Essays on Private Equity and Value Creation Levers in European Buyout Transactions

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Declaration of Contribution in Accordance with Section 8 (2) of the Doctoral Regulation (2015) of the University of Cologne:

No other persons were involved in the writing of this dissertation except for the mentioned co-authors. As such, Professor Hartmann-Wendels was involved in the conception of the research design and discussion of the empirical results for our joint papers "The Architecture of Success: Value Creation at Transaction Level in European Private Equity Buyouts" and "The Management Narrative in European Private Equity Transactions – an Empirical View on the Accuracy of Buyout Forecasts". I single-handedly collected the required data as well as selected and interpreted the related literature. Likewise, I conducted the empirical analysis and drafted these two papers. I am thankful for Professor Hartmann-Wendels' critical input towards the conclusions for both papers.

The third paper "Negotiation Power of Private Equity Funds – Evidence from Sale and Purchase Agreements in European Buyouts" is a result of my sole authorship for which I developed the research idea, collected the data and conducted the in-depth review of the acquisition agreements and related literature. I have devised the empirical work and interpreted the results without the involvement of any third party.

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Chapter 1

Introduction

Over the last four decades, private equity funds have shown a strong track record of performance and established leveraged buyout investments as a highly demanded investment class in the domain of alternative investments. In a European context, private equity investment activity in the year of 2020 alone accounted for 2,792 transactions with a combined deal value of €318.8 billion (PwC, 2021a). On a global scale, total assets under management by private equity funds amount to c. USD 4.7 trillion in 2020, a figure expected to almost double again in size by 2025 (Preqin, 2021). In other words, as noted by Pozen (2007) "the era of private equity is far from over – the top funds have become very large and are likely to play an influential role in future market cycles" (p. 80). Considering its history as well as future relevance, the subject of private equity funds and leveraged buyouts has equally attracted the interest of the wider public, professional investors and academic research, particularly with respect to the question of value creation over the investment cycle.

Following an initial focus on financial engineering to deliver strong equity returns to the limited partners of the leveraged buyout funds, increased competition among the fund sponsors called for increased diversification with respect to the value creation approach (Ghai et al., 2014). Extended periods of favourable debt conditions following the financial crisis around 2008 and the increasing scarcity of attractive buyout targets, amplified the maturing of the private equity industry and the need to maintain performance by adding value to the portfolio investments. Yet, current research on value creation in European leveraged buyout transactions remains relatively scarce, which is due to both the limited data available and a focus dedicated to the United States market (Achleitner et al., 2010). Previous research findings on earlier buyout waves require an updated view considering the remarkable decade of change within the low interest environment (PwC, 2019).

This doctoral thesis provides updated research views on European leveraged buyout transactions after the financial crisis and comprises three essays, which shed light on the value levers employed by private equity funds: The Architecture of Success: Value Creation at Transaction Level in European Private Equity Buyouts (Grobecker and Hartmann-Wendels

(2020)), The Management Narrative in European Private Equity Transactions – an Empirical View on the Accuracy of Buyout Forecasts (Grobecker and Hartmann-Wendels (2020)), and Negotiation Power of Private Equity Funds – Evidence from Sale and Purchase Agreements in European Buyouts (Grobecker (2021)). The third essay is a result of my sole authorship including the development of the research idea, the data collection, literature review and the empirical work, which I have done without the involvement of any third party. The first and second essay are the result of a collective effort with Professor Hartmann-Wendels, who participated in the conception of the research design and discussion of the research results. I single-handedly collected the required data, reviewed the literature, carried out the empirical analysis and drafted the essays myself.

The contributions of this doctoral thesis are based on the empirical analysis of hand-collected data sets, which are sourced from a large global consulting firm that provides specialised transaction advice to private equity funds. The source supports a high degree of granularity and reliability of the data, which is maintained by including additional data obtained from regulated sources, such as the commercial register, stock exchange filings and investor disclosures. As a result, the data allows detailed insights into the transaction level encompassing inter alia financial statement information relating to the pre-buyout and private equity holding period, pre-buyout forecasts presented by the target company management and the acquisition agreements concluded in the course of the transaction. The combination of resources relating to a single transaction allows a comprehensive analysis of private equity investment's conduct at transaction level, the evaluation of pre-buyout forecasts and the negotiation aspects surrounding the buyout.

The first essay (Grobecker and Hartmann-Wendels (2020), The Architecture of Success: Value Creation at Transaction Level in European Private Equity Buyouts) examines the value creation of private equity funds in European leveraged buyouts at transaction level. Our novel data set covers 114 buyout transactions realised in the low-interest environment after the financial crisis of 2007/2008 until 2018. We find strong evidence that operating improvements act as a main source of value creation at transaction level. Our regression results indicate that EBITDA margin expansion and improvements in working capital efficiency are significantly correlated with value creation. Our findings remain robust across various specifications. We further find positive effects of extended holding periods and detect potentially adverse effects of board member replacements in the context of small- and medium-sized buyout transactions. From a governance perspective, we observe no additional value from increased debt levels. With a view to aligned interests and reduced agency costs, our results suggest an insensitivity

of the size of management equity holdings on buyout performance. The results of our research align with the view on the growing importance of private equity sponsors as strategic partners and confirm the commoditised classic buyout concept in the post-2008 European buyout landscape, which previously emphasised financial engineering (Le Nadant et al., 2018). Instead, private equity funds create value over the holding period through improving operations and effecting efficiency increases at the level of the target company.

The second essay (Grobecker and Hartmann-Wendels (2020), The Management Narrative in European Private Equity Transactions – an Empirical View on the Accuracy of Buyout Forecasts) addresses the reliability of forecasts relating to future financial performance. In any buyout acquisition, the management of the target company provides a quantitative story on the future company financials, which is at the centre of the private equity sponsor's equity story. This paper examines the accuracy of target management forecasts in European private equity buyouts using a novel data set, which follows forecasted and actual performance of 80 buyouts entered between 2008 and 2018. We apply several accuracy measures and find target management projections to significantly overestimate EBITDA growth, while strongly underestimating capital requirements and expenditures required in supporting the company's growth agenda. The regression results indicate a positive and robust relationship between the overoptimistic departure from historic EBITDA growth rates and forecast error, implying a stickiness of the pre-buyout growth trajectory. Across the forecast periods, the portfolio firms only realise roughly 60% of the projected annual EBITDA growth rates on average, thereby falling significantly short of the advertised expansion prospects.

In contrast, sales forecasts appear to be reasonably reliable and improve with company age and capital intensity. Our findings suggest that the remainder of components in ambitious management forecasts are governed by pre-buyout shareholder interests instead of company characteristics or macroeconomic developments. The debt packages imposed on target companies significantly exceed conservative pre-buyout expectations of the target company's management. Further, our findings indicate that private equity sponsors look through the "hockey stick" dynamics of managerial predictions before buyouts and significantly discount management forecasts. Using a simplified discounted cash flow valuation model to derive an enterprise value based on the ambitious target company projections, we find the actual deal pricing only amounts to roughly two thirds of such enterprise value.

The third essay (Grobecker (2021), Negotiation Power of Private Equity Funds – Evidence from Sale and Purchase Agreements in European Buyouts) expands the analysis on value creation to the terms and conditions of the acquisition agreements. These increasingly

sophisticated agreements translate the parties' investment insights and transaction requirements into a complex network of risk allocation and price determination provisions, which materially connect to all relevant aspects of the deal. Considering private equity sponsors are repeat investors in buyout transactions and accumulate significant experience in negotiating transaction terms to their commercial benefit, the question addressed in this paper is whether this experience allows private equity funds to secure superior outcomes when negotiating sale and purchase agreements. Such negotiation skills might support the security of returns and create additional value for the buyout investments as suspected by earlier research (Achleitner et al., 2011). The unavailability of data on financial contracting rendered this field rather understudied (Ahlers et al., 2016) and – to the best knowledge of the author – this essay is the first analysis, which provides an empirical view on leveraged buyout contracting by private equity funds and potential drivers of negotiation outcomes in a European context.

Based on a sample of transaction agreements concluded between 2010 and 2020 in European leveraged buyouts and a novel scoring framework, this paper explores the contractual terms in buyout scores and finds a market-related explanation. Instead of private equity fund characteristics, the dominant driver for the level of protection against risk in acquisition agreements is the attractiveness of the leveraged buyout market represented by the scale of investment attractiveness as measured by operating yields and leveraged buyout debt conditions. The buyside attractiveness of contracts decreases along with increasingly favourable market conditions. The findings of this research paper thereby extend previous findings of academic literature on market-driven buyout investment effects to the complex network of risk-allocation in buyout transactions. At the same time, this paper sheds light on the formal organisation and functions of buyout contracting, whereby it takes into account market practices of contractual terms in buyout contracts and their development over time in the low interest environment of the European Union.

The findings of the essays connect to an updated view on European leveraged buyout activity in the 2010s and the value creation environment of private equity funds. Across the decade of unprecedented change, successful value creation in our data sample has been driven predominantly by operating improvements rather than management reconfigurations or leverage effects. At the same time, our data lends shape to the target management forecasts addressed to private equity sponsors ahead of buyout transactions, which are frequently not attained over the holding period, but seem to be appropriately discounted in the transaction underwriting of the fund sponsors to accommodate value creation in the interest of fund returns. Considering the sale and purchase agreements when entering and exiting the buyout

investments, the negotiation outcomes follow the market cycle and reduced buyside protection quality appears to be a trade off when competing for scarce buyout targets in a competitive investment environment with abundant debt supply and sufficient operating returns.

Chapter 2

The Architecture of Success: Value Creation at Transaction Level in European Private Equity Buyouts

2.1 Introduction

From a global perspective, the private equity industry has experienced a vibrant evolution starting with its early developments in the United States in the 1980s until today (Renneboog et al., 2007). The assets managed by private equity firms today exceed USD 4 trillion and the industry has confirmed the investors' confidence by a record fundraising of USD 595bn across more than 1,300 funds in 2019 (Preqin, 2020). Strong growth rates and prominent transactions point towards private equity firms' excellence in translating their business expertise into superior returns for their investors. The landscape of the private equity industry has long extended beyond its origins in the United States and grown in Europe with European transactions accounting for almost half of the global deal volume by transaction value between 2005 and mid-2007 (Kaplan & Strömberg, 2009). While the effects of the global financial crisis called for a decline in private equity performance indicators, the industry has proven a strong trajectory of economic recovery and sustained its relevance. In 2019 the European buyout market exhibited a total of 1,763 deals, adding up to more than €100bn worth of transactions and representing the highest level of equity invested in European companies by private equity funds ever recorded (Invest Europe, 2020).

The growth story of the private equity business has not only spurred the interest of investors and industry practitioners, but also attracted an academic discussion encompassing the value creation in private equity transactions (Guo et al., 2011). Various researchers have contributed to the field of private equity and shed light on private equity fund returns and the value created in leveraged buyout transactions. However, overall research on the topic of private equity remains limited and challenged by the scarcity of data, albeit an increasing academic interest

post-2006 (Cumming & Johan, 2017). This holds true especially for European buyout transactions with much of the existing research relating to the United States (Achleitner et al., 2010). At the same time, the changing dynamics in the industry call for a continuous update on value creation insights looking at an unprecedented decade of change (PwC, 2019). The decade following the emergence of the crisis around the year of 2007 challenged private equity funds with extreme changes in the supply and conditions of debt, seemingly inexhaustible growth in committed capital, yet increasing competition among sponsors for a scarce supply of attractive buyout targets.

The main objective of this paper is to explore how private equity investors create value at transaction level. In doing so, we extend our focus beyond the literature that presents fund level dynamics and examines the return profiles delivered by the general sponsors to the limited partners. While Braun et al. (2017) duly point out the important distinction between the equity and enterprise value perspectives, the two angles are inextricably linked to each other. Nikoskelainen and Wright (2007) highlight the intuitive, yet not perfect positive correlation between internal rate of returns (IRR) on investors' equity and enterprise value increases. Investigating value creation measures at enterprise level implies – to a certain extent – the availability of strategic actions at transaction level, which ultimately result in performance persistence. In other words, a certain degree of performance persistence in private equity returns indicates skill in lieu of luck at transaction level (Korteweg & Sorensen, 2017).

While Kaplan and Schoar (2005) and a related thread of literature argue low levels of performance persistence and underperformance of private equity funds compared to public benchmarks (Phalippou & Gottschalg, 2009), opposing research finds performance persistence among private equity funds, e.g. Buchner et al. (2016) for US buyout funds. Consistent with Korteweg and Sorensen (2017), Diller and Kaserer (2009) relate private equity returns to the skills of the funds' general partners. This complements very early research by Gompers and Lerner (1997), who show private equity funds realise risk-adjusted excess returns of 7-10%. The findings of Braun et al. (2017) might bridge the opposing views by detecting a decreasing level of persistence in private equity returns over time, which could also indicate that the success drivers of private equity deals are subject to change over time.

The shifting grounds of private equity success are also apparent in the literature investigating the activity of private equity funds at the level of the acquired portfolio companies, the targets. The literature has identified various key pillars supporting the architecture of private equity value creation, which encompass three essential elements (Kaplan & Strömberg, 2009). First, private equity funds employ sophisticated financial structures including high gearing

ratios (Jensen, 1986). Second, governance engineering refers to the alignment of interests, not only at the level of the private equity fund (Robinson & Sensoy, 2013), but also incentives and equity participations for management of the target company stimulating value increases (Cumming et al., 2007). Third, and with increasing relevance along the evolution of private equity investments, operational engineering describes how private equity firms advance the business activities of the target company (Matthews et al., 2009). While these value drivers are neither conclusive nor always clearly distinct, they facilitate the understanding of the value creation mechanics commonly employed by private equity sponsors – from their initial investment throughout to a successful exit of the investment.

Our research aims to identify the relevance of improvements at transaction level implemented under private equity ownership and calibrate our understanding of financial, operational and governance engineering in European buyout transactions. Thereby, we contribute to the existing literature in multiple ways: Our analysis provides updated insights into the topic of value creation in a changed investment landscape after the financial crisis around 2007 and the subsequent low interest environment, which has been unprecedented in European economic history. Further, we expand the continental European perspective on private equity research, which otherwise continues to be dominated by data and research focusing on the United States and the United Kingdom.

Using a novel and comprehensive data set, we add some colour to the ambiguous research findings on value creation by private equity funds. Applying an ordinary least square (OLS) regression we find that operating improvements reflected in EBITDA margin expansion are the key value drivers at transaction level. This finding remains robust across various specifications. Likewise, we detect a correlation between working capital improvement and value increase. Consistent with operating improvements we find that the length of holding periods is correlated with value creation. From a governance perspective, we find that management board replacements shortly after the buyout adversely affect value creation. The remainder of our variables relating to financial and governance engineering do not show statistical significance suggesting either a subordinate role for the value created at transaction level or implying that the different characteristics of these variables do not alter portfolio firm growth. We do not find evidence that substantial increases in asset utilisation represent a significant value lever and find a neutral role of the disciplining effect of additional debt on value creation. Interestingly, increasing levels of management equity participation do not result in higher value creation. While private equity funds might on average succeed at selecting markets with positive ex-post developments (Valkama et al., 2013), enterprise value increases are not primarily driven by

favourable market conditions. Instead, our analysis points more towards operational excellence in creating value at transaction level.

This paper is organised as follows. Chapter 2.2 provides an overview over the existing literature on private equity practices at transaction level and their implications on value creation. This sets a theoretical framework for our analysis in the subsequent chapter. In Chapter 2.3 we present the data used for our analysis including the summary statistics, a discussion of its representativeness and potential biases. Chapter 2.4 introduces the methodology of our analysis. Our results are presented and discussed in Chapter 2.5. Chapter 2.6 concludes.

2.2 Literature Review

Value creation in leveraged buyouts is linked to an extensive casual network of influencing factors. Berg and Gottschalg (2005) differentiate between value creation levers with a direct impact on the company's financial performance, e.g. cost cutting measures as a primary value lever directly changing the profit level, or those that indirectly contribute to value creation, so-called "secondary levers" like management participation programs, which align the interests between the private equity fund and the management board as co-shareholders. The value levers aim to improve the target company's value. This chapter provides a brief overview of key value levers addressed by the literature so far.

Portrayed at the centre of private equity transactions, leverage is a vital driver in private equity returns. Funds lever the acquisition of portfolio companies with senior, junior and mezzanine financing from third-party lenders. These third-party lenders include banks, debt funds, insurers or even publicly issued debt (Loos, 2006). The financing structure chosen by private equity funds departs from the predictions of classical theories on capital structure, for example, the theories on capital structure choice developed by Modigliani and Miller (1963), Myers (1984) and Myers (2001). These classical theories build on firm characteristics but have little explanatory power over leverage ratios applied in European buyouts. Instead, gearing in private equity transactions appears to be more determined by the general conditions in credit markets (De Maeseneire & Brinkhuis, 2012). This view is echoed by Axelson et al. (2013) and adds to the research findings of Demiroglu and James (2010), which show that private equity reputation positively correlates with gearing ratios and longer loan maturity terms, while being negatively correlated with the credit spread demanded by banks over the reference rate on leveraged buyout loans. Ivashina and Kovner (2011) argue that such favourable credit terms – including more lenient debt coverage ratios – are derived from "relationship banking" and

significantly increase equity returns.[1] The use of potentially superior debt terms from the private equity network as frequent borrowers does not only benefit the leverage on the private equity fund's investment, but also improves the after tax costs of capital at target level, especially during periods of economic growth and high investment intensity (Colla et al., 2012). At the same time, the accessibility of higher leverage ratios leads to higher entry valuations paid at the potential expense of fund returns (Axelson et al., 2013). This phenomenon might be reinforced for secondary buyouts for which De Maeseneire and Brinkhuis (2012) find generally higher leverage ratios than primary buyouts.

While leverage will frequently be determined by market factors and fund variables, the transaction level adds another element to the debt considerations. At transaction level, the tax deductibility of interest expenses benefits free cash flows to the firm. Cohn et al. (2014) find sustainable tax payment reductions based on increased leverage. While tax benefits from additional debt will eventually be consumed by increasing costs of capital (Damodaran, 2015), shareholder loans create additional interest expenses and tax efficient repatriation mechanisms in European buyout transactions. Renneboog et al. (2007) and Jenkinson and Stucke (2011) confirm the early finding of Kaplan (1989a) that the net tax benefits on interest deductions largely account for the premium paid to pre-buyout shareholders. The findings indicate that the beneficiaries of tax savings from increased leverage are not the private equity funds (Knauer et al., 2014). Tax benefits – consumed by the private equity fund and its investors – appear to relate more to transfer pricing. Olbert and Severin (2020) find a reduction of 13% in the effective tax rate in target companies after leveraged buyouts, which they link to the improved tax position from profit shifting activities.

Irrespective of realising tax benefits on the commercial financing needs, Jensen (1986) argues that increased debt levels promote organisational efficiency by reducing the agency cost of free cash flow through periodic debt service payments. This should especially prevent inefficient empire building by management (Jensen, 1988). Further, the governance effects of debt are supported by monitoring effects from the financing banks e.g., in light of potential covenant breaches (Nikoskelainen & Wright, 2007). The benefits of such increased monitoring

[1] Neglecting the possibility that the credit term benefits might (partially) be passed on to pre-buyout shareholders via higher valuation multiples, equity returns increase 4%-9%. Considering mean equity returns of 17% and fund performance alphas ranging up to 2% for LBOs, Ivashina and Kovner (2011) – with further references – reason that the effect from favorable credit terms is economically large. However, Achleitner et al. (2018) provide contrary evidence for a sample of German LBOs documenting that sponsor reputation only drives more favorable covenant clauses while interest costs are insensitive irrespective of institutional or bank sourced financing sources. Evidence on the acclamation that improved loan terms in U.S. buyouts are indeed paid out to pre-buyout shareholders can be found in Axelson et al. (2013) and Kaplan and Stein (1993).

are mirrored by Guo et al. (2011), who present evidence that returns to (total) capital are higher with increasing shares of bank debt financing. In other words, as noticed by Rappaport (1990, para. 47): "(…) there remains much confusion about the role of debt in the capital structure. Borrowing per se creates no value other than tax benefits. Value comes from the operational efficiencies debt inspires". This disciplining effect extends to the level of the private equity fund's management (Axelson et al., 2009) and becomes increasingly relevant for the target companies with significant free cash flows (Knauer et al., 2013), while it is difficult to empirically test the stand-alone disciplining effects independent of the inherently linked tax benefits. Consistent with the benefits of high leverage, Aslan and Kumar (2011) provide evidence on the intuitive conclusion that companies with lower leverage are not only "more attractive candidates for private equity-financed and leveraged buyouts" (p. 518), echoing Andrade and Kaplan (1998), but also that such underlevered companies are more likely to finance growth with private equity investments instead of going public.

Substantial value appears to be added through the governance improvements implemented by the private equity fund in the course of the acquisition. These governance measures extend beyond the disciplining effect from debt financing and help align the interests of management and the private equity fund. This mitigates principal agency costs (Jensen & Heckling, 1976) and establishes value maximisation as the common objective of managers and shareholders (Ames, 2002). A key element of governance engineering lays in management participations, inviting or even requiring key management members to invest alongside the private equity fund into the debt and equity financing upon acquiring the company (Kaplan & Strömberg, 2009). As a result, management equity programs often account for a significant ownership share in the target firm and aim to stimulate long-term growth and maximise fund returns upon exit. In a European context, Nikoskelainen and Wright (2007) find a statistically significant correlation between the returns realised by the private equity sponsor and management ownership. Attached to the equity participation, ratchet clauses adjust the equity percentage contingent on post-buyout performance, further incentivising the management team. Valkama et al. (2013) find that such "use of a ratchet (…) is positively related to both equity and enterprise value returns when contained in the terms of the transaction" (p. 2379). Management participations are frequently accompanied by a revision of the compensation agreements for a broader group of key executives (Baker & Wruck, 1989). Redesigned CEO contracts depart from qualitative and earnings-based criteria, instead introduce cash-flow oriented compensation measures, which are overall more performance sensitive and include vesting periods as well as contingencies (Cronqvist & Fahlenbrach, 2013). Positive effects from reduced agency costs on

corporate spending are evidenced by Edgerton (2012). Opposing research opines that the illiquid management equity share might provide an incentive for risk-aversive behaviour given the managers' equity shareholding will regularly represent a significant share of their undiversified private portfolio (Knauer et al., 2013). Further, the authors point out that internal and external control mechanisms deteriorate with growing shareholder representation of management.[2] Gilligan and Wright (2014) add that "management may suffer from the equity illusion" (p. 171) owning a significant nominal share in ordinary equity, which nonetheless ranks behind myriad other – preferred – instruments, which weaken the alignment of interest if the participating managers fully appreciate the mechanics of the governance engineering with respect to the firm.

Leveraged buyouts create concentrated ownership of the company augmenting the attractivity and intensity of shareholder monitoring (DeAngelo & DeAngelo, 1987). The private equity monitoring activity over the holding period is typically organised in the form of investment or advisory boards to the target. The active nature of such monitoring becomes evident in frequent management replacements following the buyout (Guo et al., 2011). Gertner and Kaplan (1996) confirm the "value-maximizing board" is smaller compared to non-buyout firms and meets less frequently indicating its efficient nature. Baker and Smith (1998) describe it as an important stage for shaping the company's future strategy highlighting the board's dual role in monitoring and advising the management. Jelic et al. (2019) show that private equity partners and executives drive entrepreneurial spirit and help management to identify strategic growth opportunities. Over the holding period, the general partners of the private equity fund contribute and leverage their extensive network in consulting, financing and other aspects of management to support growth (Kaplan & Strömberg, 2009). At the same time, private equity is more sensitive to CEO success and funds act on soft information about CEO ability (Cornelli et al., 2013). Bloom et al. (2015) highlight in a comprehensive global study after conducting over 15,000 interviews across 34 countries that private equity owned firms show "significantly better management practices than almost all other ownership groups" (p.442) and "superior distribution of management practices compared to other firms" (p. 444).

Matthews et al. (2009) indicate that the weights of financial, operational and governance engineering in the value equation changed along the maturing of the industry. While the employment of leverage and sophisticated capital structures invited the first buyout boom, the evolution of the industry heads towards a more pronounced role of operating improvements

[2] Knauer et al. (2013) with further reference to Morck et al. (1988), Holthausen and Larcker (1996) and Seeburger (2010).

(Ghai et al., 2014). Operational improvements were identified as part of the private equity strategy in the early evolution of the buyout industry. Kaplan (1989b) recognises increasing operating income and cash flows combined with decreased capital expenditure spending in the first three years of the buyout phase for a set of buyouts completed in the first half of the 1980s buyout wave. Operating improvements have a direct visibility in the financial statements of the business, most often in the profit and loss statements via revenue expansion or margin improvements. Ayash et al. (2017) show that both, operating margins and operating growth, are positively related to private equity buyout returns, stressing the primary importance of revenue growth. Industry practitioners appear to agree with this priority of growth over cost savings (Gompers et al., 2016), which better supports the equity story upon exiting the investment. This represents a shift from the focus on cost savings shown by Muscarella and Vetsuypens (1990) for the first buyout wave. Operating improvements for target companies exceed industry peers even stronger if the invested private equity firm has an industry specialisation (Cressy et al., 2007). In line with a positive relationship between value creation and private equity fund adding operational expertise at transaction level, operating margin improvements are more significant with the funds' industry specialisation (Le Nadant et al., 2018). Further, private equity fund managers aim to reduce the capital requirements for the business activities. Reductions in the capital intensity are frequently observed through optimising working capital, managing capital expenditures and increases in factor productivity, either by asset disposals or increased utilisation. Gill and Visnjic (2015) find that leveraged buyout companies significantly outperform their peers in asset efficiency. Moreover, target companies frequently refocus on their core business activities putting priority on the areas where the target company has a competitive advantage. Such efficiency increases can also be observed in the employment effects following the buyout with increased reallocation rates, modest decrease in labour unit costs (Goergen et al., 2014) and strongly growing employment in productive company units in a "creative destruction process" (Davis et al., 2014, p. 3958). Scellato and Ughetto (2013) complement this finding with their observation that employment in European private equity buyouts outperforms non-buyout firms in the short- and mid-term.

