Do Public-to-Private Leveraged Buyouts Result in Improved Operating Performance? Evidence from the United Kingdom

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By Ceylan Cemre Asci
Student number: ASCCEY001

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Supervisor: Prof. Francois Toerien

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Abstract

This study investigates the changes in the operating performance of public-to-private leveraged buyouts (LBOs) backed by one or more private equity firms. For this purpose, this dissertation focuses on a sample of 65 completed public-to-private LBOs in the United Kingdom, which were finalised between 2003 and 2015, and exited by 2018. Specifically, the changes in operating performance in terms of EBITDA/sales, EBIT/sales and EBITDA/total assets, as measured directly and relative to the industry median, before the LBO and at exit by the equity provider, is analysed. A regression methodology from the literature is used to determine the impact of various transaction and company-specific attributes on operating performance changes, based on the shareholder-related agency costs and free cash flow/benefits of debt theories. Surprisingly, the overall picture indicates a negative operating performance change of going-private LBOs in the post-buyout period. The main factors explaining the changes in operating performance seem to be changes in leverage. On the other hand, the hypotheses relating to improved management incentives and improved shareholder monitoring are not supported by the results, as these factors seem to have little to no effect on the operating performance changes related to the public-to-private LBOs in the sample.

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List of Abbreviations and Glossary

LBO: Leveraged Buyout

PE firm: Private equity firm

PTP: Public-to-Private

MBO: Management buyout

MBI: Management buy-in

IPO: Initial Public Offering

SBO: Secondary Buyout (by private equity firm)

SIC: Standard Industry Classification code that defines each industry based on a four-digit code

NPV: Net Present Value

Std. Dev: Standard Deviation

Capital: Total transaction value inclusive of net debt, total price paid by buyers

EBIT: Earnings before interest and tax

EBITDA: Earnings before interest, tax, depreciation and amortisation

ROS_1: Return on sales calculated as EBITDA/Sales

ROS_2: Return on sales calculated as EBIT/Sales

ROA: Return on assets calculated as EBITDA/Total Assets

Club PE: a PTP LBO deal involving two or more private equity funds as buyers

Board size: number of directors in the Board of Directors

Sponsor Director Ratio: number of directors representing the private equity investor(s) on the Board of Directors, expressed as a ratio

Duration: Investment holding period (expressed in years) by the private equity firm

Pre-buyout leverage: Debt at one financial year before buyout divided by EBITDA at one financial year before buyout ($Debt_{-1}$ / $EBITDA_{-1}$)

Leverage Change: Difference between debt at one financial year before buyout and debt one financial year after buyout, all divided by EBITDA at one financial year before buyout
($Debt_{\text{last year}}$ - $Debt_{-1}$) / $EBITDA_{-1}$

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1. Introduction

This dissertation investigates the changes in the operating performance of public-to-private leveraged buyouts in the United Kingdom that were executed from 2003 to 2015 and exited by 2018. Specifically, this dissertation aims to identify sources of operating performance changes in public-to-private LBOs mainly from the perspective of shareholder-related agency costs and free cash flow/benefits of debt theories.

The present chapter will provide a detailed overview of the investigated topic, including the theoretical and conceptual framework used, along with the hypotheses to be tested in this study. This chapter will also present a brief history of leveraged buyouts and the current state of the LBO market in the UK, the US and major European countries. In an effort to clarify why there is a need for this particular study in academia, this chapter will lastly provide the main motivations for conducting this study.

1.1. Background of Research

Definition of a Leveraged Buyout

According to Kaplan and Strömberg (2009), "in a leveraged buyout, a company is acquired by a specialised investment firm using a relatively small portion of equity and a relatively large portion of outside debt financing. The leveraged buyout investment firms today refer to themselves (and, are generally referred to) as private equity. In a typical leveraged buyout transaction, the private equity firm buys majority control of an existing mature firm".

In other words, unlike a merger, a leveraged buyout ("LBO") does not involve the combination of two distinct or similar firms in order to establish a consolidated new business, in the form of a new company or joint venture. In a leveraged buyout transaction, the equity shares of a public or non-public corporation is acquired by a non-strategic acquirer, typically including a group of private investors, a private equity company/companies or management. The typical LBO deal is financed by using a significant portion of debt, borrowed against the assets and/or cash flows of an acquired company (Kaplan and Strömberg, 2009).

An LBO transaction is not only limited to public-to-private deals in which public shareholders are bought out, and the target is taken private after a delisting process from the relevant stock exchange. It may also include private and smaller businesses that undergo a similarly structured

deal, using a large portion of debt, which goes beyond the industry average. However, in the present study, the focus will be on private equity-backed public-to-private ("PTP") LBOs, specifically deals that were completed in the United Kingdom between 2003 and 2015, and exited by 2018.

Definition of private equity firms, private equity funds and transactions

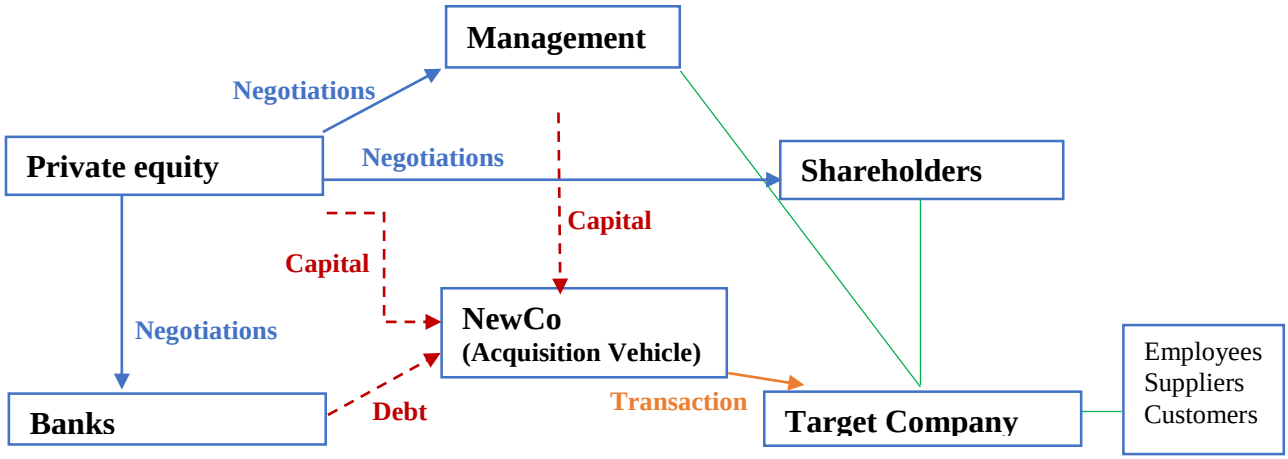
Gilligan and Wright (2008) offer a very detailed definition of a private equity firm: "Private equity is risk capital provided in a wide variety of situations, ranging from finance provided to business start-ups to the purchase of large, mature quoted companies, and everything in between. Buy-outs are examples of private equity investments in which investors and a management team pool their own money, usually together with borrowed money, to buy a business from its current owners."

Private equity funds typically have a time horizon usually spanning from 10 to 13 years. In other words, the private equity firm usually has well-defined investment horizon. In fact, according to Kaplan and Strömberg (2009), the private equity firm has "typically up to five years to invest the capital committed to the fund into companies".

It should be noted that this dissertation focuses on public-to-private LBO transactions where a private equity firm takes a listed company private. In this regard, according to Kaplan (1989a), a private equity transaction involving a public company is a transaction where a private equity firm takes a public company private by paying a premium of 15 to 50% on top of its stock price. The transaction (or leveraged buyout) is generally financed with 60-90% debt provided by banks (Kaplan and Strömberg, 2009).

Adapted from Gilligan and Wright (2008), the following is a diagram depicting different parties in a typical private equity LBO transaction.

Figure 1: Parties Involved in a Private equity Transaction defined as an LBO



Note: Adapted from Gilligan and Wright, who authored "Private Equity Demystified. An Explanatory Guide", Second Edition, 2008.

History of Leveraged Buyouts

The rise of leveraged buyouts (LBOs) started over thirty years ago in the United States and lasted for over a decade. In fact, LBOs became a major instrument that characterised the hostile takeovers that emerged, especially in the United States, starting from the 1980s. Perhaps one of the most well-known public-to-private LBO transactions that took place in this era is the acquisition of RJR Nabisco by Kohlberg Kravis Robert & Co for US$ 31 billion (or US$ 55 billion when adjusted to inflation) in 1989.

Ever since LBOs first appeared in the 1980s, the value creation in LBOs has been a focal point of research in academia, considering the fact that the annual value of LBOs of U.S. publicly listed companies increased from US$33 million to US$224 million between 1980 and 1987 (Liebeskind, Wiersema and Hansen, 1992). In fact, a number of well-known academic researchers, such as Jensen (1989), predicted the "eclipse of the public corporation" due to its inherent short-comings, which would ultimately result in the rise of the private company. According to Jensen (1989), different corporate structures, including "takeovers, corporate breakups, divisional spinoffs, leveraged buyouts and going private transactions", were a representation of this new organisational innovation in the markets. According to Jensen

(1989), these organisational forms used "public or private debt", instead of "public equity". This way, these corporate structures seemed to improve their "operational efficiency, employee productivity and shareholder value" after "resolving the central weakness of the public corporation - the conflict between owners and managers over the control and use of corporate resources – (…)" (Jensen, 1989). However, the collapse in the US stock and high yield bond markets in the early 1990s caused a significant decline in the number of LBOs during this period, as documented by Holmstrom and Kaplan (2001) and Jensen (1991).

The second wave of leveraged buyouts started in the early 2000s and reached an all-time peak in 2007. In fact, LBOs completed during the second wave were far larger in terms of value than LBOs during the first wave of the 1980s. Thus, Shivdasani and Wang (2011) find that the value of LBOs completed between 2004 and 2007 reached US$535 million, more than the double of the US$225-million-value in the first LBO wave. The second LBO wave involved middle-sized firm in new industries with growing prospects, whereas the LBOs in the first wave were large companies in mature industries. What makes the second LBO wave even more interesting was the transaction type, specifically that public-to-private (PTP) transactions had a greater share in total transaction value. In the early 1990s, PTP LBOs made up 9% of deal values compared to 34% in the second wave of the 2000s (Kaplan and Strömberg, 2009).

The rise of the second LBO wave was triggered by the exponential growth of debt and securities markets in the early 2000s. This trend facilitated the financing of riskier capital structures, as the economic environment at that time offered very favourable credit conditions, most notably low interest rates. However, the number of completed LBOs saw a sharp decline after the subprime meltdown of 2007, raising concerns on the value creation mechanisms of the LBOs. In fact, after the collapse of the collateralized debt obligation (CDO) market, the number and volume of LBO transactions shrunk by 94% (Shivdasani and Wang, 2009).

To illustrate the evolution of public-to-private LBOs during the second wave, the acquisition of Energy Future Holdings, an electric utility company from the United States, by a consortium led by Kohlberg Kravis Roberts & Co, Texas Pacific Group (TPG Capital) and Goldman Sachs for US$48 billion in 2007 was by far the largest public-to-private LBO completed at the height of mega-buyouts between 2005 and 2007. Left with a debt of US$ 40 billion after the buyout, Energy Future Holdings filed for bankruptcy in 2014. The entire deal was the result of a gamble by large private equity firms that the energy prices would rise and Energy Future Holdings

would dominate the energy market. A few years after the global financial crisis, however, the credit markets recovered and favourable conditions were restored in the second half of the 2010s, leading to an increase in the number of LBOs completed since then. The risky LBO structures as led previously by large private equity firms have become less common. In this regard, the acquisition of PetSmart Inc by the UK-based BC Partners for US$9 billion in 2014 is amongst largest LBO deals completed since 2007.

The table below provides an overview of LBOs and strategic transactions from 2013 to November 2018 completed in the US and developed European countries, including the UK, Germany, Switzerland, Spain, Italy, the Netherlands and France. For ease of reference, according to Tables 1 and 2, strategic LBO transactions involve a strategic acquirer that buys into a target company that is in direct competition or operates in an adjacent industry, such that this target company would fit the core business of the acquiring company. On the other hand, the tables below define an LBO as a public-to-private LBO transaction of a target firm backed by one or more private equity firm.

Table 1: Numerical distribution of LBOs by year and transaction type in the US and Developed European Countries[1]

Transaction Type	2013	2014	2015	2016	2017	Jan – Nov 2018
LBO	1 851	2 411	2 410	2 250	2 135	1 889
Strategic LBO	21 043	28 543	29 641	27 170	25 078	21 458
Grand Total	22 894	30 954	32 051	29 420	27 213	23 357

[1] the UK, Germany, Switzerland, Spain, Italy, the Netherlands, and France

Source : Capital IQ

Table 2: Transaction value (US$ mn) of LBOs by year and transaction type in US and Developed European Countries[1]

Transaction Type	2013	2014	2015	2016	2017	Jan – Nov 2018
LBO	171 726	168 258	165 771	131 616	103 452	91 011
Strategic LBO	1 073 529	1 918 840	2 476 342	2 121 976	1 630 657	1 254 409
Grand Total	1 245 256	2 087 098	2 642 113	2 253 593	1 734 109	1 345 420

[1] the UK, Germany, Switzerland, Spain, Italy, the Netherlands, and France

Source : Capital IQ

LBO trends in the US, the UK and Continental Europe

In fact, since the 1980s LBO wave, public-to-private LBOs have been among most prominent transaction types, which significantly contributed to the incremental growth of the PE industry globally. No doubt, private equity and leveraged buy-outs play a key role today in most developed capital markets worldwide. Accordingly, the LBO and private equity phenomena continue to receive significant attention in academia.

As seen in the following tables, the US is by far the most active LBO market worldwide in terms of transaction number and size. Despite being the second largest LBO market, the UK market barely generates a quarter of the transaction volume of the US market. When it comes to continental Europe, Germany, France, Spain, Italy and the Netherlands occupy the most prominent positions in terms of transaction count and size over the last few years, spanning from 2013 through to 2018.

Table 3: Breakdown of LBOs by country

Transaction Type	2013	2014	2015	2016	2017	Jan – Nov 2018
Switzerland	299	377	383	445	419	345
Italy	403	604	657	801	861	740
Netherlands	500	547	670	679	610	564
Spain	969	1 433	1 488	1 417	1 299	1 157
France	1 460	2 026	2 022	2 048	2 374	1 724
Germany	1 701	2 422	2 433	2 300	2 390	1 920
United Kingdom	3 495	4 538	4 921	4 380	3 903	3 406
United States	14 067	19 007	19 477	17 350	15 357	13 501
Grand Total	22 894	30 894	32 051	29 420	27 213	23 357

Source: Capital IQ

Despite some ups and downs, the number and volume of LBO transactions, including PTPs or MBOs, have been slowly increasing, in particular, in less risky and mature markets, which include Western European countries.

Table 4: Transaction size of LBOs by country (US$ mm)

Transaction Type	2013	2014	2015	2016	2017	Jan – Nov 2018
Switzerland	8 304	59 167	23 086	65 497	43 931	6 340
Spain	27 301	69 475	37 698	53 761	77 530	43 099
Italy	32 462	33 371	37 884	41 183	42 853	41 544
France	37 711	154 246	89 456	58 390	85 492	35 555
Netherlands	39 345	51 915	35 274	36 393	80 890	55 900
Germany	81 306	91 495	89 715	62 190	85 872	37 128
United Kingdom	113 588	220 227	468 100	182 270	205 021	196 025
United States	905 236	1 407 198	1 860 896	1 753 906	1 162 518	929 826
Grand Total	1 245 256	2 087 098	2 642 113	2 253 593	1 734 109	1 345 420

Source: Capital IQ

1.2. Purpose of Study and Problem Statement

The main aim of this study is to investigate the ability of private equity funds to create value by taking public corporations private through LBOs. This is a simplified definition of the Public-to-Private Leveraged Buy-Out. In this regard, the operating performance of target LBO firms in the post-buyout period is examined. This dissertation concentrates on private equity-backed PTP LBOs that took place from 2003 to 2018 in the United Kingdom, and includes both PE-backed LBOs and PE-backed LBOs involving the company's existing management (i.e. PE-backed public-to-private MBOs/LBOs).

According to some academics, private equity is a "superior form of organisation", as discussed by Kaplan and Strömberg (2009). This thinking entails that LBOs are a source of value creation for target companies, including most of the time, public corporations that have reached a certain degree of maturity. Most research papers and studies published in this field describe PE-backed LBOs as a positive contributor to the subsequent operational performance of target companies. Studies also indicate that improved operating performance result in higher returns for different stakeholders (including investors and debt providers) on their investment in LBOs.

Operating performance is usually measured as the change (Δ) in sales (Bull, 1989; Muscarella and Vetsuypens, 1990), income (Kaplan, 1989a) or cash flow (Bull, 1989; Opler, 1992). In addition, some scholars study improved operating performance as a function of higher rate of

productivity (Liechtenberg and Siegel, 1989) or lower range of capital expenditures (Kaplan, 1989a), which stem from an improved strategic focus and restructuring after an LBO structure is formed.

Most of the researchers in this area conclude that the improved operational efficiency of target companies going private under an LBO structure is a direct result of improved management incentives, reduced agency costs, improved governance and increased operational expertise. For instance, Jensen (1986 and 1989) asserts that private equity firms improve firm operations and create value by applying financial, governance and operational engineering and promoting governance principles in corporate practices.

Considering the above theoretical framework with regard to the value creation dynamics of LBOs, the focus of this present research is to investigate sources of value in the operational performance of the target companies from the perspective of the agency cost and free cash flow theories. In other words, this dissertation has a more focused approach, by examining only the change in operating performance on the firm level. Thus, value creation, financial returns and wealth transfers from the point of view of different stakeholders (e.g. shareholders, debt providers) are omitted from the scope of this dissertation.

