		1,370		1,370		1,370

***Note**: The table presents regressions based on PSM with **Log(Employees)**, **Log(Revenue/Employees)** and **Log(EBITDA/Employees)** as dependent variables. All models control for year, industry and firm characteristics. All models are run with error terms clustered at firm level.*

Robust standard errors in parentheses
**** p<0.01, ** p<0.05, * p<0.1*

Table 9 - Robustness check

	19 POLS	20 RE
Dependent variable	**Log(Employees)**	**Log(Employees)**
LBO	-0.0151	0.000901
	(0.0220)	(0.0252)
Post	0.0631*	0.145***
	(0.0346)	(0.0181)
LBO x Post	0.0696***	0.0341***
	(0.0121)	(0.0120)
Log(Revenue)	0.850***	0.549***
	(0.0491)	(0.0385)
Log(EBITDA)	-0.00827	-0.0151
	(0.0327)	(0.00922)
Leverage	-0.180	-0.0115
	(0.122)	(0.0485)
Log(CAPEX/Revenue)	0.0661	0.0289**
	(0.0991)	(0.0141)
Constant	-4.500***	-1.404***
	(0.318)	(0.375)
Observations	8,500	8,500
R-squared	0.600	
Year controls	Yes	Yes
Industry controls	Yes	Yes
Standard errors	Clustered Robust	Clustered Robust
Number of unique_id		1,554

***Note**: This table illustrates pooled OLS (Model 19) and a random effect model (Model 20) with **Log(Employees)** as dependent variables. Both models control for year, industry and firm controls. Both models are run with error terms clustered at industry level as a robustness check. The main explanatory variable **LBO** is a dummy variable, where LBO targets equal 1 and non-LBOs equals 0. **Post** dummy equals 1 for a LBO or non-LBO three years post-buyout, 0 otherwise. **LBO x Post** equals 1 if LBO target and three years post-buyout. Leverage, defined by Total debt to Total assets have been winsorized at the 1st and 99th percentile.*

Robust standard errors in parentheses
**** p<0.01, **p<0.05, *p<0.1*

Table 10 - Robustness check

	21 POLS	22 RE
Dependent variable	**Log(Revenue/Employees)**	**Log(Revenue/Employees)**
LBO	0.00970	-0.00757
	(0.0216)	(0.0218)
Post	-0.0632**	-0.137***
	(0.0286)	(0.00849)
LBO x Post	-0.0666***	-0.0334***
	(0.0131)	(0.0127)
Log(Revenue)	0.139***	0.395***
	(0.0443)	(0.0243)
Log(EBITDA)	0.0126	0.0294***
	(0.0318)	(0.00575)
Leverage	0.165	0.0165
	(0.116)	(0.0474)
Log(CAPEX/Revenue)	-0.0456	-0.0158
	(0.0950)	(0.0140)
Constant	4.594***	1.887***
	(0.286)	(0.279)
Observations	8,500	8,500
R-squared	0.159	
Year controls	Yes	Yes
Industry controls	Yes	Yes
Standard errors	Clustered Robust	Clustered Robust
Number of unique_id		1,554

***Note**: This table illustrates pooled OLS (Model 21) and a random effect model (Model 22) with **Log(Revenue/Employees)** as dependent variables. Both models control for year, industry and firm controls. Both models are run with error terms clustered at industry level as a robustness check. The main explanatory variable **LBO** is a dummy variable, where LBO targets equal 1 and non-LBOs equals 0. **Post** dummy equals 1 for a LBO or non-LBO three years post-buyout, 0 otherwise. **LBO x Post** equals 1 if LBO target and three years post-buyout. Leverage, defined by Total debt to Total assets have been winsorized at the 1st and 99th percentile.*

Robust standard errors in parentheses
**** p<0.01, **p<0.05, *p<0.1*

Table 11 - Robustness check

	23 POLS	24 RE
Dependent variable	**Log(EBITDA/Employees)**	**Log(EBITDA/Employees)**
LBO	0.00373	-0.0153
	(0.0198)	(0.0227)
Post	-0.0650*	-0.142***
	(0.0311)	(0.0180)
LBO x Post	-0.0722***	-0.0367***
	(0.0111)	(0.0115)
Log(Revenue)	-0.830***	-0.568***
	(0.0431)	(0.0444)
Log(EBITDA)	0.984***	1.011***
	(0.0278)	(0.00959)
Leverage	0.163	0.00737
	(0.120)	(0.0481)
Log(CAPEX/Revenue)	-0.0770	-0.0429***
	(0.0894)	(0.00932)
Constant	4.484***	1.641***
	(0.304)	(0.457)
Observations	8,500	8,500
R-squared	0.615	
Year controls	Yes	Yes
Industry controls	Yes	Yes
Standard errors	Clustered Robust	Clustered Robust
Number of unique_id		1,554

***Note**: This table illustrates pooled OLS (Model 23) and a random effect model (Model 24) with **Log(EBITDA/Employees)** as dependent variables. Both models control for year, industry and firm controls. Both models are run with error terms clustered at industry level as a robustness check. The main explanatory variable **LBO** is a dummy variable, where LBO targets equal 1 and non-LBOs equals 0. **Post** dummy equals 1 for a LBO or non-LBO three years post-buyout, 0 otherwise. **LBO x Post** equals 1 if LBO target and three years post-buyout. Leverage, defined by Total debt to Total assets have been winsorized at the 1st and 99th percentile.*

Robust standard errors in parentheses
**** p<0.01, **p<0.05, *p<0.1*