Working capital is frequently improved by inventory management, extended terms of creditor payments and quicker cash conversion through accelerated collection of accounts receivable. While Boucly et al. (2011) find similar working capital developments among private equity backed companies and control firms and Knauer and Sommer (2010) detect no working capital improvements, another strand in the literature recognises a value contribution by managing working capital needs. Smith (1990) finds strong improvements in the collection of

accounts receivable during the holding period with significant effects on the (industry-adjusted) working capital needs. Wilson et al. (2012) confirm that private equity backed firms have superior working capital control and observe it to be even more pronounced in recessionary periods. Likewise, Harbula (2011) finds improved working capital ratios for a set of European buyout transactions. Holthausen and Larcker (1996) opine that working capital levels outperform industry counterparts both before and after the buyout, questioning the private equity fund's role in improvements. Accounting for size, Holthausen and Larcker (1996) find the private equity backed portfolio firms require only half the working capital compared to industry peers and only observe negative effects on working capital after the exit if management shareholding decreases.

With a view to productivity Harris et al. (2005) find substantial increases in plant productivity following a leveraged buyout. This is consistent with earlier research provided by Ames (2002) who observes increases in the marginal product of labour and capital and confirms early buyout research by Lichtenberg and Siegel (1990), Smith (1990) and Kaplan (1989b), who present evidence on increased plant productivity based on financial statement ratios. This includes the disposal of unproductive assets or business units but is limited to the legal boundaries of anti-asset stripping rules (Wright et al., 2009). Bernstein and Sheen (2016) document a direct nexus between improved efficiency and industry-experienced private equity ownership in the context of mixed franchise target companies, where the chain-owned business units grow stronger in terms of productivity than the franchised business units of the same target company. Operating improvements facilitated by the fund also include intangible assets. Kamoto (2017) finds increased innovation intensity in management-led buyouts. In terms of innovation Lerner et al. (2011) report significant increases in patent citations. Cumming et al. (2007) highlight that new product developments significantly increase following a buyout. Along an apparently positive impact of the leveraged buyout on research and development as well as operations' productivity, the literature presents critical evidence on capital expenditures during the holding period of the private equity fund. Several other research contributions find strong declines in the capital expenditure spending behaviour of the portfolio companies ranging from modest decreases to strong spending cuts.[3] Aligned with the sceptical part of literature, Ayash and Schütt (2016) oppose the idea of improved operating performance following a buyout on a sample of US deals pointing towards "a decline in value creation opportunities over time" (p. 196).

[3] Knauer et al. (2013) provide an overview with further references on decreases in median capital expenditures of up to approximately 40% compared to non-buyout peer companies.

2.3 Data Sample

We investigate enterprise value changes over the investment period by exploring a new and comprehensive set of leveraged buyout transactions. Our original data sample comprises 153 leveraged buyout transactions realised between 2002 and 2018 across Europe. The buyout transactions in our sample cover a wide range of transaction types. The entry and exit routes of our deals include privatisation, re-listings, carve outs, primary and secondary buyouts. In total we identify 90 target companies in our data set and can split the transactions in two groups: 135 leveraged buyout transactions are sponsored by a single private equity fund and the remaining minority of 18 buyouts are so-called club deals, which involve more than one private equity sponsor in a single leveraged buyout. To focus the analysis on value creation in the low interest environment, we restrict our data set to buyouts entered in the year of 2008 or later. This leaves a total of 114 private equity buyouts targeting a total of 82 companies.

Our core data originates from a large global consulting firm, which offers highly specialised transaction advice to private equity funds comprising both buy-side and vendor-side services. We hand-collected our data from transaction relevant documents and sources, which support a high level of reliability in our data. Private equity firms conduct thorough due diligence prior to the acquisition, which requires extensive access to target information and its management. The due diligence most commonly covers commercial, financial, tax, legal and operational aspects. Findings from the due diligence will influence the private equity firms' purchase price offer, investment model and the sale and purchase agreement. In a second step, we use publicly available information from commercial registers, stock exchange filings and investor disclosures to enrich our data. We thereby add any missing information on the holding periods. As a result, we arrive at a panel design data set with a high granularity of data, which is very supportive of our value creation analysis. Our core data and careful extension with official records does not only cater to the depth of data, but also secures its reliability. In aggregate our detailed data set reports on 1473 financial years with 530 years relating to private equity ownership periods beginning 2008 onwards.

The transactions in our sample represent the activity of many private equity sponsors. We therefore hold no substantial concern for a bias in our data. Across all transactions we find 106 unique private equity sponsors with 7 sponsors being represented both in single fund buyouts and in club deals. In the subset of 18 club deals we find 35 unique private equity sponsors and observe an average of 2.2 co-investing sponsors per club deal, while none of our club deals involve more than 3 sponsors. Considering our single sponsor deals, we find an average of 1.4

buyouts per sponsor among our data and only 5 sponsors are represented in more than 3 buyouts (median of 5.8 deals among these five most represented funds). Imposing our time restriction (i.e. eliminating buyouts with entry dates prior to 2008), the low level of fund concentration reduces further. In our data set covering the low-interest period 2008 onwards, only two funds with more than three buyouts remain in our data and the most active five buyout funds in our data set are involved in 22 buyouts. This results in a decreased average of 4.4 deals per buyout fund. Our time-restricted data comprises 114 buyouts including 7 club deals with a slightly decreased average of 1.3 buyouts per sponsor. Overall, we have no concern that a single private equity sponsor might be overrepresented in our data and could thereby distort our analysis. By allowing for realised and unrealised transactions in our data set, we avoid a potential issue of selection bias building on private equity funds typically delaying the exit of underperforming investments, especially in times of fundraising (Cumming & Walz, 2010). The combination of resources relating to a single transaction offers an unprecedented insight into private equity investment's conduct at transaction level. While past research at European transaction level has often relied on data sourced from initial public offering exits or selected limited partner data, the data set at hand reflects the full range of buyout types across a wide range of sponsors. The origin of our buyout sample removes any potential publicity bias.

Most of our buyout transactions are small- and medium buyouts with multiple-based enterprise values below €500m. The interquartile range of enterprise values spans from €129m to €625m with a mean valuation of €577m, which is driven by a group of larger transactions. Our sample shows mean earnings before interest taxes, depreciation and amortisation (EBITDA) of €56.35m and a holding period of roughly four years (mean of 3.9 years). The average EBITDA margin is around 18.6% (mean) upon entry of the private equity fund. Target companies hold on average €68.9m in trade working capital (or a mean of 122.3% times annual EBITDA) and hold roughly an average of €293.5m in fixed assets. For a consistent view on trade working capital, we use current assets and current liabilities directly linked with the operations of the target. This includes inventory, trade receivables, cash, trade payables, advances from customers and provisions for outstanding purchase invoices.[4] Considering shareholding structures, we find management members hold an average of 11.4% of the ordinary equity in the target companies. **Table 2.1** provides an overview on the characteristics of our target firms and **Table 2.2** shows the even distribution of our buyouts across our time period of analysis. Based on ICB code industry classifications our sample companies cover a

[4] Other – potential and deal specific – working capital components, which might be agreed between negotiating parties, are disregarded.

variety of industries: The five most prominent industries are industrials (36%), consumer discretionary (26%), healthcare (12%), technology (10%) and basic materials including chemicals (10%) – with the remainder of 7% relating to other ICB code classifications. For details on the computation on the average approximate value of €51m for the tax shields from additional acquisition debt, please refer to the methodology chapter of this paper.

Table 2.1: Data Sample Summary

Company Statistics *All Buyout Companies*	**Mean**	**Standard Deviation**	**First Quartile**	**Third Quartile**	**Observed Buyouts**
Company at Entry					
Enterprise Value	577.39	778.38	128.77	625.32	114
Sales	404.87	477.65	68.07	538.98	114
EBITDA	56.35	71.18	14.69	63.35	114
Trade Working Capital	68.94	83.58	8.63	110.41	114
Fixed Assets	293.46	405.87	35.33	358.82	114
Management Share	30.2%	85.1%	14.8%	56.1%	114
Holding Period	3.93	1.88	2.44	4.73	114

The table shows the financial characteristics of our buyout target firms at entry. All figures are presented in millions of Euro (€m), unless indicated otherwise.

With respect to our sample, we conclude that it connects well to previous research and the European private equity market in general. Harbula (2011) observes – across a much larger set of 1,000 leveraged buyout transactions in continental Europe – an average enterprise value of €512m, holding periods of 3.8 years and a management stake of 11.3%. These characteristics of buyouts between 1997 and 2010 are also comparable to Acharya et al. (2013), who report on a set of 295 European buyouts during the time period 1991-2007. Among their set of transactions, Acharya et al. (2013) find an average holding period of 3.9 years, which equals our mean holding period. At transaction level we find an increase in enterprise value of 53.6% between entry and exit of the private equity fund (mean value created), which is significant, but lower than the 74% enterprise value increases found by Acharya et al. (2013). While the average enterprise value at entry of €430.2m is smaller than in our target sample, the strong growth is evident in the higher average exit value of €749.6m. Nikoskelainen and Wright (2007) observe somewhat shorter holding periods of 3.5 years in a set of 321 UK buyouts between 1995 and 2004, but significantly higher average management equity shares of 37.6%. The larger equity shares of management among these transactions in conjunction with comparably lower enterprise values of GBP55m – translating to roughly €60m at current exchange rates – point toward an analysis that is coloured by smaller, management-led buyouts.

Table 2.2: Entry and Exit Overview

Data Overview – Distribution of Transactions over Time												
Buyout Timing												
Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Sum
Entries	7	4	7	16	14	14	12	11	13	16	-	114
Realised Exits	-	-	1	-	3	3	7	10	7	17	11	59

The table above shows the number of entered and exited leveraged buyout investments in the respective period. Investments, which are not exited by 31 December 2018 are subject to the same valuation mechanism at year end as previously exited investments providing a consistent analytical framework.

Further, we observe target companies to reduce their relative working capital requirements and – on average – remain stable regarding the efficiency of using their fixed assets. We capture fixed asset efficiency improvement by relating net revenues to the balance of net fixed assets. Consistent with the literature, we observe EBITDA margin improvements around 2.6% on average, which is comparable to e.g., Kaplan's (1989b) finding of up to 3.8% of margin growth. Considering public, non-buyout peer companies, we observe very favourable industry changes over the holding period reflected in average EBITDA multiple increases of 30.2%. We describe the valuation mechanism and matching process in the following chapter in more detail.

2.4 Methodology

Our paper evaluates value creation at transaction level using an OLS regression capturing operating, governance and financial engineering. In our regression, we control for the private equity market environment and its development over the holding period. The dependent variable of our regression defines value created by the increase or decrease in the enterprise value of the portfolio firm between entry to exit. While our data includes actual enterprise value observations at entry and exit for some of our 54 exited buyout companies, we perform a peer valuation. The peer valuation allows us to separate other pricing factors from our analysis that are not directly linked to the value creation plan of the private equity sponsor at transaction level. Such factors might include e.g. the negotiation skills of experienced PE sponsors with a direct effect on the actual transaction multiples (Achleitner et al., 2011) or distortions from potential agency conflicts between limited and general partners of a private equity fund (Axelson et al., 2013). Axelson et al. (2013) argue that such agency conflicts are especially relevant for periods of lax credit conditions and favourable interest rates leading to purchase price overpayments. Considering the low interest environment of our analysis, it should be imperative to mitigate any such effects in the basis of our analysis. Eschenröder and Hartmann-

Wendels (2019) further point to other pricing distortions included in transaction multiples like transaction fees or premia for synergy effects paid by strategic investors upon exit. Also, it allows us to value unrealised investments. In the computation of value created at transaction level, we consider the tax effect of additional leverage introduced by the private equity sponsor. We isolate and remove the tax shield from increased third-party debt and shareholder loans using the present value of additional tax savings and take into account a stylised version of European interest tax deduction limitations.

2.4.1 Quantifying Value Creation at Transaction Level

We calculate enterprise value for each of our sample companies at entry and exit of the private equity sponsor. For all valuations we identify public industry peers and infer trading multiples from the set of most comparable companies. With a view on consistency and data depth, we use the STOXX Europe indices as our peer group, which is sufficiently large. For unrealised investments, i.e. which have not been exited by the end of 2018, we perform a year end valuation. Our approach follows Eschenröder and Hartmann-Wendels (2019) who offer further comments on the benefits of this approach.

When determining the trading multiples to derive enterprise value, we rely on a peer group of five peers, which offer a high comparability in terms of financial and commercial characteristics in the entry and exit year. The scope of five firms corresponds to Kaplan (1989b). To establish this set of peers, we apply an industry-code based matching process. The comparable companies are drawn from the corresponding sector index of the STOXX Europe 600 as our valuation index, which is also used as a reference index by Achleitner and Figge (2014). To allow for a refined valuation we match our target companies to the 114 subsectors as defined by the Industry Classification Benchmark code (ICB industry code), which span across the super sector indices made available by our valuation index (STOXX Ltd., 2020). The 19 sector indices provide a rich and reliable set for peer selection and are consistent with the European geographic focus of our analysis. In the first iteration for each valuation, we limit comparable equity titles to the same ICB industry code. Further, we only accept search results, which do not substantially deviate from our sample company operating metrics in accordance with the following rules: Our valuation peers may not deviate more than 15 percentage points in terms of (i) profitability (EBITDA margin) and (ii) capital intensity (sales/fixed assets). In cases where we do not retrieve at least five comparable firms based on our criteria set, we successively drop the last digit(s) of the ICB industry code until a reference group of at least

five firms becomes available.[5] Whenever we retrieve more than five peer companies, we compute the Euclidean distance of the peer variables (EBITDA margin, fixed assets/sales and operating cash flow/sales) and use the closest five matches.

Among the identified peer group companies, we establish the median enterprise value/EBITDA multiple by adding net debt to the market capitalisations and relating the result to the EBITDA of our target company. For the sample companies where we can observe add-on acquisitions during the holding period, we repeat the valuation process and add it to the platform's enterprise value to provide for a holistic valuation upon entry and exit. All matching processes use the financials of the year in which the respective initial or add-on transaction occurred.

2.4.2 Isolating the Tax Effect of Leverage

We capture the tax effect of leverage by comparing the level of non-current debt at transaction level prior to the buyout to the average non-current debt over the holding period. The granularity of our data allows us to identify the share of shareholder loans and other non-current debt issued by banks and other lenders. Our pre-buyout observation draws on the last financial year preceding the buyout and for the average post-buyout debt we include each financial year over the private equity holding period until the exit event. For our analysis we use the interest rates as reported by the S&P European LBO index, which is a multi-currency index including all facilities to European issuers backed by private equity firms. We apply the debt yields reported in the month of the acquisition by the index to the buyout debt issued by third parties. For the shareholder loans, which are commonly unsecured loans with repayment flexibility, we add 200 basis points to estimate a shareholder loan interest rate. In the computation of the discounted value of the tax shield we assume a discount rate equal to the interest rate following Kaplan (1989a) with further reference to Brealey and Myers (1984). This appears to be reasonable considering the tax benefits associated with the interest expenses are subject to the same risk profile as the corresponding debt financing. As a result of the equality of our interest and discount rates, the value of our tax shield is not sensitive to changed interest rates (Kaplan, 1989a).

In the European context of our analysis, we appreciate the tax environment of private equity investments in two ways. First, we use the average European tax rate of 30.64% as reported by

[5] We apply the narrower boundary of 15 percentage points allowed deviation in comparison to Eschenröder and Hartmann-Wendels (2019) recognising the comfort of remaining within the (same) sector index while retrieving sufficient (compliant) search results.

Olbert und Severin (2020) to calculate the value of the additional tax shield. We decide to use a blended tax rate over national tax rates considering the aggregate financial information do not always allow to allocate debt balances to specific countries in cases of pan-European target groups. Second, we recognise that the tax deductibility of interest expenses will frequently be restricted by interest expense limitation rules. Building on the Anti-Tax Avoidance Directive proposed by the European Commission (2016), we introduce a deductibility threshold based on the target company's EBITDA, which limits the amount of deductible interest to 30% of EBITDA. While the national implementation of such rules across Europe will often involve adjustments and exceptions under domestic laws, we feel the stylised representation of the rules adds an important aspect of debt to our analysis. Based on the average enterprise value in excess of €570m and leverage ratios above 50%, the inclusion of interest deduction rules appears to be reasonable as the exemption limits for the application of interest deduction rules will frequently be exceeded, even in cases where the debt facilities are spread across different company levels and countries. Consistent with our debt observations, we use 30% of the average EBITDA over the private equity holding period. We then calculate the eternal value of the tax shield by multiplying the additional debt with the European average tax rate but restrict the maximum amount to a tax advantage resulting from annual interest deductions of 30% average EBITDA. The resulting discounted eternal value from the additional tax shield of debt is then subtracted from the delta between enterprise value at entry and enterprise value at exit.

This approach follows the notion that private equity sponsors pay a premium to pre-buyout shareholders using the value of additional tax benefits (Kaplan, 1989a; Jenkinson & Stucke, 2011). For the selected transactions where we can observe the actual valuation upon entry and exit, we find our approach to perform well. Reviewing the quality our valuation approach, we perform a regression of our valuation results on actual enterprise valuations for the cases with available transaction pricing. Considering a coefficient of 0.9468 and a R^2 of 0.9663 we conclude that the results of our valuation approach properly fit actual pricing observations and for the purpose of our analysis.

With a view to value creation, isolating the tax effects from financial engineering appears consistent with the view that such effects are rather "value capturing" (Loos, 2006, p. 21) and provide for a potential wealth transfer from a macroeconomic point of view (Berg and Gottschalg, 2005 with further references). We further neglect actual maturities and specific repayment terms of our buyout debt which requires a couple of remarks: First, leveraged loans are often bullet loans requiring principal repayment only upon expiration. The same frequently applies to shareholder loans with payment-in-kind arrangements where neither cash interest nor

principal repayments apply over the loan term (Colla et al., 2012; De Maeseneire & Brinkhuis, 2012). Second, refinancing measures and changes in ownership make a lasting deleverage or final retirement of augmented debt levels improbable. Finally, our tax shield calculation implicitly assumes that the private equity funds can correctly anticipate the debt levels over the holding period and estimate the resulting tax effects. Building the estimate potentially requires tax knowledge across multiple involved jurisdictions. We consider this assumption to be reasonable based on practical observations. Hartmann-Wendels et al. (2012) provide empirical evidence in support of firms' general ability to recognise the marginal tax benefits of debt and corresponding leverage increases in the capital structures of over 80,000 German firms. Considering a common private equity acquisition, private equity funds conduct thorough due diligence with the support of large, international auditing and tax consulting firms (e.g. the "Big Four"). The same consulting firms are typically engaged to develop an acquisition structure that caters the private equity sponsor's commercial needs in a tax efficient way. Therefore, the private equity firms obtain detailed tax structuring advice including tax considerations for debt financing and repatriation mechanism for the holding period and exit.

2.4.3 Variable Calculation

Consistent with academia, private equity practitioners have a self-understanding to create value from combining operational, financial and governance engineering (Gompers et al., 2016). We follow this assessment by introducing a set of seven predictive variables to identify the effects from the different value creation levers. Our main value drivers analyse operational improvements, governance engineering and the (non-tax) effects of financial engineering as determinants of value creation at transaction level. **Table 2.3** provides an overview of the variables used in our analysis. Descriptive statistics on our variables at entry and their subsequent development over the holding period are shown in **Table 2.4**.

To measure operational improvements, we develop a set of three variables. We include a profitability measure capturing the growth of EBITDA over sales. This variable will remain independent of the financing effects as well as accounting effects relating to the target company's assets (Eschenröder & Hartmann-Wendels, 2019). EBITDA margins grow on average by roughly 2.6% annually throughout the holding period. Our second variable captures reduced capital requirements in working capital, which we define by trade working capital over sales. We limit our working capital efficiency variable to trade working capital and exclude other working capital components for a consistent methodology across our data sample

Table 2.3: Variable Overview

Explanatory Variables	
Operating Engineering	
(1) EBITDA Margin Expansion	The ratio of EBITDA to net revenues to scale by volume.
(2) Working Capital Efficiency	This variable is defined as trade working capital divided by net revenues to account for operation size.
(3) Fixed Asset Productivity	The ratio of net revenues over the balance of fixed assets (net of depreciation).
Governance Engineering	
(4) Management Equity Share	The variable captures the percentage of ordinary equity held by members of the management board 1 year after the buyout.
(5) Active Management Selection	Dummy variable indicating non-retirement changes in the management board within one year after entering the investment.
Financial Engineering	
(6) Interest Coverage Ratio	Accounts for the disciplining effect of debt by actual or estimated operating cash flows (= EBITDA less capital expenditures) over bank interest expense.
(7) Bank Monitoring	Measures the share of bank debt to total debt to capture bank monitoring among debt holders.
Control Variables	
(8) S&P Indicator Change	Difference between 12-Month EBITDA/Enterprise Value for STOXX Europe 600 companies less S&P European LBO Loan spreads. Enterprise Value is calculated using the market value of equity plus net debt (= current and non-current debt less cash and marketable securities). Based on the EBITDA approach we exclude banks and insurance companies from our computations.
(9) Holding Years	Records the number of years over which the respective private equity investor holds the target company.
(10) Buyout Size	The natural log of the target company's net revenues in the year of entry by the private equity fund.
(11) Sponsor Fund Size	The natural log of the investing private equity fund's committed capital (in €100m). We use the average fund size in case the buyout involves more than one private equity sponsor.

The table above presents the explanatory and control variables used in our regression analysis. For the variables relating to financial engineering, we use the median observation over the holding period.

irrespective of deal specific considerations. Beneficial developments in this variable will therefore reflect expedited account receivable collections from customers, extended supplier credit terms or leaner inventory management. We relate this to sales to account for growth. Over the holding period of the private equity fund we observe a mean improvement in working capital, ceteris paribus a negative annual working capital growth of 3.5% in relation to sales.

Table 2.4: Variable Summary

Descriptive Statistics *All Buyout Companies*	**Mean**	**Standard Deviation**	**First Quartile**	**Third Quartile**	**Observed Buyouts**
Variables at Entry					
Tax Shield (€m)	51.01	78.50	11.85	57.21	114
EBITDA Margin	18.6%	12.0%	10.2%	23.6%	114
Working Capital Intensity	122.3%	117.4%	58.8%	174.3%	114
Fixed Asset Productivity	86.1%	104.1%	26.3%	101.6%	114
Management Share	11.4%	6.0%	7.2%	13.8%	114
Interest Coverage	5.10	28.15	0.80	2.23	114
Bank Monitoring	0.64	0.18	0.56	0.72	114
Development over Holding Period					
Value Created	53.6%	60.5%	9.1%	77.2%	114
EBITDA Margin Expansion	2.6%	8.7%	0.5%	5.4%	114
Working Capital Changes	(3.5%)	10.1%	(7.1%)	1.2%	114
Fixed Asset Efficiency Improvement	(0.4%)	15.7%	(7.2%)	1.9%	114
Industry Change	30.2%	85.1%	14.8%	56.1%	114
Holding Period (years)	3.93	1.88	2.44	4.73	114

The table presents our variables at entry and shows the subsequent development over the private equity ownership period. For all buyouts our data set includes annual figures for each year of the holding period as well as at least the two years preceding the entry of the private equity fund. The annual year-on-year growth rates per company are calculated using the median growth rate.

Our third operational variable aims to identify efficiency improvements and enhanced asset utilisation by relating fixed assets to sales. Among our data sample, we find the target companies turn over their fixed assets more than once each financial year or – expressed as the mean ratio of net revenues over fixed assets – we find 86.1% upon entry of the private equity fund. Scaled by sales development, we find the balance of fixed asset to remain almost constant with a weak annual efficiency improvement of c. 0.4%.