Most importantly, this research aims to complete the lack of data and study with regard to PTP LBOs that happened during the second and third wave of LBOs in a specific geography, i.e. the UK, specifically given that most of the relevant studies focussed on LBOs that happened in earlier periods. For instance, Kaplan (1989a) analyses 76 management buyouts that took place from 1980 to 1986 in the US, and the research carried out by Guo at al. (2011) examine 192 PTP LBOs completed between 1990 and 2006, again in the US.

To sum up, the logic behind the time window selected to conduct this study can be explained by the general impact of the financial crisis in 2007-2008 upon global debt and stock markets. For this reason, this dissertation examines PTP LBOs that were announced starting from 2003 (i.e. approximately five years before the global financial crisis) and exited by 2018. In other words, 2018 is the final year during which an LBO must reach a final outcome (e.g. IPO, SBO, strategic investor sale, insolvency) in order to be included in the sample collected for this study.

It should also be noted that the period from 2003 to 2007-2008 is seen as the second wave of LBOs, as it is characterised by a boom phase in LBO transactions completed in terms of value and volume. As the markets recovered from the financial crisis of 2007-2008, another wave of LBOs seems to have started in the 2010s, even though it still is in its infancy and far from reaching the same levels of dynamism recorded during the second wave of early 2000s. Therefore, the timespan of this present study is relevant to understand the current dynamics that have been affecting the LBO market since 2003.

When it comes to geographic scope of this dissertation, the UK market is considered one of the most suitable countries in which to carry out this type of research, as it has always been the second largest LBO market worldwide after the US, and it was also one of the economies most affected by the financial crisis of 2007-2008. This research, therefore, aims to test the current thinking in academia with regard to sources of value in LBOs before and after the global financial crisis.

A further key reason for selecting the UK as LBO study market can be explained by data availability. The UK is unique in the sense that all companies registered within it, be it public or private, are required to submit their audited financials to Companies House, a public register where anyone can access and download online financial reports of companies. On the other hand, when it comes to the US market, most studies focus on reverse leveraged-buyouts where companies go public again after a period of private ownership. Authors of the US-based studies collect data on companies by accessing their corporate tax returns (e.g. Cohn et al., 2014), and SEC filings, if the target firm issues publicly held debt or is acquired later by another public company (e.g. Kaplan, 1989a). Data availability is also a major challenge for other countries, including South Africa. Therefore, this dissertation focuses on the UK LBO market, as public data on private companies is relatively more available for this market.

Last but not least, limiting the research to one single country eliminates complexities introduced by diverse legislative frameworks of different countries, as well as other country-based discrepancies and differences relating to financial market maturity, regulations and macroeconomic structures.

In terms of search strategy, several public resources and databases were used to access the relevant information of parties involved in an LBO transaction completed in the UK. In order

to facilitate the deal search, the following keywords were used: public-to-private leveraged buyout, management buyout, Private Equity, United Kingdom. The databases queried include Companies House UK, S&P Capital IQ, MergerMarket and many others. The search strategy will be presented in detail in Chapter 3.

1.3. Hypotheses Development

The following are the detailed hypotheses, based on the findings in the related finance literature and the research sample that are tested in this study:

Hypothesis 1: Changes in operating performance of PTP LBO target firms are positively correlated with reduced agency costs (e.g. improved management incentives) (H1)

Kaplan (1989a) and Guo et al. (2011) find a positive and significant improvement in net cash flows after an LBO deal. One of the reasons given in both research studies is related to reduced principal-agent costs, especially in deals involving the management of the LBO target. For example, Guo et al. (2011) find that the increase in operating cash flows are higher when the CEO is replaced right after the transaction. The same outcome is expected here.

Hypothesis 2: Changes in operating performance of PTP LBO target firms are positively correlated with higher post-LBO leverage (H2)

Consistent with the finance theory supporting the benefits of debt in reducing agency costs (the disciplining effects of debt), improvements in operating cash flows are expected to be greater in companies with a higher debt ratio. The positive effect of high leverage is explained in detail in the Literature Review section. The same outcome is expected in this study.

Hypothesis 3: Changes in operating performance of PTP LBO target firms are positively correlated with stronger shareholder monitoring and governance (H3)

As described by Jensen (1986) and Kaplan and Strömberg (2009), private equity firms apply operational and financial expertise and well-established governance principles to companies they invest in. Acharya et al. (2009) document that the private equity firms are active "hands-on" shareholders. In accordance with the cited literature, changes in operating performance of PTP LBO firms should be positively correlated with stronger shareholder (i.e. private equity firm) involvement and monitoring. The same outcome is expected in this study.

1.4. Contributions of this Dissertation

As mentioned above, this dissertation aims to address the scarcity of research with regard to the changes in operating performance of PTP/LBOs during the second wave of the early 2000s, and the third wave which started after the 2010s, in the aftermath of the global financial crisis in 2007. It should be noted that there is little research done in this area in the selected timespan and geography. As mentioned above, most of the studies with regard to LBOs focused on the first wave or the 1990s. Furthermore, the US market still remain the main geographic market investigated by most academic research in this area.

In addition, some other studies do not distinguish between public-to-private LBOs driven by outsiders (e.g. private equity) or insiders (MBOs). For instance, some similar studies on the same topic include pure MBO PTPs (with no private equity involvement) in their research scope, along with solely private equity-backed PTPs, as well as private equity-backed MBO PTPs. In this dissertation, private equity involvement is a required condition of the sample construction. Listed PTP deals in the database are included in the sample only if they actually involve private equity participation, be it an MBO or not. This is an important contribution to the literature, as different types of buyers may reflect completely different deal structures in terms of capital structure, deal size and other characteristics.

Moreover, this dissertation takes a focused approach and emphasises the changes in operating performance of LBO firms in the post-LBO or the private period after being de-listed from the stock exchange. In other words, this present study examines the changes in operating performance during the entire private period under private equity firm (and sometimes management) ownership. This dissertation, therefore, aims to fill the existing gap in sources of value of LBOs in terms of operating performance from the time of PTP/LBO completion to the final outcome of the PTP/LBO (e.g. exit, or other outcome). There is little research focusing on operating performance improvements during the entire period under private equity firm ownership. For instance, Opler (1992) and Kaplan (1989a) only use a time window of (-1,+2), spanning from one financial year before buyout to two financial years after the completion of buyout.

In light of the above, the content and questions investigated in this dissertation could be interesting for two distinct audiences, namely academia and the private equity industry.

1.5. Limitations of this Dissertation

As in most financial research papers, the main challenge was to access the correct data on LBO transactions and targets, both pre- and post the transaction. The United Kingdom was selected as the geographical scope of this dissertation because it offered the most unified and complete data source for our research. Despite this, tracing back the entire financials of some companies that were taken private by private equity firms in the required time frame (deals completed between 2003 and 2015, with a condition of deal exit by 2018) was a great source of struggle in this dissertation. Moreover, the significant decline in the number of LBOs after the financial crisis in 2007 negatively affected the available sample size (full sample: 65 PTP transactions; subsample with complete post-buyout data: 54 PTP transactions).

It could therefore be argued that a relatively short time frame and small sample size may limit the representativeness of the study. Moreover, transactions completed in the pre-2007 era formed the majority of the research sample. The number of PTP LBO transactions completed post-2007 were significantly lower. This was also an important caveat of this research. Moreover, this dissertation has only investigated exited deals until 2018 and deals that have not been exited are omitted from the scope of the study. As a major implication of this, it may be argued that this dissertation suffers from selection bias to a certain extent as only realised LBO investments are investigated. There is no doubt that some private equity firms will inevitably postpone their exit if the target firm is facing financial difficulties. The "unknown" number of distressed companies in investments that are not realised and/or exited by private equity firms may have a negative effect on the representativeness of the study conducted in this dissertation.

1.6. Organisation of the Dissertation

In terms of research organisation, the following structure will be followed: Chapter 2 will provide an overview of the academic literature and previous studies on LBOs. In Chapter 3, the data used in this research will be presented. Specifically, the logic behind each dataset collected will be explained, and a descriptive overview of the sample will be provided. Chapter 4 will present the method used in the analysis. This dissertation has specifically used the methodology used by Guo et al. (2011). Chapter 5 will present and discuss the analysis with regard to the changes in operating performance of PTP LBOs. An overview of the calculations will be given in order to determine determinants of the changes recorded in the operating performance of PTP LBO firms. Chapter 6 will conclude the study.

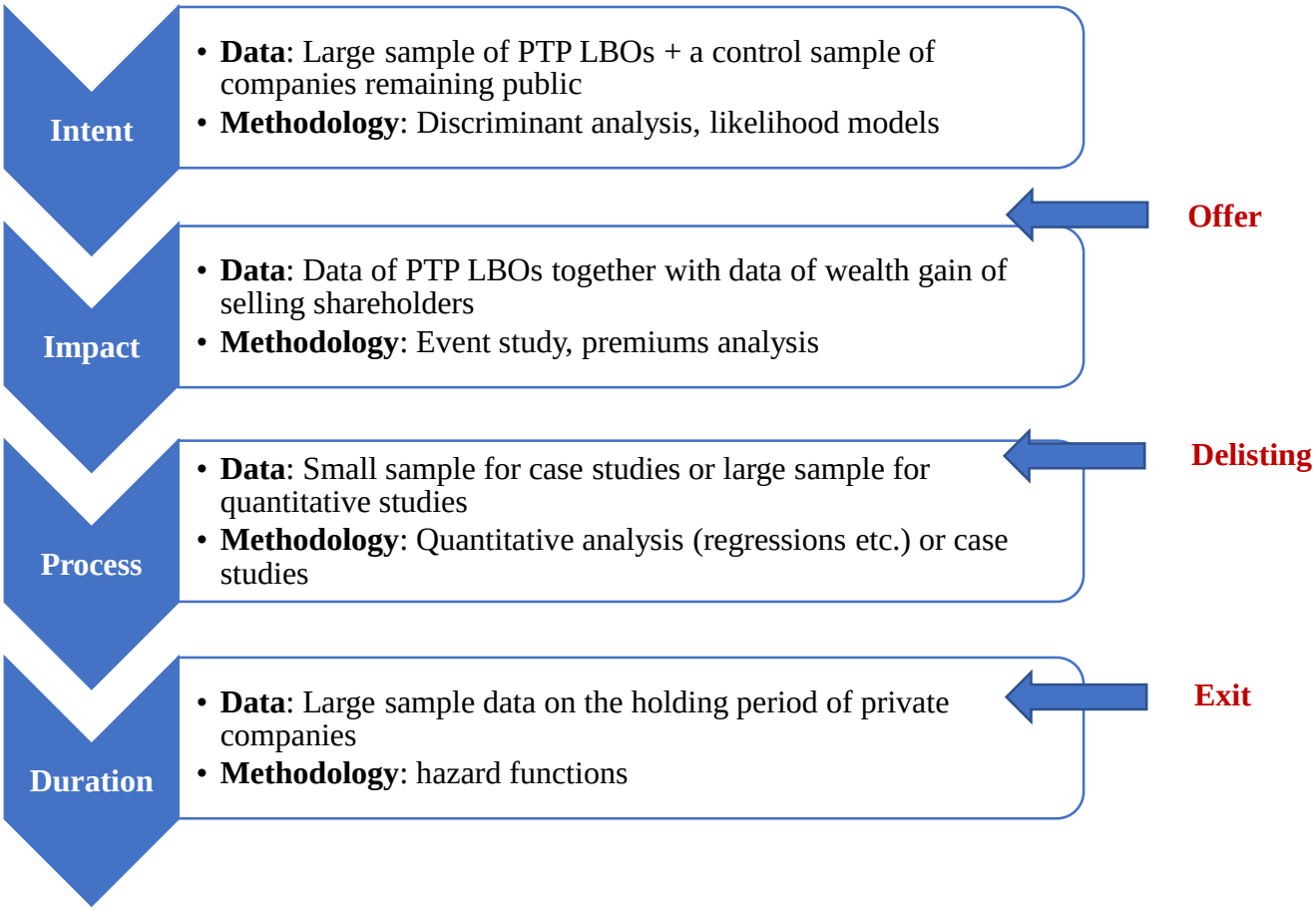
2. Literature Review

This chapter provides an overview of the academic literature relating to the value creation dynamics of LBOs. The review starts from the early literature and articles that opt for a more general perspective, and continues with the most relevant academic and empirical studies realised in the same or similar topic.

2.1. Main Academic Literature in LBOs

As suggested by Renneboog and Vansteenkiste (2017), the finance literature in LBOs can be split into four strands, each corresponding to a different stage of a typical PTP LBO transaction.

Figure 2: Theoretical Framework of PTP LBO literature



Note: For more information on different strands of PTP LBO literature, please refer to the Appendices/Figure 1 of the working paper authored by Renneboog and Vansteenkiste (2017).

The research described in this document focuses on the third strand of the literature defining the LBO process, which spans from the delisting from a stock exchange to the exit transaction of the LBO-sponsors. Thus, the value created during the private status of the (previously listed) LBO target will be measured in an attempt to detect sources of performance changes in LBOs, using a set of transaction data relating to private equity-backed PTP transactions completed in UK from 2003 to 2015, and exited by 2018.

As a result of the above, the literature review that follows focuses mainly on studies completed in the same research area, namely the third strand of the literature as defined above.

2.2. Value Creation in PTP LBOs

Public-to-private LBOs received considerable attention in academic literature. This was because most scholars considered the public company as a superior form of organization compared to the private company (Kaplan and Strömberg, 2009). Listed companies were enjoying a higher degree of prestige and reputation in the market due to their ability to raise large amounts of capital and to maximize returns to shareholders.

However, this attitude towards listed corporations began to change when the private company emerged as a strong alternative against the listed company over time (Jensen 1986, 1989). A considerable number of academic studies sought to understand the underlying reason why public companies taken private by a group of investors in an LBO transaction started outperforming their peers operationally and financially.

In this regard, the academic literature focused mainly on explaining the motivations for PTP LBOs. The theoretical framework developed by scholars mainly revolves around the following hypotheses in order to shed light on *shareholder wealth gains and improvements in operating performance* as a result of PTP LBOs.

- **Shareholder-related agency costs theory:**

The principal explanation for going-private decisions is given by the shareholder-related agency costs theory, which was originally developed by Jensen and Meckling (1976).

According to this theory, shareholders and managers have divergent interests when it comes to taking a set of decisions for the company. In this regard, the theory suggests that the manager (the agent) will often not act in the best interest of the shareholder (the principal) and "will choose a set of activities for the firm such that the total value of the firm is *less* than it would be if he were the sole owner" (Jensen and Meckling, 1976). This behavioural pattern called "shirking" by Jensen and Meckling characterises the motivation behind the decisions taken by the managers on firm activities on a selective basis. According to Jensen and Meckling, the ultimate purpose of the managers is to serve their own private benefits instead of increasing firm value, hence the apparent conflict of interest existing between shareholders and managers.

Unable to exert a full control on the management activities, shareholders will endure an agency loss and will be a victim of an informational asymmetry. Agency losses are even higher when a company has a dispersed shareholding structure, as is the case in large listed corporations, where management control mechanisms are weaker than private companies or public companies with one major shareholder.

In light of this, Jensen and Meckling's analysis results in three hypotheses, which will be discussed in the sections that follow. These are the same as the ones used in existing academic studies that focused on the motivations behind PTP LBOs. For instance, Kaplan (1989a) studies a sample of large 76 MBOs closed between 1980 and 1986 in the US and demonstrates that MBOs outperform their peers in terms of net cash flow and operating income coupled with a reduction in capital expenditures. He finds that pre-buyout and post-buyout investors earn a combined median (industry-adjusted) return of 77%. Similarly, Kaplan and Strömberg (2009) document that PE companies create economic value by altering the target company's capital structure, management incentives and corporate governance. The following hypotheses are the most recurrent in the finance literature with regard to value creation in LBOs.

Incentive realignment hypothesis

A way to reduce shareholder-related agency costs is to realign incentive schemes offered to the management. This could include financially more rewarding salary structures. Another way to achieve lower agency costs could be by increasing equity ownership of the management team in the firm. In this regard, Jensen (1989) even argued that the combination of concentrated ownership, performance-based managerial compensation and improved governance structures would make LBOs, amongst other corporate structures based on private ownership, the

"dominant corporate organisational form", so that the public corporation would eventually disappear.

A significant number of PTP LBOs involve management participation in equity, as a strategy used by PE companies to balance the interest of managers/agents with theirs. For instance, studying 76 MBOs that were completed in the US between 1980 and 1986, Kaplan (1989a) observes that percentage of equity owned by management increase from a median of 5.88% to 22.63% during a typical LBO. He concludes that operating improvements and value gains are generated by positive incentive alignment rather than other factors. Similarly, Muscarella and Vetsuypens (1990) study reverse leveraged buyouts (RLBOs) (i.e. firms going public after undergoing an LBO transaction) of 72 firms that went public since 1983 in the US. They report an improvement in incentive alignment by increasing the equity holdings of the management; the outcome of this being a significant increase in profitability. It should be noted that the management ownership declines again when the company that was taken private again goes public after a few years (Muscarella and Vetsuypens, 1990). The reason of this change of incentive structure when the company goes public again is still not clear, as discussed by Holthausen and Larcker (1996), who study the accounting and market performance of a sample of 90 RLBOs that went public between 1983 and 1988 in the US.

Similarly, Opler (1992) studies a sample of 44 PTP LBO transactions completed between 1985 and 1989 in the US and concludes that improvements in the cash flow of companies subject to LBOs could be explained by reduced agency costs between shareholders and management and "disgorgement of free cash flow" as a result of cost cutting and efficient use of company resources. In fact, Opler finds that the operating cash flow/sales ratio during the post-LBO stage rose by 11.6% after industry adjustment. He also finds that the operating cash flows of the LBOs in his sample were in excess of US$ 2 billion and the net cash flow of those firms were even higher. Opler states that the excess operating cash flow should be one of the main causes that could explain the high rate of efficiency gains for investors.

On the same topic, Easterwood et al. (1989) study a sample of large LBOs completed between 1978 and 1985 in the US and analyse the relationship between the management-shareholder agency duality and the restructuring activities undertaken in the post-buyout stage. These researchers show that there is a greater emphasis placed on restructuring activities in the LBO firm, as the interests of managers and shareholders are more aligned due to the increased equity ownership of the management.