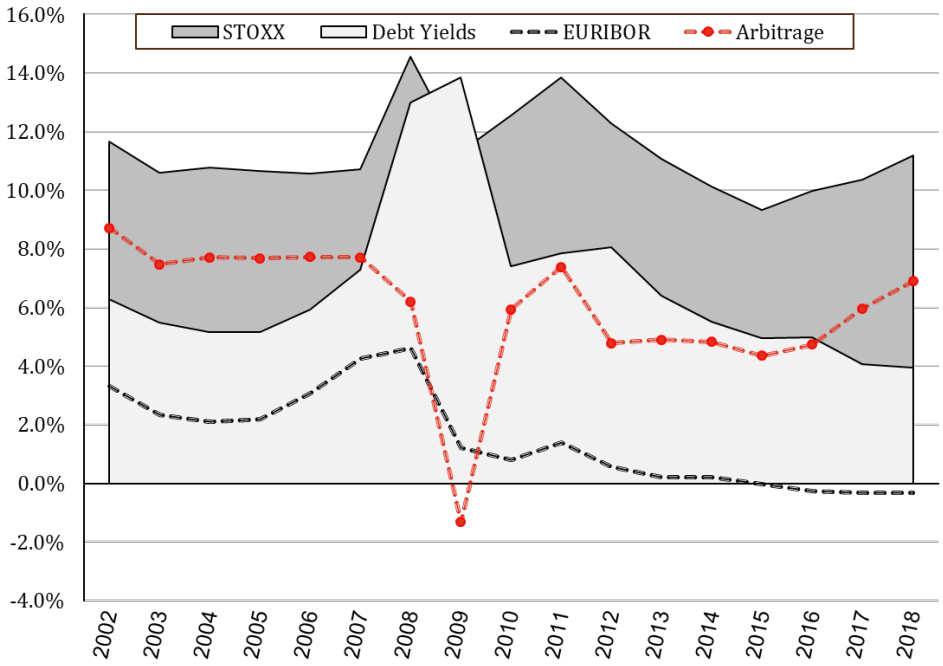
For all three operational growth variables, we compute the median year-to-year growth rate over the holding period for each buyout company, which we feel follows the trajectory more accurate in comparison to compounded annual growth rates. Also, we prefer the median growth rates over mean growth rates, which would otherwise introduce a (slightly) right skewed distribution for some of our independent variables. Our variable set-up should also mitigate effects from potential earnings management and other accounting measures surrounding the private equity sponsor's entry. Chou et al. (2006) present evidence on earnings management around security offerings and Mao and Renneboog (2015) confirm the nexus established by Wu (1997) that primary management buyouts induce earnings manipulation. Tutuncu (2019) opposes this view and argues private equity sponsors constrain pre-buyout earnings management practices in management buyouts.

The effects from governance engineering are captured by two management related variables. We include the percentage of ordinary equity shares held by management (Management Share) to see if varying levels of management ownership affect value creation. Further, we introduce a dummy variable indicating non-retirement changes in the management board within one year after entering the investment. This variable will document active management selection by the private equity fund sponsor. With our measure for active management selection, we follow Guo et al. (2011) and Kaplan et al. (2012), who offer a detailed description on management boards in private equity buyouts.

As for the non-tax related aspects of financial engineering, we account for the disciplining effect of debt by including two further variables. We introduce the median interest coverage ratio over the holding period by relating operating cash flows to the bank interest expense. We only include bank debt interest in our interest coverage ratio assuming shareholder loan liabilities most commonly feature accruing interest only, will rank behind third party debt and thus are unlikely to provide for a default event. We therefore do not expect significant disciplining effects for target company managers based on shareholder interest expenses. For buyouts where we cannot directly observe operating cash flows in our data set, we approximate operating cash flows by subtracting capital expenditures from EBITDA, which is a good proxy for cash flow (Opler & Titman, 1993). After accounting for the acquisition financing, the average interest coverage is 5.1x cash flow from operations with the quartiles indicating that the core of target companies is subject to much lower interest coverage. Our second variable on financial engineering captures the potential monitoring effect that the inclusion of third-party debt entails represented by median bank debt to total debt over the holding period following Guo et al. (2011). A high average degree of 64% in bank monitoring indicates that most of the debt at target level originates from bank financing or debt funds, i.e. only a minority of debt is held by the investing private equity fund or entities related to the fund, for example, shareholder loans extended by an intermediate holding company.

In our regression we control for the economic environment of our buyout transactions. We follow the development of the private equity investment market with an indicator we build in the spirit of Kaplan and Strömberg (2009). The indicator reflects on the attractivity of the market for the funds to generate positive equity returns by leveraging high yield debt on operating earnings. For this purpose, our indicator relates the STOXX Europe 600 companies returns to leveraged financing yields. As an exaggerated example to illustrate the reasoning behind the indicator, the private equity fund could realise the entire surplus between the debt yield and operating margins, if the leveraged debt market allowed a full debt financing of the

Figure 2.1: Private Equity – Market Cyclicality Indicator



The figure visualises our control variable capturing the attractiveness of market conditions for private equity investments building on Kaplan and Strömberg (2009). For reference purposes, the figure depicts the development of the 3-Month EURIBOR rate obtained from S&P Capital IQ to differentiate between the spreads and a commonly used base rate in leveraged buyout financing arrangements.

acquisition. Thus, the more credit market conditions relax relative to operating yields, the more attractive buyout transactions become. We use the median trailing 12 months EBITDA over enterprise value as obtained from Bloomberg with enterprise value defined as the market value of equity plus net debt (current and non-current debt less cash and marketable securities) for STOXX Europe 600 companies. If either the numerator or denominator of EBITDA/Enterprise Value is negative for a company, the ratio is not meaningful and not included in our calculation. Likewise, we excluded banks and insurance companies in light of the EBITDA calculation approach. The second component of our indicator – the leveraged financing yields – measures the cost of debt financing for private equity funds. We use the yields to maturity as reported in the S&P European LBO Index. We depict the resulting market arbitrage potential between operating yields and debt yields for private equity sponsors in **Figure 2.1**. Our variable then draws on the change of the above indicator between the time of entry to exit.

We include controls for the buyout size following Le Nadant et al. (2018) with the logarithmic amount of target company's revenues in the year of the buyout, denominated in Euro. Likewise, we control for the size of the investing private equity fund based on the amount of capital committed to the fund. Fund size drives investment behaviour (Humphery-Jenner,

Table 2.5: Cross-correlation Table

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) Tax Shield	1.0000												
(2) Sales	0.6856	1.0000											
(3) EBITDA	0.8189	0.8119	1.0000										
(4) Trade Working Capital	(0.0856)	0.1450	(0.1325)	1.0000									
(5) Fixed Assets	0.6345	0.6968	0.7686	(0.0529)	1.0000								
(6) Management Equity Share	0.0507	0.0930	0.0531	(0.0680)	0.0242	1.0000							
(7) Active Management Selection	0.0090	0.0914	0.1023	(0.0111)	0.0544	(0.0889)	1.0000						
(8) Interest Coverage Ratio	(0.0497)	0.0304	(0.0153)	(0.1074)	(0.0436)	0.0951	(0.0408)	1.0000					
(9) Bank Monitoring	0.1830	0.1942	0.1480	0.0665	0.2531	(0.1245)	(0.0868)	(0.1723)	1.0000				
(10) Private Equity Cyclicality	0.0626	0.0819	0.0417	(0.0219)	0.1015	0.0767	0.0754	0.0179	0.0577	1.0000			
(11) Holding Duration	(0.0766)	(0.0528)	(0.1544)	(0.0420)	(0.0555)	0.0121	**(0.2797)**	0.1992	(0.0727)	0.0675	1.0000		
(12) Fund Size	0.3058	0.2491	0.2978	0.1822	0.1859	(0.1070)	0.1317	(0.1507)	0.0882	(0.0050)	(0.1216)	1.0000	
(13) Buyout Size	0.5278	**0.8247**	0.6838	0.2184	0.6248	(0.0246)	0.1328	0.0891	0.1432	0.1738	(0.1047)	0.3141	1.0000

The table exhibits the cross-correlations between the observations used in the computation of our variables for our OLS regression. The strongest positive and negative cross-correlation points are highlighted in bold

2012) and reflects on the fund's experience and reputation. To avoid issues of heteroscedasticity in our analysis, we use the logarithm of the fund's committed capital as recorded in the Preqin database with fund sizes in €100m units. In case more than one fund is involved in the buyout, we use the average fund size among the funds involved in the club deal.

Table 2.5 shows the cross-correlations for the observations we retrieve and use in our variables. We observe an expected degree of cross-correlation for the measures derived from the profit and loss statements of our target companies, which does however not adversely affect our analysis. The strongest positive cross-correlation can be found for buyout size and sales, which is sensible considering the sales figures are underlying our buyout size variable. The strongest negative correlation exists between active management selection and holding duration. Based on the cross-correlation results we have no material concern for collinearity.

2.5 Results

In a first step, we consider the correlation coefficients for our dependent variable and independent variables included in our regression analysis, which we report in **Table 2.6**. In Panel (A) we report the results on all 114 buyout transactions in our data sample. We observe the strongest correlation between EBITDA margin improvements and enterprise value increases, which is highly statistically significant (at the 0.1% level). This aligns with the intuitive link between increased EBITDA and higher cash flow generation potential demanding higher enterprise valuations. Correspondingly, strong increases in EBITDA margin over the private equity holding period will invite larger increases in enterprise value and our value creation measures, which adjusts the gross enterprise value change by the tax shield of additional debt. This relationship continues to hold in Panel (B), which incorporates our outlier definition. We define outlier buyouts as any buyout transaction, which features at least one outlier variable. Such outlier values are defined for each variable based on Tukey boxplots. Any value that shows a distance of more than 1.5 times the interquartile range above and below the median observation for the variable qualifies the buyout as an outlier.

Similarly, we find the duration of the holding period and improvements in fixed asset productivity to each have significant impacts on the value creation. Under both specifications of our correlation coefficient test, we observe improved working capital management – indicated by declines in growth relative to sales – is positively related to value creation. In Panel (A) we observe working capital improvements significant at the 1% level, in Panel (B) at the

Table 2.6: Correlation Coefficients

Correlation Coefficients for Value Creation *All Buyouts*	**(A) Correlations with Outliers**	**(B) Correlations excl. Outliers**
Explanatory Variables		
Margin Improvements	0.4151 ***	0.4505 ***
Working Capital Efficiency	(0.2971) **	(0.2780) *
Fixed Asset Productivity	(0.0299)	0.0355
Management Share	(0.0633)	(0.1058)
Active Management Selection	(0.2360) *	(0.1691)
Interest Coverage Ratio	(0.0845)	(0.0352)
Bank Monitoring	0.0540	0.1455
Control Variables		
S&P Indicator Change	0.0806	(0.0089)
Holding Years	0.3541 ***	0.3720 **
Buyout size	(0.0623)	(0.0558)
Sponsor fund size	0.0417	0.1062
Number of observations	114	69

*The table presents the correlation coefficients for our dependent and independent variables. The regression variables are grouped by company specific explanatory variables and control variables with the latter group accounting for fund, deal and market aspects surrounding the buyout. Panel (A) reports on our entire data sample. Panel (B) shows the correlation coefficients for reduced data samples excluding outliers. We define outlier buyouts as any buyout transaction, which feature at least one outlier variable. We define outliers based on Tukey boxplots including values extending up to 1.5 times the interquartile range above and below the median observation. The significance levels for all specifications are ***0.1%, **1% and *5%. Negative values are shown in brackets.*

5% level. Even more significant, there is a correlation between holding years and value creation among all buyouts (significant at the 0.1% level), which remains significant when removing outliers (1% level respectively). Interestingly, active management selection – our dummy variable indicating manager replacement within one year of the buyout transaction – is negatively correlated with our dependent variable, value creation. For the entirety of our buyout transactions reported in Panel (A) this relationship is significant at the 5% level. This implies – from a correlation perspective considering only two observations at a time – management replacements by the private equity fund might miss their economic objective: Instead of a strengthened board and expected benefits from a relief of diverging ideas about the company's future, the appointment of new directors adversely affects value creation at target level.

Table 2.7 reports the results of our OLS regression and elaborates on the results of the two-dimensional correlation coefficients. The analysis consists of four specifications shown in columns (A) through (D). The first set of columns reported in the table, specifications (A) and (B), report on our entire data set using all 114 buyout transactions. Specification (A) only considers our explanatory variables in a partial analysis. This includes the seven variables

relating to operational, governance and financial engineering, but excludes our battery of control variables. We add the control variables in our full analysis under specification (B), which account for changes in the private equity investment environment based on the S&P indicator change, holding years, buyout size and the private equity fund size. For the second set of specifications reported in columns (C) and (D) of the table, we remove outliers based on the previously introduced interquartile range rule. We repeat our two-fold approach to analyse the reduced set of 69 buyout transactions. The two columns report on our partial and full analysis in specifications (C) and (D), respectively. Below the regression coefficients we report t statistics.

Across all specifications, our variable on EBITDA margin improvements remains the sole robust and significant driver in explaining value creation of private equity funds at transaction level. In our partial analyses under specifications (B) and (D) we find the length of the private equity holding period to be equally significant (at the 5% level), being positively related to value creation. Under specification (A) we also observe a significant governance variable. Active management selection – representing the replacement of directors shortly after the buyout – negatively impacts value creation at transaction level, also on a 5% significance level. However, the management selection variable does not remain robust throughout the other specification (B) to (D) and is not supported as a determinant under both outlier specifications. The noticeable increase in our adjusted R^2 measures for the full analysis confirm the additional explanatory power from adding our control variables. Our strict outlier definition removes a considerable share of buyout transactions and stresses the robustness of the effect from EBITDA margin improvements as our key operational determinant. The comparable regression fits reflected in the adjusted R^2 indicate that our main regression is not driven by outliers, which is especially evident for our full analysis including control variables.

Our findings are in line with recent investigations into the impact of private equity funds at transaction level and how they create value: EBITDA growth is a key metric and EBITDA margin improvements are imperative in value creation. With a mean EBITDA margin of 18.6% at entry and standard deviation of 12%, we find a median annual profitability increase of around 22% following our buyouts, which is economically comparably large as the return on asset increase reported by Boucly et al. (2011). Wilson et al. (2012) make comparable observations in EBITDA margin improvements and relate these to the private equity sponsor's presence for a much larger set of UK buyouts. Further, they show that profitability increases exceed public company peers and are more robust to recessionary developments, substantiating operating improvements adding value through increased productivity. This adheres to an earlier thread of

Table 2.7: Determinant Analysis – Regression Results (All Buyouts)

Determinant Analysis *All Buyouts* *Regression coefficients and t statistics*	**(A) Partial Analysis** with Outliers	**(B) Full Analysis** with Outliers	**(C) Partial Analysis** excl. Outliers	**(D) Full Analysis** excl. Outliers
Explanatory Variables				
Margin Improvements	2.6107 **	2.2172 **	5.0800 **	5.0248 **
	3.373	2.934	3.248	3.355
Working Capital Efficiency	(0.7204)	(0.9040)	(0.0181)	(0.1419)
	(1.277)	(1.636)	(0.017)	(0.141)
Fixed Asset Productivity	(0.1168)	0.0412	(0.7287)	(0.7761)
	(0.393)	0.141	(0.830)	(0.859)
Management Share	(4.4986)	9.3457	(199.0505)	(125.8561)
	(0.051)	0.108	(1.493)	(0.969)
Active Management Selection	(0.2529) **	(0.1808)	(0.0702)	0.0166
	(2.680)	(1.893)	(0.682)	0.158
Interest Coverage Ratio	(0.0021)	(0.0024)	(0.0348)	(0.0123)
	(1.354)	(1.598)	(0.540)	(0.189)
Bank Monitoring	(0.0431)	0.0479	0.2542	0.3169
	(0.135)	0.154	0.613	0.739
Control Variables				
S&P Indicator Change		0.0303		(0.0753)
		0.522		(0.405)
Holding Years		0.0816 **		0.0958 **
		3.144		2.717
Buyout size		(0.0478)		(0.0462)
		(1.205)		(0.999)
Sponsor fund size		0.0348		0.0381
		1.329		1.327
Number of observations	114	114	69	69
Adjusted R^2	0.1958	0.2622	0.1698	0.2638

*The table presents the regression coefficients, which are grouped by company specific explanatory variables and control variables with the latter group accounting for fund, deal and market aspects surrounding the buyout. Panels (A) and (B) report on our entire data sample. Panels (C) and (D) show the correlation coefficients for a reduced data sample excluding outliers. We define outlier buyouts as any buyout transaction, which feature at least one outlier variable. We define outliers based on Tukey boxplots including values extending up to 1.5 times the interquartile range above and below the median observation. The significance levels for all specifications are ***0.1%, **1% and *5%. Negative values are shown in brackets. The t statistics are reported below the respective coefficients.*

literature finding that private equity funds add value (Ames, 2002) and provide for superior efficiency gains in the portfolio company's operations during the first four years of the holding period (Amess, 2003). This contrasts the findings of Jelic and Wright (2011), who find mixed evidence on operating improvements in a set of UK buyouts in the period 1980-2009. Meanwhile, Cressy et al. (2007) find strong profitability improvements of 9.06% over the first three holding years among a comparable set of UK buyouts over the time period 1995-2002. This is not only consistent with our results and the early findings on operating efficiency of

Jensen (1989), but also Cressy et al. (2007), who relate the strength of profitability improvements to industry specialisations of private equity funds.

Bergström et al. (2007) report similarly significant EBITDA margin improvements advocating the positive operating impact of private equity funds at transaction level. With a view to the sources of margin improvements and employment effects, they note that EBITDA profitability coincides with wage level decrease, however, these do not explain the EBITDA margin increases. Revisiting our data, we find 27 buyouts with an accounting set up that allow us to track the headcount in full-time employees and the personnel expenses. We find wage costs – expressed as average personnel costs per full-time employee – grow on average 2.05% per year (median 2.62%). Considering an average consumer price inflation of 1.74% (median 1.84%) over the time period of our data set from 2007 to 2018, real wages in our buyout firms enjoy moderate growth. Meanwhile the size of the workforce grows considerably with an average annual growth rate of 6.12% (median 4.04%) over the private equity holding period. This finding aligns with Bergström et al. (2007). Arguably, we have no indication of the wage and workforce development among industry peers but can confirm in a general way that our EBITDA margin improvements are unlikely sourced from nominal or real wage cuts and notice favourable employment growth under private equity ownership. This corresponds to Davis et al. (2014) providing evidence of large gross job creation in US buyouts and Jelic and Wright (2011) finding annual employment increases among UK management buyouts.

We conduct two further analyses to deepen our understanding of the role of operational engineering in private equity buyouts. Based on discussions in the literature on different value creation dynamics in primary and secondary buyouts, we rerun our regression excluding any secondary and subsequent buyouts. With a view to different approaches depending on the target company's size, we also repeat our regression analysis for a restricted data set only including small and medium sized buyouts with an enterprise value less than €500m and exclude any buyout transaction exhibiting a higher valuation at entry of the private equity fund.

Table 2.8 shows the regression results for 83 primary buyout transactions included in our sample. The first two columns, (A) and (B), report on all primary buyouts and the two following columns, (C) and (D), show the results for our regression repeating the outlier restriction we previously used in our main regression. Across all specifications of our primary buyout regression, we continue to observe profitability increases as a key value driver. In Panel (A) we observe margin improvement to strongly drive value creation, significant at the 1% level. Also, we observe the negative effect of active management selection to be statistically significant at the 5% level. While our operational improvement variable (extension of EBITDA margin prof-

Table 2.8: Determinant Analysis – Regression Results (Primary Buyouts)

Determinant Analysis *Primary Buyouts* *Regression coefficients and t statistics*	**(A) Partial Analysis** with Outliers	**(B) Full Analysis** with Outliers	**(C) Partial Analysis** excl. Outliers	**(D) Full Analysis** excl. Outliers
Explanatory Variables				
Margin Improvements	2.4814 **	2.2290 *	4.7791 *	5.1873 *
	2.707	2.434	2.521	2.680
Working Capital Efficiency	(0.8890)	(0.8448)	(0.4511)	0.1024
	(1.219)	(1.140)	(0.348)	0.072
Fixed Asset Productivity	(0.0981)	0.0757	(0.9519)	(0.7464)
	(0.299)	0.225	(0.854)	(0.634)
Management Share	1.4234	0.5390	(255.1793)	(136.2922)
	0.013	0.005	(1.507)	(0.779)
Active Management Selection	(0.2881) *	(0.2289)	(0.0699)	0.0411
	(2.458)	(1.810)	(0.515)	0.278
Interest Coverage Ratio	(0.0020)	(0.0022)	(0.0340)	(0.0180)
	(1.175)	(1.271)	(0.609)	(0.324)
Bank Monitoring	(0.2483)	(0.1789)	(0.0603)	0.0714
	(0.680)	(0.486)	(0.139)	0.154
Control Variables				
S&P Indicator Change		0.0223		(0.2787)
		0.349		(1.144)
Holding Years		0.0746 *		0.0873
		2.098		1.921
Buyout size		(0.0333)		(0.0222)
		(0.033)		(0.324)
Sponsor fund size		0.0405		0.0287
		1.168		0.758
Number of observations	83	83	44	44
Adjusted R^2	0.1953	0.2198	0.1664	0.1990

*The table presents the regression coefficients, which are grouped by company specific explanatory variables and control variables with the latter group accounting for fund, deal and market aspects surrounding the buyout. Panels (A) and (B) report on our entire data sample. Panels (C) and (D) show the correlation coefficients for a reduced data sample excluding outliers. We define outlier buyouts as any buyout transaction, which feature at least one outlier variable. We define outliers based on Tukey boxplots including values extending up to 1.5 times the interquartile range above and below the median observation. The significance levels for all specifications are ***0.1%, **1% and *5%. Negative values are shown in brackets. The t statistics are reported below the respective coefficients.*

-itability) retains its statistical significance across all specifications of our primary buyout regression – yet, at a 5% significance level – the statistical significance of our active management selection variable disappears in the other regression columns. Including our battery of control variables, we find mixed evidence on the effect of holding periods in our primary buyout regression. While we find an increased holding period benefits value creation for our primary buyouts like in our main regression, we observe a slightly reduced significance (at the 5% level in our primary buyout regression). The significance of holding periods disap-

pears in our last specification (D). Overall, the results of our primary buyout regressions align with the results of our main regression and confirm the high relevance of operational improvements for value creation.

In **Table 2.9** we present the results of our second analysis modification, which excludes larger buyout transactions with an enterprise value of more than €500m at the time of the private equity fund's investment entry. This modification removes roughly one third of our buyout sample leaving 81 small and medium sized transactions for our regression. The evidence adheres to the other two regression results in a way that underlines operational engineering as the prevalent value lever. However, operational improvements through profitability increases in EBITDA margin is less accentuated with a shift in statistical significance towards working capital efficiency, which is statistically significant at the 5% level for specifications (A) through (C) in our size-restricted regression. Yet, the significance of working capital efficiency disappears when further removing outliers from our size-restricted sample under specification (D). Our second regression modification highlights another area of operational improvement corresponding to research by Singh (1990). During private equity ownership our sample buyout firms improve their working capital management, which we scale by revenues to consider growing company size. The improvements are evident as a key value lever in small and medium sized buyout transactions. This is consistent with Achleitner et al. (2010) pointing out different roles of value levers depending on transaction size. We likewise find evidence that larger deals pronounce EBITDA margin improvements in our main regression to create value, while these lack significance for small and medium sized buyouts in our regression results.

Interestingly, our determinant analysis excluding large buyouts yields additional effects on the account of governance engineering. Under the partial analysis – only using the main explanatory variables as reported in column (A) neglecting our control variables – we find negative effects of active management selection to be strongly statistically significant (on the 0.1% level). This effect continues to be significant at the 1% level when including our battery of control variables in specification (B). The result appears to be intuitive in the context of small and medium sized buyouts: In smaller and medium sized organisations managers might acquire company-specific knowledge providing them an advantage in leading the organisation, adjusting to the market and giving them an edge in retaining their positions. Replacing the managers shortly after the buyout transactions potentially removes the benefits of such domain knowledge from the board and adversely affects value creation over the holding period (Robbie & Wright, 1995). Further, within the field of governance variables, we notice another adverse

Table 2.9: Determinant Analysis – Regression Results (excluding large buyouts)

Determinant Analysis *Small and medium sized buyouts* *Regression coefficients and t statistics*	**(A) Partial Analysis** with Outliers	**(B) Full Analysis** with Outliers	**(C) Partial Analysis** excl. Outliers	**(D) Full Analysis** excl. Outliers
Explanatory Variables				
Margin Improvements	1.2422	1.1349	1.8630	2.7438
	1.248	1.142	0.974	1.401
Working Capital Efficiency	(2.4943) *	(2.2375) *	(3.0623) *	(2.4572)
	(2.526)	(2.251)	(2.492)	(1.876)
Fixed Asset Productivity	(0.1356)	(0.0316)	(0.1876)	(0.8060)
	(0.441)	(0.100)	(0.191)	(0.789)
Management Share	(2.6214)	18.0047	(413.5196) *	(326.7239)
	(0.024)	0.163	(2.277)	(1.783)
Active Management Selection	(0.4117) ***	(0.3420) **	(0.3200) *	(0.1780)
	(3.907)	(3.044)	(2.296)	(1.043)
Interest Coverage Ratio	(0.0053)	(0.0040)	0.0257	0.0880
	(1.187)	(0.895)	0.330	1.111
Bank Monitoring	0.1084	0.1681	0.2492	0.1354
	0.302	0.471	0.403	0.228
Control Variables				
S&P Indicator Change		0.0383		0.1692
		0.602		0.737
Holding Years		0.0609 *		0.0990 *
		2.084		2.172
Buyout size		(0.0057)		(0.0322)
		(0.106)		(0.430)
Sponsor fund size		0.0291		0.0471
		0.890		1.153
Number of observations	81	81	74	74
Adjusted R^2	0.3579	0.3727	0.3390	0.4212

*The table presents the regression coefficients, which are grouped by company specific explanatory variables and control variables with the latter group accounting for fund, deal and market aspects surrounding the buyout. Panels (A) and (B) report on our entire data sample. Panels (C) and (D) show the correlation coefficients for a reduced data sample excluding outliers. We define outlier buyouts as any buyout transaction, which feature at least one outlier variable. We define outliers based on Tukey boxplots including values extending up to 1.5 times the interquartile range above and below the median observation. The significance levels for all specifications are ***0.1%, **1% and *5%. Negative values are shown in brackets. The t statistics are reported below the respective coefficients.*

effect from increasing management shareholding levels. This provides weak evidence of the thesis that managers engage in risk aversive behaviour ultimately resulting in reduced enterprise value increases (Holthausen & Larcker, 1996). Possibly, certain buyouts attract larger management participations and require changes in the composition of the management board. For example, more successful firms could attract higher levels of management equity, while poor buyout performance might drive management changes. We think these types of endogenous selection are unlikely given the design of the management participation is

determined ex-ante and – while not impossible – it appears improbable that private equity funds relinquish higher equity shares to management if prospects are particularly promising. The narrow time frame of management selection within the first year after the buyout relative to overall holding periods leave a very limited probability of being driven by overall buyout performance, even more when considering the preparation time involved in exchanging the management position. The changes are more likely to be driven by interpersonal or strategic factors than the overall buyout performance.

Across our regression specifications and data modifications, holding periods remain statistically significant, except for one specification where we include only primary buyouts and simultaneously exclude outliers. Our general observation on the favourable effect of extended holding periods on value creation has an interesting implication: Chapman and Klein (2010) find a negative relationship between duration of private equity ownership and margin improvements of the portfolio firm. Harbula (2011) argues this relationship is caused by short term cost cutting initiatives and a lower degree of industry expertise that the private equity investor can offer to the portfolio firm in comparison to a strategic investor. As a result, the private equity fund's operational expertise would be exhausted more rapidly in Harbula's view (2011). We find the opposite to be true for our analysis. Holding years are positively correlated to EBITDA margin improvements and are a (positive and significant) determinant in value creation. With comparable – almost identical – average holding periods around four years in the literature and in our data set, we do not suspect this is owed to a changed investment perspective of the private equity funds or signals a preference for long term investment measures similar to those of corporate buyers. Rather, our observation on margin improvements and holding periods evidences a changed paradigm in value creation at transaction level. In the post-crisis and low interest environment of the European Union, private equity funds leverage operational expertise to drive profitability, which requires and is supported by extended holding periods.

The silence of the remaining variables in most of our regression specifications indicates a less pronounced role of governance engineering and minor role of the (non-tax) effects of financial engineering. The amount of management ownership – reflected in the percentage of equity held by target managers – does not show a significant effect on value creation in our main and primary buyout regressions. This should however not question private equity funds' successful arbitrage on the cost of change in ineffective governance structures and benefits from alleviating agency problems (Schofield, 2020). Instead, much of the insignificance might relate to a commoditisation of the industry and its core elements. This can be explained by several

considerations: Management equity participations will always represent a significant and illiquid part of the managers' personal wealth. This in turn provides a strong incentive to participating managers, which is insensitive to marginal incentive increases to spur additional growth at company level. Alternatively, increased equity holdings do provide additional governance incentives, but do not alter management actions that ultimately result in measurable value creation in our analysis. Such behaviour patterns might echo the perception of an option-like compensation mechanism of private equity fund managers even extending to potential gambles for resurrection (Robinson & Sensoy, 2013; Caselli et al., 2009). Similarly, we could explain the potential insignificance of augmented management equity levels on value creation with a view to the terms of management participations: Multiple debt and equity instruments, interdependencies with other compensation mechanisms and complex conditions and terms connected to their co-investments might render management equity an opaque arrangement. As a result, managers could have a more binary perception of their co-investment in the firm with substantial uncertainty about translating marginal value creation at transaction level into individual management equity gains. To test the robustness of our finding on management participations, we rerun our regression with an alternative specification of the variable relating to the management share. We replace the continuous variable (aggregate equity share held by management) with a categorical variable, which distinguishes among classes of participation reflecting high management shares (top quartile of management shares in our sample), low management equity (first quartile) and observations falling in between (interquartile range).

Across all specifications of our regression model, our results remain unchanged. The alternative specification does also not show a better fit of the model in terms of R^2 and leaves the significance levels of the relevant determinants unchanged, which lends further support to a binary effect of management equity in leveraged buyouts. Bergström et al. (2007) offer a similar conclusion and suspect "a significant equity stake in the company is itself critical, rather than whether this stake is 5% or 15%" (p. 35). The same logic could help explaining the insignificance of governance effects by additional bank debt. Increased bank debt either entails no additional intensity in management monitoring or management's perception of monitoring activities is insensitive to the share of debt owed to credit institutions. This topic should provide for an interesting and fruitful field for future research.

Our control variable proxying changes in the investment environment for private equity buyouts in Europe shows no significance across all specifications. This lends additional credibility to our observations at portfolio firm level, which are not – statistically significant – determined by the general attractivity of private equity investments. However, we thereby do

not exclude the possibility that actual transaction multiples paid will benefit enterprise values and private equity returns by favourable arbitrage opportunities and increased competition for investment targets within the private equity industry. However, we deem our analysis at transaction level to be largely independent from such market effects based on our approach.

As regards fund size, we find no statistically significant impact on value creation. Fund size needs not to be perfectly correlated with the ability to offer expertise in the portfolio firm's industry. Also, smaller funds are not precluded from attracting industry knowledge from external advisors or operating partners (Baker & Wruck, 1989). As such, our observation does not contradict the finding of Cressy et al. (2007) that an industry specialisation of a private equity fund substantially advances operating improvements and profitability. It does however call into question the idea that more experienced funds in general "build better businesses" (Wright et al., 2009, p. 8) if we presuppose fund size as a good proxy for the experience of the private equity fund sponsor.

2.6 Conclusion

Private equity funds pursue strategies to improve post-buyout performance at the level of their portfolio companies (Wright et al., 2019). These strategies take shape in the financial metrics of the target firm with increased profitability, improved working capital management and efficient asset utilisation. Using a novel and hand-collected data set of 114 European buyouts, we investigate the role of financial, governance and operational engineering buyouts in the low interest environment after 2007. We find evidence of improvements in the areas of operational engineering and confirm EBITDA margin increases to be the key driver in value creation at transaction level. Following the prediction of Brigl et al. (2008) our results are consistent with a shift in the way private equity fund's create value: After the 1980s era of leverage, the 1990s multiple expansion era and the earnings growth era in the 2000s, the 2010s are dominated by operational improvements. Our results stress the positive contribution of active ownership by private equity funds beyond and above additional market timing effects (Bergström et al., 2007). This applies specifically to the low interest environment of the European Union with our finding of private equity funds as catalysts for operational change and growth at transaction level.

Our OLS regression results with operational improvements as primary value levers are robust across a range of specifications. The significance of our variables does not substantially differ for a modified regression analysis of primary buyouts only and transaction size restricted

sample. With a view to governance instruments, our results suggest a certain commoditisation of management equity participations. The insignificance of the size of management shareholdings indicates a binary role of equity participation programs in value creation or suggest that the complexity of governance instruments introduce substantial uncertainty about the true level of economic participation. We find no evidence that higher bank debt levels additionally benefit value creation through increased external management monitoring.

Replicating our analysis for small- and medium-sized buyout transactions, we find a greater emphasis on working capital improvements to create value at transaction level. At the same time, we notice an adverse effect imposed by active management selection. This could imply that value creation in smaller buyouts is more reliant on company specific domain knowledge, which is removed by management replacements with a negative effect on value creation over the holding period. Our results create a meaningful link to research advocating value creation based on operational expertise. While industry specialisation adds to value creation (Cressy et al., 2007), such expertise is not identical to fund size, which we include in our control variables. Likewise, we find no evidence that transaction size or debt arbitrage opportunities in the private equity market have an effect on value creation at transaction level.

Chapter 3

The Management Narrative in European Private Equity Transactions – an Empirical View on the Accuracy of Buyout Forecasts

3.1 Introduction

Leveraged buyout funds provide alternative investment structures managed by private equity firms, which have a reputation to significantly increase the value of their investment holdings (Barber & Goold, 2007). The trust in private equity firms to successfully source, develop and exit portfolio companies is evidenced by the strong growth in deal volumes and investment inflows. European private equity markets soared in the upward trajectory marking a record buyout volume of €464.5bn in 2018 followed by a record fund raising level of €86.4bn for European funds in 2019 (PitchBook, 2020). The low interest rate environment in Europe has certainly been an important influence in driving this trend. The euphoria for buyout deals presented private equity sponsors with new challenges: In an environment of abundant committed capital to invest and the increasing competition for a limited set of targets, buyout pricing turns increasingly aggressive. Across all sectors expanding transaction multiples in buyouts witness the competition for promising private and public target companies (Bain & Company, 2020).

With a view to the growing competition among funds and pricing developments, the industry is required more than ever to add value at transaction level. In this spirit, European buyout investors themselves identify operational improvements as the key factor in building successful equity stories around their buyout transactions (PwC, 2020). Likewise, academic literature explores the changing paradigm of private equity value creation towards supporting operational excellence at target company level. A growing number of empirical works focuses on causal effects between private equity ownership and portfolio company performance (Tykvová, 2018). In an effort to reconcile private equity returns and portfolio company

performance existing research provides a broad spectrum of findings, which is yet limited by data scarcity in some fields (Puche et al., 2015). Transaction level research highlights the positive effects from improved operations and governance effects (Guo et al., 2011).

Empowering management, implementing controls as well as incentives and ultimately forming a lasting partnership with the key executives of a target firm is at the heart of success of buyout transactions. This relationship is – to a large extent – governed by the terms negotiated at the time of investment, which includes the business plan and begins with the management forecasts. Managerial forecasts summarise the cornerstones of expected future growth and anticipate improvement opportunities. Such improvements stem from a variety of sources as identified by academic literature. Operational improvements under private equity ownership are driven by more effective working capital management (Wilson et al., 2012), higher asset utilisation (Gill & Visnjic, 2015), enhanced plant productivity (Harris et al., 2005) and accelerated innovation (Lerner et al., 2011), all connected with expanding revenue profitability (Boucly et al., 2011). Cressy et al. (2007) underline the relevance of operational determinants in the private equity "playbook" with their finding that buyout companies outperform their public peers even stronger if the private equity investor shows an industry specialisation. Le Nadant et al. (2018) show a positive relationship between industry knowledge and operating margin increases. These more recent findings note a departure from a previous spotlight on financial engineering (Matthews, Bye, & Howland, 2009), which nevertheless continues to add value to the transactions through increased tax benefits (Jenkinson & Stucke, 2011), albeit part of the literature qualifies this rather a value transfer from a macroeconomic point of view (Berg & Gottschalg, 2005).

Leveraged buyout fund managers devote considerable attention to the agreement of a final business plan and carefully reflect due diligence findings and deal structuring considerations (Loos, 2006). The planning procedure revisits all parts of the financial statements to derive a view on the future earnings situation, balance sheet structure and cash flow generation. Anticipated value creation and deal structuring will therefore be inextricably linked to the business plan, immediately raising the question on the strength of the business plans proposed by the target company's managers in the marketing of the transaction. The main objective of this paper is to shed light on the accuracy and reliability of target management forecasts, which form the basis for the private equity investment. Our analysis extends to earnings as well as balance sheet projections. Using a novel data set, we review the fulfilment of business figures advertised by the target company's management before the buyout and follow their actual economic realisation over the holding period. In this context we add new insights to the

leveraged buyout and management related literature. To our knowledge this contribution is the first study in the field of private equity research that analyses both the profile and subsequent realisation of management business plans proposed in leveraged buyouts. For several reasons, we believe our analysis on management forecasting quality to be relevant in the changing winds of private equity value creation.

First, the business plan derived from the forecasts will influence the design of the financial structure including governance effects to reduce agency costs and maximise value creation. Baker and Montgomery (1994) opine that management control is effectively outsourced to third-party lenders through leverage. The required debt payments and covenant thereby put an effective floor – in the sense of a lower bound to the range of outcomes – to the future business development, which makes accurate planning essential. Baker and Montgomery (1994) conclude that the generation of ambitious projections and proper structuring of financial statements will effectively install "an operating budget with large rewards for success and strong sanctions for failure" (p. 22).

Second, the behaviour of managers with respect to the target company's financials might be opportunistic around the time of the deal. Mao and Renneboog (2015) present evidence of negative earnings management in the run-up to buyouts transactions. Studying a sample of 247 reverse buyouts, Chou et al. (2006) detect current accrual management approaching the exit with adverse effects on post-exit performance. Further, Berg and Gottschalg (2005) highlight that managers in buyouts might "depress or manipulate reported or forecasted earnings" (p. 12), which could be induced by the incentive of their co-investment alongside the private equity fund. This reinforces earlier evidence provided by Kaplan (1989) and suggests that management teams use information asymmetries to the detriment of pre-buyout shareholders. Along the lines of self-interest, Ang et al. (2014) present evidence of managers using leveraged buyouts as effective divestment opportunities serving as a cause for upward pre-buyout earnings management, poorer post-buyout performance and potentially riskier behaviour. Similarly, target managers might systematically taint forecasts issued to potential private equity bidders ahead of leveraged buyout transactions.

Third, financial forecasting encompasses its own methods and challenges (De Gooijer & Hyndman, 2006) and is subject to myriad influencing factors. Bacon-Gerasymenko et al. (2016) describe the influence of cognitive biases in financial forecasting and explore the influence of venture capital firms in forecast revisions. The quality of forecasts will also be impacted by forecasting techniques (Ittner & Michels, 2017) and management characteristics. Hribar and Yang (2016) recently find that CEO overconfidence negatively affects forecast precision. An

assessment of management forecasts in leveraged buyouts will add further colour to the picture from the perspective of academic literature as well as industry practitioners.

We apply several measures to evaluate the variance of real developments around management predictions and find the ambitious forecasts to systematically overestimate earnings and underestimate capital requirements. Our observations document that sales predictions are more reliable than EBITDA forecasts, which significantly depart from historical growth and result in the shape of a "hockey stick" (Bergström et al., 2007). We run regressions across all accuracy measures as dependent variables using company characteristics and macroeconomic indicators as independent variables. Our regression results show that historic EBITDA growth trajectory has a force of gravity for future developments, implied by the robust and significant relationship between executive optimism on future EBITDA improvements and increasing forecasting errors. Also, pre-buyout EBITDA profitability reduces EBITDA forecasting error. These findings have a high relevance considering the pivotal role of EBITDA in private equity value creation (Achleitner et al., 2011). Our sales regression results indicate higher sales forecasting quality among older companies, while the remaining regression results suggest that factors outside the company and economic development drive forecasting error. Our findings overall fit into a narrative of systematically inflated target manager forecasts to maximise buyout valuations to the benefit of pre-buyout shareholders. Based on a high-level valuation model we provide evidence that private equity sponsors appreciate the dynamics behind managerial forecasts and appropriately discount the estimates of target managers on future cash flow performance. While further research will be needed to investigate the role of overconfidence effects of target management in private buyout transaction – if any – we find no compelling signs of market-related effects in explaining overestimated forecasting.

The remainder of this essay is structured as follows. In Chapter 3.2 we provide an overview of the existing literature relating to management forecasts, identify their position in the buyout process and discuss managerial behaviour surrounding leveraged buyout transactions. This provides a basis for the analysis of the data. We present our data in Chapter 3.3 including summary statistics and discuss our sample's representativeness as well as the absence of potential biases. Chapter 3.4 presents and discusses the historic and forecasted performance as described by our data. Chapter 3.5 introduces the approach of our analysis and outlines our methodology in assessing the quality of forecasts and potential determinants. Our results are presented and discussed in Chapter 3.6. Chapter 3.7 concludes.

3.2 Literature Review

Our literature review provides an overview of financial forecasting and managerial behaviour around buyout transactions. We further provide context on the process of buyout transactions to identify the position of management business predictions, which later become subject to our analysis. Our brief summary on academic literature reflects findings on financial as well as managerial forecasting to support a general understanding of forecasting challenges. In addition to forecasting techniques, cognitive biases and further aspects in forecasting accuracy, we review the literature with a spotlight on management behaviour around buyouts. A holistic view on the determining factors will help understanding buyout forecasting accuracy. Bacon-Gerasymenko et al. (2016) analyse forecasting accuracy in a venture capital environment and underline the importance of forecast accuracy considering the financial role of the funds. Private equity firms invest outside equity, which is committed by their limited partners, often pension funds, institutional investors and high-net-worth individuals (Ang et al., 2018). Also – corresponding to venture capital funds – private equity partnerships have a limited duration of around 10 years (Gilligan & Wright, 2014) with the aim to fully realise the value potential of the portfolio firm within the investment horizon. In the same spirit Goodman et al. (2014) show a positive correlation between the quality of external forecasts and the quality of internal corporate investment decisions, which puts an additional relevance to forecasting accuracy as an indicator of managerial skills in leveraged buyouts.

3.2.1 Financial Forecasting

Financial forecasting summarises a wide domain of predictions within a company or organisation. Makadok and Walker (2000) identify financial forecasting a "distinctive competence" (p. 853), not only in corporate environments, but also in the fund industry, to make efficient strategic decisions and yield a performance above average. Some resource-based views in strategic management even argue that the key to sustaining a competitive advantage is superior forecasting accuracy (Barney, 1986; Barney, 1991). This relationship appears intuitive considering the firm's ability to acquire and allocate resources in an optimal way. Forecasting thereby captures all areas of entrepreneurial activity: From internal operations over product and market developments to acquisitions (Goodman et al., 2014). Just like the myriad application areas of forecasting, a wide range of forecasting techniques have evolved over time: Exponential smoothing, autoregressive integrated moving-average computations and state space models are a few examples among the many described in a review by De Gooijer and

Hyndman (2006) of 25 years in time series forecasting. As described by Yusof and Aziz (2008) forecasting has evolved from an isolated and technical field to a more holistic area of planning with organisational interaction and management involvement.

The greatest asset in forecasting proves to be the greatest challenge: Forecasting heavily relies on managerial and therefore human judgement as outlined by Bacon-Gerasymenko et al. (2016). This opens up managerial forecasts to a wide array of cognitive biases and heuristics, which are recognised in the early work of Tversky and Kahneman (1974). Among the many influences on the judgement process, managerial forecasts might be tainted by the confirmation bias (Nickerson, 1998), anchoring effects (Strack & Mussweiler, 1997) and routine effects (Tripsas & Gavetti, 2000), which overall contribute to unjustified confidence in questionable forecasts (Kahneman & Tversky, 1973). The anchoring bias is especially evident in time-series forecasting like the management business plans in our analysis (Andreassen & Kraus, 1990). In a forecasting context, Wagenaar and Sagaria (1975) observe in time series forecasts that participants rely more strongly on the final value in number sequences, which in turn underestimates exponential growth. While this is one of the many adverse effects of cognitive heuristics and their deteriorating effect on forecasting accuracy (Andreassen & Kraus, 1990), Makridakis et al. (1982) make another valuable contribution: In their seminal work Makridakis et al. (1982) point out that more complex forecast models are not related to better accuracy compared to simple extrapolation methods, which could imply that increasing sets of variables do not necessarily mitigate managerial error.

In a management context, Durand (2003) adds the "organizational illusion of control" (p.821) phenomenon as a further factor in forecasting and builds on the groundwork of Schwenk (1984), who finds that managers overestimate the degree of control on future developments. Driven by a misguided perception of control, managers eliminate a natural correction factor – the overestimation of negative information – that would otherwise balance overall forecast optimism. Similarly, Hribar and Yang (2016) find that confidence not only increases the manager's tendency to release forecasts, but also prompts them to define narrower forecast ranges, which then prove to be less accurate. This is in line with previous research by Hilary and Hsu (2011), who find evidence of managerial overconfidence as an endogenous factor in the deterioration of forecast quality resulting from managers' previous experience of forecasting success. In contrast, a recent contribution by Hilary et al. (2016) shows that over-optimistic forecasts possibly impel managers to achieve their ambitious estimates, resulting in stronger profitability increases, which are both sustainable and genuine in the authors' earnings quality assessment. Libby and Rennekamp (2016) likewise find signs of an upward spiral driven

by managers' overestimation of initial performance and exaggerated perception of their individual contribution, which boosts managerial confidence on improved prospects, which in turn leads to a stronger commitment to more ambitious forecast levels. This aligns with previous findings of the authors (Libby & Rennekamp, 2012).

Overoptimistic bias effects in forecasts appear to be amplified for management boards chaired by founder chief executive officers (CEOs) in comparison to firms with outside CEOs (Lee, Hwang, & Chen, 2017). This is consistent with the strong influence of founder CEOs in management boards and the limited performance effects of outside managers in founder-led firms demonstrated by Hendricks et al. (2019). Further, Schrand and Zechman (2012) recognise that overconfident management forecasts also increase the likelihood of accounting misstatements in the periods following overconfident forecasts. The effects of overconfidence are therefore not materially limited to accuracy issues, but extend to financial accounting, which is tainted by e.g., loss recognition timing and usage of certain accounting practices (Ahmed & Duellman, 2013). For a large set of stock market predictions made by senior finance executives on the US economy from 2001 to 2011, Ben-David et al. (2013) find severe "managerial miscalibration" (p. 1547). Such misjudgements are reflected inter alia based on the 80% confidence intervals on the future returns of the S&P 500 index, which yet include only roughly one third of the actual returns. Consistent with the notion of cognitive biases in financial forecasting, Bacon-Gerasymenko et al. (2016) find that forecasting accuracy improves when multiple venture capital funds are involved in subsequent financing rounds and thereby objectify single-fund views on managerial predictions. In contrast to the negative perception of biased judgements, Hilary et al. (2014) add a shareholder point of view noting that experienced investors appear to value consistency over accuracy: In their empirical test the authors observe stronger economic effects in investor reactions from consistent forecasting errors compared to more accurate, but less consistent forecasts. We do not expect a significant effect from this finding as the private equity sponsors in our analysis do not repeatedly observe revised buyout forecasts originating from the same target. However, we anticipate an additional impact from Kaplan and Ruback's (1995) expectation that pre-buyout forecasting will have an inherently large inaccuracy for post-buyout periods, which are subject to major organisational changes following the buyout transaction.

Such inaccuracies could be driven – along with the interests of pre-buyout shareholders – by a self-interest of the target management board. Graham et al. (2005) present in detail the motivations of financial executives with a striking focus on external earnings-reporting. Based on their analysis, Graham et al. (2005) find management executives relinquish value investment

opportunities in favour of stable earnings and matching forecasts. Along with the compensation interest, the behaviour is motivated by self-interest career concerns resulting from being "seen either as an incompetent executive or a poor forecaster" (Graham et al., 2005, p. 28). Francis et al. (2008) observe that more reputable managers are associated with lower quality of earnings in a potential effort to retain status and elevate compensation. Hayward and Fitza (2017) establish a (positive) relationship among performance-based manager compensation and forecasting behaviour and find chief executive officers to use precise forecasting figures as a strategic instrument to create a favourable appearance of the organisation and to "convey control and authority" (p. 1095). In line with the literature's perception of forecasts being linked to executive image and tenure management, Richardson et al. (2004) pronounces the self-interest equity-considerations of managers: Among a large sample of firm-quarter observations, they find strong evidence of managers guiding the forecasts of analysts to maximise gains from stock option compensation schemes and selling stocks shortly after disclosing actual results of the period.

3.2.2 The Buyout Acquisition Process

From a private equity fund's perspective, the process for acquiring portfolio firms can broadly be divided into the following steps: Target sourcing, concluding the "heads of terms" for targets of interest, the due diligence and deal structuring phase and the final negotiation of the sale and purchase agreement. While the mature private equity markets in Europe certainly show some standardisation, not each transaction must follow a clear sequence of steps. All steps will however work towards determining the final valuation and the essential terms associated with the private equity fund's purchase offer before ultimately signing the acquisition agreement.

A considerable share of private equity fund managers' time is committed to the first phase of screening investment opportunities (Gilligan & Wright, 2014) with a preference to find proprietary deals instead of participating in auction processes, which are often led by investment banks (Puche, 2016). Upon finding targets of interests, private equity sponsors seek to establish a sound basis of information, which is frequently provided by confidential information memoranda and supporting documents. A first sketch of a potential transaction is then outlined in the heads of terms, also referred to as letter of intent, briefly summarising an indicative offer with key commercial, legal and tax considerations associated with the purchase offer of the private equity fund. During the due diligence phase private equity sponsors contract law and accounting firms to carefully vet the legal, tax and financial affairs of the target company (Loos,

2006). This allows the fund managers to validate the assumptions included in the heads of terms, adjust the company valuation and secure their understanding of the financial profile of the target operations. Most importantly, this phase allows to identify upside potentials and risk items for proper reflection in a revised purchase offer. Along this process the private equity fund and its external advisors receive increasing access to confidential due diligence information and key executives of the target company. Following – or often also accompanying – the due diligence process, the private equity fund develops an acquisition structure that fits the legal, financing and tax requirements for the fund and enters into (often repeating rounds of) negotiations of the acquisition agreement.

The initial forecasts of the target company's management commonly enter the buyout stage during the early phase of the acquisition process and form an integral part of the marketing material to the transaction. An abridged summary of the predictions on the future development of the target company by the management team is part of most confidential information memoranda to support the prospecting private equity funds – or other interested buyers – in developing their interest. This implies that the management forecasts were developed before the outlined buyout process from an acquirer perspective starts. From the selling shareholders' point of view, which can be a private equity fund as well, the process therefore starts earlier with the preparation of the sale. After initial timing considerations and the exploration of strategic options among the shareholders, much effort is dedicated to the presentation of the company and the business plan, assisted by investment banks and other advisors. Refining the management proposal and drilling down its determinants along the due diligence and negotiation phase will result in a final business forecast, which is important in two ways: The actual cash flows resulting from the forecast will determine the internal rate of return for the private equity sponsor with a direct impact on pricing of the deal via discounted cash flow valuations. Also, the cash flow forecasts require an acceptable level of confidence to secure debt financing and the target company's debt servicing ability.