Free Cash Flow and Disciplining effect of Debt hypothesis

The agency cost of free cash flows is another major hypothesis used to explain value creation in LBOs. As supported by Jensen (1986), the increased leverage reduces the free cash flow available to management's discretion. Jensen goes on by defining free cash flow as the excess cash that could be deployed for positive Net Present Value (NPV) projects.

In a study of large 33 LBOs that occurred in the US between 1980 and 1984, Liebeskind and al. (1992) argue that managers tend to invest in expansion and diversification projects ("empire building" as described by Jensen, 1986) in order to increase their rewards. However, this "empire building" strategy does not necessarily increase the firm's market value.

In an LBO structure, the disciplining effect of debt comes into play. Managers in an LBO are forced to generate sufficient cash and make efficient use of it, in order to avoid a default in debt repayments. In fact, if the firm goes insolvent/bankrupt, the management will lose all power and reputation relating to the company (Grossman and Hart, 1980, 1988).

In other words, increased leverage mitigates the overinvestment, which could be defined as the practice of investing excessively, even in negative NPV projects. This particular issue is developed by Stulz (1988), who shows that debt is the best solution to the overinvestment problem by compelling managers to pay excess cash to debt providers.

Most studies have shown that LBO firms undergo substantial restructuring in order to narrow the strategic focus of their business. According to Phan and Hill (1995), after a company is taken private, the management and shareholders facilitate a restructuring plan in order to improve the company's effectiveness and efficiency. In a study of 72 firms that went public since 1983 after having completed an LBO transaction previously, Muscarella and Vetsuypens (1990) show that the vast majority of LBOs in their sample engaged in one of the following restructuring activities: redeployment of resources, improved operational efficiencies, new marketing plans and labour change. Similarly, Kovenock and Phillips (1997) study public and private firms engaged in manufacturing activities between 1979 and 1990 in the US. They show that high leverage brings higher profitability. According to them, this is result of improved productivity after eliminating unnecessary and unproductive assets in the LBO firm. The direct result of corporate and operational restructuring of LBO firms is reduced competition in the industry, which reinforces the LBO firm's position in the market.

However, not everyone shares the same view on this issue. Other groups of researchers find no differences between buyouts and non-buyout companies in the same industry (Cohn et al., 2014), when it comes to disciplining effects of debt or concentrated managerial ownership. In fact, Cohn et al. (2014) study a large sample of 317 LBOs that took place in the US from 1995 to 2007 and find that the operating performance improvements of LBOs are not significant. Other researchers (e.g. Holthausen et al., 1996) are more reluctant to accept the disciplining effect of debt as a given fact. Having studied a sample of 90 reverse LBOs from 1976 to 1988 in the US, Holthausen et al. (1996) assert that the change in leverage and managerial ownership could actually worsen the financial performance of the firm, because managers could reject high-risk and profitable (high NPV) projects and accept low risk and less profitable projects (low NPV). As described by Holthausen et al. (1996), "(…) leverage could affect project selection by managers due to managerial risk aversion". Similarly, Rappaport (1990) argues that high leverage and the resulting high level of debt repayments could actually jeopardise or "choke off" profitable investment opportunities and projects.

Shareholder Monitoring/Control hypothesis

It is also possible to see the shareholder-related agency cost hypothesis as an argument supporting debt financing over diversified "public equity", which undermines effective shareholder monitoring upon management (Myers, 1993).

As mentioned above, when a listed firm is taken private in an LBO, the shareholding structure becomes less diversified as there is, most of the time, one or two institutional shareholders (i.e. one or more private equity companies), which allows for more efficient shareholder monitoring of management. Acharya et al. (2009) argue that private equity firms are active investors and apply contractual limits to the management's activities in the company. In a study of approximately a dataset of 9 million companies and 153 000 insolvencies during the period 1995-2010, Wilson and Wright (2013) study the relation between private equity, buyout and insolvency risk. In a similar way to Acharya et al. (2009), Wilson and Wright (2013) define private equity firms on their experience in monitoring, and support the view that private equity investors are more proactive in "restructuring the finances of companies" with regard to debt repayments in order to avoid "insolvency risk, preserve assets and protect their reputation".

According to Kaplan and Strömberg (2009), it is widely accepted that private equity firms bring financial, governance and operational engineering to the companies they invest in. Kaplan and

Strömberg (2009) define "governance engineering" as "the way that private equity investors control the boards of their portfolio companies and are more actively involved in governance than boards of public companies".

As a result of this efficient monitoring structure, private equity firms tend to replace management much easier than other shareholders if the financial performance of the company remains low. For example, Acharya et al. (2009) show that PE funds have a "single-minded value creation focus" consisting of "leading the strategy of the firm through intense engagement with top management", whereas PLCs (public limited companies) board often accept the strategy of the executive management. Based on a sample of 60 large private equity buyouts that were exited between 2000 and 2007 in the UK, Acharya et al. (2009) find that the CEO of the firm is replaced in 69% of deals, and within the first 100 days in 39% of deals. On the other hand, the frequency of formal meetings is nine annually, which is the same as PLC board meetings. However, the number of informal meetings between the CEO and the private equity company is at least once a week throughout the investment period.

Moreover, high leverage also allows for an increased monitoring by debt providers (e.g. banks) (Diamond, 1984) on the management and firm performance, which reinforces the corporate governance structure in the company and reduces the agency misalignment between shareholders and managers (Jensen, 1986). Citron et al. (1997) show that MBO loan agreements contain more covenants than general corporate lending agreements. They also show that communication between the bank/lender and the firm is of higher degree and frequency.

- **Other Hypotheses**:

Tax benefits

The finance literature has also paid much attention to tax benefits generated by high leverage in public-to-private LBOs. For instance, Kaplan (1989b) studies tax benefits generated in 76 management buy-outs of public companies from 1980 to 1986 in the US and demonstrates that the tax gains of these companies are in the range of 20% to 70% of the premium paid to shareholders during the de-listing process of the company. He explains this phenomenon by tax deductibility of the interest expense paid for high amounts of debt raised for the financing of the transactions. In addition, in a study of a sample of 317 LBOs that were completed in the US between 1995 and 2007, Cohn et al. (2014) show that the number of firms paying tax drastically declines at the buyout year and remains low after the first five years of the buyout period.

Undervaluation and Information Asymmetry

In an effort to clarify the motivations behind PTP transactions, Renneboog, Simons and Wright (2007) study 177 PTP transactions that occurred in UK from 1997 to 2003. These authors find strong evidence that the LBOs in the UK are driven by the undervaluation hypothesis. Their study shows that past share performance of the PTP transactions during the second wave (1997-2003) in the UK was the main motivation of buyouts. In fact, premiums paid to shareholders were even higher when the transaction involves the management (MBO) due to informational asymmetry. The latter suggests that management has greater insider information on the future outlook of the firm and thus, in most cases, management is ready to pay higher premiums to take control of the firm. Renneboog et al. (2007) observe that another source of shareholder wealth gain is increased tax gain due to high leverage ratio in LBOs.

Market Conditions: Market Timing of Buyout and Exit; Industry and Macroeconomic Factors

As shown by Kaplan and Strömberg (2009), market timing is another major value driver in LBOs. In their study, Kaplan and Strömberg (2009) show that the private equity industry goes through recurring boom and bust cycles. It seems that the level of interest rates to earnings affect private equity activity in general, regardless of the fact it involves public or private companies.

Market timing of buyout and exit is closely related with the investment strategy of private equity companies. As mentioned in the first section, private equity companies have a definite LBO investment time horizon of up to 5-7 years when investing in a target company. In a study of 180 PTP buyouts that occurred between 1979 and 1986 in the US, Kaplan (1991) shows that the period of the median LBO target remaining private under private equity ownership is 6.82 years.

According to Kaplan and Strömberg (200), private equity investors take advantage of market timing and market mispricing in conformity with their investment duration or time horizon. The goal of private equity companies is to buy cheap and sell high (Kaplan and Strömberg, 2009), as is the case with most investment approaches.

With regard to market effects, Valkama et al. (2013) observe that industry growth is one of the major value drivers increasing the return on investment, especially in MBOs compared to MBIs (probably due to the informational advantage of the inside management). Their study also provides evidence on the limited effect of other macro-economic variables on private equity-backed buyouts.

2.3. Empirical Studies in the United Kingdom and United States

The US and UK markets have received considerable attention from scholars and researchers since the emergence of LBOs in 1980s. In this subsection of the literature review, an overview of the recent empirical studies carried out in the UK and US will be provided, in order to get an understanding of different questions raised by each of them. In particular, the studies will be compared in terms of theoretical frameworks and hypotheses.

To the author's knowledge, the following represents the main literature focusing on the UK and US-related PTP LBOs. Unfortunately, despite extensive research, no more recent research papers and studies on LBOs realised in the UK and US could be found, especially with regards to the post-PTP performance of LBO firms. There is extensive literature with regard to the first (i.e. Intent) and second strand (i.e. impact) of the literature. However, there is little up-to-date research in the third strand (i.e. process) of the literature.

As expected, most academic research on LBOs, especially in the third strand of the literature, is confined to PTP transactions in the US market, the largest LBO market in the world. There is still limited research on LBO dynamics in the UK, even though it is the second largest LBO market after the US. Having said that, in both countries, the number of up-to-date and recent empirical research to measure the value creation of LBOs remains limited for the period post-2008. Similarly, little is known about LBO trends in Continental Europe and emerging markets, as both markets are still considerably underdeveloped compared to the UK and US LBO markets.

In light of the above, empirical studies conducted in the 1980s will not be covered in this section, as the emphasis will be placed on relatively more recent academic studies. Most of the dated literature and empirical studies were, in fact, already discussed in Section 2.2. Therefore,

the scope of this present subsection will be limited to the most relevant empirical studies conducted in the UK and the US.

Table 5: Empirical Studies with regard to PTP LBOs in the UK[1]

Authors	Sample Period	Transaction number (N)	Transaction type	Incentive realignment	Free Cash Flow	Governance / Monitoring	Undervaluation	Tax Shield	Other Hypotheses
Green (1992)	1980-1984	8	MBO	No					
Robbie and Wright (1995)	1987-1989	5	MBI	Yes	Yes		Yes		
Harris, Siegel, Wright (1995)	1994-1998	35,752 (manufacturing sites)	MBO	Yes					
Cressy, Munari, Malipiero (2007)	1995-2000	122	PTP	Yes					Advantage-to-specialisation (Yes)
Weir, Jones, Wright (2015)	1998-2004	138	PTP	Yes		Yes		Yes	
Valkama, Maula, Nikoskelainen, Wright (2013)	1995-2004	321	ALL			Yes but limited			Industry growth (yes)

[1] This table format is inspired by Renneboog and Vansteenkiste's paper on the finance literature with regard to academic studies in LBOs. The above table is a more complete and up-to-date version of the overview provided by Renneboog and Vansteenkiste (2017). This present overview includes only more recent academic studies involving LBOs that were completed in the UK.

One of the first studies relating to the LBO transactions in the UK is that of Green (1992), who conducts a cultural and behavioural analysis on changes in ownership and control subsequent to an LBO transaction. Thus, eight MBO transactions are analysed, and it is concluded that management becomes more entrepreneurial and motivated after a change in ownership. Furthermore, Green observes that this is not a pure consequence of the "incentive realignment hypothesis", but that it seems that the altered ownership structure through management involvement has a positive effect on the attitude of management towards their responsibilities.

In another case-study based investigation in the UK, Robbie and Wright (1995) analyse the effect of the changing ownership on corporate restructuring. This study specifically examines the success of Management Buy-ins (MBIs), and supports the importance of management incentives and new shareholder monitoring, while navigating problems relating to informational asymmetries between management and shareholders.

More recently, the question of efficiency gains in the post-LBO period of companies has started to receive increasing interest from a number of scholars in the UK. For instance, in 2008, Harris, Siegel and Wright assess the total factor productivity (TFP) of a large number of manufacturing plants in the UK between 1994 and 1998. They research the effect of change of ownership on productivity and economic efficiency levels of the plants from the perspective of agency costs theory. After studying 35,752 manufacturing plants in the UK, they find that productivity increases considerably as the new owners reduce overhead and labour costs after the MBO transaction. This observation seems to be an indication of the improved agency costs in an MBO structure.

In terms of post-LBO operating performance, Cressy et al. (2007) test whether private equity-backed firms have higher post-LBO sales growth and operating performance (as measured by EBIT and EBIT/total assets) compared to comparable firms. They also test whether the private equity firm provides a competitive advantage to companies in which they invest. In order to verify their hypotheses, Cressy et al. (2007) study a sample of 122 LBOs that happened in the UK between 1995 and 2000, and a matching sample of comparable peers that have not been backed by a private equity firm. They conclude that the EBIT of buyout firms backed by private equity firms is 4.5% higher than their matched peers over the first three years following the LBO. They also find that that "specialised" private equity companies having expertise in executing buyouts in only a limited number of industries add an 8.5% profitability advantage

to the LBO firms' performance. Despite the observation of Cressy et al. (2007), one should also address the question whether the management manipulate key accounting figures such as EBITDA and EBIT by overstating earnings prior to an LBO deal in the hope of increasing the stock price (and the transaction value) and obtaining more favourable terms for debt-raising. This issue is actually discussed in a research conducted by Mao and Renneboog (2015) on 168 LBO transactions completed from 1997 to 2007 in the UK. Mao and Renneboog (2015) find that the management of target firms engage in negative earnings manipulation to decrease price in the case of an MBO. On the other hand, positive earnings management in LBOs to increase valuation and leverage do not seem to play a prominent role, at least in the UK-based buyouts. Nevertheless, earnings manipulation or other manipulation techniques (such as asset revaluations or misrepresentation of production costs) should be taken into account when assessing the value creation mechanisms of LBOs. The misrepresentation of earnings is also an important factor to consider when assessing the exit deals by private equity firms which may give incentives to management to inflate earning numbers to secure a higher price at exit.

In an effort to identify the drivers of firm-level returns under private equity ownership, Valkama et al. (2013) use a set of 321 exited private equity-backed buyouts in the UK from 1995 to 2004. The aim of the study is to assess the returns of buyouts backed by private equity firms. For this purpose, the authors use a set of variables in order to test the effect of the industrial and macroeconomic factors on firm-level returns. They find that use of leverage, size of the buyout and post-LBO acquisitions completed by the LBO target company under the ownership of the private equity company are major contributors to returns. They also find that industry growth has a significant effect on buyout returns, especially in divisional buyouts and MBOs (rather than MBIs – as a result of informational advantage of inside management). On the other hand, they find that the influence of macro-economic factors on buyout returns is weak.

A recent study examines the correlation between the ownership and operating performance of firms taken private under an LBO structure. Using a sample of 138 PTP buyouts completed in the United Kingdom from 1998 to 2004, Weir, Jones and Wright (2015) compare the performance outcomes of different PTPs, regardless of whether they are private equity backed or not. This research finds that private equity involvement does not have a statistically significant effect on profitability. Nevertheless, the performance of private equity-backed PTP deals is higher than the industry average, but not worse than non-private equity backed PTPs.

Other findings of this study are improved efficiency (lower expenses), and increased liquidity in all PTP deals.

The following is a summary of empirical studies realised recently in the US.

Table 6: Empirical Studies with regard to PTP LBOs in the US

Authors	Sample Period	Transaction number (N)	Transaction type	Incentive realignment	Free Cash Flow	Governance /Control /Monitoring	Undervaluation	Tax Shield	Other Hypotheses
Bruton, Keels, Scifres (2002)	1980-1988	39	Reverse LBOs	Yes					
Leslie and Oyer (2008)	1996-2005	144	Reverse LBOs	No					
Guo, Hotchkiss and Song (2011)	1990-2006	192	ALL	Yes	Yes	Yes	No	Yes	
Datta, Gruskin and Iskandar-Datta (2013)	1978-2006	208	Reverse LBOs		Yes		Yes	Yes	
Cohn, Mills and Towery (2014)	1995-2007	317	ALL				Yes	Yes	
Ayash and Schütt (2016)	1980-2006	183	ALL						Accounting distortions
Gao (2018)	1986-2007	208	ALL		No	Yes			

When it comes to the US, there are a few interesting and recent empirical studies conducted with regard to the operating performance and value creation of LBOs during private ownership. As mentioned above, however, this subsection does not include an overview of more dated empirical studies as those were already presented in the first subsection of this chapter. Some of the first empirical studies already presented above include Kaplan (1989a), Bull (1989), Easterwood et al. (1989), Liechtenberg and Siegel (1990), Stulz (1988), Muscarella and Vetsuypens (1990), Opler (1992), Liebeskind et al. (1992), and Holthausen and Larcker (1996).

In terms of corporate restructuring and performance of LBO firms, Bruton et al. (2002) examine a sample of 39 (reverse) LBOs whose secondary IPO was completed in the US between 1980 and 1988. It should be noted that the main reason for these authors to examine reverse leveraged buyouts is linked to data availability. It is easier to find financial data for public companies in the US, as private companies are not obliged to disclose their financials. This study finds that performance, as measured by sales and profit margin, improve considerably during the private ownership period, although not very different from that of the peer companies in the controlling sample. The authors show that increased managerial ownership results in greater operating performance. In addition, Bruton et al. (2002) show that buyout companies engage in a corporate restructuring and strategic narrowing process during the private period. Their findings are consistent with the hypotheses pertaining to agency costs theory.

One of the more recent studies on the operating performance of LBOs sponsored by private equity firms is realised by Leslie and Oyer (2008). Using a sample of 144 companies that go public after being previously owned by a private equity firm (i.e. Reverse LBOs), and a controlling sample of similar public companies, they find that managers of buyout firms are more incentivised compared to the managers of peer companies. For instance, in terms of equity ownership, the highest paid manager owns 3.3% more equity and earns an 11.9% lower salary compared to the controlling sample. Their study also indicates that private equity-backed firms have significantly more debt than their matched peers. Having said that, they also find that higher management incentives in LBO firms do not generate higher returns for Private equity firms. This study therefore questions the validity of the assumption that LBOs create value in terms of operating performance and financial returns to private equity investors.