3.2.3 Management Conduct around Buyout Transactions

Part of the academic buyout literature serves a note of caution against management behaviour around the transaction. This includes pre-buyout earnings management, inflated short term performance after the buyout and possibly extends to exaggerated post-buyout forecasts. As noted in the introduction to this paper, target company managers might influence financial reporting and forecasting propelled by a self-interest considering potential divestment or

investment intentions. Mao and Renneboog (2015) present evidence on downward earnings manipulation in a set of management buyouts in the United Kingdom between 1997 and 2007 based on accruals and earnings shifting. This is consistent with a broader analysis by Chen et al. (2016), who extend the research question on earnings management in acquisitions beyond private equity buyouts and analyse a set of over 2,000 merger and acquisition deals entered in the United States between 1985 and 2010. Chen at al. (2016) derive a more nuanced picture, which confirms downward earnings management, which is however followed by earnings overstatements. In particular, they find earnings and cash flow understatements for the time period between the announcement and completion of the deal, which they refer to as "spring-loading" post-acquisition performance with corresponding earnings overstatements in the first post-acquisition year.

Similarly, management boards strategically use the release of forecasts to attract debt financing (Hsieh et al., 2019) and support seasoned equity offerings (Kim, 2006). In a broader sample of management earnings forecasts for listed US companies, Rogers and Stocken (2005) show that managers bias forecasts in the pursuit of self-interest financial gains. In anticipation of management stock grants, Rogers and Stocken (2005) show depressed earnings leading up to the buyout transaction and at the same time upward biased forecasts to the benefit of open market stock disposals by managers. The observations are complemented by the finding that such economic misrepresentations are mitigated by the market's ability to detect management biases. Linck et al. (2013) contrast sceptical views on earnings management with their finding of improved equity and debt financing in a large set of public companies echoing Dechow et al. (2011), who previously advocated a more differentiated view on earnings quality judgements.

Ang et al. (2014) conduct a similar analysis in the field of private equity transactions. Drawing on a sample of 179 buyout transactions in the United States over the time period between 1997 and 2008, they confirm upward biased forecast driven by the (self-) interest of divesting management teams. Correspondingly, Chou et al. (2006) evidence managerial opportunism in reverse leveraged buyouts. Upon the private equity fund's exit through a public security offering, aggressive accrual management coincides with increased management share disposals. Previous research by Wu (1997) evidences earnings management before management buyouts of publicly listed companies in a potential effort to reinforce simultaneous stock price declines in favour of the post-buyout shareholders. The complex relations indicate that the early presumption of credible management forecasts (Lev & Penman, 1990) falls short of the multifaceted interests among managers and shareholders. Overall, existing literature

suggest that managers might alter reporting behaviour and use signalling effects both to the firms and their personal advantage, which could imply a lower reliability of financial forecasts in our set of buyout predictions.

3.3 Data Sample

We use a novel data set of 114 European leveraged buyout transactions entered between 2008 and 2018 covering 80 target firms. Our transaction sample features 106 unique private equity sponsors with a subset of 18 club deals accounting for 35 co-investing private equity funds. Most of our buyout transactions are small- and medium market buyouts with an enterprise value below €500m. Our sample shows a mean EBITDA of €56.3m and an average holding period of roughly four years. According to the Industry Classification Benchmark (ICB) codes our data set represents a variety of industries including industrials (36%), consumer discretionary (26%), healthcare (12%), technology (10%) and basic materials including chemicals (10%) – with the remainder of 7% relating to other ICB code classifications. For additional information and summary statistics on our data set please refer to our research paper covering value creation at transaction level where we explain our data set in more detail (cf. Chapter 2.3).

A subset of 80 buyout transactions in our data set includes detailed management forecasts. The characteristics of these sample firms – at the time of the buyout – are presented in **Table 3.1**. The median transaction value amounts to €358.0 million (mean: €624.4 million) portraying a broad spectrum of buyout transactions with enterprise values ranging between the first and third quartile of €173.6 million and €761.5 million. Our sample companies generate median sales of €331.1 million (mean: € 436.2 million) and a median EBITDA of €32.3 million (mean: €59.7 million). The magnitude of our target companies' operations is comparable to Achleitner et al. (2018) – covering European buyouts for the time period from 2000 to 2008 – with median sales of €276.4 million (mean: €613.6 million). The companies in our sample appear to be slightly less profitable compared to a median EBITDA of €35.0 million (mean: €78.4 million) in the sample of Achleitner et al. (2018). Considering a much larger data set presented by Puche et al. (2015) our data set appears to include more medium and large sized deals compared to mean sales of USD 342.7 million and mean EBITDA of USD 45.9 million across all size ranges for the 1,366 European transactions (reported in US Dollars by the authors). Drawing on the Unquote private equity database we find a total of 9,469 European private equity buyouts for the time period 2008-2019. Among this large number of transactions, we find 2,630 buyout transactions, which include enterprise values (valuations at entry). The valuations show a

median enterprise value of €100.0 million and mean enterprise value of €337.2 million. Across these buyouts we find a median EBITDA of €20.0 million (mean: €48.8 million) and median sales €89.4 million (mean: €259.7 million). Removing smaller transactions with an enterprise value of less than €100 million confirms our view that our sample includes more medium and large size transactions. For the subset of medium and large buyout transactions reported by Unquote, we find a median enterprise value of €316.1 million (mean: €646.7 million) with a close EBITDA match of €39.7 million (mean: €70.8 million) and sales of €208.7 million (mean: €441.7 million).

Table 3.1: Data Sample Summary

Descriptive Statistics *Target Company Characteristics*	**Median**	**Average**	**First Quartile**	**Third Quartile**	**Obs. Buyouts**
Valuation at Entry	357.97	624.41	173.61	761.45	80
Sales	331.05	436.20	85.58	548.58	80
EBITDA	32.33	59.69	16.23	74.17	80
Capital Expenditures	(10.91)	(18.95)	(23.15)	(2.68)	80
Fixed Assets	127.24	313.06	43.70	343.82	80
Bank Debt	(55.30)	(176.07)	(240.15)	(6.95)	80
Shareholder Debt	(14.71)	(69.96)	(62.00)	-	80
Working Capital	35.45	57.48	11.35	76.52	80

The table shows the financial characteristics of our forecasting firms in the buyout year. All figures are presented in millions of Euro (€m), unless indicated otherwise. Negative values connote expenses, outflows and liabilities, which are shown in brackets.

We have no concern that potential selection bias issues taint our analysis. The management forecasts are prepared in advance of the transaction's marketing and distributed to corporate or private equity bidders alike irrespective of whether they subsequently acquire the target company. Second, the target companies were ultimately acquired by 65 distinct funds – including three club deals – excluding the possibility that a few certain funds attract a certain company profile or forecast pattern. As our analysis aims to study the accuracy of management forecasts in the context of European private equity buyouts relative to actual post-forecast performance, there should be no room for a significant selection bias except for the circumstance that all forecasts share the characteristics of ultimately entering into a leveraged buyout, which is the basis for our subsequent analysis of actual buyout performance. It is possible that other target management forecasts have not attracted the investment interest of the funds represented in our data set or no fund at all. While it would be interesting to see if such forecasts in rejected proposals show deviating characteristics, these would not allow to observe the realisation of management forecasts under private equity ownership. Further, we conclude

that our data sample will be representative for the European private equity landscape given the strict geographic scope of only including target companies with headquarters in Europe.

The forecasts show budget numbers for the ongoing financial year of the buyout transaction and – most commonly – three to four financial years ahead. This time frame is consistent with Guo et al. (2011) and Kaplan (1989) showing the most substantial (industry-adjusted) changes occur during the first three years following the buyout. These forecast terms also align with the finding that private equity sponsors implement most of the business changes within the first three years after the buyout. Our forecast data touches all areas of business accounting including profit and loss statements, balance sheet items as well as cash flow statements with varying degrees of data granularity. Depending on the data items required, our sample offers up to 321 years of forecast information with the vast majority of 305 years relating to financial years ending prior to 2020. The forecasts data are complemented by 699 years of actual financials resulting in 278 years for which our data set includes both forecast financials as well as actual figures. This provides a sound basis for our analysis. Reconsidering the industry distribution of our initial data set, we find no substantial changes.

Our analysis is based on the development of key financial items in our forecast and actual reporting. The first three line items included in our analysis are net revenues, EBITDA and capital expenditures (capex). These are certainly among the most prominent financial metrics in leveraged buyout transactions considering their high sensitivity for the cash and profit position of our target firms. Further, we follow working capital, fixed assets and liabilities, whereby we use the granularity of data to distinguish between bank debt and shareholder loans. As the methodology of this paper will build on projected and actual outcomes, we restrict our data set to projections up to and including financial reporting periods ending in the year 2019 or earlier, i.e. we exclude the projections for financial years ending in 2020 or later.

3.4 Historic and Forecasted Performance

3.4.1 Historic Performance

We index the development of our actual and forecast observations using the last financial year preceding our first forecast year, meaning our pre-forecast year will be set as index (equalling one). This supports our intertemporal comparisons, both looking back on historic trajectory and forecasted development across all company sizes. **Table 3.2** shows the indexed development of our reference observations for the historic years leading up to the beginning of our forecast period. The historic development for our target companies proves to be of steady nature with

varying degrees of growth intensity depending on the time horizon. Taking a holistic view across all eight years up to and including to the last pre-forecast year, we find our median sales and EBITDA levels to roughly double within eight years. A compounded annual growth rate of 9.4% in sales and 12.0% for EBITDA leads to a remark on EBITDA development: EBITDA growth among our sample companies is not only fuelled by revenue growth, but also margin expansion and a combination effect outlined by Achleitner et al. (2010). The operative growth is accompanied by comparable increases in fixed assets, which could be financed by comparable increases in liabilities towards banks and shareholders. However, the broad time perspective across eight years relies on comparably few companies in the earlier years. Notably, the columns in Table 3.2 reflect strong changes in asset and debt observations in the first two time columns. Meanwhile, our observations on EBITDA growth outperforming sales growth remains unchanged.

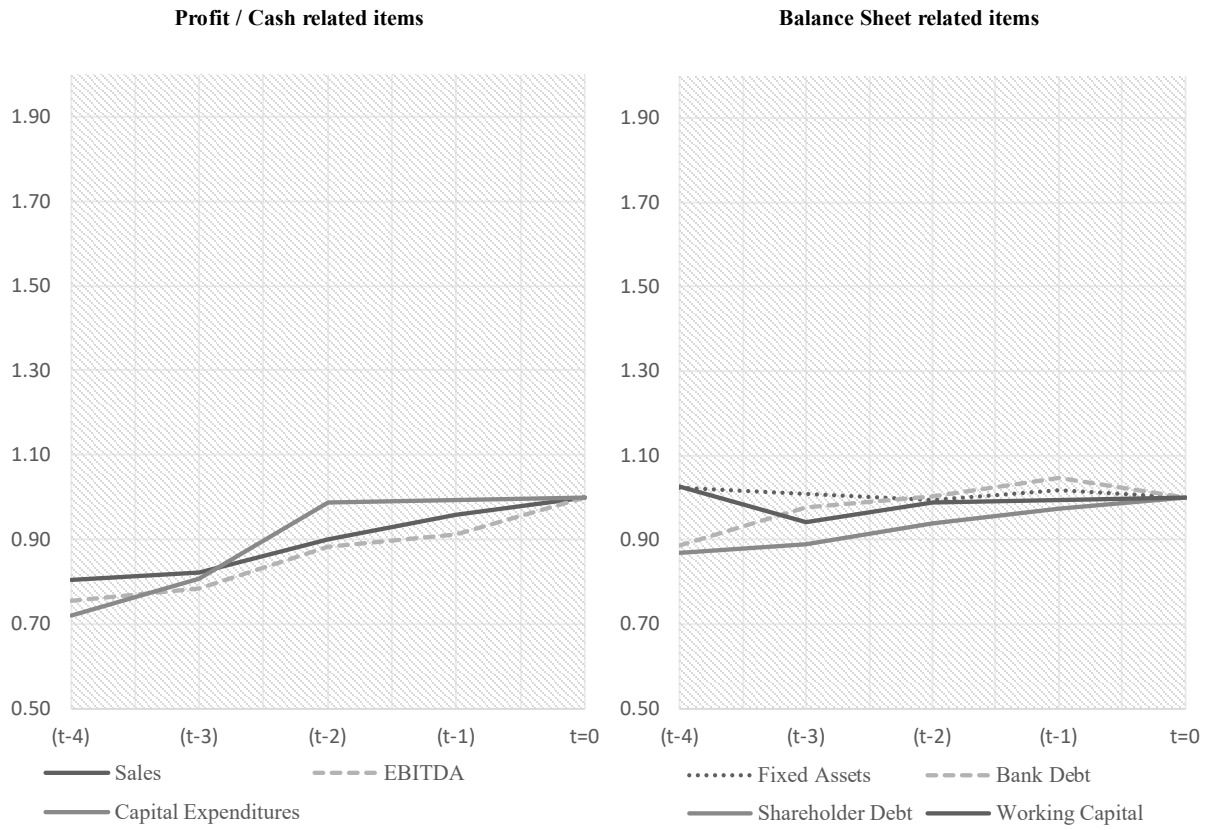
In **Table 3.3** we exclude the first three time columns and limit our growth assessment to the last five years preceding the forecast. In Panel A of Table 3.3 we observe compounded annual sales growth rates of 5.7%, while median EBITDA levels increase by 7.3% across our target companies. This also holds true when applying average annual growth rates as presented in Panel B of Table 3.3. We find the limited time horizon used in Table 3.3 provides a more stable view on the actual growth trajectory, reducing the noise introduced by a few strong growth companies. The focused time frame further provides us with some interesting insights on the target company's investment and asset evolution. With compounded and average annual growth rates around 8.8% capital expenditures appear to grow in excess of sales and EBITDA. However, reconsidering capital expenditure growth on an annual basis in Panel B of Table 3.3, high increases in spending precede slowing capital expenditure spending when approaching the buyout year and beginning of the forecast term. This reduction aligns with Tutuncu (2019) indicating earnings shifting before buyout transactions and Mao and Renneboog (2015) providing comparable evidence, albeit the latter contribution finds downward earnings management in management buyouts. In conjunction with roughly steady fixed asset levels displaying average annual reductions of 0.6%, most investments presumably relate to maintenance capital expenditures as opposed to growth capital expenditures, which should otherwise result in increased fixed asset levels. Yet, this hypothesis required confirmation based on the firm's initial (fixed) asset acquisition cost and the broad range of potential depreciation patterns. Irrespective of the capital expenditures' growth share, the steady median level of fixed assets indicates a positive trend in the target firm's operating efficiency: All annual changes in fixed assets are well below the respective sales changes, even if we assume a time lag of one

Table 3.2: Actual Financial Performance in pre-Forecast Years

Financial Time Period	t-7	t-6	t-5	t-4	t-3	t-2	t-1	t=0
Panel A: Indexed Actual Development								
Sales	0.5335	0.6610	0.7434	0.8027	0.8228	0.9010	0.9575	1.0000
EBITDA	0.4521	0.4492	0.6276	0.7537	0.7842	0.8819	0.9116	1.0000
Capital Expenditures	0.5768	0.5048	0.6640	0.7190	0.8075	0.9867	0.9940	1.0000
Fixed Assets	0.4874	0.8130	0.9554	1.0237	1.0086	0.9934	1.0169	1.0000
Bank Debt	0.1903	0.7552	0.8168	0.8870	0.9781	1.0041	1.0469	1.0000
Shareholder Debt	0.6023	0.7414	0.6010	0.8686	0.8901	0.9386	0.9724	1.0000
Working Capital	0.3085	0.8404	0.9938	1.0277	0.9406	0.9885	0.9942	1.0000
Panel B: Descriptive Statistics								
Sales								
Average	0.5133	0.7569	0.7840	0.8156	0.8457	0.9077	0.9765	1.0000
First Quartile	0.3505	0.4496	0.4396	0.6562	0.7098	0.8033	0.8911	1.0000
Third Quartile	0.6791	0.9183	0.9347	0.9118	0.9001	0.9994	1.0386	1.0000
Standard Deviation	0.2132	0.4965	0.4379	0.3438	0.2922	0.2302	0.1733	0.0000
Observations	6	12	19	29	37	72	80	80
EBITDA								
Average	0.5145	0.5960	0.6736	0.7917	0.7825	0.9624	0.9854	1.0000
First Quartile	0.4463	0.4326	0.4200	0.5047	0.6274	0.7112	0.8050	1.0000
Third Quartile	0.4851	0.6882	0.9351	0.9958	0.9358	1.0433	1.0389	1.0000
Standard Deviation	0.1390	0.3040	0.3102	0.3836	0.2942	0.5200	0.5036	0.0000
Observations	5	9	17	28	36	71	80	80
Capital Expenditures								
Average	1.0302	0.8808	1.0022	1.0168	1.0060	1.1781	1.1438	1.0000
First Quartile	0.4236	0.3852	0.4106	0.4935	0.5346	0.6842	0.8011	1.0000
Third Quartile	1.1835	1.0678	1.7932	1.3814	1.1855	1.3333	1.2286	1.0000
Standard Deviation	1.1859	0.8614	0.8135	0.7472	0.7791	1.6242	0.7302	0.0000
Observations	4	9	16	25	30	66	76	76
Fixed Assets								
Average	0.6663	0.8782	0.8307	0.9218	0.9311	0.9600	0.9841	1.0000
First Quartile	0.3425	0.4224	0.3736	0.8459	0.8386	0.8864	0.9591	1.0000
Third Quartile	0.8112	1.3707	1.1153	1.1128	1.1204	1.0721	1.0564	1.0000
Standard Deviation	0.5703	0.5189	0.4239	0.3350	0.2909	0.2395	0.2035	0.0000
Observations	4	8	16	26	32	64	75	75
Bank Debt								
Average	1.9306	1.3204	1.3044	1.0690	1.1664	1.4766	1.0702	1.0000
First Quartile	0.1515	0.2544	0.6961	0.2486	0.6471	0.7908	0.9484	1.0000
Third Quartile	2.8395	1.1664	1.1992	1.2499	1.1960	1.2418	1.1140	1.0000
Standard Deviation	3.0817	1.8688	1.4105	1.0983	1.0237	2.9614	0.3740	0.0000
Observations	3	7	13	25	28	54	65	65
Shareholder Debt								
Average	0.6023	0.9304	1.1754	1.6535	1.5387	1.7538	1.3508	1.0000
First Quartile	0.5889	0.6151	0.5463	0.5447	0.5965	0.8567	0.9141	1.0000
Third Quartile	0.6157	0.9232	1.1325	1.0902	1.0495	1.2296	1.0467	1.0000
Standard Deviation	0.0379	0.5079	1.4549	3.0788	2.7569	3.3349	1.6296	0.0000
Observations	2	5	11	21	26	38	49	48
Working Capital								
Average	0.3550	1.9464	2.2439	1.6694	1.3841	1.1836	1.0734	1.0000
First Quartile	-0.0746	0.4801	0.6403	0.6820	0.7170	0.8425	0.8736	1.0000
Third Quartile	0.7381	1.0362	1.2010	1.4688	1.1299	1.1092	1.1617	1.0000
Standard Deviation	0.7440	3.9717	4.1193	2.6939	1.9398	1.0513	0.3969	0.0000
Observations	4	8	15	25	33	65	77	77

The table above presents the historic development of our target companies up to the beginning of the forecast period. We index the development based on year t=0, which is the last financial year preceding the beginning of the forecast period (t = 1 onwards). Panel A shows the median values for the development of our indexed reference observations. Panel B provides further summary statistics on our historic observations.

Table 3.3: Historic Growth Trajectory



Actual Growth Trajectory Index time period (t=0) indicates the last year prior to the forecast period	**Year t-4**	**Year t-3**	**Year t-2**	**Year t-1**	**Year t=0**	**Growth Rates**
Panel A: Implied Compunded Growth Rates						CAGR
Sales	0.8027	0.8228	0.9010	0.9575	1.0000	5.65%
EBITDA	0.7537	0.7842	0.8819	0.9116	1.0000	7.33%
Capital Expenditures	0.7190	0.8075	0.9867	0.9940	1.0000	8.60%
Fixed Assets	1.0237	1.0086	0.9934	1.0169	1.0000	-0.58%
Bank Debt	0.8870	0.9781	1.0041	1.0469	1.0000	3.04%
Shareholder Debt	0.8686	0.8901	0.9386	0.9724	1.0000	3.59%
Working Capital	1.0277	0.9406	0.9885	0.9942	1.0000	-0.68%
Panel B: Implied Annual Growth Rates						Average
Sales		2.50%	9.50%	6.27%	4.44%	5.68%
EBITDA		4.04%	12.46%	3.37%	9.70%	7.39%
Capital Expenditures		12.30%	22.20%	0.74%	0.61%	8.96%
Fixed Assets		(1.47%)	(1.51%)	2.37%	(1.66%)	-0.57%
Bank Debt		10.27%	2.67%	4.26%	(4.48%)	3.18%
Shareholder Debt		2.48%	5.45%	3.60%	2.84%	3.59%
Working Capital		(8.47%)	5.09%	0.57%	0.59%	-0.56%

The figure above provides a view on the financial development focused on the five years preceding the forecast. The charts show a visualisation for the indexed development of the profit and cash related items as well as the balance sheet related items over this period. We index the development based on year t=0 being the last financial year preceding the beginning of the forecast period (t=1 onwards). Panel A shows the implied compounded growth rates based on the median indexed development of the observed actual financials. Panel B provides the average annual growth rates for each of our observations.

financial year. This view certainly finds its limitations in two considerations: First, operating improvements exist only to the extent the depreciation delivers a fair view on the asset consumption at target level. Second, the sales and EBITDA observations along constant fixed assets could also be market driven to the extent the target firm continuously succeeds in imposing higher unit prices inflating revenues and profitability relative to asset balances.

Over the same time period we observe moderately increasing debt levels. The average annual growth rates of around 3.4% in total liabilities with compounded annual growth rates of 3.0% and 3.6% for bank debt, shareholder loans respectively could hint value creation potential through additional debt at target level inspiring further efficiencies (Rappaport, 1990). Further, the observed average operating earnings yields (following Kaplan and Strömberg (2009) expressed as EBITDA relative to Enterprise Value) show a margin of 13.7% for our sample companies, which is well above private equity debt financing conditions. These operating yields accommodate sufficient capacity for equity returns considering typical credit spreads ranging from 2.5% for senior bank financing to 8.3% for mezzanine financing with specific spreads depending on seniority, maturity and covenant intensity (Colla et al., 2012). The S&P European LBO Index yields a similar view onto debt conditions surrounding private equity transactions, albeit with a slightly higher implied median credit spread of 6.1% for the time period 2008-2018. The higher credit spread level should result from variety of debt facilities tracked by the index considering the S&P European LBO Index captures all European debt issuers backed by a private equity firm across all rating categories. From the debt growth below approximate interest rates, we can also infer that the target companies remain in a cash interest paying position in the pre-forecast period. Otherwise, the accruing interest – e.g., upon payment in kind arrangements – would annually increase the principal amounts accordingly.

3.4.2 Forecast Performance

Table 3.4 shows the indexed development of our reference observations for the first five forecast years. The table further shows the compounded annual growth rates (CAGR) for each of the forecast year columns considering year one through year five. The bottom section of Table 3.4 shows the number of observations underlying the calculation of indexed development and CAGR figures. The first three forecast years show the richest data availability followed by the fourth forecast year, which still maintains more than two thirds in terms of data density. The average forecast period of four years and majority of forecast horizons spanning below five years results in a decline of observations underlying the fifth forecast year onwards. Therefore,

our scope of analysis includes five forecast years and neglects the few forecast figures provided for periods thereafter. The distribution of forecast data is consistent with the special attention of private equity firms paid to the first three years following the buyout, which Ang et al. (2014, p. 463) characterise to be "the high risk part of the deal". **Table 3.5** depicts the indexed growth trajectory as anticipated by these forecasts.

The overall outlook drawn by the forecast line shows strong operative growth in terms of revenues (7.2% annually) and EBITDA (15.8% annually) while projected fixed assets remain almost constant (average annual growth rate of 0.7%). At the same time, average annual capital expenditures growth of 6.1% remains below the anticipated business growth, while working capital closely follows the forecast trajectory for sales: Working capital is expected to grow at a slightly higher annual growth rate of 7.5% in comparison to the sale growth rate of 7.2%. Meanwhile, the liability forecasts assume the usage of free cash flows to repay bank debt, effectively cutting the amount owed to credit institutions in half after 4-5 years of the forecast period elapsed. The average reduction rate of c. 12.6% in bank liabilities per year is balanced by managers' expectation that shareholder loan levels increase by an average of c. 6.9% annually. This leads to two remarks on our financing observations: First, both bank and shareholder debt forecasts rely on a significantly smaller number of observations roughly representing half of the total forecasts. Second, the almost constant growth of shareholder debt in the range of 5-8% could imply that management assumes the principal amount of the shareholder debt to remain roughly constant, with only interest accruing over the term of the shareholder loan (so-called "payment-in-kind" or "PIK" debt arrangement).

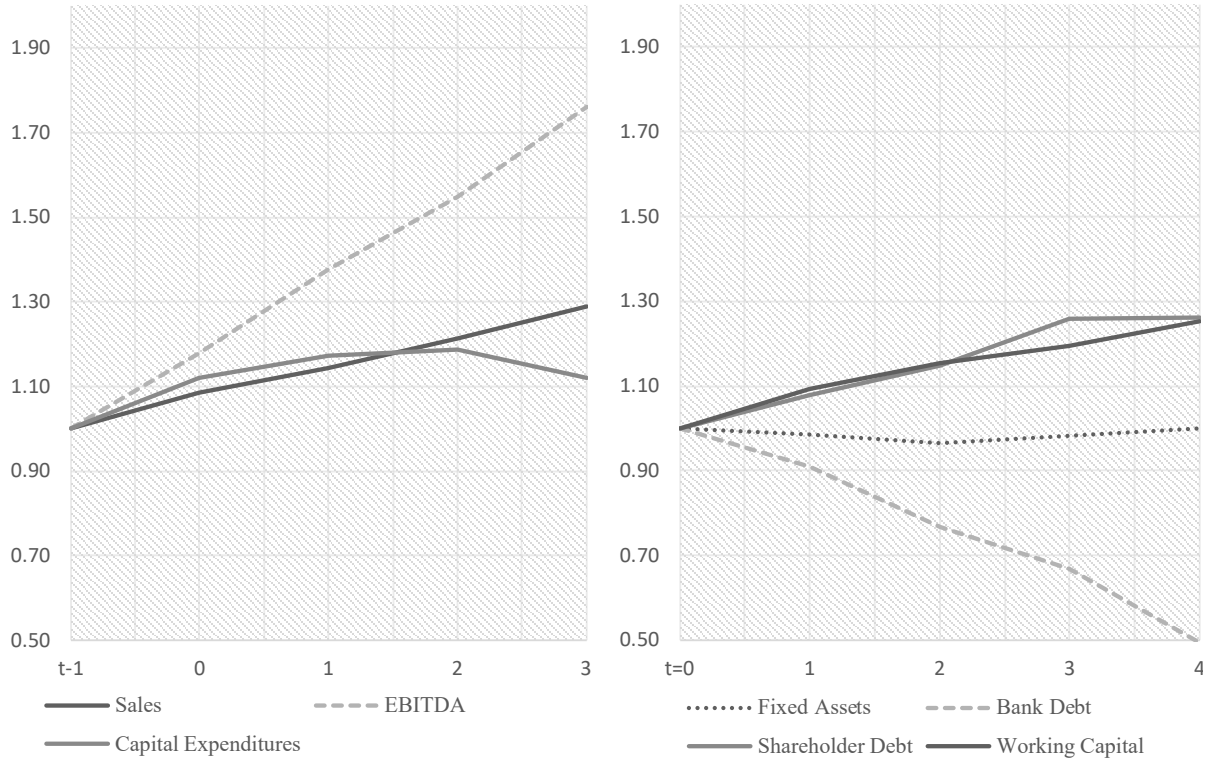
As expected, pre-buyout management expectations place an emphasis on strong EBITDA growth. Considering the lower growth rate in sales, the majority of EBITDA stem from margin improvements and the remainder of 46% of the EBITDA growth is – on average – backed by sales growth. As a result of this growth prediction, forecasted EBITDA almost doubles within a five-year period to 1.8226 on an indexed scale, which coincides with common private equity expectations (Butler, 2001). At the same time, sales and working capital are foreseen to increase roughly 50% over the same time period of five years to 1.4379 on an indexed scale, 1.4607 respectively. It is challenging to reconcile why management expects EBITDA growth to exceed sales growth on such a significant scale, especially considering the mature age structure of private equity target firms.

Table 3.4: Forecasted Financial Performance

Forecast Development (Indexed)	t=1	t=2	t=3	t=4	t=5	t=6
Panel A: Indexed Forecast Development						
Sales	1.0840	1.1442	1.2142	1.2877	1.4379	1.4249
EBITDA	1.1771	1.3769	1.5478	1.7611	1.8226	1.7559
Capital Expenditures	1.1200	1.1720	1.1874	1.1203	1.0745	1.2292
Fixed Assets	0.9840	0.9645	0.9825	1.0000	1.0326	0.9918
Bank Debt	0.9094	0.7676	0.6694	0.4938	0.3957	0.6002
Shareholder Debt	1.0795	1.1481	1.2571	1.2616	1.2947	0.6947
Working Capital	1.0915	1.1553	1.1941	1.2517	1.4607	1.4429
Panel B:Descriptive Statistics						
Sales						
Average	1.1065	1.2052	1.3372	1.3939	1.5651	1.4339
First Quartile	1.0383	1.0927	1.1587	1.1907	1.2805	1.3769
Median	1.0840	1.1442	1.2142	1.2877	1.4379	1.4249
Third Quartile	1.1398	1.2915	1.4575	1.5472	1.6851	1.4717
Standard Deviation	0.2095	0.2590	0.3401	0.3355	0.4590	0.1305
Observations	78	78	73	53	26	6
EBITDA						
Average	1.2248	1.4240	1.6913	1.9188	2.0014	1.8752
First Quartile	1.0750	1.1679	1.3379	1.4494	1.5245	1.6036
Median	1.1771	1.3769	1.5478	1.7611	1.8226	1.7559
Third Quartile	1.2857	1.5465	1.8531	2.0948	2.2736	1.9759
Standard Deviation	0.4408	0.3882	0.7637	1.0293	0.7849	0.3782
Observations	77	77	72	52	25	6
Capital Expenditures						
Average	1.3646	1.5727	1.4349	1.4656	1.2175	1.1820
First Quartile	0.8709	0.8711	0.8768	0.7820	0.7273	1.0332
Median	1.1200	1.1720	1.1874	1.1203	1.0745	1.2292
Third Quartile	1.4578	1.7486	1.6248	1.4023	1.3099	1.3537
Standard Deviation	1.2196	1.9358	1.2889	1.8260	0.9061	0.2048
Observations	75	75	70	51	25	6
Fixed Assets						
Average	0.9632	0.9906	1.0126	0.9969	1.2005	0.8710
First Quartile	0.9211	0.9021	0.8462	0.8147	0.8615	0.9212
Median	0.9840	0.9645	0.9825	1.0000	1.0326	0.9918
Third Quartile	1.0262	1.0425	1.0824	1.0962	1.1426	1.0467
Standard Deviation	0.2791	0.3882	0.5157	0.4938	0.8655	0.3298
Observations	55	55	51	37	19	6
Bank Debt						
Average	0.8996	0.8144	0.6721	0.5772	0.4827	0.6002
First Quartile	0.8148	0.5872	0.4297	0.2783	0.2006	0.4034
Median	0.9094	0.7676	0.6694	0.4938	0.3957	0.6002
Third Quartile	1.0086	0.9968	0.9834	0.8795	0.8009	0.7970
Standard Deviation	0.2857	0.3306	0.3243	0.3553	0.3808	0.5566
Observations	39	39	35	24	10	2
Shareholder Debt						
Average	1.0225	1.0391	1.0768	1.0875	1.2156	0.7398
First Quartile	1.0002	0.9106	0.8211	0.7778	1.0388	0.5378
Median	1.0795	1.1481	1.2571	1.2616	1.2947	0.6947
Third Quartile	1.1109	1.2047	1.3224	1.4163	1.5895	0.9192
Standard Deviation	0.2688	0.3306	0.3990	0.4715	0.4597	0.3833
Observations	28	27	24	18	8	3
Working Capital						
Average	1.5364	1.6413	1.4808	2.0940	2.9121	2.4993
First Quartile	0.9400	0.9611	1.0325	1.1194	1.1966	1.3588
Median	1.0915	1.1553	1.1941	1.2517	1.4607	1.4429
Third Quartile	1.2294	1.4061	1.5289	1.6143	1.8662	1.5508
Standard Deviation	2.3019	2.2894	3.4976	3.2094	4.6213	2.8927
Observations	63	63	59	44	24	7

This table above reports the indexed development of our target companies over the forecast period. We index the forecasted development of our observations based on the last financial year preceding the forecast period (t=0). Panel A shows the median values for our indexed observations. Panel B provides further summary statistics on our historic observations.

Table 3.5: Forecasted Growth Trajectory



Forecasted Growth Trajectory Time period (t=1) indicates the first forecast year	**Year t=0** Index Period	**Year 1** Forecast Period 1	**Year 2** Forecast Period 2	**Year 3** Forecast Period 3	**Year 4** Forecast Period 4	**Growth Rates**
Panel A: Implied Compunded Growth Rates						CAGR
Sales	1.0000	1.0840	1.1442	1.2142	1.2877	6.52%
EBITDA	1.0000	1.1771	1.3769	1.5478	1.7611	15.20%
Capital Expenditures	1.0000	1.1200	1.1720	1.1874	1.1203	2.88%
Fixed Assets	1.0000	0.9840	0.9645	0.9825	1.0000	0.00%
Bank Debt	1.0000	0.9094	0.7676	0.6694	0.4938	-16.17%
Shareholder Debt	1.0000	1.0795	1.1481	1.2571	1.2616	5.98%
Working Capital	1.0000	1.0915	1.1553	1.1941	1.2517	5.77%
Panel B: Implied Annual Growth Rates						Average
Sales		8.40%	5.55%	6.12%	6.05%	6.53%
EBITDA		17.71%	16.97%	12.41%	13.78%	15.22%
Capital Expenditures		12.00%	4.64%	1.32%	(5.65%)	3.08%
Fixed Assets		(1.60%)	(1.98%)	1.86%	1.79%	0.02%
Bank Debt		(9.06%)	(15.59%)	(12.79%)	(26.23%)	-15.92%
Shareholder Debt		7.95%	6.36%	9.49%	0.36%	6.04%
Working Capital		9.15%	5.84%	3.36%	4.82%	5.79%

The figure above depicts the indexed growth trajectory as anticipated by the forecasts. The charts provide a visual of the indexed development of the profit and cash related items as well as balance sheet related items. We index the development based on the last financial year preceding the forecast period (t = 0). Panel A shows the implied compounded growth rates based on the median indexed development of the observed forecasted financials. Panel B provides the average annual growth rates for each of our observations.

At the time of the forecasts our sample firms' age ranges from 6 to 199 years – from the year of foundation – with an average age of 60 years and median company age of 40 years. With only a small fraction of six forecasts made for a company that is older than 5, but younger than 10 years and the remainder of companies being all older than 10 years, the companies should qualify as mature and be subject to a certain level of stability. The surging growth expectations long after the early entrepreneurial stages adhere to the "hockey stick phenomenon" often encountered in projections, but appear very ambitious in practice (Bergström et al., 2007). For an orientation of the forecast developments, we replicate the indexation based on historic results. We summarise the details of the growth trajectory in Table 3.5.

In **Table 3.6** we segment the forecasts by forecast term. We observe most forecasts cover a term of three to five years with most forecasts predicting the ongoing financial year and three years ahead. These most common forecast terms of three to five years cover more than two thirds of the total forecast years included in our sample. We deepen our understanding of the forecasted growth trajectory by filtering the dominant forecast terms, which we present in panel B of Table 3.6 and provides a clearer view on the predicted growth. This differentiation allows us to control for the effects of longer forecast periods and ensures that longer forecast terms do not blur the view on shared earlier forecast years. Table 3.6 provides us with comfort that the different time horizons share ambitious management goals with some minor nuances. Across all three forecast terms, we observe predictions of strong annual revenue growth with disproportionately stronger increases in EBITDA profitability. At the same time, all forecasts share the managerial presumption of annual bank debt reductions and increases in shareholder debt, albeit with varying degrees of intensity. These developments are accompanied by roughly constant fixed asset balances, noting however, that the three- and four-year forecasts show modest declines in asset requirements, while the five-year forecasts show a small increase of 1% in fixed assets. In terms of capital expenditures our drill down in Table 3.6 sheds light on some differences. The three-year forecasts show comparably strong spending increases on firm assets, which are forecasted around 30% above pre-forecast levels. The four-year forecasts likewise predict capital expenditures in excess of pre-forecast levels, yet at an overall lower level. Meanwhile, the five-year forecast terms only maintain increased capital expenditure levels over the first four years, overall at lower levels and show a contraction in asset spending, which falls below pre-forecast levels in the ultimate forecast year. Regarding working capital requirements, we note the management forecasts predict increases in the numerical proximity of the anticipated sales growth for all forecast terms with the five-year forecast term showing the highest capital expenditure levels.

Table 3.6: Forecast Trajectory by Forecast Term

Panel A: Distribution of Forecast Terms							
Forecast Term in Years	1	2	3	4	5	6	Total
Number of Forecasts	1	5	20	27	20	7	80
Resulting Forecast Years	1	10	60	108	100	42	321
Panel B: Forecast Trajectory by Forecast Term							
Indexed Development Forecast Time Period (t)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	CAGR (%)
3-yr Forecasts							
Sales	1.0991	1.1727	1.3043				9.26%
EBITDA	1.2773	1.3925	1.5299				15.23%
Capital Expenditures	1.2479	1.3127	1.2973				9.06%
Fixed Assets	0.9798	0.9544	0.9492				-1.72%
Bank Debt	0.8483	0.6910	0.6005				-15.63%
Shareholder Debt	1.0976	1.1855	1.2710				8.32%
Working Capital	1.1048	1.2372	1.3547				10.65%
4-yr Forecasts							
Sales	1.0724	1.1412	1.1979	1.2589			5.93%
EBITDA	1.1875	1.4176	1.6597	1.8555			16.71%
Capital Expenditures	1.1917	1.2535	1.1699	1.1014			2.44%
Fixed Assets	0.9835	0.9610	0.9461	0.9165			-2.16%
Bank Debt	0.8943	0.7865	0.7256	0.5917			-12.30%
Shareholder Debt	1.0395	1.0831	1.1294	1.1802			4.23%
Working Capital	1.0666	1.1069	1.1475	1.1973			4.61%
5-yr Forecasts							
Sales	1.0876	1.2276	1.3759	1.3902	1.5797		9.58%
EBITDA	1.1110	1.3278	1.5888	1.6638	1.8652		13.28%
Capital Expenditures	1.0105	1.0394	1.0745	1.1591	0.8972		-2.15%
Fixed Assets	1.0000	1.0000	1.0410	1.0514	1.0526		1.03%
Bank Debt	0.9369	0.6546	0.5158	0.4330	0.3366		-19.57%
Shareholder Debt	1.0976	1.2045	1.3220	1.4509	1.5885		9.70%
Working Capital	1.1352	1.1985	1.3303	1.4545	1.6651		10.74%

The table shows the financial characteristics of our forecasting firms in the buyout year. All figures are presented in millions of Euro, unless indicated otherwise. All forecasted developments are indexed based on the last financial year preceding the forecast period (t=0).

3.5 Methodology

3.5.1 Measuring Forecasting Accuracy

In our analysis we apply a three-fold approach to assess the accuracy of management forecasts in our sample of European private equity buyouts. We use managerial forecast error to inversely measure forecast accuracy (Dhaliwal et al., 2012). First, we observe budgeting accuracy in the variation of actual outcomes in comparison to the projection figures for each of our observation years across the forecast periods. This approach provides for a very intuitive measure of forecast accuracy. We expand our analysis with two further views because we appreciate that errors in earlier forecast periods will taint the accuracy of any following years and produce subsequent faults in the row of forecasts. Therefore, our second view departs from matching annual figures

and compares the relative annual percent changes in our data set. For this purpose, we take advantage of the panel structure of our data set and calculate the year-over-year growth rates in the actual and forecasted business figures. This approach allows us to compare the relative change in an observation expected by management to the actual relative change incurred from one financial year to the next. It is therefore possible to shed light on management's ability to anticipate growth patterns beyond a strict and separate evaluation of each financial year. The third angle of our analysis neglects timing of the forecast numbers entirely. Instead, we focus on the overall delivery of the business forecast on an aggregated basis. While internal rate of return calculations of private equity sponsors will call for short-term growth, our third angle will show to what degree the business plan is delivered after all. For the income statement related observations, we aggregate forecasted sales and forecasted EBITDA, which we compare to the aggregated actual figures recorded in the financial statements over the forecast period. We repeat this for capital expenditure measures to remove the timing factor predicting cash flows. The remainder of our observations are balance sheet items. For these reference date values we compare actual average balances to average forecasted balances for the same time period, for example, comparing the average balance of fixed assets over the buyout observation period to the average forecasted balance of fixed assets. This approach delivers a comprehensive view on the design of management forecasts preceding the private equity takeover and sheds light on the reliability of the figures in comparison to the factual developments observed. The resulting accuracy measures are presented in **Table 3.7**. The corresponding calculation formulas are presented in the next section, which describes the design of our regression analysis.

Table 3.7: Forecasting Accuracy

Forecast Accuracy Time period (t=1) indicates the first forecast year	**Year 1** Forecast Period 1	**Year 2** Forecast Period 2	**Year 3** Forecast Period 3	**Year 4** Forecast Period 4	**Year 5** Forecast Period 5	**Median** Accuracy	**Observations**
Relative Accuracy (RelA)							
Sales	0.0222	0.0710	0.1174	0.1148	0.1218	0.0750	281
EBITDA	0.0489	0.1751	0.2434	0.2918	0.3834	0.1786	277
Capital Expenditures	0.0189	0.1613	0.2532	0.4551	0.4554	0.2175	276
Fixed Assets	0.0974	0.2489	0.3084	0.3520	0.3076	0.2373	200
Bank Debt	0.3082	0.9073	1.7373	3.6865	7.3277	1.1524	133
Shareholder Debt	0.2736	0.7047	0.8887	0.9434	1.0186	0.7185	92
Working Capital	0.0180	0.0865	0.1347	0.1387	0.0700	0.0738	232
Growth Accuracy (GrA)							
Sales		0.0493	0.0654	0.0532	0.0606	0.0544	203
EBITDA		0.1483	0.1644	0.1851	0.1840	0.1534	200
Capital Expenditures		0.3238	0.1991	0.2321	0.2706	0.2902	199
Fixed Assets		0.0951	0.0755	0.0634	0.0659	0.0835	145
Bank Debt		0.3380	0.1661	0.1783	0.2446	0.2454	94
Shareholder Debt		0.1310	0.0816	0.0866	0.0435	0.0873	65
Working Capital		0.0547	0.0589	0.0782	0.0472	0.0558	169
Aggregate Accuracy (AggA)							
Sales						0.0707	78
EBITDA						0.1929	77
Capital Expenditures						0.1500	77
Fixed Assets						0.2603	55
Bank Debt						2.1609	39
Shareholder Debt						0.7259	28
Working Capital						0.0658	63

The table shows forecasting errors as measured by our three accuracy measures for each of the financial characteristics. Relative accuracy and growth accuracy measures are presented for each year of the forecast period. The median accuracy observation is presented in the penultimate column followed by the number of underlying observations in the ultimate column. All annual accuracy measures use the median absolute deviation from forecasted financials to prevent issues from the balancing of under- and overestimates.

3.5.2 Regression Analysis

To identify drivers of the accuracy in management forecasting around buyouts we extend our analysis by an ordinary least square (OLS) regression. With the aim to address our various evaluation perspectives, we separately employ our three accuracy measures as dependent variables. We compute our dependent variables for each of our observations under each of our three perspectives individually to not lose the rich level of detail in our panel data structure. First, our regression draws on the median absolute percentage error of the actual outcome for a specific forecast year (Relative Accuracy), which we can define as

$$Relative\ Accuracy_{obs}\ (\text{RelA}) = \text{Median}\left[\left|\left(\frac{ACT\ _t^{obs}}{FC\ _t^{obs}} - 1\right)_{t\,=\,1}^{T}\right|\right]$$

with ACT denoting actual financial observations and FC representing forecast figures. *t* marks the forecast years in our row of consecutive financial years starting with t=1 and ending with T as the last financial year included in the respective forecast row. The equation includes the specific observation – sales, EBITDA, capital expenditures, fixed assets, shareholder debt, bank debt and working capital – with *obs*. The amount bars reflect our use of absolute deviations to prevent a balancing of shortfalls and surpluses in actual over forecasted performance.

Second, our analysis uses the absolute percentage point deviations between the actual and forecasted growth rates (Growth Accuracy). For each observation we use the median of the deviations we observe between the actual and forecasted growth rates, which we compute for each set of neighbouring years in the row of consecutive forecast years. The actual and forecast growth rate for the first year is based on the preceding years actual observation as the common denominator.

$$Growth\ Accuracy_{obs}\ (\text{GrA}) = \text{Median}\left[\left|\left(\frac{ACT_t^{obs} - ACT_{t-1}^{obs}}{ACT_{t-1}^{obs}} - \frac{FC_t^{obs} - FC_{t-1}^{obs}}{FC_{t-1}^{obs}}\right)_{t\,=\,1}^{T}\right|\right]$$

Third, we use the aggregate perspective as dependent variable in our regression, which reflects the percentage deviation the aggregated actual financials show over the aggregated forecast period (Aggregated Accuracy). This variable will provide us with a view on total performance over the forecast period irrespective of specific timing within the forecast term. Aggregate accuracy captures the aggregate error in overall expected capital expenditures, sales and EBITDA measures. For working capital, fixed assets and debt the variable will reflect the actual variation of the average balance over the forecast period.

$$Aggregate\ Accuracy_{obs}\ (\text{AggA}) = \left| \left(\sum_{t=1}^{T} ACT_t^{obs} \Big/ \sum_{t=1}^{T} FC_t^{obs} \right) - 1 \right|$$

By applying three accuracy measures in total, we seek to strengthen the robustness of our results and secure a proper granularity of our analysis to uncover factors driving only one of the accuracy angles.

The explanatory variables in our regression account for characteristics of the company as well as the macroeconomic surrounding of the actual development over the forecast period. First, we construct a variable to measure to which extent the forecast numbers depart from the actual growth trajectory the company experienced up to the year in which the forecast is made and the target company is not yet under private equity ownership. This extends the notion of mean reverting tendencies as identified by Fama and French (2000) to firm-level stickiness of financials, which is echoed by Ciftci et al. (2016), who observe analyst forecasting error to be driven by an imperfect appreciation of variability and stickiness in accounting dynamics. Our expectation is that stronger deviations from past growth patterns will result in decreased forecast accuracy. We refer to this variable as 'executive optimism' and define it by the absolute percentage points between the historic growth rate in our observation and the future growth rate anticipated for the observation over the forecast period. The percentage point deviation is computed as the difference between the median of historic and forecasted growth rates. The computation of our historic growth rate draws on an average of five years before the forecast period begins and thus provides a reliable picture on the target company's pre-forecast development. Consistent with the three specifications of our dependent variable, executive optimism is calculated individually for each of our seven observation items. This will help to identify potential relationships between poor pre-buyout performance and the delivery on the promise of improved post-buyout performance, also referred to as the hockey stick phenomenon. In doing so, we will identify if and to which extent a distancing from past growth patterns indeed (adversely) affects accuracy and if overly cautious or optimistic forecasts are prone to miss the economic reality over the forecast period.

Further, we account for company size by introducing logarithmic net sales as a regression variable, which we calculate based on the financial year in which the forecast is made. Despite potential disruptive events across industries, we suspect that company size provides for a certain level of stability. To avoid potential issues of heteroscedasticity we use the natural logarithm considering different sizes of buyout target firms. We prefer to use sales as a size scale for our companies in lieu of enterprise value to exclude interdependencies resulting from the valuation, which will draw on future cash flows and should be closely linked to our forecasted financials.

Further, the size of existing economic activity will be more closely followed by sales compared to enterprise value, which is impacted by other distorting market factors, for which we control with our macroeconomic developments separately.

Following Baik et al. (2018) we account for the target firms' age by the distance in years between the founding year of the company and the year of forecast. Our expectation is that more mature firms show higher forecasting accuracy, potentially assisted by increased data availability on historic developments of the company. In determining the forecast year, we either use the founding year as presented in the investment memorandum for the transaction or information from the company's website. In cases of buy-and-build strategies or mergers we rely on the earliest root of the consolidated company group, i.e. we use the earliest year among the joint history of companies. The rationale behind introducing the company's age as an explanatory variable is the data availability and experience advantage that should apply to longer existing companies. Possibly, older companies not only have a broader financial data base, but also more mature forecasting processes and experience. This should – in theory – result in more accurate forecasts given the quantitative and qualitative knowledge advantage older companies might possess. However, since the historic data require processing to arrive at the forecast, we feel the 'company age advantage' reaches certain limitations where changes in the management members and practices blur the effect of data availability. In addition to firm age, Clement (1999) confirms a positive relationship between (outside) analyst forecasts and employer size representing available firm resources to deliver forecast quality. We control for potential resource effects among larger organisations by our variable for company size, which is based on the natural logarithm of net revenues in the year the forecast is made.

Moreover, we include a variable capturing the industry classification of the target company based on the ICB industry code. With a view to the size of our sample we use the first two digits of the ICB industry code and distinguish industries, e.g. industrial companies, consumer discretionary goods, technology companies, healthcare and chemicals. We expect the financial stability inherent in some sectors to positively contribute to forecasting quality. Fairfield et al. (2009) emphasise the determining role of industry membership in growth forecast accuracy issued by financial analysts while noting an exception applying to profitability. Hutton et al. (2012) highlight different degrees of cyclicality among industries and their role in relative forecasting accuracy.

In addition, we include fixed asset intensity. This variable considers the balance of fixed assets relative to sales representing the asset heaviness of the target firm's business and controls for the relative complexity of operations that could potentially affect forecasting accuracy

(Hutton et al., 2012). According to Coën et al. (2009) firm-specific profitability levels significantly influence the forecast accuracy among their sample of mainly European analyst forecasts. Therefore, we include a variable measuring the pre-forecast profitability of the target company as indicated by the EBITDA margin. For both variables – fixed asset intensity and profitability – we use the average level of actual financials observed over the period up to the first forecast year.