In a comprehensive study of different sources of value in 192 LBOs completed in the US between 1990 and 2006, Guo et al. (2011) test a number of hypotheses, involving agency costs,

the debt tax shield, and free cash flow theory, to name a few. They observe that the financial returns to pre-buyout and post-buyout capital are generally positive, except for distressed companies. On the other hand, in terms of operating performance (as measured by changes in ROS and ROA), LBO firms do not seem to outperform their counterparts in the same industries. They also show that higher debt provides for a greater tax shield, which increases cash flow gains of the LBO firms. In terms of agency costs, Guo et al. (2011) find that a CEO change has a positive effect on cash flow gains of the LBO firm at the completion of the buyout.

In order to assess the correlation between capital structure and operating performance of LBO firms, Cohn et al. (2014) examine a sample of 317 buyouts completed in the US between 1995 and 2007. They find no support on average for the hypothesis that an LBO leads to improvements in operating performance and efficiency. However, they find that their sub-sample of 71 private LBO firms for which public financial data were available due to public debt issues, experience better firm performance, as measured by industry-adjusted Return on Assets and Return on Sales ratios. Private companies for which public financial data were not available (but for which tax returns could be obtained) do not experience any operating performance improvements. Another finding of this study relates to the tax shield hypothesis. In other words, these authors show that LBO firms have a higher debt ratio, which generate greater tax shields after the completion of the buyout.

In another empirical study involving Reverse LBOs, Datta et al. (2013) study a comprehensive sample of 208 RLBOs completed in the US between 1978 and 2006. They find that the main motivation for companies to engage in an LBO process could be explained by the undervaluation hypothesis. During the pre-buyout stage, those companies seem also to have higher leverage and performance compared to their peers, but a lower valuation. After the LBO completion, these firms enjoy greater efficiency and productivity as a result of cost-cutting and labour reduction. These firms' valuation at the secondary IPO is significantly higher compared to the pre-buyout period, as a result of the corporate restructuring during the private period and disciplining effect of high leverage in cash flow management.

Finally, the study conducted by Gao (2018) investigates the value creation in a sample of 208 PTP LBOs completed in the US from 1986 to 2007. Gao (2018) finds that the influence of private equity investors on the LBO firms' value creation is significant. In fact, value created through private equity influence is 7.8% of the pre-buyout market capitalisation of the LBO

firm. The strategic and corporate restructuring and active participation of the management of LBO firms seem to be among main sources of value and returns for private equity investors. However, value created through debt is insignificant. On this point, Gao says the following: "(...) the value created through debt is insignificant, which means that at buyout consummation, the ex-ante benefits of debt are equal to the ex-ante costs of financial distress." Gao also finds that club deals involving several private equity investors generally involves a higher degree of leverage.

Lastly, Ayash and Schütt (2016) study a sample of 183 PTP LBOs that happened between 1980 and 2006 in the US. Thus, they review the dataset of Kaplan (1989a) and Guo et al. (2011) and reproduce the results of these two studies with slightly changed accounting measures. They show that the typical accounting data used to measure value creation and operating performance of LBOs is highly sensitive to subtle accounting issues. By modifying some accounting data in their own research, they find that the operating improvements of LBO firms in the post-buyout period are actually not significant. The results obtained by Ayash and Schütt (2016) are interesting as they are not consistent with previous research which indicates value creation and improvements in operating performance after a firm goes private under an LBO structure.

2.4. Conclusion

In conclusion, LBOs and especially PTP LBOs have been a major phenomenon of economic and financial markets since 1980s. There exists exhaustive literature on the topic, in particular with regard to the first and second strand of the literature. However, most research papers concerning the operating performance of LBOs under private ownership are outdated and there is need for more up-to-date research in this area. Therefore, in an effort to fill this gap, this dissertation is aimed at providing some insights to the operating performance changes of recent PTP LBOs in the UK market, from the perspective of the shareholder related-agency costs and free cash flow/disciplining effects of debt theories. Thus, a significant number of past studies focusing on the first wave of LBOs document that going-private LBOs show performance improvements after buyout completion. However, a growing number of studies published more recently question this approach considering, especially the high default rates and negative performance of private equity-backed companies, especially after the financial crisis in 2007. In light of the results obtained in previous studies, this dissertation will aim to assess the recent PTP LBO deals in an effort to clarify to what extent the PTP LBO firms in the research sample show performance improvements and what the sources of gains are in terms of operating performance in target PTP LBO firms.

3. Sample and Data

This chapter will explain the data collection and sample selection process used on this study. This will include a detailed overview of the resources used in data collection. Finally, in a separate subsection, the sample characteristics will be summarised to provide a snapshot of PTP LBO transaction details that happened between 2003 and 2015.

3.1. Data Collection

The lack in availability of public data has always been the most challenging part of studies pertaining to value creation in LBOs. It is therefore not surprising that the finding and accessing of relevant and reliable data posed the biggest risk to the completion of this study.

Several databases were used to access relevant figures and information on different parties involved in an LBO transaction. Most of the data was hand-collected, as the information required for this study was sparse and unorganised. Fortunately, the required data is mostly available in public resources or databases, given that all companies incorporated in the United Kingdom (including private companies) are obliged to deliver their annual reports to Companies House, as per the provisions of Companies Act 2006 and other relevant legislation. The annual reports must include their detailed profit and loss statement and balance sheet, including notes to the accounts. Companies may also be required to submit their group company accounts, a directors' report, and finally an auditor's report, when appropriate.

The typical data collection process on a company that underwent a PTP LBO for the purposes of this study was as follows, as explained below in detail for each step:

Table 7: Data Construction

Database / source	**Action**
Merger Market and S&P Capital IQ	Generate lists of PTP LBOs completed between 2003 and 2015 in the UK
S&P Capital IQ	Generate the historical financials of LBO firms before going private
Companies House, FE Investegate and Merger Market	Find official deal offer documents and identify the name of the "acquisition vehicle" created by the

	private equity investor (together with management or not)
Companies House	Find the consolidated annual reports of the new holding company that acquired the LBO firm. Access company reports and financial information of the LBO firm under private ownership starting from the last financial year before LBO to the last financial year before deal outcome/exit
FE Investegate	Access official deal offer documents to obtain more information on the structure and financing of the transaction
FE Investegate, Companies House and Merger Market	Access historical and current shareholding and management information
Capital IQ	Find industry data based on SIC codes of the LBO firm and its peers with the same first four-digit SIC code
Other	Collect information on deal resolution and exit deals on public databases, i.e. news, corporate websites of LBO firms and private equity firms etc.

As briefly summarised above, the data collection process started with the generation of a list of going private LBO transactions that occurred in the United Kingdom between 2003 and 2015. A PTP LBO transaction was included in the sample provided that the investment of the private equity fund with or without the participation of the management reached an outcome (e.g. exit/disinvestment, and if the latter had not occurred, another outcome such as insolvency) by 2018.

Two PTP deal lists were generated using both the Merger Market and Capital IQ databases. Merger Market does not cover public-to-private LBO deals backed by private equity firms. Therefore, as a first step, deals that did not involve private equity investments were eliminated from the list generated by Merger Market. As a second condition, deals smaller than £20 million were removed from the list, because public data is scarce and sometimes not available for small sized deals and companies.

A similar approach was followed with the deal list generated by Capital IQ, with one difference. Capital IQ includes private transactions that involve private equity firms as investors. Deals smaller than £20 million were again eliminated, however. After going through both lists and removing duplicated transactions, one "master list" of PTP LBO transactions was created.

The original master list included 101 PTP LBO deals that were completed between 2003 and 2015. The deal number decreased to 91 after 10 deals smaller than £20 million in terms of transaction value were removed from the list. Another 22 deals were eliminated as, by December 2018, they were still owned by the same private equity firm (i.e., exit had not taken place yet). Another four deals were deleted from the list as there was no information at all on their deal structures, investors and financing, as well as deal resolution. The final sample for this study thus consisted of 65 PTP LBO transactions that reached a final outcome under the ownership of the private equity firm.

As a next step, the target firms that went private under an LBO or MBO structure backed by a private equity firm were examined one by one. First, the financials of the sample companies before buyout were sourced from the Capital IQ database. Unfortunately, Capital IQ does not provide the financial figures of companies under private ownership, unless they do go public again (i.e. reverse LBOs) after the completion of the buyout process. Therefore, financials of companies that went private for a certain period of time before going through a post-LBO IPO process were collected solely from Capital IQ. There were thirteen deals that matched this particular condition in the full sample.

After collecting the financial figures of the last financial year before buyout from Capital IQ, the name of the acquisition vehicle created by the private equity firm, along with the participation of the target firm management, if applicable, had to be identified. For this purpose, the official bid/offer document was downloaded from FE Investegate. Thereafter, the content of this document was compared to the information provided by Merger Market and Companies House.

In term of deal structure, the general tendency of private equity firms when investing in a target company is to create an acquisition vehicle, which is itself owned by a holding company. The acquisition vehicle will usually acquire the shares of the target LBO firm, and the financials of the latter can then be accessed in the consolidated financial accounts of the holding company,

described as the “ultimate parent company” in the annual reports of the acquired LBO firms. The acquisition vehicle is generally described as the “immediate parent company” in the annual reports of the LBO firm after the buyout process.

Moreover, name changes are common after going private. Therefore, the identity of the LBO firms had to be thoroughly verified in the annual reports of all parties involved in an LBO process. Therefore, annual reports of the LBO firm itself, together with those of the acquisition vehicle and holding company (and of other subsidiaries, if any) were extensively cross-checked, to ensure there were no faulty data in the research sample.

To briefly summarise, the identity of the ultimate parent company was ascertained in the offer document, as well as the first annual report of the target LBO firm after the completion of the buyout. The financial figures of the LBO firm were accessed using the group accounts of the ultimate parent company. After completing the entire verification process, all relevant financial data were hand-collected starting from the first financial year after going private to the last financial year before the end of the Private equity ownership.

After completion of the above steps, more information on the relevant deal structures and financing was gathered by reading through bid/offer documents delivered by the private equity firm along with the management team, if the latter was involved in the transaction. FE Investegate, a public database, was used as the main source of information for this purpose. Offer documents generally contain meaningful information on the shareholding structure that follow the buyout process. Based on data gathered from offer documents, pre- and post-buyout shareholding structures (i.e. the equity holdings of the private equity firm and when appropriate, of the executive management team) were then cross-checked and verified – again by referring to annual reports provided by Companies House and transaction comments published by Merger Market.

Offer documents also contain significant information on expected changes in key management and the executive team in the post-buyout process. Expected management changes were then checked for accuracy through public resources and annual reports as made available by Companies House.

Other key matters included in offer documents encompass the financing structure of the buyout, including debt raised and cash used in the acquisition of the target firm. Financing information provided in the offer documents were verified by referring to the annual reports and balance sheets of LBO firms for the first financial year following the buyout completion.

Next, the SIC code (Standard Industrial Classification Code) of the LBO firm was identified as provided by Capital IQ. The SIC code is numerical system which classifies the industries by a four-digit code. The SIC code was used to match the LBO firm with other comparable public companies having the same four-digit SIC code.

Lastly, the industry classification based on SIC codes was used to collect annual data on the average performance of listed peer companies and the related industry, for the same duration as the holding period of the investment by the private equity firm (i.e. from the last financial year preceding the buyout to the last financial year at deal resolution or exit).

3.2. Sample Selection

In terms of sample selection, the following criteria were followed:

- As mentioned above, deals smaller than £20 million were excluded from the sample due to data scarcity on small sized deals and companies.
- In order to be included in the sample, the buyout process had to reach an outcome, which could be either an exit deal (e.g. IPO, strategic investor sale, SBO etc.) or other possible outcomes (e.g. insolvency, liquidation etc). 2018 was chosen as the last financial year required for exit in order to be included in the research sample of this study.
- Following the approach of Guo et al. (2011), firms that were purchased to be merged with another operating company were eliminated from the list, as it would be difficult to measure the individual operating performance of the LBO target after its merger with another business. In addition, companies acquired in a distressed position or using the equity of another company in the portfolio of the private equity firm were omitted from the sample, on the basis of Guo et al.'s (2011) description of these companies as having "atypical characteristics".
- In the present sample, four deals were deleted from the list because of insufficient information on the transaction. It is worth noting that these deals were completed by some of the largest private equity firms (e.g. Blackstone). These private equity firms do

sometimes opt for a more secretive structures, where the acquisition vehicle or the holding company is incorporated in offshore jurisdictions such as Bermuda, the Cayman Islands and the like. In such cases, it is not possible to access the consolidated financial statements and annual reports of these LBO firms, as their holding company is not based in the United Kingdom and has, therefore, no obligation to publicly disclose its financial accounts.

3.3. Data collected

In order to measure the changes in operating performance of companies that went through a PTP LBO process, a number of accounting figures were collected from the financial statements of companies, as described hereafter.

Table 8: Description of Financial and Accounting Figures Collected

Data Type	Description
Transaction value	This is the deal value as provided by Merger Market and Capital IQ. It is the price or amount paid inclusive of net debt incurred by the buyer.
Accounting data for one financial year before buyout (T_{-1}) and one financial year after buyout (T_{+1})	Sales, EBIT, EBITDA, interest expense, total assets, long term debt, short term debt, shareholder funds.
Accounting data for the last financial year ($T_{last\ year}$) before deal outcome/exit	Sales, EBIT, EBITDA, interest expense, total assets, long term debt, short term debt, shareholder funds.

Thereafter, the following data was collected in order to test the effect of agency costs following a PTP LBO.

Table 9: Description of Post-buyout Management Data collected

Data Type	Description
Management equity participation	A yes/no question. If the management contributed to the equity, then this variable took the value of 1. If not, it took the value of 0.
Management equity participation	If the answer to the first question above was a "yes", then the percentage of management equity holdings was provided in the following format: "x %"
CEO change	If the CEO of the LBO target firm was replaced in the next financial year following the buyout, then this variable took the value of 1. If not, it took the value of 0.
CEO becomes Chairman	If the CEO of the LBO firm becomes chairman in the next financial year following the buyout, then this variable took the value of 1. If not, it took the value of 0.
Club PE	A yes/no question. If there was more than one private equity firm involved as buyer/investor in the transaction, then this variable took the value of 1.
Board size	This refers to the number of persons present in the board of directors in the first financial year following the buyout.
Sponsor director ratio	This refers to the number of persons representing the private equity firm(s) in the board of directors in the first financial year following the buyout. It is expressed in the form of a ratio.

3.4. Sample Characteristics

The full sample contained 65 public-to-private transactions, whereas the subsample with sufficient post-buyout information includes 54 PTP deals. The first element that stands out in both samples is the absence of any private equity backed PTP transactions in 2013 in the United

Kingdom. Moreover, neither the full sample nor the subsample include any exited PTP LBOs completed in 2014. Thus, of the four PTP deals completed in 2014, none had reached an outcome as at December 2018.

It should also be noted that the number of PTP LBOs declined significantly after the global financial crisis that created financial fragility and hindered private equity firms' ability to access financing instruments. In fact, as described by Kaplan and Strömberg (2009), "From the summer of 2007 into mid-2008, interest rates on buyout-related debt have increased substantially – if buyout debt can be raised at all." Moreover, as stated by Wilson and Wright (2013), private equity firms were criticised for their use of highly leveraged capital structures causing high default rates amongst private equity backed companies during the global financial crisis.

For this reason, PTP deals completed after 2009 have a median deal value of £79 million, while the median transaction value is £218 million for the subsample for 54 PTP LBOs completed from 2003 to 2015. Another consequence of this phenomenon relates to the yearly transaction distribution – almost two thirds of the PTP deals listed in the samples were completed before 2009. While the main reason for this is the temporary decline in PTP LBOs in the aftermath of the global financial crisis, another cause is related to duration or holding period of those companies by private equity firms. Thus, as mentioned in the previous sub-section, there were approximately 20 deals in the sample that had not been exited as at December 2018.

With regards to deal size, the median transaction values for the full sample and subsample are £225 million and £218 million, respectively. The minimum transaction value in the deal list is approximately £24 million and the largest deal had a transaction value of £3 400 million. The two samples do not differ significantly in terms of median values.

Observation of pre-buyout accounting data also suggest no significant differences between the samples. For instance, the median EBITDA margins for the full sample and subsample are 15,32% and 15,26% respectively. Following a similar trend, the median EBIT margins of the full sample and the subsample are 9,75% and 10,06% respectively. In terms of sales, the full sample has a median value of £118 million, whereas the subsample has a median value of £122 million. Similarly, with regards to the pre-buyout total debt measure, companies in the full sample and the subsample both have a median debt amount of £48-50 million, although the

standard deviation of total debt is quite high (i.e. in the range of £1 000 million for both samples). Table 10 provides an overview of pre-buyout accounting data for both samples.

Table 11 provides a summary of annual leverage ratios of LBO firms in the research sample. Referring to the subsample with complete post-buyout data, the median value of EBITDA to capital is 9,62% during the pre-buyout period. In addition, the median value of debt to capital is 20,67% at the same period. However, the median value of debt to capital moves up to 92,14%, after buyout, as expected.

Deals completed in the United Kingdom during the 2003-2015 were highly leveraged. The median value of change in debt to capital in the research time span was in the order of 60% between the pre-buyout and post-buyout periods. The debt to EBITDA ratio follows a similar trend as it rose from 2,06 to 8,03, which also points out to large amounts of debt used by private equity investors when financing PTP LBOs, especially in the early 2000s. It should also be noted that median values of the full sample and the subsample with post-buyout data do not display any significant difference.

Making a similar analysis on a full sample of 192 PTP LBOs and 94 PTP buyouts in the US between 1990 and 2005 with sufficient post-buyout data, Guo et al. (2011) find a median pre-buyout and post-buyout debt to capital ratio of 23.9% and 70.7%, respectively. This compares to the post-buyout debt to capital ratio of 92,14% of the present sample. This observation suggests that buyouts completed in the 2000s, especially between 2003 and 2007, had a much riskier capital and financing structure. Indeed, the post-buyout debt to capital shrinks to 31% after 2009 in the subsample examined in this dissertation. On the other hand, Kaplan (1989a) finds a median pre- and post-buyout debt to capital ratio of 20,7% and 85,6% for 76 MBOs completed in the US between 1980 to 1986, which are more in line with the sample used in this study.