With a view to the management's own investment in the prospects of the target firm, we include the share of equity held by the management board one year after the buyout, i.e. approximately one year into the forecast period. Managerial ownership might affect forecasting similar to the choice of accounting policies as shown by Lafond and Roychowdhury (2008), who detect a positive link among management equity holdings and accounting conservatism as opposed to timely earnings shifting. By including management's co-investment in the forecast period, we implicitly assume that management anticipates the co-investment alongside the private equity sponsor. Building on the common observation that leveraged buyouts maintain or increase management shareholdings to align interests and provide incentives this assumption appears reasonable. The effect could take two directions: Management could be more invested in the planning of the company's prospects improving forecast accuracy with more accurate planning. Also, management could be inclined to understate forecasts to improve the terms of their co-investment primarily at the cost of the exiting shareholders. While we cannot exclude either dynamic, we opine a systematic depression of forecasts is less likely given the overall growth as per the forecasts and considering the limited influence management will have in negotiating the ultimate price with pre-buyout shareholders. Further, downward manipulations on forecasts might be detected by advisors of the pre-buyout shareholders, including investment banks, which serve as a (potentially) correcting influence on management self-interest in buyout pricing.

We include a dummy variable indicating previous private equity affiliation, which might cause more aggressive future business plans to support exit pricing negotiations and deteriorate forecast quality with underperforming actual figures. Ajinkya et al. (2005) show greater forecast quality associated with institutional ownership and find "forecasts are more specific, accurate and conservatively biased" (p. 361). At the same time, forecast quality in secondary and following buyouts might be challenged by the ability of target managers to anticipate changes in the application of value levers after the primary buyout period (Eschenröder and Hartmann-Wendels, 2019). A battery of macroeconomic variables controls for the economic development surrounding our forecast period. Yang and Chen (2021) find the development of the

macroeconomic environment to affect both the issuance likelihood and quality of forecasts and observe management forecast quality to deteriorate relative to analyst forecasts in times of increased economic uncertainty. Following Gilchrist et al. (2014) – who summarise "credit spreads form the most informative and reliable class of financial indicators for future economic activity" (p. 2) – we include average buyout credit spreads as reported in the S&P Leveraged Loan Index for the year of forecast issuance. As a proxy for macroeconomic development over the forecast period, we use the average growth rates of the gross domestic product (GDP) in our regression analysis (Ciftci and Salama, 2018). Consistent with the geography of our data sample we use the average growth rate of GDP in the European Union (EU) at constant prices across the forecast period. Separately, we consider the average consumer price inflation in the EU over the forecast period, which may not only affect forecast quality as documented by Hope and Kang (2005), but impact the realisation over the holding period. We consider the market developments along the forecast period using an index yield measure like Kaviani et al. (2020), whereby our variable tracks the average EBITDA profitability of STOXX Europe 600 companies over the forecast period. Last, we include a variable measuring the time interval between the origination year of our forecasts (i.e., the calendar year in which the forecast is presented) and the year 2007 as the beginning year of the financial crisis. The forecast timing variable controls for any time trends potentially influenced by increased general economic optimism departing from the crisis years. **Table 3.8** provides an overview and descriptions on the dependent variables and explanatory variables of our regression analysis.

Table 3.8: Variable Overview

Explanatory Variables	
Profitability	Average EBITDA profitability calculated on net revenues in the pre-forecast period.
Capital Intensity	We proxy capital intensity by the relation of average fixed assets to average net revenues in the pre-forecast period.
Executive Optimism	We measure the departure from the actual pre-forecast growth trajectory implied in the forecast financials. The variable captures the percentage point deviation between the median historic growth rate and the forecast growth rate for each of our forecast financial variables. The computation of our historic growth rate draws on an average of 5 years before the forecast period begins.
Company Size	The natural log of the forecast company's net revenues in the year the forecast is made.
Company Age	Age of the forecast company in years since the founding year as given in the investment memorandum for the transaction or the company's website. In cases where we observe combinations of companies, e.g. add-on acquisitions, we use the earliest roots of the consolidated group.
Management Equity Share	The variable captures the percentage of ordinary equity held by members of the management board 1 year after the buyout.
Buyout Experience	Dummy variable indicating previous private equity affiliation over the pre-forecast period. The variable is equal to one when the ultimate shareholder of the forecasting company is a private equity fund.
Industry Classification	Dummy variables indicating the Industry Classification Benchmark (ICB) of the forecast company at the time of the initial forecast.
Forecast Year Dummy	Dummy variables indicating the distance of the forecast year to the calendar year 2007 (distance to year of the financial crisis).
Control Variables	
GDP Growth	Average growth rate of the gross domestic product (GDP) in the European Union at constant prices over the respective forecast period.
Inflation Rate	The average consumer price inflation rate in the European Union over the respective forecast period.
Credit Spreads	Average credit spreads as reported under the S&P Leveraged Loan Index in the year of the forecast presentation.
European Profit Yields	This variable captures the average operating profitability in public companies listed in the STOXX Europe 600 index over the forecast period. The variable is defined by the average level of median EBITDA / Enterprise Value across all STOXX Europe 600 companies, excluding banks and insurance companies.

The table above presents the explanatory and control variables used in our regression analysis.

Table 3.9 shows the cross-correlations for the variables of our regression. Panel A of the table summarises the correlations between executive optimism for each forecast item. The remaining cross-correlations are provided in Panel B of the table. Across all correlations, we find no material concern for multicollinearity. Among the cross-correlations relating to executive optimism, we observe the strongest positive cross-correlation between industry variables and executive optimism to secure higher leverage. Meanwhile, the strongest, but still modest, negative cross-correlation exists between company executive optimism on fixed asset growth and company size. This relationship appears intuitive given increasing company size could incline managers to assume significant efficiency potential, which in turn requires less strong departure from historic asset growth along ambitious top line growth. Similarly, we observe the

Table 3.9: Cross-correlation Table

Panel A: Correlations Executive Optimism Variables	Sales	EBITDA	Capex	Working Capital	Bank Debt	Shareholder Debt	Fixed Assets
Company Size	(0.0748)	0.2676	(0.0501)	(0.0543)	(0.0919)	(0.2462)	**(0.3201)**
Company Age	0.0425	(0.0395)	(0.1020)	0.1096	(0.0534)	(0.1850)	(0.0823)
Industry Classification	0.0179	(0.1649)	(0.0877)	0.3300	**0.3531**	0.2097	0.0985
Profitability	0.0306	(0.1357)	(0.0557)	(0.0101)	(0.0610)	(0.1255)	(0.0578)
Capital Intensity	0.0352	(0.0575)	(0.0702)	0.1932	(0.0178)	(0.1388)	(0.1249)
Management Equity Share	0.1555	(0.0437)	(0.0460)	(0.0230)	0.1271	0.0383	0.0799
Buyout Experience	(0.0973)	(0.0323)	(0.1131)	0.0755	0.2482	0.2802	0.2873
Forecast Year Dummy	0.0187	0.0893	0.0609	(0.0855)	0.3259	0.2729	0.1928
GDP Growth	0.1109	0.1358	0.0186	(0.1192)	0.2685	0.2124	0.2484
European Profit Yields	0.0270	0.0208	0.1318	(0.1498)	0.2756	0.2403	0.0095
Inflation Rate	(0.0732)	(0.0116)	0.0700	0.0423	0.0197	0.2218	(0.2294)
Credit Spreads	(0.0757)	(0.0971)	(0.0512)	0.0966	(0.2639)	(0.2152)	(0.2193)

Panel B: Correlations Other Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Company Size	1.0000						
(2) Company Age	0.3172	1.0000					
(3) Industry Classification	(0.1657)	(0.1825)	1.0000				
(4) Profitability	(0.5351)	(0.2552)	0.3157	1.0000			
(5) Capital Intensity	(0.1274)	(0.1628)	0.4203	0.4806	1.0000		
(6) Management Equity Share	(0.0073)	0.1780	(0.0588)	(0.0601)	(0.0130)	1.0000	
(7) Buyout Experience	(0.1784)	(0.0427)	0.0252	0.0900	0.2047	0.0714	1.0000
(8) Forecast Year Dummy	0.0298	(0.1366)	0.2968	0.0024	0.0351	(0.1302)	0.2275
(9) GDP Growth	0.0503	(0.1460)	0.2685	(0.0314)	0.0015	(0.1323)	0.1295
(10) European Profit Yields	0.0835	(0.1402)	0.2756	(0.0218)	(0.0032)	(0.0376)	0.0031
(11) Inflation Rate	(0.0968)	(0.0621)	0.0197	0.1377	0.0913	0.0890	(0.0226)
(12) Credit Spreads	(0.0994)	0.1026	(0.2639)	0.0218	(0.0211)	0.0241	(0.2150)

continued	(8)	(9)	(10)	(11)	(12)
(7) Buyout Experience					
(8) Forecast Year Dummy	1.0000				
(9) GDP Growth	0.2372	1.0000			
(10) European Profit Yields	**0.6097**	0.6080	1.0000		
(11) Inflation Rate	(0.2828)	(0.5191)	0.1463	1.0000	
(12) Credit Spreads	(0.3929)	**(0.5743)**	(0.5090)	0.4739	1.0000

The table exhibits the cross-correlations among the variables of our OLS regression. Panel A reports the correlations for the executive optimism computed for each forecast line item. Panel B provides an overview over the correlations among the remaining variables. Negative values are shown in brackets. The strongest positive and negative cross-correlation points are highlighted in bold.

strongest cross-correlations in Panel B among our macroeconomic control variables, which represent developments in the financial sector and real economy.

3.6 Results

Our accuracy measures supply a comprehensive view on the development of managerial forecasts and the actual development of the buyout company financials. Forecasting accuracy deteriorates over time for most of our observations with increasing errors in relative accuracy. We also observe low accuracy in the predicted growth patterns as indicated by the percentage point deviations in growth rate accuracy. Among our observations, we find the highest accuracy levels for sales and working capital forecasts. Recalling predicted sales growth around 7% per year, we find comparably low median predictive errors of 2% in the first year which build up to 12% five years into the forecast term. The median percentage point variation of 5% in actual sales growth around the forecasted sales growth reflects a considerable scattering in the annual changes. However, the aggregate sales accuracy of 6% underline that management delivers most (94%) of the sales promised under the forecasts until the end of the forecast term.

From a profitability perspective, we recognise significant predictive errors in forecasted EBITDA. Consistent with Dhaliwal et al. (2012), who review financial analyst forecasts, the error increases sharply from a relative error of 5% for the first year forecast to 18% for the second year. As opposed to the sales forecast error, EBITDA forecast errors steadily increase along the forecast term with persistent growth rate errors. The EBITDA growth rate divergence ultimately creates a significant shortfall in the aggregate delivery of forecasted earnings, which remain roughly 20% below predicted levels. We find the top quartile forecasts to predict EBITDA with considerable higher median accuracy with all three error types ranging below 8%. Meanwhile, the bottom quartile forecasts show median errors in excess of 30% on all three scale specifications, which contrasts the higher reliability of top line predictions. The top quartile sales forecasts show forecasting errors below 4% and bottom quartile forecasts errors of more than 12%, which underlines the relative unreliability of EBITDA forecasts.

Management forecasts also do not anticipate the financing structure of a leveraged buyout. Managerial predictions significantly fall short of the actual bank and shareholder debt attracted in the first year after the buyout with roughly 31% and 27% forecasting errors, respectively. The progressively increasing error in relative debt forecast accuracy evidences the erroneous assumption that free cash flows will be used to pay down bank debt. This is especially noticeable in the strong annual increases in bank debt forecast errors, which are consistent with

bullet bank loans relying on a balloon repayment at maturity. Meanwhile, we observe comparably smaller errors for shareholder debt in terms of annual changes, where managers assume less strong repayment effects in the first place. As a result of the higher debt-share in buyout financing and actual repayment patterns, the portfolio companies hold more than twice the debt level predicted by management over the holding period. Considering capital requirements, we observe median relative forecast errors of 22% and 24% for capital expenditures and fixed asset levels respectively over the forecast period. Substantial scattering of the actual growth rate around managerial estimates (median of 29 percentage points) suggests poor managerial control on the timing of asset investments or suggest window-dressed asset requirements. Excessive capital expenditures relative to forecasts surface after the first forecast year and comport with the median relative predictive errors in fixed asset balances. As a result, aggregate accuracies show a variance of 15% in actual capital expenditures around forecasts and an aggregate fixed asset variation of 26% over the entire forecasting period.

Figure 3.1 and **Table 3.10** illustrate the economic significance of the forecast errors and provides a break down according to forecast terms. The charts summarise our key findings with respect to operational growth, capital expenditure spending and managerial estimates on the asset-heaviness of the company's future operations as well as intensity of the debt burden after the buyout. Considering the growth rate implied in the last pre-forecast year until the last year of the forecast, we see significant shortfalls in EBITDA growth with more than two thirds (78.9%) of the forecasting companies overestimating the majority of years in the forecasted period. The weighted average across the forecast terms indicates that the portfolio firms live up to 57.6% of forecasted EBITDA growth rate, leaving roughly 40% of the forecasted growth rate expectations unfulfilled. Managerial predictions are more accurate for the anticipated sales growth with actual growth rates attaining 86.3% of the forecasted growth rates on average. Irrespective of forecast terms, portfolio firms considerably exceed the capital expenditure budgets as per the forecasts, which on average amount to 140.7% of the forecasted capital expenditure level over the forecast period. Fixed assets balances echo underestimated capital requirements showing 124.9% of the initially forecasted balances on average. In parallel, working capital requirements likewise show excessive growth relative to management forecasts. Noticeably, for both cash sensitive variables – capital expenditures and working capital – we find the growth in excess of forecasts to further increase with the length of the forecast period, when comparing 3-year forecast to the 4-year and 5-year forecasting horizons. For both shareholder and bank debt, we conclude that on average portfolio firms issue three times more debt than expected by the management team before the buyout transaction.

Figure 3.1: Forecasting Accuracy

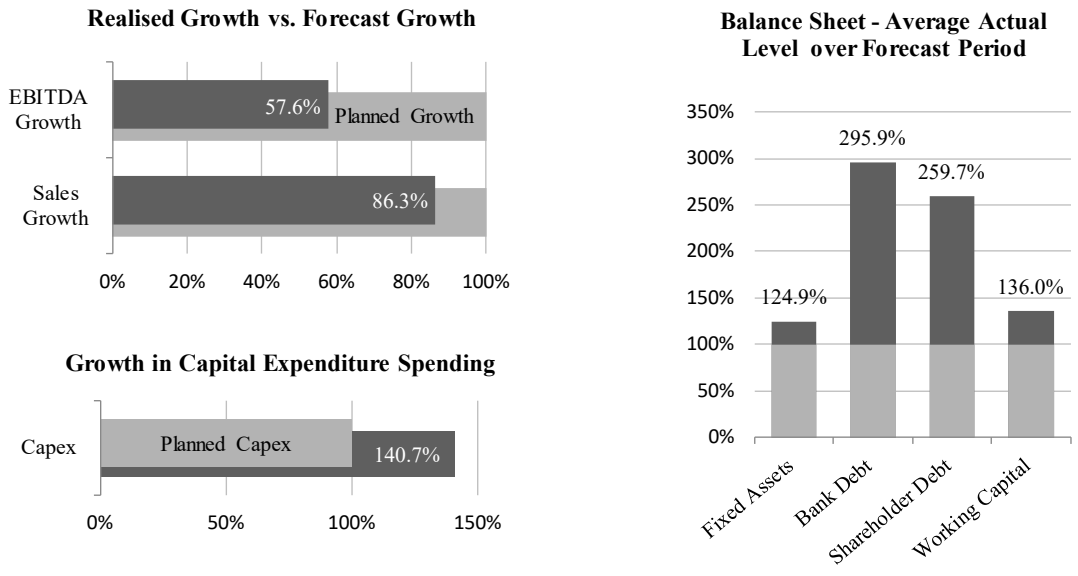


Table 3.10: Details on Forecasting Accuracy

Forecasts Conclusions on Overall Forecast Accuracy	**3 Year** Forecast	**4 Year** Forecast	**5 Year** Forecast	**Average** Weighted
(A) Operational Growth				
Realisation of Forecasted Income Growth				
Sales	88.6%	84.7%	86.1%	86.3%
EBITDA	49.1%	62.0%	60.2%	57.6%
(B) Capital Expenditures Spending Growth				
Budget Compliance in Forecasted Capex Growth	130.6%	143.7%	148.0%	140.7%
(C) Balance Sheet Control				
Departure from Forecasted Average in %				
Fixed Assets	115.0%	131.9%	127.7%	124.9%
Bank Debt	188.9%	353.8%	345.1%	295.9%
Shareholder Debt	165.7%	281.2%	332.1%	259.7%
Working Capital	101.4%	125.2%	181.5%	136.0%

The table shows forecasting accuracy by financial characteristics and in accordance with forecast terms. Panel (A) measures the realisation of forecasted compounded annual growth rates for sales and EBITDA. Panel (B) shows the level of average actual capital expenditures over forecasted capital expenditures. Panel (C) shows average actual levels of various balance sheet items over forecasted balances. The ultimate column of the table provides the average relation between actual and forecasted financials, weighted by the number of forecasts using the respective forecast term.

The results of our OLS regressions support the perception of overoptimistic EBITDA forecasts. In all three accuracy specifications, the effect of executive optimism on EBITDA forecasting error is positive and highly significant (at the 0.1% level). The adjusted R^2 measures indicate a reasonably good fit of the model. The finding of overoptimistic forecasts resulting in poorer predictive accuracy also aligns with the literature findings on overconfident managerial predictions, e.g. Ang et al. (2014). Further, in two of the three EBITDA regressions we observe industry classification and pre-buyout EBITDA profitability as significant determinants (at the 5% level). This relationship however does not hold in the second specification regression, which focuses on managerial precision to accurately forecast the future growth pattern. The regression specification on growth accuracy in turn shows a negative impact of company size on forecasting error (significant at the 5% level), which might imply that the management forecasts of bigger firms are more precise in accurately anticipating EBITDA growth patterns. The regression results for EBITDA overall confirm our expectation that historic profitability growth has a certain "stickiness". This finding does not contradict value creation of private equity funds through operational expertise and improvements after the buyout. Rather, our various findings on EBITDA forecast accuracy show that the average threefold increase in EBITDA growth rates is not predictive of the forecasted investment holding period. Predictive errors grow with increasing sharpness of the "hockey stick" and the overoptimistic forecast cannot be compensated by the strategic assistance of the private equity fund.

Considering private equity sponsors are highly experienced corporate acquirers, we feel that private equity valuations will mirror our empirical evidence on pronounced errors in EBITDA growth forecasts. This should likewise apply to the understated capital requirements in terms of fixed assets and capital expenditures, which all together point to upward biased cash flow forecasts. We suspect that private equity funds will appropriately discount management forecasts along the transaction process. As the actual detailed investment models – as per the time of buyout – are not available to us, we develop a simplified discounted cash flow valuation to confirm our intuition of management-forecast savvy private equity funds. Our high-level valuation approach builds on Kaplan and Ruback (1995). To discount the business forecasts, we apply equity return expectations of 19.5% as reported by Buchner (2016), whose findings on the risk-return profile of private equity investments align with Axelson et al. (2013). We infer the cost of debt from the S&P LBO credit index and use the median implied debt yields to maturity between 2008 and 2018. For the computation of the weighted average cost of capital (WACC) – as our discount factor – we use an average debt to equity ratio of 3 (75% debt / 25% equity) as observed by Groh and Gottschalg (2009), which also aligns with Kaplan and

Strömberg (2009). We follow Olbert and Severin (2020) and use an average European nominal tax rate of 30%. In most forecast cases we cannot directly observe unlevered free cash flow estimates and approximate these using EBITDA, fixed asset changes including capital expenditures and changes in net working capital. We use the ultimate forecast year to compute a terminal value assuming a constant growth rate of 3%, which is based on Kaplan and Ruback (1995), who add one percentage point in excess of inflation. We assume an expected inflation level of 2% consistent with the target of the European monetary union. Also, we include the cash outflows from the expected capital expenditures considered in the forecasts. In a second step, we compare the results of our simplified discounted cash flow valuations with the actual enterprise valuations in our deal sample, which we can observe for roughly half of the buyouts.

We find that private equity sponsors substantially discount the forecasts and pay roughly two thirds of the forecasted cash flows, i.e. the average actual enterprise value amounts to 67.3% (median: 60.9%) of the discounted forecast cash flows as per our valuation of the management forecasts. Arguably, this finding rests on several simplifications and assumptions. Also, final enterprise values can take into account myriad factors, e.g. from the negotiations, due diligence and structuring. However, the parameters would need to significantly depart from the above to result in full payment of the management forecasts. As an instance of illustration for our sample: Everything else equal, the equity share would need to exceed 50% equity financing asking above 20% annual return or leveraged debt yields need to exceed 10% to arrive at full payment of managerial forecasts as per our model. This however appears unlikely in leveraged buyout transactions. Therefore, we conclude that in equilibrium of the deal and in accordance with neoclassical investment model (Ferracuti & Stubben, 2019), the buyout fund managers and target managers narrow down the hockey stick case to an investment case, which represents a strong – potentially around 35% – discount on the initial managerial forecasts. Our view on discounted investment cases also aligns with Harbula (2011), who finds significant, but less pronounced shortfalls in expected sales and EBITDA growth when comparing actual performance to a set of acquisition business plans provided by a group of European private equity funds.

The remainder of our regressions – beyond the EBITDA regression results discussed above and presented in **Table 3.11** – analyse the determinants in forecasting errors in sales, bank debt, shareholder debt, fixed assets, trade working capital and capital expenditures. Across all three specifications, the six regression results offer little explanatory power on the drivers of predictive errors regarding these additional financial line items. The only exception to this builds the sales forecast regression, which shows an accuracy improving effect of increasing

Table 3.11: Determinant Analysis – Regression Results (EBITDA)

Determinant Analysis *EBITDA*	**(1) Relative Accuracy**	**(2) Growth Accuracy**	**(3) Aggregate Accuracy**
Explanatory Variables			
Executive Optimism	0.0253 ***	0.0371 ***	0.0248 ***
	5.145	5.757	5.463
Profitability	(0.5621) *	(0.5995)	(0.5447) *
	(2.515)	(1.958)	(2.641)
Company Size	(0.0033)	(0.0062) *	(0.0034)
	(1.439)	(2.046)	(1.590)
Capital Intensity	0.0059	0.0181	0.0025
	0.217	0.527	0.101
Company Age	(0.0376)	(0.0487)	(0.0259)
	(1.520)	(1.537)	(1.134)
Management Equity Share	(0.3998)	0.5602	(0.3519)
	(1.016)	1.103	(0.969)
Buyout Experience	NO	NO	NO
Industry Classification	YES	NO	YES
Forecast Year Dummy	NO	NO	NO
Control Variables			
GDP Growth	(1.7322)	(2.8883)	3.0552
	(0.192)	(1.836)	0.366
Inflation Rate	(6.9605)	(8.5883)	(5.6145)
	(1.038)	(0.825)	(0.908)
Credit Spreads	7.0068	9.7425	6.3726
	1.279	1.307	1.261
European Operating Profit Yields	0.0697	0.3268	(0.2323)
	0.098	0.301	(0.354)
Number of observations	77	73	77
Adjusted R^2	0.3308	0.4033	0.3537

*The table presents the regression coefficients, which are grouped by company specific explanatory variables and control variables with the latter group accounting for the economic development surrounding the forecast term. Column (1) reports on the regression using relative accuracy in annual financials as the dependent variable. Column (2) shows the regression results for growth rate accuracy and column (3) reports on the results using aggregate accuracy as dependent variable. The significance levels for all specifications are ***0.1%, **1% and *5%. Negative values are shown in brackets.*

company age for relative and aggregate accuracy (significant at the 5% level). As for the accuracy in growth pattern for sales forecasting, capital intensity and industry classification show significant results (also significant at the 5% level). The silence of the remaining models in conjunction with significantly lower R^2 measures – in comparison to the EBITDA and sales regressions – complement the low predictive accuracy of managerial forecasts as reflected in the percentage accuracy in relative, aggregate as well as growth rate terms. Our results suggest that forecasting accuracy for capital requirements and financing structures are either governed by other factors not incorporated into our model, e.g. forecasting techniques or personal traits

of the managers, or that the forecasts are rather driven by one major and comparably simple factor: Pre-buyout shareholder interests – including shareholding management teams – fuelled by incentivised investment advisors to maximise exit valuations and secure room for financial negotiations, which in turn deteriorate forecasting accuracy and leaves it to the bidders to find the "true forecast". The remainder of our regression results are provided in the **Appendix**.

3.7 Conclusion

We fill a gap in management and buyout literature on the accuracy and shape of target management forecasts in leveraged buyouts as well as their potential determinants. Our findings show that forecasts of the target management significantly depart from the company's historic growth trajectory with excessive optimism for future sales and EBITDA developments in the shape of hockey sticks. Meanwhile, capital requirements measured in fixed assets, working capital and capital expenditures only show modest growth. From a financing perspective, target managerial expectations assume that free cash flows will be used to repay existing bank debt and anticipate modest shareholder debt increases. Following the target firm's financial performance over the holding period, we put the accuracy of buyout forecasts into perspective.

We measure forecasting accuracy of target managers using three measures of predictive error capturing variations on annual terms, with respect to growth rates and the aggregate delivery of expected financial performance over the forecast term. Among our observations we find the highest accuracy for sales forecasts and trade working capital. While the overall growth rate for working capital exceeds forecasted levels, we observe actual sales growth around 86.3% of the forecasted compounded annual growth. The median predictive error of 5.4% for aggregate sales over the entire forecast term indicates that management after all delivers the lion's share of the expected top line growth. EBITDA forecasts prove to be far less reliable and overly optimistic.