Table 10: Key accounting data of sample of target LBO firms during the pre-buyout period

This table presents the key accounting figures of LBO firms at the last financial year preceding the buyout for companies listed in the full sample of 65 PTP LBOs, along with the subsamples with and without post-buyout data. LBO price (or Capital) is the amount paid in £ million by buyers. Total debt, interest paid, sales, total assets, shareholder funds and short-term loans are all expressed in £ million. EBIT and EBITDA margins are expressed in %. Difference (I)-(II) is the difference between median values of key accounting figures belonging to the two subsamples, with and without post-buyout data. Pre-buyout data of PTP LBO firms were sourced from Capital IQ. The table format is adapted from Guo et al. (2011).

Sample	Full Sample, 65 LBOs			Subsample with complete post-buyout data, 54 LBOs (I)			Subsample without post-buyout data, 11 LBOs (II)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Variable	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	Difference (I)-(II)
LBO price (Capital)	603,95	225,51	1093,73	647,54	218,82	1180,24	389,95	245,60	418,92	-26,79
Pre-buyout total debt	240,55	48,90	994,92	265,86	50,65	1079,03	103,85	37,83	160,42	12,82
Sales	394,89	118,30	772,18	366,35	122,61	601,41	535,04	102,18	1313,05	20,43
EBITDA %	13,51%	15,32%	38,42%	17,64%	15,26%	11,11%	-6,79%	15,33%	87,31%	-0,08%
EBIT%	6,07%	9,75%	45,80%	11,26%	10,06%	10,56%	-19,40%	6,34%	105,21%	3,72%
Total Assets	531,00	166,49	944,63	552,14	182,75	1004,58	427,23	161,26	552,86	21,49
Shareholder funds	181,60	80,05	373,22	177,45	80,05	392,40	204,00	77,05	243,73	3,00
Short term loans	19,50	1,70	47,36	22,35	1,98	51,00	4,11	1,08	5,37	0,91

Table 11: Annual leverage ratios of PTP LBO sample firms during the pre- and post-buyout period

The table below is a compared overview of leverage ratios between the pre- and post-buyout period. The first section of the table contains data on the full sample of 65 PTP LBOs, and the second section focuses on the subsample of 54 PTP LBOs with post-buyout information. The PTP LBO transactions are distributed annually according to their year of completion. Capital is the buyout price in million £. Pre-buyout EBITDA to Capital is the ratio of EBITDA to Capital in the year preceding the buyout (year T_{-1}). Pre-buyout debt is the amount of debt as at T_{-1}. Post-buyout debt is the sum of debt raised at buyout and the amount of debt already present in the pre-buyout period. Change in debt to capital is the median % change between pre- and post-buyout debt divided by Capital. The same logic was applied to the ratios of pre- and post-buyout debt to EBITDA. Pre-buyout data was sourced from Capital IQ. Post-buyout data was sourced from deal offer documents and annual reports obtained from Companies House. The table format is adapted from Guo et al. (2011).

Full Sample		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Year	Number of PTP LBOs	Capital (Million £)	Pre-buyout EBITDA to Capital (%)	Pre-buyout Debt to Capital (%)	Pre-buyout Debt to EBITDA	Post-buyout Debt to Capital (%)	Post-buyout Debt to EBITDA	Change in Debt to Capital %
	2003	7	192,00	14,59%	22,11%	1,34	95,84%	5,85	73,73%
	2004	4	474,25	14,51%	22,68%	1,45	80,55%	5,36	57,87%
	2005	15	296,20	7,92%	19,45%	2,05	92,05%	8,33	72,61%
	2006	13	249,68	9,64%	20,55%	1,95	87,10%	9,83	66,56%
	2007	8	258,19	6,61%	17,68%	1,85	104,98%	10,53	87,30%
	2008	7	230,74	7,94%	21,27%	2,60	97,95%	10,79	76,68%
	2009	3	149,96	18,74%	25,76%	1,19	31,09%	0,72	5,32%
	2010	3	372,07	11,44%	15,85%	1,33	65,25%	5,54	49,40%
	2011	2	54,69	9,98%	0,00%	0,00	60,84%	6,71	60,84%
	2012	2	40,20	7,97%	0,05%	0,04	0,17%	0,05	0,12%
	2013	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
	2014	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
	2015	1	78,80	11,23%	26,37%	2,35	19,67%	1,75	-6,70%
2003-2015		**65**	**225,51**	**9,64%**	**20,08%**	**1,98**	**84,29%**	**7,44**	**60,84%**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Year	Number of PTP LBOs	Capital (Million £)	Pre-buyout EBITDA to Capital (%)	Pre-buyout Debt to Capital (%)	Pre-buyout Debt to EBITDA ratio	Post-buyout Debt to Capital (%)	Post-buyout Debt to EBITDA	Difference in Debt to Capital (4)-(6)
Subsample with post-buyout data								
2003	6	235,34	15,18%	29,67%	1,95	116,06%	7,24	86,39%
2004	4	474,245	14,51%	22,68%	1,45	80,55%	5,36	57,87%
2005	10	240,095	8,89%	21,89%	2,13	98,33%	12,00	76,44%
2006	12	230,9	9,55%	19,03%	2,04	87,10%	9,83	68,08%
2007	6	354,085	6,10%	21,42%	2,08	108,56%	11,72	87,14%
2008	7	230,74	7,94%	21,27%	2,60	97,95%	10,79	76,68%
2009	1	225,51	21,68%	25,76%	1,19	31,09%	1,43	5,32%
2010	3	372,07	11,44%	15,85%	1,33	65,25%	5,54	49,40%
2011	2	54,69	9,98%	0,00%	0,00	60,84%	6,71	60,84%
2012	2	40,195	7,97%	0,05%	0,04	0,17%	0,05	0,12%
2013	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
2014	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
2015	1	78,8	11,23%	26,37%	2,35	19,67%	1,75	-6,70%
2003-2015	**54**	**218,82**	**9,62%**	**20,67%**	**2,06**	**92,14%**	**8,03**	**60,84%**
Full sample	65	225,51	9,64%	20,08%	1,98	84,29%	7,44	
Subsample with post-buyout data (1)	54	218,82	9,62%	20,67%	2,06	92,14%	8,03	
Subsample without post-buyout data (2)	11	245,6	11,81%	16,35%	1,55	48,16%	1,89	
Difference in medians (1)-(2)		-26,79	-2,19%	4,32%	0,51			

When it comes to deal outcomes as presented in Table 12, the majority (i.e. 31,48%) of deals in the subsample of 54 PTP LBOs were exited via a Secondary Buyout (SBO) involving another private equity firm. A further 29,63% of sample LBO firms taken private by private equity firms were sold to a strategic buyer. Finally, 24,83% of the sample LBO firms went public again after the end of the private equity ownership. Lastly, 14,81% of deals in the subsample ended up in a distressed situation. In many cases, private equity firms were forced to exit as those companies were taken over by lenders after defaulting on their liabilities. Other companies ended up in an administration or insolvency process.

With regard to distressed companies, the above finding is in line with that of Guo et al. (2011), who find that 15% of LBO firms taken private ended in a distressed situation and were taken over by their lenders. Compared to Guo et al. (2011) findings, the share of SBOs seems to have grown significantly. In the study of Guo et al. (2011), the share of SBOs was 15% for their subsample with sufficient post-buyout data. In this dissertation, the share of SBOs is 31,48%.

On the other hand, Strömberg (2008) find a failure rate of 6% for private equity transactions completed between 1970 and 2002. However, Kaplan and Strömberg (2009) claim that a failure rate of 6% could be underestimating the reality of financial distress amongst private equity-backed firms due to their highly leveraged capital structures. Kaplan and Strömberg (2009) suggest that these distressed companies "may be hidden in the relatively large fraction of "unknown" exits (11%)" in some research samples. They also think that these empirical analyses may suffer from selection bias as only realised investments are included in the scope of research. On the other hand, private equity investors may be unwilling to engage in a potential exit deal in the hope of possibly reversing the company's financial situation and improving their investment returns by doing so (Kaplan, 1989a). It should also be noted that Andrade and Kaplan (1998) find a default rate of 23% for 31 highly leveraged large public to private transactions completed in the 1980s in the US.

Although there are different views on the rate of failure of PTP buyouts, the distressed company rate as a deal outcome as presented in this dissertation is close to the findings of Guo et al. (2011), who included a significant number of distressed companies in their sample of research. As described above, the research sample includes 54 PTP LBOs with sufficient post-buyout data. The analysis in this dissertation will be essentially be based on the PTP LBO firms in the subsample.

3.5. Conclusion

In this chapter, the characteristics of the research samples were summarised. The full sample contains 65 PTP LBOs, whereas the subsample with post-buyout data contains 54 PTP LBO deals completed in the UK between 2003 and 2015. Only deals that achieved an outcome (e.g. exit, distressed state etc.) were included in the sample. General characteristics and findings of the research sample are similar to those studied in major previous research papers. The tables below provide a summary overview of the research sample, including the full sample and subsample with post-buyout data.

Table 12: Post-buyout deal resolutions/exits

This table provides an overview of deal outcomes and exit deals for both the full sample of 65 PTP LBOs and the subsample of 54 PTP LBOs with sufficient post-buyout information. The first section focuses on the full sample. The second section relates to the subsample with post-buyout data. The PTP deals are distributed according to their year of completion. For instance, seven going private LBOs were completed in 2003. In other words, the year 2003 does not indicate the year of exit, but is the year during which the LBO firm went private. Out of those seven deals in 2003, two were exited via an IPO, two via strategic sale, and one via an SBO. The remaining two deals ended up in a distressed state. For ease of reference, IPO is initial public offering; Sold means the LBO firm is sold to a strategic investor; and SBO means the LBO firm is sold to another private equity firm. Firms that are in a distressed state means that they are either taken over by their lenders or are insolvent. The table format is adapted from Guo et al. (2011).

	(1)	(2)	(3)	(4)	(5)	(6)
Year (deal completion date)	IPO	Sold	SBO	Distressed	Unknown	Total
Full Sample						
2003	2	2	1	2	0	7
2004	1	0	2	1	0	4
2005	1	6	5	3	0	15
2006	4	7	2	0	0	13
2007	2	2	2	1	1	8
2008	1	1	3	2	0	7
2009	1	0	1	0	1	3
2010	0	1	2	0	0	3
2011	0	0	2	0	0	2
2012	0	1	0	1	0	2
2013	-	-	-	-	-	-
2014	-	-	-	-	-	-
2015	1	0	0	0	0	1
Total 2003-2015	**13**	**20**	**20**	**10**	**2**	**65**
% of deals	**20,00%**	**30,77%**	**30,77%**	**15,38%**	**3,08%**	**100%**

Year (deal completion date)	(1) IPO	(2) Sold	(3) SBO	(4) Distressed	(5) Unknown	(6) Total
Subsample with post-buyout data						
2003	2	2	1	1	0	6
2004	1	0	2	1	0	4
2005	1	4	3	2	0	10
2006	4	6	2	0	0	12
2007	2	1	2	1	0	6
2008	1	1	3	2	0	7
2009	1	0	0	0	0	1
2010	0	1	2	0	0	3
2011	0	0	2	0	0	2
2012	0	1	0	1	0	2
2013	-	-	-	-	-	-
2014	-	-	-	-	-	-
2015	1	0	0	0	0	1
2003-2015	**13**	**16**	**17**	**8**	**0**	**54**
% of deals	**24,07%**	**29,63%**	**31,48%**	**14,81%**	**0,00%**	**100%**

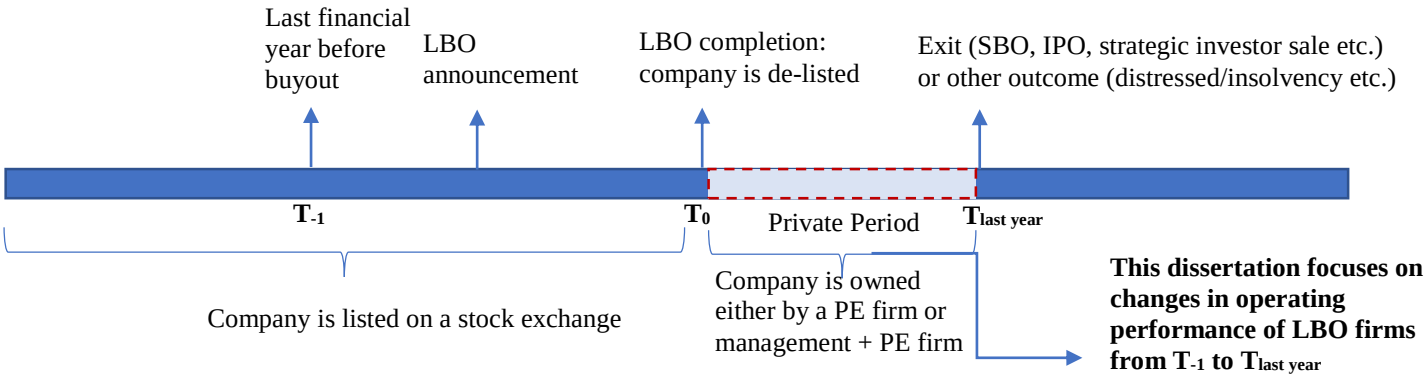
4. Method

4.1. Method used to measure Operating Performance

The research methodology used in this study to evaluate the performance changes that take place after a firm goes private through an LBO process, was adapted from that used by Andrade and Kaplan (1998) and Guo et al. (2011), who respectively investigated the return to capital of 31 highly-leveraged transactions (HLTs) during late 1980s, and 192 leveraged buyouts completed between 1990 and 2006 in the US market.

The following diagram, which is an improved version of the diagram provided by Kaplan (1989a), provides a detailed overview of the time variable as measured in most LBO-related research papers, including that of Guo et al. (2011). To summarise, the timeline in most LBO studies is understood to be as follows.

Figure 3: Timeline of a typical LBO process



Source: adapted and improved version of the diagram from Kaplan (1989a)

Following the example of Guo et al. (2011), the correlations between changes in operating performance of PTP LBO firms with other factors such as improved management incentives, improved monitoring of management by shareholders, and the disciplining effect of debt, were evaluated in this study.

To do so, the operating performance of LBO firms were firstly estimated from T_{-1} to $T_{last\ year}$, being the last year before exit of the LBO investment, after which the observed changes in operating performance were related to a number of variables to which these changes should be theoretically linked.

The following table is a summary overview of operating ratios used in previous studies.

Table 13: Operating Performance ratios used in previous studies

Research	**Performance ratios**
Kaplan (1989a)	Net cash flow/Sales, Operating Income/Sales Net cash flow/Total assets.
Guo et al. (2011)	EBITDA/sales, Net cash flow/sales. EBITDA/Total Assets, Net Cash Flow/Total Assets.
Opler (1992)	Operating cash flow/sales, Operating cash flow/employee Net cash flow/sales, Net cash flow/employee Capex/sales, R&D expenditures/sales
Leslie and Oyer (2008)	ROA: EBITDA/TA
Cohn et al. (2014)	Pre-interest ROS, Pre-interest ROA Pre-interest EVA

Guo et al. (2011) used the profitability ratios EBITDA/sales and net cash flow/sales, where net cash flow was defined as the difference between EBITDA and capital expenditure. Kaplan (1989a), on the other hand, used net cash flow/sales, operating income/sales and net cash flow/total assets as proxies for operating performance. Like Guo et al (2011), the current study used the EBITDA/Sales ratio. However, for the sample used in this study there was a lack of consistent and reliable data with regards to capital expenditures, and thus net cash flows of PTP LBO firms, especially during the private period. As a result, EBIT/sales was used as the second operating performance measure in this study. However, most of this study was based on EBITDA/Sales and EBITDA/Total Assets.

This dissertation uses EBITDA instead of net cash flows as the EBITDA does not take into account capital expenditures, which are a source of cash outflow in a company. In fact, some industries (such as energy, infrastructure or manufacturing) require higher capital expenditures compared to others (such as IT or services). Therefore, EBITDA seems to be a better measure for purposes of comparing companies with often very different capital expenditure requirements. This was also the case with this present dissertation that had an "industry-

agnostic" approach without focusing on a single industry or market. Therefore EBITDA/sales and EBITDA/Total assets are deemed to be more suitable to compare the operating performance of companies across a broad range of industries. These ratios do not require any additional adjustments to account for capital expenditures and other expenses that are inherent to some specific industries.

The return on sales was computed as follows:

$$ROS_1 = \frac{EBITDA}{Sales} \qquad \text{(Equation 1)}$$

$$ROS_2 = \frac{EBIT}{Sales} \qquad \text{(Equation 2)}$$

Where EBITDA is earnings before interest, tax, depreciation and amortization, and EBIT is earnings before interest and tax.

One way to estimate the change (Δ) in operating performance is to calculate the changes in ROS from T_{-1}, the last financial year before LBO, to $T_{last\ year}$, the exit/outcome date of the LBO. In this regard, the following formulae were used:

$$\Delta(ROS_1) = \frac{ROS1\ (T-1)}{ROS1\ (T\ last\ year)} - 1 \qquad \text{(Equation 3)}$$

$$\Delta(ROS_2) = \frac{ROS2\ (T-1)}{ROS2\ (T\ last\ year)} - 1 \qquad \text{(Equation 4)}$$

Similarly, for Return on Assets (ROA), the same formulae involving EBITDA were used, but with Total Assets as the denominator, as follows:

$$ROA = \frac{EBITDA}{Total\ Assets} \qquad \text{(Equation 5)}$$

As an alternative way to estimate the change (Δ) in operating performance, the changes in ROA from T_{-1}, from the last financial year before LBO to $T_{last\ year}$, the exit/outcome date of the LBO, were calculated using the following formula:

$$\Delta\ (ROA_1) = \frac{ROA1\ (T-1)}{ROA1\ (T\ last\ year)} - 1 \qquad \text{(Equation 6)}$$

Using industry data based on matching SIC codes, the change (Δ) in ROS and ROA were adjusted for industry performance in order to allow for a better comparison in terms of operating performance of PTP LBOs. The following formulae were used to calculate the industry-adjusted operating performance ratios.

$$\Delta \text{ Adjusted } ROS_1 = \Delta\ ROS_1 - \Delta \text{ Industry } ROS_1$$
$$= (ROS_{last\ year}/ROS_{T-1} -1) – (ROS\ Ind_{last\ year}/ROS\ Ind_{T-1} -1) \qquad \text{(Equation 7)}$$

$$\Delta \text{ Adjusted ROA} = \Delta \text{ ROA} - \Delta \text{ Industry ROA}$$
$$= (ROA_{last\ year}/ROA_{T-1} -1) – (ROA\ Ind_{last\ year}/ ROA\ Ind_{T-1} -1) \qquad \text{(Equation 8)}$$

As seen in the above formulae, industry median ROS and ROA ratios (and hence operating performance changes) were matched on a deal-by-deal basis to the duration of each individual deal's holding period. The duration of a deal spans from the financial year preceding the buyout (T_{-1}) and the last financial year before exit/deal outcome ($T_{last\ year}$).

The median industry ROS and ROA ratios were calculated annually for London Stock Exchange listed peer companies with the same four-digit SIC code. For each calculation, the data of all UK-listed peer companies (according to Capital IQ) were utilised to find matching ROS and ROA ratios for each industry per year, for each corresponding holding period. This resulted in 54 different industry medians being calculated and used for each of the three dependent variables used in the regressions. No industry peer year group consisted of less than ten companies, with many consisting of 40 or more companies.

It should also be noted that statistical tests carried out in previous studies tend to use exclusively the medians and not the means of each variable. This dissertation, therefore, followed the same method to test the research hypotheses as described in the following chapter.

4.2. Method used to explain changes in operating performance

As this study tests for possible correlations between operating performance changes and reduced agency costs as a result of improved management incentives, improved shareholder control and monitoring and the disciplining effects of debt, three OLS multivariate regression analyses, each one based on Equation 9, were applied to selected dependent and explanatory variables:

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_n x_n + \varepsilon \qquad \text{(Equation 9)}$$

Where, depending on the analysis done, Y is either ROS_1, Δ Adjusted ROS_1 or Δ Adjusted ROA, as defined above.

The independent variables used, as well as the associated hypotheses, are shown in Table 14. Data relating to the independent variables was collected for the first financial year following the buyout.

Table 14: Independent variables in the regression analysis

Independent variable	**Hypothesis tested**
Management Equity Participation	H1
Equity Holding of Management in %	H1
CEO Change	H3
CEO becomes Chairman	H3
Club PE	H3
ROS_1 at T_{-1}	Low performing companies in the pre-buyout period may have better operating performance after buyout

Log (Capital)	Low performing firms (thus, smaller deals) in the pre-buyout period may have better operating performance after buyout
Pre-buyout Leverage	H2
Leverage Change	H2
Log (Board size)	H3
Sponsor Director/Board Size	H3

All collected data have been tested for normality to ensure that they are interpretable in an OLS regression. Some of the variables (Capital and Board Size) are log transformed to remove the deviance from normality.

The relationship of the above variables to the operating performance of target PTP LBO firms are examined in the regression analyses presented in the next chapter. The following explains the logic behind each independent variable selected to test the various hypotheses.

As described above, the management equity contribution (in % and as a yes/no question) assumes that the interests of management and shareholders are more aligned as the percentage of equity held by management increases (Kaplan, 1989a and Guo et al., 2011). According to this hypothesis, the higher management's equity ownership is, the less the agency cost relating to the conflict of interests between shareholder and managers (agents) is. Thus, it is assumed that the interests of management will become more aligned with the increase of management incentives and rewards (e.g. higher salaries, higher management equity contribution etc.). Using binary outcomes, if the target company's management participates in the deal as shareholders, then this variable is taken as a dummy variable equalling 1. If the management does not have any equity holding in the LBO firm, then this variable takes the value of 0.

The variable "CEO change" assumes that the private equity firms are proactive shareholders and actively participate in the selection and monitoring of the management team of the companies they invest in (Acharya et al. 2009). Thus, according to Acharya et al. (2009), the CEO is replaced in 69% of deals after completion of the buyout. Another independent variable of relevance to this hypothesis is the CEO becoming chairman. In some case, the CEO resigns to take over as chairman of the board, and in other cases the CEO retains this role and becomes

chairman. Guo et al. (2011) speculates that the latter scenario is an indication that the private equity investor assumes that replacing the pre-buyout management does not improve firm performance. Both of these two variables (i.e. CEO Change and CEO becomes Chairman) are taken as dummy variables, each one equalling 1 if the CEO is replaced and the CEO takes over the Chairman role, respectively.

Similarly, the variable "sponsor director ratio" is used to control for the private equity involvement within the management of the target LBO firm as a means to ensure an efficient monitoring. Similarly, deals involving more than one private equity firm (i.e. Club PE) are tested from the perspective of shareholder monitoring hypothesis. Guo et al. (2011) assume that deals involving a Club PE structure may hinder the monitoring process. The "Club PE" variable is a dummy variable in the form of a "yes/no" question. If there is more than one private equity firm involved in the deal, then this variable takes the value of 1, otherwise it is considered 0.

When it comes to test the "disciplining effect of debt" hypothesis, the pre-buyout leverage and leverage change are taken into consideration in the analysis. Increased debt may reduce agency costs as it has a disciplining effect on managers, who will adopt a more selective attitude when considering different investment projects (positive NPV projects). This is also called the Free Cash Flow Hypothesis. By reducing the amount of cash flow available, the management team will be more committed to pay the company's debt and interest liabilities instead of engaging in a never-ending investment and diversification cycle called "empire building" by Jensen (1986). This hypothesis is measured by examining the pre-buyout leverage (debt/EBITDA at T_{-1}) and the leverage change between pre- and post-buyout period (measured as Δ Debt between T_{-1} and $T_{\text{last year}}$, divided by EBITDA at T_{-1}). Following the methodology of Guo et al. (2011), the pre-buyout leverage (and the leverage change) is calculated as Debt/EBITDA (and the corresponding Δ Debt/EBITDA for leverage change), instead of assigning the capital to the denominator. This is because capital is also inclusive of debt value.

Finally, capital and ROS_1 (that is, EBITDA/Sales) at T_{-1} are used to test whether the low-performing companies in the pre-buyout period experience better operating performance improvements compared to other comparable PTP LBO firms. Thus, Guo et al. (2011) argue that firms with low pre-buyout performance and low transaction value present better prospects in terms of operating performance improvements.

4.3. Conclusion

This dissertation follows the literature when it comes to measure the operating performance of target PTP LBO firms in the subsample. The metrics relating to operating performance of target LBO firms form the dependent variables of the regression analyses.

A number of leverage and management data relating to target LBO firms are then used to test the underlying research hypotheses that are reduced agency costs, improved control and monitoring and the disciplining effect of debt, all three of which are anticipated to explain the operating performance changes of LBO target companies while under private ownership. The regression results are discussed in the next chapter.

5. Results and Analysis

This chapter describes the results of the analyses of operating performance changes for LBO target firms that completed going private transactions. Specifically, the changes in operating performance of PTP LBO firms, categorised according to the various deal outcomes observed, are compared in terms of median percentage changes from the last financial year before buyout to the financial year before exit/deal outcome. In the second section of this chapter, the results of the multivariate OLS regression analysis performed to detect the sources of operating performance changes that occur in PTP LBO firms during the post-buyout period, are discussed in terms of the different hypotheses presented in the previous chapters of this dissertation.

5.1. Changes in Operating Performance

In this section, the operating performance changes of LBO firms that went private between 2003 and 2015 are analysed. Table 15 summarises the post-buyout operating performance changes of the 54 PTP deals with sufficient post-buyout information.

It should be noted that the overall picture of public-to-private LBO transactions completed in the United Kingdom between 2003-2015 shows deteriorating operating performance. In fact, the subsample of 54 PTP LBO deals generates a median unadjusted change in EBITDA/Sales and EBITDA/Total Assets ratios of -2,87% and -22,01%, respectively. The median industry-adjusted values of these ratios for the entire subsample are -8,64% and -6,71%, respectively.

The best operating performance is generated by LBO firms that went public again. The outcome of these deals in terms of median EBITDA/Sales and EBITDA/Total Assets ratios are 25% and 11% for unadjusted and industry-adjusted categories, respectively. The deals that were exited via a secondary buyout by another private equity firm also mostly display negative values. The unadjusted and industry-adjusted EBITDA/Sales ratio of SBOs are 4,66% and -0,17%, respectively. On the other hand, the unadjusted and industry-adjusted EBITDA/Total Assets ratios of deals exited via an SBO are approximately 25% and 17%, respectively.

With regards to deals that were sold to strategic investors, median ROS and ROA ratios are also negative, with unadjusted and industry-adjusted EBITDA/Sales ratios being close to -16% and -22%, respectively, whereas unadjusted and industry-adjusted ROA ratios are approximately -22% and 5,3%, respectively. Lastly, as expected, all performance ratios for distressed deals

are significantly negative, with unadjusted and industry-adjusted EBITDA/Sales ratios having median values of -100% and -64,90%, respectively, and unadjusted and industry-adjusted EBITDA/Total Assets ratios of -109,53% and -66,19%, respectively.

The above results closely mirror the findings presented by Guo et al. (2011). The latter also find a negative operating performance for all 94 deals with sufficient post-buyout information in the US from 1990 to 2006, with unadjusted and industry-adjusted EBITDA/Sales ratios of -6,72% and -1,38%, respectively. In terms of return on assets (EBITDA/Total Assets), unadjusted and industry-adjusted values of -4,43% and 1,52% are calculated. Guo et al (2011) further similarly find that the best performing category in their sample are firms that went public again through a second IPO, and that deals exited via strategic sales or SBOs generate negative operating performance. Kaplan (1989a), on the other hand, finds an improvement in the operating cash flow of MBOs completed between 1980 and 1986 in the US. However, unlike Guo et al. (2011), it should be noted that Kaplan does not look at the entire private ownership period. His study is limited to a time window of -1 to +2 years relative to deal closure.

Opler (1992) uses a sample of 44 PTP LBOs completed in the US from 1985 to 1989 and finds an improvement of 16,5% in the operating cash flow/sales ratio. Kaplan (1989a) finds an increase by 11,9% for the same ratio in the first two years after buyout. In a similar manner, the study realised by Muscarella and Vetsuypens (1990) show an improvement by 23,5% for 35 reverse LBOs completed between 1976 and 1987 in the US.

However, recent studies on the operating performance of private equity-sponsored PTP LBO firms yield somewhat mixed results. For instance, Ayash and Schütt (2016) study 183 PTP buyouts in the US by reproducing the same study as Guo et al. (2011) and Kaplan (1989a). After having slightly modified the accounting data used to measure operating performance, they find no improvements in the operating performance of PTP firms in the post-buyout period. As described above, the subsample studied in this dissertation presents some similarities with most recent research when it comes to the negative operating performance of target PTP LBO firms in the post-buyout period.

In fact, in terms of EBITDA/Sales, the maximum value of change obtained in the subsample is in the order of 24%. Other operating performance ratios measured in this present study are mostly negative. This observation can possibly be explained by the fact that the MBOs/LBOs

of the first wave generated higher cash flow gains compared to the wave of the 2000s and later, as the buyouts of the early 1980s involved mostly underperforming companies in need of additional cash flow to improve their operations. This may be the reason why LBOs in early 1980s generated positive operating performance. Another explanation for this result could be related to potential selection bias. As described earlier, some of the major deals could not be included in the research subsample due to data scarcity. This is an important issue, as those deals were, most of the time, completed by some of the largest private equity firms globally (e.g. Blackstone). It is not possible to track the post-buyout financial data of those LBO firms acquired by private equity firms via an offshore company. In other words, the above results could be suffering from selection bias, as this could be the case with the similar negative results obtained by Guo et al. (2011). In fact, according to Kaplan and Strömberg (2009), the US-based firms are more affected by selection bias than other countries where data is more available. This is because information on private companies may not be always available in the US. For this reason, most of the studies realised in the US focus on reverse LBOs, in which companies go public again after going through an LBO structure. Moreover, databases such as Capital IQ, sometimes provide incomplete or missing information for earlier LBO deals, especially for those completed until mid-1990s (Kaplan and Strömberg, 2009). Another important point is the fact that smaller deals may not be listed in large databases, such as Merger Market or Capital IQ, and even, if they are listed, most studies do not include them in their research sample. For instance, Guo et al. (2011) only study PTP LBO with deal values of at least US$100 million. Thus, the selection bias may have an effect on the negative results observed in some studies realised on LBOs.

Finally, a third possible reason for the negative operating performance of the target LBO firms in the subsample could be that, after raising large amounts of debt, the target LBO firms are usually under pressure to pay off their creditors and meet their liabilities. For this reason, some LBO firms may limit capital expenditures and investments by deciding not to invest in positive NPV projects in order to be able to service their debt (Kaplan, 1989a; Kaplan and Strömberg, 2009). As a result, cash flows may be negatively affected, and the operating performance may deteriorate.

When it comes specifically to changes in return on assets, Weir et al. (2015) find a declining ROA for 138 PTP transactions in the UK from 1998 to 2004. However, Leslie and Oyer (2008), for 144 LBO deals from 1996 to 2004 in the US, find the change in adjusted EBITDA/Total

Assets to be statistically not significant. In this present study, both unadjusted and industry-adjusted changes in return on assets are found to be negative for all deals and across various exit/deal outcomes, with the exception of deals that were exited via an IPO. Naturally, the first option of PE firms is to take the IPO path for firms whose operational profitability have improved, whilst those who deteriorated are more likely to be in distress or sold on. In fact, RLBOs generally outperform other IPOs and the entire stock market, as shown by Cao and Lerner (2006). Thus, it seems plausible that the private equity firms will re-IPO the best performing firms in their portfolio. This is even more important considering the fact that the private equity firms face a reputation risk if the re-IPO of the company ends up being a failure. Since their reputation is at stake, the private equity firms are expected to be very cautious when selecting their portfolio firms to be exited via an IPO process.

As mentioned above, the change in ROA for IPO deals are positive, both for unadjusted and industry-adjusted data. This could be a result of operational downsizing as a result of the financial, governance and operational engineering brought by the private equity firm (Kaplan and Strömberg, 2009). On the same issue, Guo et al. (2011) argue that the increasing ROA in the post-buyout period may be a result of the sale of unproductive assets. Similarly, Guo et al. (2011) find negative values for all deals and across different exit categories, except for IPO and secondary LBOs.

To sum up, the subsample in this dissertation shows a negative operating performance for PTP LBOs completed between 2003 and 2015 in the UK. Results are similar to those that were obtained in other recent research in the same field. Unfortunately, it was not possible to calculate financial returns generated by the PTP LBO deals in the research sample as data on terminal values and interim interest and dividends payments are in most cases not available. In theory, if this data could be obtained, this study can be further expanded by investigating and estimating the financial returns obtained by private equity firms in the same deals. One study which managed to obtain sufficient data to do this was conducted by Acharya et al. (2009), who did find significant returns. This is an interesting result, since it shows that high return on capitals of private equity investors do not necessarily stem from the improvements in operating performance of PTP LBO firms.

Table 15: Changes in Operating Performance from one financial year before buyout to the last financial year before exit/deal resolution

This table present the changes in operating performance of the subsample with sufficient post-buyout information from T_{-1} prior to buyout to $T_{last\ year}$ prior to exit. The subsample is then categorised according to different deal outcomes (IPO, Sold, SBO or Distressed). The performance ratios used are ROS_1 (EBITDA/Sales) and ROS_2 (EBIT/Sales), as well as ROA (EBITDA/Total Assets), all expressed in %. The column "+Obs" indicates the number of deals with positive performance ratios. Two sets of data are provided: the unadjusted change denote the median change of ROS_1, ROS_2 and ROA from T_{-1} to $T_{last\ year}$. The industry-adjusted change subtracts the median industry change (Δ Industry ROS_1, Δ Industry ROS_2 and Δ Industry ROA) based on the four-digit SIC code from the median ΔROS_1, ΔROS_2 and ΔROA. Performance ratios of LBO firms were sourced from Companies House and Capital IQ, and industry data from Capital IQ. The table format is adapted from Guo et al. (2011).

		(1) Subsample with post-buyout info (54 PTPs)		(2) IPO (13)		(3) Sold (16)		(4) SBO (17)		(5) Distressed (8)	
	Performance Measure	**Δ**	**+ Obs.**	**Δ**	**+ Obs.**	**Δ**	**+ Obs.**	**Δ**	**+ Obs.**	**Δ**	**+ Obs.**
ROS_1	**Change in EBITDA/Sales**										
	Unadjusted	-2,87%	26	24,67%	9	-15,76%	7	4,66%	9	-100,00%	1
	Industry adjusted	-8,64%	24	24,44%	9	-21,77%	6	-0,17%	8	-64,60%	1
ROS_2	**Change in EBIT/Sales**										
	Unadjusted	-42,00%	14	-38,50%	6	-40,99%	4	-25,94%	4	-248,40%	0
	Industry adjusted	-34,69%	19	-1,65%	6	-22,62%	7	-16,90%	6	-226,15%	0
ROA	**Change in EBITDA/Total Assets**										
	Unadjusted	-22,02%	16	10,60%	7	-22,02%	3	-24,83%	4	-109,53%	2
	Industry adjusted	-6,71%	25	10,87%	8	5,29%	8	-16,97%	7	-66,19%	2

5.2. Descriptive statistics of proxy variables

As introduced briefly in Chapters 3 and 4, a number of independent variables were chosen to test the hypotheses linking improved management incentives, the disciplining effect of debt and improved shareholder monitoring and governance, to improved operating performance. The following will provide an overview of the hypotheses tested and proxy variables used to test these hypotheses. For this purpose, the presence and distribution of each proxy variable within the research subsample will be described by referring to Table 16. The observations and findings presented in this dissertation will be mostly compared to those of Guo et al. (2011) and Kaplan (1989a), as well as other studies, when possible.

- **Improved management incentives:**

This hypothesis is measured by the percentage of shares owned by the management. In order to test this hypothesis, the number of PTP LBO deals involving the existing management team was determined by reading through deal offer documents. Thereafter, the exact percentage of equity holding by management was identified by referring to deal offer documents and annual reports. As shown in Table 16, the subsample with 54 PTP LBOs involves 35 deals (64,81%) with management equity participation. Out of these 35 deals, the average and median equity ownership of the management are 14,08% and 9,65%, respectively.

These number are close to that of Guo et al. (2011), whose subsample contains 58 deals (out of 94) with management equity participation, and average and median management equity holdings of 12,8% and 6,5%, respectively. Similarly, Acharya et al. (2009) find that the average equity ownership of management is 15% for a sample of 60 private equity buyouts that took place from 2000 to 2007 in the United Kingdom. On the other hand, in a study of 76 MBOs completed between 1980 and 1986, Kaplan (1989a) finds the management ownership have a mean and median value of 22% and 31% after the buyout. Kaplan's findings are probably higher because his research sample consists of management buyouts.

Management equity contribution seems to be an important characteristic of PTP LBO deals completed in the UK and the US, as shown by previous studies. Private equity firms usually aim to benefit from the operational expertise and know-how of the existing management team as a driver to improve operational performance of target LBO firms. Therefore, a significant number of private equity firms usually overcome the shareholder-agent conflict by increasing

the number of shares owned by management, and by contractually limiting the management discretion in decision-making processes.

- **Disciplining effects of debt:**

As presented in Table 16, the mean and median values of pre-buyout leverage of 54 PTP LBO deals were 1,96 and 2,06 respectively. Guo et al. (2011) find mean and median ratios of 2,58 and 1,90, respectively.

When it comes to leverage change, the mean and median values are 8,11 and 6,06, respectively. This increase is normal as PTP LBO deals are normally financed with large amounts of debt raised by private equity investors. However, the leverage change found in this study is a little higher than the leverage change observed by, for example, Guo et al. (2011), who observe a leverage change with a mean value of 4,03 and a median value 3,70. This difference could stem from the way those PTP deals have been realised. It should be noted that the research sample of Guo et al. (2011) spans a larger time period, including all PTP LBOs from 1990 to 2005. However, as described by Kaplan and Strömberg (2009), the capital structure of deals in the 1990s had a more conservative composition. In contrast, PTP deals completed between 2003 and 2007, just before the global financial crisis, had a much riskier capital structure. This may be the reason why the leverage change found in this study is higher than the findings presented by Guo et al. (2011). This observation may be an indication that private equity firms, especially in the pre-2007 period, used increased debt as an instrument to improve the operating performance of PTP LBO firms. This observation may explain the underlying motivation of private equity firms to opt for highly leveraged capital structures. Consistent with the disciplining effects of debt hypothesis, private equity firms aim to exert a better control upon the management team by increasing the leverage ratio of the companies in which they invest.

- **Improved Shareholder Monitoring and Governance:**

This hypothesis assumes that the private equity firm brings with it operational and financial expertise and applies governance principles to the firms it invests in (Kaplan and Strömberg, 2009). In order to test this hypothesis, several independent variables are used. Firstly, the PTP LBOs that involve two or more private equity firms are identified. This variable is named "Club PE" in Table 16. As seen below, the number of deals that could be defined as Club PE deals is

17. This number represents 31,48% of the subsample with post-buyout information. The next two variables used to test this hypothesis are the board size, and the sponsor director ratio (the percentage of directors that represent the private equity firm). For the sample used, the average and median board sizes are 6,26 and 6,0 respectively, while the sponsor director ratio is 0,37 (mean) and 0,33 (median).

Moreover, the CEO is replaced in 18 deals, representing approximately 33% of the deals in the subsample. Similarly, Guo et al. (2011) find a management change in 37,2% of the deals they observe in their subsample of 94 LBO firms. This means that approximately one third of private equity firms build a new management team and tend to replace the CEO in the first year after buyout completion in order to better control the target firm operations. This is mostly the case when the management is not part of the deal. On the other hand, the CEO or the management team are usually not replaced when the deal involves management as shareholder (i.e. MBO). Sometimes, even if the deal is not an MBO, the private equity firm retains the existing management team in a significant number of transactions. This might indicate that the conflict shareholder-agent is not perceived always as a major risk to the operational performance of target LBO firm. Sometimes, knowledge and expertise of the management team as a driver of operational performance in target LBO firm are more important to private equity firms.

As for the deals where the CEO becomes chairman, the subsample in this dissertation shows only 6 deals, representing approximately 11% of the subsample. This observation is interesting as Guo et al. (2011) identify 48 deals where the CEO becomes chairman. This figure represents 51.1% of their subsample of 94 PTP LBO deals. The observation in this dissertation is much lower than that of Guo et al. (2011). In fact, this difference between both studies could be explained by the underlying perceptions and motivations of private equity investors with regard to management incentives. In other words, private equity investors in the sample of Guo et al. (2011) seem to be unconcerned by a "strong CEO" within the management of the target firm. In other words, it could be that the private equity firms in the US do not believe that a CEO under strict control of the private equity investor will have a positive effect on improving the target firm's operating performance. This observation might be an indication that US private equity firms do not believe in increased shareholder monitoring by way of imposing strict contractual limits to the CEO position when it comes to take important decisions about the future of the target firm.

- **Pre-buyout Firm Performance**

As Guo et al. (2011) is of the view that firms with low performance during the pre-buyout period outperform their peers that went through a PTP LBO process, ROS_1 (that is, EBITDA/Sales) at T_{-1} and log (Capital) are used to test this hypothesis. In fact, Guo et al. (2011) think that underperforming companies respond better to an LBO structure by making a better use of cash and debt resources brought by the private equity firm, along with its operational and managerial expertise. According to this hypothesis, underperforming companies in the pre-buyout period show higher operating performance improvements compared to other comparable PTP LBO firms.

Table 16: Summary of Proxy Variables of the Subsample with Post-buyout Information
This table presents a general overview of various variable data measured across the 54 PTP deals making up the subsample. Definitions of the variables have been provided above. The table format is adapted from Guo et al. (2011).

Panel A: Distribution of various deal characteristics across the subsample (dummy variables)

	Number of deals	% of deals
Management Equity Participation	35	64,81%
Club PE	17	31,48%
CEO Change	18	33,33%
Post LBO, CEO is Chairman of the Board	6	11,11%

Panel B: Mean and median values of different variables across 54 PTP deals (continuous variables)

	Number of observations	Mean	Median
Management Equity %	35	14,08%	9,65%
Pre-buyout leverage (total debt/EBITDA)	54	1,96	2,06
Leverage change	53	8,11	6,06
Board size	52	6,26	6
Sponsor director ratio	52	0,37	0,33
Capital (£ million)	54	647,54	218,82
EBITDA/Capital	54	0,10	0,10
Duration/Holding Period in years	54	5,72	5

5.3. Factors Correlated with Post-buyout Operating Performance

As can be seen in Table 17, which presents the results of the regression analysis, there are a few independent variables that have an effect on the post-buyout operating performance of PTP LBOs in the regression subsample of 52 firms with sufficient post-buyout data. Note that for the regression analysis a further two deals had to be removed from the original sample of 54, as their board size and sponsor director numbers did not match.

- **Regression model with Return on Sales at last year as dependent variable**

The first regression is conducted on the return on sales (EBITDA/Sales) at last year as dependent variable. The adjusted coefficient of determination (or the adjusted R^2) of the model is 0,39, which indicates that around 39% of the variation in the dependent variable (i.e. the ROS at last year for the first regression) can be explained by the independent variables.

The first statistically significant variable in explaining return on sales at last year is the industry-adjusted return on sales of the LBO target firm one year before buyout (T_{-1}), which has a positive coefficient and is statistically significant at the 1% level. In other words, the industry-adjusted return on sales of the company one year before going private is positively correlated with the return on sales obtained at last year before the end of private equity ownership. In other words, a company's return on sales at buyout date (or one year preceding the buyout) seems to have a direct effect on the last return on sales before exit. This finding is actually the contrary of what was implied by the hypothesis of Guo et al. (2011) with regard to better performance of LBO firms that had a low operating performance in the pre-buyout period. In other words, companies that perform well in the pre-buyout period seem to generate a relatively good return on sales during the private equity ownership. This observation may also indicate that private equity firms tend to select the high-performing companies as desirable LBO targets and invest in them to further improve their operational performance and bottom-line profitability.

The second statistically significant variable is the level of pre-buyout leverage, which is similarly statistically significant at the 1% level, and has a negative sign. This means that as the pre-buyout leverage increases, the operating performance measured as ROS (EBITDA/Sales) at last year diminishes. On the other hand, the third and last statistically significant variable at the 1% level is the leverage change. This variable has a positive sign. In other words, as the leverage change increases, the operating performance of the firm in the post-buyout period also

increases. This result shows that the free cash flow or the disciplining effect of debt hypothesis must be interpreted with caution. While the leverage change could be one of the factors that could explain operating performance improvements, a high level of pre-buyout leverage may indicate a deterioration of the operating performance of target PTP LBO firms. In other words, target LBO firms with a high leverage ratio in the pre-buyout period may have a declining return on sales in the post-buyout period.

Guo et al. (2011) similarly find that the target company's pre-buyout leverage and changes in leverage are both statistically significant, and thus can be seen as effective predictors of the return on sales of the PTP LBO firm at last year before exit. It should be noted, however, that in the study of Guo et al. (2011), the pre-buyout leverage has a positive relationship with return on sales at the last year of private ownership as opposed to negative sign found in this present study. In contrast to the findings in this dissertation, the findings of Guo et al. (2011) suggest that target firms with a high level of debt in the pre-buyout period still perform well after the buyout.

Unlike Guo et al. (2011), however, this study does not find that management changes, the CEO of the target company becoming chairman, and return on sales of the industry in the last year before target company exit as statistically significant variables. This is actually an interesting finding as shareholder-monitoring hypothesis as a driver of operating performance does not seem to be validated in the first regression analysis presented in this dissertation. Similarly, the industry performance does not seem to have an effect on the operating performance changes of target firms.

The regression results of this dissertation bear mostly the same signs as those presented by Guo et al. (2011) on the same or similar variables. There is one exception, however: the findings of Guo et al. (2011) suggest a negative relationship (although not statistically significant) between the sponsor director ratio and the dependent variable, ROS at last year. In this dissertation, the sponsor director is insignificant and positive, suggesting that as the number seats held by the private equity firm in the board of directors increases, the operating performance of the target LBO firm show positive changes. Thus, an increase in the sponsor director ratio could be reflected as operating performance improvement, as a result of a more efficient shareholder monitoring by private equity firm(s). This finding is consistent with the shareholder-monitoring hypothesis which suggest that the private equity firms actively participate to the management

of the companies they invest in by exerting an increased control over the operations of the management and by restructuring the governance structure of the company. Having said that, one would expect to see that the sponsor director ratio had a more significant effect on the operating performance of the company, which is not the case in this research. The positive effect of the presence of sponsor directors within the board of directors on operational improvements of target LBO firms remains somewhat weak.

- **Regression model with Change (Δ) in Return on Sales (EBITDA/Sales) from T_{-1} to $T_{last\ year}$ as dependent variable:**

The adjusted R^2 of the model in this case is 0,54. As observed in the previous model, the sign of leverage change is positive and statistically significant at the level of 1%. Thus, the leverage change has a positive relationship with the change in return on sales from T_{-1} to $T_{last\ year}$. This finding seems to validate the hypothesis relating to free cash flow/disciplining effect of debt. The higher is the leverage change, the better is the operating performance.

In addition, the sign of the log (Capital) is negative in the model, and statistically significant at the 10% level. A negative coefficient for log (Capital) seems to validate the hypothesis of Guo et al. (2011) with regard to the superior operating performance of previously underperforming (and therefore, undervalued) companies in the post-buyout period. Guo et al. (2011) claim that an underperforming company in the pre-buyout period with a smaller capital (i.e. transaction value) usually outperforms its peers and shows a significantly higher operating performance. Underperforming companies usually have a cash flow requirement to efficiently keep up with their competitors and get ahead of them. In many cases, an investment by a private equity firm provides the necessary cash resources that help the target firms improve their operating performance. Having said that, the ROS at T_{-1}, which is another variable used to test the aforementioned hypothesis, is positive but not significant, unlike the log (Capital) variable, which is negative. So, this finding must be taken cautiously. This could indicate that smaller deals that do not necessarily involve underperforming companies perform better. The underlying reason for this finding needs to be investigated further.

This regression analysis does not show other significant variables. On the other hand, Guo et al. (2011) find that the variables including management change and CEO becomes Chairman are positive and significant, suggesting that the shareholder monitoring by the private equity

firm generates operating performance gains for the target PTP LBO firm when the CEO is replaced or becomes Chairman. In this dissertation, the change in operating performance has a negative correlation (but not significant) with the variable called "CEO becomes Chairman". In other words, in a situation where the CEO takes over the Chairman role without resigning from his/her former role, the operating performance of the target LBO firm declines. This may indicate that the monitoring ability of the private equity firm could be reduced when the CEO significantly increase his/her control over the operations of the target LBO firm by taking over the Chairman role (Guo et al., 2011).

Although not significant in this regression analysis, the "Club PE" variable is negative, suggesting that the operating performance of a target LBO firm declines as the number of private equity investors increase. In other words, the monitoring ability of private equity firms loses its importance as the number of private equity firms increases. Guo et al. (2011) find a positive but insignificant result on this, suggesting that a higher number of private equity firms improves monitoring ability, although their initial hypothesis anticipated the opposite outcome.

Unlike the findings of Guo et al. (2011), the findings in this dissertation with regard to "Club PE" variable is consistent with the shareholder monitoring hypothesis suggesting that a higher number of private equity firms involved in a deal may bring along a dispersed shareholding structure, which is actually deemed to be one of the main challenges encountered in public corporations. In fact, as described by Jensen and Meckling (1976), a dispersed ownership may hinder the decision-making process and the value creation mechanisms within a company. In other words, a higher number of shareholders creates "too much noise" in the management of the firm operations, especially when the interests of different shareholders clash with each other.

Moreover, this conflict of interest may become even more pronounced, considering also the agency problem related to management actions. This may inevitably create a situation where the shareholders lose their monitoring ability and management becomes too independent in their actions, which would allow them to take self-serving corporate decisions.

- **Regression model with Change (Δ) in Return on Assets (EBITDA/Total Assets) from T_{-1} to $T_{last\ year}$ as dependent variable**

The dependent variable in this third model is the change in return on assets (ROA) as measured by Δ EBITDA/Total Assets from T_{-1} to $T_{last\ year}$. The adjusted R^2 is 0,14, which is close to the adjusted R^2 0,10 as presented by Guo et al. (2011) in the corresponding regression model in their study.

As observed in the two previous regression analyses, leverage change is positively and statistically significantly associated with Δ EBITDA/Total Assets at the 5% level. Thus, higher leverage changes seem to have a positive effect in the operating processes and asset profitability of the PTP LBOs. This finding may be explained by the disciplining effect of debt, which encourages the target PTP LBO firm to improve its asset profitability as a result of a more efficient deployment of resources and assets. Moreover, a higher leverage may allow PTP LBO firms to engage in maintenance expenditures that were postponed in the pre-buyout period (Kaplan, 1989a). Similarly, companies may invest in new equipment and machinery as cash becomes more available after raising debt. All these factors may increase the return on assets of target companies. However, this result has to be interpreted with caution, as the free cash flow hypothesis suggests that the priority is debt servicing, rather than engaging in capital expenditure projects. Moreover, it should be noted that the pre-buyout leverage in this regression bears a negative sign, although insignificant, as was the case with the first regression analysis. This may suggest that a high debt level in the pre-buyout period could reduce the asset profitability by increasing the cash-flow pressure on the target firm.

It is further found that management equity participation is a relatively significant variable in the regression. In other words, the equity contribution of the management seems to be associated with a positive change in the return on assets. This might be a sign of more aligned management incentives and reduced agency costs in the LBO firm. As a result of the alignment of interest between management and shareholders, managers may start to be more selective when considering investment projects (Jensen, 1986), and also start selling unproductive assets and even divest entire divisions. In line with this, managers would typically start to invest in NPV positive assets, which should reflect as a positive change in the return on assets ratio of PTP LBO firms (Guo et al., 2011).

Although not significant, the variables including CEO change, CEO becomes Chairman, Club PE and Sponsor Director ratio are all negative. These findings suggest that these variables have an inverse effect on the asset profitability of target PTP LBO firms. The negative coefficient of "Club PE" is an anticipated element of this regression analysis, as a higher number of private equity firms as shareholders may cause a negative effect in the operating performance of the target LBO firm due to the dispersed ownership structure.

The regression yields a negative coefficient for the "CEO change" and "CEO becomes Chairman" variables, suggesting that the change in ROA becomes negative when either of these variables is realised. A negative coefficient is an expected outcome for "CEO becomes Chairman", as a very strong CEO may hinder the operating performance of the target LBO firm by reducing the monitoring ability of private equity firm as shareholder. On the other hand, the negative result for the CEO change is not consistent with the shareholder-monitoring hypothesis, as a newly-appointed CEO would increase the monitoring of the private equity firm and hence, improve the operating performance of target firm.

On the other hand, the coefficients of the variable sponsor-to-director ratio are unexpectedly negative in this third regression analysis. This finding suggests that an increase in number of seats held by private equity firms decreases the operating performance of the firm. This is not consistent with the theory. In fact, one would expect that the contrary of this finding as the monitoring ability of the private equity firm would increase as they appoint more directors involved with the operations of the firm. On the other hand, this finding may also indicate that LBO firms with "problematic" financial and operational prospects may need a higher number of PE firm representatives involved with company operations (Guo et al., 2011).

These results differ from those of Guo et al. (2011), who find a positive and significant relationship between the variables, including Club PE, management change and CEO becomes Chairman. The fact that Guo et al. (2011) find that operating performance improves when the number of private equity firms involved in the deal increase is not consistent with the theory of shareholder-monitoring as described above.

Table 17: OLS Regressions for post-buyout operating performance in PTP LBOs

The table below presents the results of the three regression analyses conducted on three distinct dependent variables, namely return on sales (EBITDA/sales) at last year before the end of private equity ownership (ROS at last year), change in adjusted ROS (change in adjusted return on sales as measured as EBITDA/sales from one financial year before buyout and last financial year before exit), and change in adjusted ROA (EBITDA/total assets) T_{-1} to $T_{last\ year}$. The change in return on sales and the return on assets is adjusted for the industry performance for the period of the private equity ownership of the LBO target company. Capital (i.e. transaction value) and board size are log-transformed. Pre-buyout leverage is defined as debt/EBITDA at T_{-1}. The leverage change between pre- and post-buyout period is measured by change (Δ) of debt between T_{-1} and $T_{last\ year}$ divided by EBITDA at T_{-1}. Other independent variables have already been described in detail above. P-values are in brackets. Significant coefficients are indicated in bold. ***, **, * indicate significance levels of 1%, 5% and 10%, respectively.

	ROS at last year	**Change in adjusted ROS**	**Change in adjusted ROA**
Log (Capital)	-0,04 *(0,3)*	**-0,88*** *(0,06)*	-0,05 *(0,92)*
Adjusted ROS (ROA) at year -1	**0,93***** *(4,47E-06)*	0,24 *(0,90)*	-3,01 *(0,35)*
Industry ROS (ROA) at last year	-0,36 *(0,19)*		
Management equity participation	0,08 *(0,13)*	0,18 *(0,74)*	**1,25*** *(0,07)*
Management equity %	-0,24 *(0,11)*	0,23 *(0,88)*	-0,83 *(0,65)*
Pre-buyout leverage	**-0,02***** *(0,002)*	0,01 *(0,89)*	-0,03 *(0,72)*
Leverage Change	**0,003***** *(0,008)*	**0,08***** *(1,57E-07)*	**0,035**** *(0,04)*
CEO change	-0,01 *(0,76)*	0,28 *(0,56)*	-0,06 *(0,91)*
CEO becomes chairman	0 *(0,97)*	-0,06 *(0,92)*	-0,43 *(0,55)*
log (Board size)	0,05 *(0,63)*	0,68 *(0,57)*	-0,2 *(0,88)*
Sponsor director ratio	0,05 *(0,49)*	0,4 *(0,63)*	-0,38 *(0,70)*
Club PE	0,02 *(0,65)*	-0,24 *(0,62)*	-0,07 *(0,89)*
Intercept (constant)	0,25 *(0,05)*	0,6 *(0,63)*	-0,09 *(0,94*
Number of observations	52	52	52
R^2	0,54	0,64	0,32
Adjusted R^2	0,39	0,54	0,14
Significance F	0,000712	3,85983E-06	0,09

5.4. Conclusion

The main finding of this study is that, for LBO transactions completed in the United Kingdom between 2003 and 2015 and exited by 2018, the overall change in operating performance change was, on average, negative. Of these, the best performing companies were the ones that went public again to facilitate exit by their private equity investors.

Consistent with the findings of Guo et al. (2011), Kaplan (1989a, 1989b) and others, changes in leverage of the target company between the LBO and the exit of the private equity investors, are positively correlated with changes in operating performance. In other words, the hypothesis relating to the disciplining effect of debt and free cash flow theory seems to be validated, as the leverage change is positively correlated with gains in operating performance. The implied "benefits of debt" finding is also consistent with the hypothesis that an increased tax shields as a result of interest expense deductibility is a driver of improved LBO target operating performance.

In contrast, management changes and management equity participation seem to have little to no correlation with operating performance changes of PTP LBO firms. According to this result, increased management incentives and reduced agency problems do not seem to have a jointly significant effect on the operational performance improvement of target LBO firms. In other words, the hypothesis suggesting that improved management incentives are positively correlated with operating performance is not validated.

Similarly, the regression analyses failed to demonstrate any significant link between shareholder control and monitoring, as well as corporate governance principles, on the operating performance gains of PTP LBO firms. In other words, the regression analysis failed to demonstrate the hypothesis suggesting that private equity firms improve operational performance of target LBO firms by restructuring their governance structure and by exerting increased control upon the management activities and corporate decisions.

6. Conclusion

This study investigated public-to-private leveraged buyouts that were completed in the United Kingdom from 2003 to 2015. All deals that reached an outcome in the form of an exit deal (e.g. IPO, SBO, strategic sale) or other deal resolution (e.g. insolvency) was included in the sample. In addition, the research sample included only deals that were backed by one or more private equity firm, both with and without a management contribution to the equity of the target firm. The full sample comprised of 65 deals, whereas the subsample with sufficient post-buyout data contained 54 deals. Most of the analyses focused on the subsample with post-buyout data.

The main theoretical framework for this study was the shareholder-related agency costs theory, which focuses mainly on three hypotheses to explain operating performance improvements resulting from a going-private LBO structure. These three hypotheses were improved management incentives, the free cash flow/disciplining effect of debt, and improved shareholder monitoring and control. The primary goal of this study was to test these three hypotheses as potential determinants of operating performance gains in PTP LBOs.

When it comes to the sample characteristics, deals examined, especially in the pre-2007 period, had riskier capital structure and were highly levered, compared to the deals after the 2008-2009 financial crisis. In fact, the capital structure of deals examined in this dissertation were similar to that of the deals completed in the first wave of PTP LBOs in the 1980s, that were characterised by high leverage (Kaplan, 1989a). Furthermore, nearly 15% of the LBO target companies in the subsample went either insolvent or were taken over by lenders. This phenomenon seems to be a direct result of risky capital structures characterising the PTP LBOs in the period of study.

With regards to the operating performance of the PTP LBOs, the overall picture in terms of return on sales (measured as EBITDA/Sales) and return on assets (EBITDA/Total Assets) was negative. In other words, the majority of going-private LBOs completed in the timespan of this study did not result in operating performance improvements. Thus, the only companies with positive post-buyout performance were the ones that went public again after the exit of the private equity firm. This is an expected result as private equity firms will naturally choose to re-list the best-performing companies in their portfolio to enhance their returns and increase

their reputation in their industry. In this regard, sample selection bias come into play as only realised investments were part of the research subsample. For example, it is expected that other LBO firms remain still private if they have not yet reached their optimal performance that will allow a safe exit for the private equity firm. In addition, the research did not include some LBO firms that were acquired by an offshore structure based in tax haven countries. Having said that, the subsample included a fair number of distressed firms compared to other studies. To sum up, one must cautiously interpret the operating performance changes of target LBO firms because of potential selection bias. Unfortunately, most studies on value creation of LBOs inevitably suffer from the aforementioned bias at some extent.

Considering the high rate of distressed firms, coupled with negative operating performance, it can be argued that the PTP LBOs examined in this dissertation failed to create value. However, this study only considered operating performance, and mainly due to a lack of data availability, not measured such as return on capital or the internal rate of return (IRR) obtained by private equity firms through their investments in the chosen LBO firms.

In order to test the effect of the main hypotheses investigated in this study, three regression analyses, comprising a number of independent variables that could be related to the hypotheses of improved management incentives, the disciplining effect of debt/benefits of debt, and improved shareholder monitoring, were conducted. The dependent variables for each regression analysis were as follows: Return on sales (EBITDA/Sales) at last year before exit, Industry-adjusted Change in Return on sales and Industry-adjusted Change in Return on assets (EBITDA/Total Assets), from one financial year before buyout to the last financial year before exit (from T_{-1} to $T_{\text{last year}}$).

The main finding of the regression analyses was the positive effect of a leverage change on operating performance. In all three of the models, the operating performance seemed to increase as leverage increased. This finding is consistent with the hypothesis that increased debt in an LBO scenario results in a more focused and disciplined management, and thus improved operating performance.

In addition, the industry adjusted ROS at T_{-1} was found to be positively correlated with the ROS at last year in the first regression model. On the other hand, no statistically significant evidence was found with regard to the hypothesis of Guo et al. (2011) that underperforming firms in the

pre-buyout period deliver a superior operating performance, or that a greater equity contribution by management results in better operating performance.

This study's finding that the PTP LBOs completed from 2003 to 2015 in one of the world's most-developed LBO markets did not generate positive operating performance, calls into question the motivations of companies to go through a going-private LBO deal with the financial backing of private equity firms. In fact, the results found imply that LBOs might not generate real value beyond the gambling effect of the additional leverage taken on. In fact, it is undeniable that private equity firms who planned on "investing" in a specific industry usually meant "gambling" and "making speculative investments" given the high leverage risk associated with the recent deals concluded, especially, during in the pre-financial crisis era.

This study could also be extended to measure return on capital and internal rate of return (IRR), if the required data could be obtained. In addition, it would be useful to analyse the valuation multiples at entry and exit (terminal values) of PTP LBO firms. As indicated, however, future research on this topic will have to overcome severe challenges relating to data collection.

In terms of monitoring and control hypothesis, the research could be expanded to other stakeholders (e.g. banks as debt providers) instead of focusing only on the shareholder-control hypothesis. Moreover, future research could focus on different geographic markets such as continental Europe or emerging markets, where there is a significant lack of research on PTP LBOs and their value creation mechanisms. Cross-country or industry comparisons could be very interesting research topics, but again the main challenge is that of LBO and private firm data availability.

Last but not least, other possible performance measures can be included in future research. Employee-related productivity or plant-based productivity are amongst some of the interesting topics that could add value to the existing literature in public-to-private leveraged buyouts.

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Appendices

Appendix 1: Industry Distribution (based on SIC codes) of the Subsample of 54 PTP LBOs with sufficient post-buyout data.

Primary Industry	Number of Firms
Energy	2
Materials	2
Industrials	13
Utilities	2
Financials	5
Real Estate	1
Healthcare	3
Consumer Discretionary	15
Information Technologies	7
Communication Services	4
Total	**54**

Appendix 2: A summary list of the PTP LBO deals in the subsample with sufficient post-buyout data (54 deals)

Transactions Announced	Type of Exit	Target Firm	Target - Total Sales (£GBPm) At T_{-1}	Target - EBITDA (£GBPm) At T_{-1}	Target - EBIT (£GBPm) At T_{-1}	Targe Total Assets (£GBPm) At T_{-1}	Target - Total Sales (£GBPm) At $T_{last\ year}$	Target - EBITDA (£GBPm) At $T_{last\ year}$	Target- EBIT (£GBPm) At $T_{last\ year}$	Target - Total Assets (£GBPm) At $T_{last\ year}$
04/03/2003	IPO	PizzaExpress Limited	221,9	44,55	23,0	199,0	255	62	51	294
04/10/2003	SBO	Fleets Point Limited	224,22	54,69	28,67	462,96	401	95	40,1	909
06/09/2003	Sold	FCC Recycling (UK) Limited	302,53	84,9	21,62	754,72	498	100	19,6	957
07/31/2003	Sold	Macdonald Hotels and Resorts Limited	91	19	25,79	222,46	154	21	11	440
08/21/2003	IPO	Safestore Holdings plc (LSE:SAFE)	7,22	0,372	-1,1	39,44	75	41,5	41	723
09/22/2003	Distressed	Stirling Group PLC	167,97	8,5	5,9	55,41	0	-3	-3,8	48
12/11/2003	Distressed	Jarvis Hotels Limited	160,7	24,3	11,83	319,58	119		-13	187
12/17/2003	IPO	Debenhams plc (LSE:DEB)	1.810,2	254,7	172,0	1.294,0	1708	314,7	223,6	1862

02/13/2004	SBO	New Look Group Limited	679,3	116,2	87,35	276,1	1415	212	148	1261
10/27/2004	SBO	South Staffordshire Plc	68,66	32,59	20,86	164,25	120	44	27	60
11/12/2004	Distressed	Countryside Properties (Holdings) Limited	330,07	29,22	20,0	423,33	164	-18,6	-19	471
02/03/2005	SBO	Vita (Holdings) Limited	959	50	43	694	598	35	20	186
03/11/2005	Distressed	Trio Holdings Limited	32	1	1	16,5	57,6	6,7	-7,2	39
03/16/2005	Sold	EIGL Limited	322,86	26,4	5,45	931,18	343	7,2	38	1000
04/08/2005	Sold	East Surrey Holdings Limited	108,95	35,65	21,71	533,57	102	23	8,9	363
05/06/2005	Sold	LA Fitness Limited	82,68	20,14	12,79	121,87	57,5	19	-41	63
07/07/2005	SBO	PHS Group Limited	187,72	66,02	54,64	534,85	418,4	112,9	88,5	1541,2
07/18/2005	IPO	Telecity Group plc	27,99	2,46	(3,62)	49,65	97,9	23,4	4,8	227,3

08/27/2005	Sold	PGL Realisations plc	563,23	70,51	43,02	328,89	526	77,1	27,7	559
09/08/2005	SBO	Novus Leisure Ltd	78,36	17,53	10,92	86,35	95	7	-0,6	89
12/19/2005	IPO	Rift & Co Limited	44,91	7,22	4,38	44,64	112,3	12,3	6,2	61,6
03/13/2006	IPO	Nielsen Holdings plc (NYSE:NLSN)	2.473,39	461,15	290,05	6.205,03	3268	759,6	507	9241
03/17/2006	Sold	Parkdean Holidays Limited	84,19	20,54	14,55	162,76	142,5	33,7	19,7	314
03/29/2006	SBO	Associated British Ports Holdings Limited	434,9	203,4	172,0	1.700,8	519	302,1	256,5	3428
04/25/2006	Sold	PrecisionIR Group, Inc.	17,79	1,9	(1,57)	14,98	7,2	0,08	-0,4	4,5
05/25/2006	Sold	Mayborn Group Limited	87,2	13,25	11,23	67,08	130	25	16,9	164
07/06/2006	IPO	DX Services Limited	128,9	33,4	23,7	127,2	305,5	29,7	25	267,9
07/17/2006	IPO	McCarthy & Stone Retirement Lifestyles Limited	325,7	117,4	115,6	656,8	485,7	96,3	93,2	762,3

09/07/2006	Sold	CEB Talent Assessment	69,2	9,9	7,8	44,7	93,1	35,4	9,6	170,8
09/21/2006	Sold	Incisive Media Limited	66,4	16,51	13,51	166,49	52	5	-9,5	64
09/28/2006	Sold	Planit Holdings Limited	32,05	4,62	2,56	38,62	28,5	6,2	3	39,1
10/06/2006	SBO	Gondola Group Limited	404,4	88,4	71,2	603,5	204,9	27,5	-19,7	887,3
03/08/2007	IPO	Crest Nicholson PLC	690,7	99,6	98,8	841,1	408	36,3	35,1	734
03/16/2007	SBO	Computer Software Group Limited	33,57	7,54	3,61	61,34	31,77	23,3	25,3	81,4
03/23/2007	Sold	Enterprise Group Holdings Limited	566,3	34,0	30,7	347,2	926,2	34,7	2,6	1101
05/21/2007	Distressed	Maltby Capital Limited	1.808,3	(74,8)	(143,7)	1.498,5	1651	310	174	6468
06/13/2007	SBO	Oasis Healthcare Limited	89,96	9,44	6,66	68,4	148	19	1,9	165,8
07/17/2007	IPO	Premier Asset Management Limited	18,82	1,66	0,6	30,18	35,7	8	0,7	35,2

12/13/2007	Sold	Environmental Scientifics Group Holdings Limited	194,74	17,86	7,59	226,41	89	8,2	4,8	185
12/19/2007	SBO	Abbot Group Limited	723,88	108,7	64,08	1.134,94	1584	310	-471	3285
01/24/2008	Distressed	Biffa Group Limited	742,7	154,8	93,1	1.250,1	775,1	129,9	13,3	2125
03/20/2008	Distressed	Premier Research Group Ltd	61,9	7,92	4,79	85,12	84	5,5	-85	21
03/28/2008	SBO	Civica Group Limited	126,91	20,95	10,86	207,75	202	34,9	13,5	4446
07/04/2008	IPO	Nord Anglia Education Limited	76,46	11,71	9,16	52,7	195	40	28	683
07/23/2008	SBO	SSP Holdings Limited	64,41	15,79	13,99	122,04	77	20	9,7	42
09/25/2009	IPO	Just Retirement (Holdings) Limited	312,6	48,9	48,4	3.089,1	965,2	217,1	217,1	9676
06/02/2010	Sold	Trafficmaster Ltd.	57,47	9,47	6,33	83,02	57	5,4	-6,7	99,1
06/15/2010	SBO	EnServe Group Limited	310,7	38,5	29,0	362,2	200,6	1,4	-0,8	134,7
07/19/2010	SBO	Gates Industrial Corporation plc (NYSE:GTES)	3.033,74	408,62	290,97	2.820,0	2262	413,5	253,3	3796,5

02/28/2011	SBO	Independent Media Distribution Limited	10,14	2,84	2,16	8,2	21	5,4	1,4	34
04/20/2011	SBO	Ideal Shopping Direct Limited	117,3	8,74	6,98	47,89	149	11,9	9,6	77,4
12/09/2011	Sold	WorkPlace Systems International plc	9,74	0,453	0,384	7,09	11	2,7	-3,6	10,8
12/19/2011	Distressed	Style Group Brands Limited	118,3	5,98	4,51	57,45	158	-1,8	-8	90,7
09/16/2015	IPO	Alkane Energy Limited	17,62	8,85	5,31	73,76	25,22	14,30	9,56	72,89
		Mean	366,35	53,4	35,63	552,14	418,68	78,54	33,28	1.112,01
		Median	122,61	20,34	13,15	182,75	151,5	25,0	9,65	247,6
		Std. Dev.	601,41	91,97	67,44	1004,58	630,71	136,17	117,03	2068,49