We find predictive errors in excess of 13% among all accuracy measures and observe compounded annual EBITDA growth rates to fall short of the forecasts. As a result, we observe the portfolio firms only realise 57.6% of the EBITDA growth rates forecasted by management. On the balance sheets of our sample firms we likewise observe significant variations. Fixed asset levels and annual capital expenditures range well above forecasted levels. Particularly, managerial forecasts heavily underestimate the level of debt financing and erroneously assume deleverage effects from free cash flows. This appears consistent with bullet loan financing

practices and refinancing transactions over the holding period. Although the past proves to be a poor indicator for the future for financing forecasts, we observe a certain stickiness of the EBITDA growth trajectory: In the years approaching the beginning of the forecast period, our sample firms show annual EBITDA growth rates around 7.3%, which are assumed to roughly double to 15.2% over the forecasts but remain considerably below the ambitious target.

Our determinant analysis evidences managerial overoptimism in future (and well over historic) EBITDA growth as a significant factor in deteriorating predictive accuracy. This finding remains robust across multiple specifications of our regressions. While we cannot rule out overconfidence effects, our results point towards a systematically upward biased forecasting behaviour of target managers in terms of earnings-related figures. Further, we provide evidence that pre-forecast profitability reduces EBITDA forecast errors and lower company age increases sales forecast errors. The absence of significant effects in our other company-specific and macroeconomic variables as well as the determination coefficients in our remaining regressions suggest that managerial forecasts are driven by pre-buyout shareholder and potential managerial (self-) interests. Meanwhile, private equity sponsors appear to look through the dynamics of managerial forecasting around buyouts. Using a simplified discounted cash flow model to determine the enterprise value based on target management forecasts, we show that actual transaction values only pay around two thirds of the discounted and overstated target manager forecasts, which suggests that private equity funds narrow down the forecasts to a level of growth that is much closer to the actual growth observed over the later buyout holding period.

After all, it appears not only the leveraged buyout firms "produce ambitious business plans" (Loos, 2006, p. 24), but also the potential portfolio firms themselves. To which extent these forecasts are driven by traits of the pre-buyout shareholders, the target company's management and their advisors will provide an interesting field for future research. Further, it would be interesting to evaluate the private equity firms' internal forecasts and relate them to managerial forecasts and subsequent buyout performance. Our study contributes a first overview on managerial forecasting accuracy in private equity buyouts, inviting future research on this topic with a high relevance for the buyout funds, its limited and general partners as well as leveraged loan lenders. Sharing the thought of Berg and Gottschalg (2005), the stimulating effect of aspirational business projections should likewise be an interesting topic for future research from a strategic management point of view. In the spirit of Bacon-Gerasymenko et al. (2016) it will also be interesting to explore how the initial management forecasts are updated over the holding period in response to actual economic developments.

3.8 Appendix

Table 3.12: Determinant Analysis – Regression Results (Sales)

Determinant Analysis *Sales*	**(1) Relative Accuracy**	**(2) Growth Accuracy**	**(3) Aggregate Accuracy**
Explanatory Variables			
Executive Optimism	0.0037	0.0005	0.0049
	0.871	0.187	1.105
Profitability	(0.1722)	0.0779	(0.0631)
	(1.573)	0.990	(0.548)
Company Size	0.0001	0.0010	0.0002
	0.128	1.342	0.149
Capital Intensity	0.0127	(0.019) *	0.006
	0.958	(2.149)	0.427
Company Age	(0.0279) *	(0.0030)	(0.0275) *
	(2.311)	(0.374)	(2.164)
Management Equity Share	(0.3177)	(0.1044)	(0.3234)
	(1.641)	(0.797)	(1.588)
Buyout Experience	NO	NO	NO
Industry Classification	NO	YES	NO
Forecast Year Dummy	NO	NO	NO
Control Variables			
GDP Growth	6.1862	(3.6749)	4.4590
	1.425	(0.903)	0.976
Inflation Rate	2.0607	(0.5132)	1.4106
	0.640	(0.195)	0.416
Credit Spreads	(1.7950)	(1.4909)	(2.4381)
	(0.666)	(0.777)	(0.860)
European Operating Profit Yields	(0.1552)	0.3748	0.1272
	(0.452)	1.378	0.352
Number of observations	77	73	77
Adjusted R^2	0.0540	0.2701	0.0024

*The table presents the regression coefficients, which are grouped by company specific explanatory variables and control variables with the latter group accounting for the economic development surrounding the forecast term. Column (1) reports on the regression using relative accuracy in annual financials as the dependent variable. Column (2) shows the regression results for growth rate accuracy and column (3) reports on the results using aggregate accuracy as dependent variable. The significance levels for all specifications are ***0.1%, **1% and *5%. Negative values are shown in brackets.*

Table 3.13: Determinant Analysis – Regression Results (Capital Expenditures)

Determinant Analysis *Capital Expenditures*	**(1) Relative Accuracy**	**(2) Growth Accuracy**	**(3) Aggregate Accuracy**
Explanatory Variables			
Executive Optimism	(0.0030)	0.1720	0.0042
	(0.126)	0.748	0.257
Profitability	(0.2187)	(9.4364)	0.9897
	(0.106)	(0.441)	0.694
Company Size	0.0988	(1.1548)	0.0222
	0.497	(0.581)	0.161
Capital Intensity	(0.213)	1.232	(0.093)
	(0.858)	0.513	(0.545)
Company Age	(0.3227)	0.5643	(0.1255)
	(1.370)	0.245	(0.771)
Management Equity Share	6.1782	7.0839	2.8959
	1.699	0.199	1.152
Buyout Experience	NO	NO	NO
Industry Classification	NO	NO	NO
Forecast Year Dummy	NO	NO	NO
Control Variables			
GDP Growth	11.6884	(207.1489)	36.0471
	0.139	(0.184)	0.620
Inflation Rate	86.5281	20.3443	75.0436
	1.482	0.271	1.859
Credit Spreads	(21.1404)	202.6907	(22.3994)
	(0.400)	0.287	(0.613)
European Operating Profit Yields	(8.0521)	(132.0413)	(4.7629)
	(1.267)	(0.240)	(1.084)
Number of observations	74	70	74
Adjusted R^2	(0.0185)	(0.0923)	(0.0140)

*The table presents the regression coefficients, which are grouped by company specific explanatory variables and control variables with the latter group accounting for the economic development surrounding the forecast term. Column (1) reports on the regression using relative accuracy in annual financials as the dependent variable. Column (2) shows the regression results for growth rate accuracy and column (3) reports on the results using aggregate accuracy as dependent variable. The significance levels for all specifications are ***0.1%, **1% and *5%. Negative values are shown in brackets.*

Table 3.14: Determinant Analysis – Regression Results (Fixed Assets)

Determinant Analysis *Fixed Assets*	**(1) Relative Accuracy**	**(2) Growth Accuracy**	**(3) Aggregate Accuracy**
Explanatory Variables			
Executive Optimism	0.0748	0.0026	0.0542
	2.264	0.425	1.653
Profitability	(0.0737)	(0.0648)	0.2211
	(0.035)	(0.154)	0.107
Company Size	0.0776	(0.0435)	0.0863
	0.418	(1.207)	0.469
Capital Intensity	0.032	(0.036)	0.049
	0.125	(0.798)	0.194
Company Age	(0.0289)	0.0323	0.0523
	(0.155)	0.948	0.283
Management Equity Share	4.5860	(0.4764)	3.9625
	1.690	(0.968)	1.473
Buyout Experience	NO	NO	NO
Industry Classification	NO	NO	NO
Forecast Year Dummy	NO	NO	NO
Control Variables			
GDP Growth	124.6282	3.6780	128.8355
	1.812	0.242	1.889
Inflation Rate	49.5900	10.2299	57.9814
	0.860	0.956	1.014
Credit Spreads	13.9625	(9.8817)	2.2556
	0.305	(1.153)	0.050
European Operating Profit Yields	(8.0042)	0.9268	(7.4216)
	(1.317)	0.790	(1.231)
Number of observations	55	52	55
Adjusted R^2	0.0256	(0.0069)	(0.0785)

*The table presents the regression coefficients, which are grouped by company specific explanatory variables and control variables with the latter group accounting for the economic development surrounding the forecast term. Column (1) reports on the regression using relative accuracy in annual financials as the dependent variable. Column (2) shows the regression results for growth rate accuracy and column (3) reports on the results using aggregate accuracy as dependent variable. The significance levels for all specifications are ***0.1%, **1% and *5%. Negative values are shown in brackets.*

Table 3.15: Determinant Analysis – Regression Results (Bank Debt)

Determinant Analysis *Bank Debt*	**(1) Relative Accuracy**	**(2) Growth Accuracy**	**(3) Aggregate Accuracy**
Explanatory Variables			
Executive Optimism	0.0031	0.0735	(0.0508)
	0.007	1.583	(0.107)
Profitability	106.5024	(0.6394)	109.9139
	0.601	(0.033)	0.628
Company Size	19.1071	(1.0587)	19.8498
	1.271	(0.609)	1.337
Capital Intensity	(14.7644)	(0.9099)	(13.5287)
	(0.700)	(0.441)	(0.650)
Company Age	3.5807	0.1590	3.4998
	0.235	0.107	0.232
Management Equity Share	105.6228	(26.3103)	129.7369
	0.453	(1.177)	0.564
Buyout Experience	NO	NO	NO
Industry Classification	NO	NO	NO
Forecast Year Dummy	NO	NO	NO
Control Variables			
GDP Growth	5,470.2519	1,141.4178	4,406.5732
	0.745	1.190	0.608
Inflation Rate	3,237.5164	879.5253	2,342.9673
	0.576	1.587	0.422
Credit Spreads	370.4708	54.9189	341.7523
	0.104	0.135	0.097
European Operating Profit Yields	(544.8410)	(128.4600)	(435.6361)
	(0.660)	(1.275)	(0.535)
Number of observations	39	36	39
Adjusted R^2	(0.4232)	(0.0917)	(0.4072)

*The table presents the regression coefficients, which are grouped by company specific explanatory variables and control variables with the latter group accounting for the economic development surrounding the forecast term. Column (1) reports on the regression using relative accuracy in annual financials as the dependent variable. Column (2) shows the regression results for growth rate accuracy and column (3) reports on the results using aggregate accuracy as dependent variable. The significance levels for all specifications are ***0.1%, **1% and *5%. Negative values are shown in brackets.*

Table 3.16: Determinant Analysis – Regression Results (Shareholder Debt)

Determinant Analysis *Shareholder Debt*	**(1) Relative Accuracy**	**(2) Growth Accuracy**	**(3) Aggregate Accuracy**
Explanatory Variables			
Executive Optimism	(0.4695)	0.0031	(0.4528)
	(2.406)	0.303	(2.969)
Profitability	(2.0746)	(2.6904)	(13.0058)
	(0.047)	(1.163)	(0.682)
Company Size	1.9665	(0.0651)	1.8592
	1.080	(0.660)	1.326
Capital Intensity	(4.924)	0.167	(3.554)
	(1.128)	0.973	(1.439)
Company Age	(3.7135)	0.0088	(4.1159)
	(1.927)	0.070	(3.012)
Management Equity Share	(2.3929)	0.5626	7.0768
	(0.052)	0.225	0.339
Buyout Experience	NO	NO	NO
Industry Classification	NO	NO	NO
Forecast Year Dummy	NO	NO	NO
Control Variables			
GDP Growth	(1,113.8223)	(46.9664)	(1,748.9954)
	(0.356)	(0.209)	(1.368)
Inflation Rate	2,043.4787	(48.6537)	2,213.2322
	2.271	(0.872)	3.435
Credit Spreads	(2,664.8653)	10.1107	(3,323.4897)
	(1.143)	0.103	(4.135)
European Operating Profit Yields	(487.1913)	6.3086	(538.1965)
	(2.233)	0.899	(6.015)
Number of observations	24	22	27
Adjusted R^2	(0.6439)	(1.0361)	(0.7897)

*The table presents the regression coefficients, which are grouped by company specific explanatory variables and control variables with the latter group accounting for the economic development surrounding the forecast term. Column (1) reports on the regression using relative accuracy in annual financials as the dependent variable. Column (2) shows the regression results for growth rate accuracy and column (3) reports on the results using aggregate accuracy as dependent variable. The significance levels for all specifications are ***0.1%, **1% and *5%. Negative values are shown in brackets.*

Table 3.17: Determinant Analysis – Regression Results (Working Capital)

Determinant Analysis *Working Capital*	**(1) Relative Accuracy**	**(2) Growth Accuracy**	**(3) Aggregate Accuracy**
Explanatory Variables			
Executive Optimism	0.0089	(0.0024)	0.0111
	1.009	(0.430)	1.005
Profitability	0.0701	(0.5717)	(0.3680)
	0.106	(1.380)	(0.444)
Company Size	0.1019	0.0120	0.0677
	1.663	0.329	0.882
Capital Intensity	0.015	0.003	0.034
	0.178	0.061	0.326
Company Age	(0.1229)	(0.0293)	(0.1490)
	(1.857)	(0.742)	(1.797)
Management Equity Share	(0.1223)	(0.1520)	(1.4147)
	(0.126)	(0.267)	(1.162)
Buyout Experience	NO	NO	NO
Industry Classification	NO	NO	NO
Forecast Year Dummy	NO	NO	NO
Control Variables			
GDP Growth	3.3237	(14.9508)	(6.8239)
	0.136	(0.862)	(0.222)
Inflation Rate	2.5690	(1.8471)	9.1613
	0.127	(0.148)	0.363
Credit Spreads	3.0865	(2.0579)	(6.6551)
	0.187	(0.203)	(0.321)
European Operating Profit Yields	0.7361	(0.5770)	0.9228
	0.354	(0.440)	0.354
Number of observations	62	59	62
Adjusted R^2	0.0169	(0.1261)	0.0389

*The table presents the regression coefficients, which are grouped by company specific explanatory variables and control variables with the latter group accounting for the economic development surrounding the forecast term. Column (1) reports on the regression using relative accuracy in annual financials as the dependent variable. Column (2) shows the regression results for growth rate accuracy and column (3) reports on the results using aggregate accuracy as dependent variable. The significance levels for all specifications are ***0.1%, **1% and *5%. Negative values are shown in brackets.*

Chapter 4

Negotiation Power of Private Equity Funds – Evidence from Sale and Purchase Agreements in European Buyouts

4.1 Introduction

With a growing demand for alternative investments, the market environment for leveraged buyouts has long become increasingly competitive (Cressy et al., 2007). Across the spectrum of the buyout landscape, a variety of investment strategies and asset focuses evolved and captured interest from an economic and academic point of view. The commoditisation of the "classic" buyout concept rooted in financial engineering calls industry professionals to expand their approach to value creation (Le Nadant et al., 2018). Across the lifecycle of an investment, fund managers seek value opportunities and returns for their investors, which require strong negotiation skills. Such negotiation skills may confer a competitive advantage in terms of value creation not only over the holding period, but especially upon acquiring and selling the portfolio company. Academic literature suspects the negotiation skills of experienced private equity funds to favourably affect deal terms, thereby contributing to value creation in the interest of the fund's partners (Achleitner et al., 2011). Most prominently, the deal terms and outcome of negotiations are reflected in the contractual agreements governing the entry and exit of the investment. By considering risks and opportunities, the deal contracts and its negotiation go beyond the mere definition of a purchase price, which only takes up a relatively small fraction of the sale and purchase agreements (Coates, 2015).

Jastrzębski (2019) emphasises the relevance of transactional contract negotiations, which build a bridge from theoretical assumptions to the imperfect reality of the economy and observes value-creating as well as value-distributing components for the acquiring and selling party. Considering the broad range of financial, operational, legal and tax topics to be addressed in an acquisition agreement, financial contracting is in practice frequently more complex than

theoretic predictions assume (Kaplan & Strömberg, 2003). Sale and purchase agreements in mergers and acquisitions have sharply increased in textual length and linguistic sophistication (Coates, 2016) governing the deal structure, purchase price, the process for completion of the transaction, risk allocation and dispute resolution. Cumming and Johan (2014) even refer to the drafting and negotiation of the acquisition agreement as "the most critical part of the investment process" (p. 313) with a wide variety of topics to be considered.

Much scientific attention has meanwhile been given to the fund dynamics from a limited partner perspective to assess fund performance relative to equity and debt markets (Ang et al., 2018) as well as performance persistence (Robinson & Sensoy, 2013). Notwithstanding its high relevance for the broad casual network of private equity value creation, deal contracting continues to be a rather understudied field (Ahlers et al., 2016). The scarcity of research should also be attributable to the opacity involved in financial contracting in the context of private equity transactions (Brown & Wiles, 2016), which especially holds true for the European deal landscape where few mandatory publication requirements apply with respect to private equity transactions. This essay aims to shed light on buyout acquisition agreements concluded by private equity funds and investigate their bargaining power in financial contracting. To the author's knowledge, this research is first to evaluate private equity negotiation power based on European leveraged buyout contracts and addresses typical contractual agreements, establishes their role in private equity acquisitions and develops a new framework to operationalise bargaining outcomes. In doing so, existing research is extended, which draws on the subjective assessment of negotiation power by private equity funds (Michel et al., 2020), by developing a scoring framework for contractual outcomes.

Past research indicates that contract design alters with the comparative bargaining power of the contracting parties (Bengtsson & Bernhardt, 2014). More reputational venture capital funds leverage their bargaining power into obtaining stronger board representation over downside protections (Bengtsson & Sensoy, 2011; Hsu, 2004). In leveraged buyout transactions, Demiroglu and James (2010) find experienced private equity funds to negotiate superior debt terms. Equally important to the favourable pricing of debt margins, private equity funds succeed in negotiating appropriate ex-ante contingencies to achieve an advantageous renegotiation of the debt conditions over the loan term (Roberts & Sufi, 2009). At the level of the portfolio company, the fund managers display negotiation skills in the realignment of executive compensation agreements towards more cash-flow sensitive targets (Metrick & Yasuda, 2010), while at fund level the bargaining zone with respect to limited partnership agreements appears to be limited (Phalippou et al., 2018). The scope of comparative bargaining

advantages of the funds therefore seems to be more pronounced at portfolio level and further influenced by the market environment when the contracting involves the design of the participation (Cumming, 2005). Changes also apply to acquisition agreement outcomes in general as observed by market practitioner studies, which document time trends in merger and acquisition over time (American Bar Association, 2019). Aside from market dynamics, the bargaining outcome is suspected to be driven also by deal-specific factors such as the type and complexity of the sell side and the distribution of expertise advantages (Michel et al., 2020).

Building on a sample of sale and purchase agreements in transactions with private equity involvement, I find that the institutional investor side of the private equity fund is not directly associated with a superior bargaining power over non-institutional negotiators. Instead, the results indicate that the cyclicality of the private equity market environment is the primary driver of risk allocation in buyout acquisition agreements. The acquirers' level of contractual protection – as measured by the analytical framework – deteriorates with increasing return opportunities between leveraged buyout debt and operating profitability of equity markets, which fuel investment appetite for private equity funds. Also, the characteristics of the private equity fund including age, size or specialisation do not yield statistically significant effects on the negotiation outcomes. These results remain robust across various specifications of the scoring approach and regression analysis. Similar to the returns and investment behaviour of private equity funds, debt and equity markets are significant drivers in acquisition contracting (Bengtsson & Bernhardt, 2014) and in contrast to credit spreads, fund experience measured by size and age does not convey a comparative bargaining advantage on contractual risk allocation (Demiroglu & James, 2010). The European buyout contracts included in the sample are similarly structured to United States contracts (Coates, 2015) with an equal relative pronunciation of the warranty and indemnification network, which remains largely independent of transaction and fund size effects.

This essay is structured as follows: Chapter 4.2 provides an overview of the existing literature relating to acquisition contracting and negotiation power of private equity sponsors. I describe and discuss the structure and content of sale and purchase agreements in some more detail in Chapter 4.3 before I present the data sample in Chapter 4.4. Chapter 4.5 describes the methodology and introduces the scoring framework used in the subsequent regression analysis. The results are discussed in Chapter 4.6 and Chapter 4.7 concludes.

4.2 Literature Review

In their role as financial intermediaries, private equity funds are repeat investors acquiring and exiting portfolio companies in a pursuit of returns for their limited partners, which are the investors in the funds managed by the general partner (Ang et al., 2018). Over the holding period, value creation through operational, financial and governance engineering determines the realisation of the business plan (Kaplan & Strömberg, 2009), while substantial resources of the general partner are devoted to the entry and exit of the investment (Gilligan & Wright, 2014). Along with the due diligence and structuring of the transaction, all insights are translated into the price-risk-measures-network of the contractual agreement (Patschureck et al., 2015), which regulates the scope of the transaction, the purchase price determination, terms of payment as well as the non-pricing provisions, which allocate risks and benefits pertaining to the target company and market among the contracting parties. As a result, the agreement in all its provisions will affect the value derived from the deal and thereby affect the value created for the fund managers and its partners (Achleitner et al., 2011). The outcome of the contract depends on the comparative distribution of bargaining power, the previous "irrelevance proposition" (p. 1670) of the non-price provisions in agreements has been declined in favour of a market-oriented view on value distribution in contractual designs among the parties (Choi & Triantis, 2010). Private equity sponsors navigate the transaction process using their expertise with the deal structuring, terms and processing, which are key characteristics in their value proposition towards stakeholders (Derakhshani, 2014). This chapter provides an overview on contract design, bargaining power and literature's findings in the context of private equity investments.

Contracts in mergers and acquisitions have significantly increased in size and complexity in the 21st century. For a sample of United States acquisition agreements (Coates, 2016) finds a doubling in terms of length and considerable rise in linguistic sophistication, which might also be driven by the growing complexity of regulations and business operations covered by the transaction agreements. While the particularities of each transaction demand appropriate adaptions, the broader structure of the agreement remains similar and recurrent elements provide a basic pattern for the negotiation of acquisition agreements (Coates 2015). Such corner pillars of standardisation do not only ease the risk of litigation (Manns & Anderson, 2013), but allow practitioners to follow potential trends in market studies over time, e.g., the "M&A Deal Points Studies" published annually by the American Bar Association. To the extent relevant for

the analysis, the respective contract provisions and their role for the transaction are described in more detail in Chapter 4.3.

The contractual outcomes of the negotiation strongly depend on the bargaining power that the contracting parties can exercise (Cabrales et al., 2011). The width of the bargaining zone in an acquisition context might even amplify such benefits of a power position based on the parties' alternatives (Kim & Fragale, 2005). In a survey-based analysis of buyouts (Michel et al., 2020) identify bidder competition, the expertise advantage and seller's time pressure as the key mediators of self-perceived bargaining power of private equity funds. Among their sample of buyouts, the authors find that family businesses as a distinct type of seller yield a (perceived) comparative negotiation advantage of the buying fund with family firm complexity magnifying the detected relationship, while mediating bargaining effects from seller's time pressure (Michel et al., 2020). This connects with the findings of Ahlers et al. (2016) confirming an expertise advantage of private equity funds as a positive driver of perceived bargaining power in buyout transactions while bidder competition deteriorates the comparative advantage.

Bengtsson and Sensoy (2011) explore financial contracting and shed light on the bargaining effects of experienced and well performing funds in the neighbouring field of venture capital funds. Based on the cash flow rights, Bengtsson and Sensoy (2011) construct a downside protection index to measure contractual protection if actual performance of the venture investment falls below expectations. Consistent with Hsu (2004), who observes more reputational and experienced venture capital funds to enter investments at comparatively discounted equity valuations, Bengtsson and Sensoy (2011) find that more capable funds use a negotiating advantage to obtain board representation in a tradeoff over protection rights. Caselli et al. (2013) find a robust and positive relationship between deal contract complexity and several return measures for venture capital investments. Earlier research by Cumming (2005) shows that private equity and venture capital contract design in the United States also responds to general market environment changes and tax regimes.

At other levels of the private equity spectrum, evidence on bargaining power appears to be both limited and mixed. The compensation mechanism private equity managers agree with their investors at fund level – the limited partnership agreements – show a high degree of standardisation, which most commonly price buyout funds' management fees at 2% of committed capital and set carry levels at 20% of realised returns above an 8% annual return hurdle rate (Metrick & Yasuda, 2010). Interestingly, the authors find that buyout funds use experience and performance track records to raise larger funds and to scale the overall fee revenue while income per dollar committed capital decreases, which suggests that the

standardised contract environment does not allow for bargaining power to be exercised, if any. Slightly more variation is observed by Metrick and Yasuda (2010) for monitoring and transaction fees and their economic allocation to the fund investors and the fund managers.[6] For these types of fees – albeit accounting for a smaller fraction of fund sponsor income – Phalippou et al. (2018) find that more skilled limited partners are less likely to accept high monitoring fees, evidencing bargaining effects of stronger investors surrounding limited partnership agreements. Batt and Appelbaum (2021) underline that – aside from remuneration – the partnership agreements are directed towards an investment period with a significant power asymmetry between the general partner and constrained limited partners until expiration of the fund's life term.

Supplementing the bargaining insights into limited partnership agreements with a view to performance, Litvak (2009) finds that contractual complexity is not associated with higher – disguised – fund manager compensation and only small fractions of the fee framework can be predicted by quality of the fund manager skills. Adding to the private equity compensation puzzle, larger and older fund managers invite a higher share of performance-sensitive compensation compared to younger, less reputable organisation, while across all funds the fee agreements appear to be unrelated to return performance (Gompers & Lerner, 1999). However, in a more recent and multi-faceted analysis on venture capital funds Hüther et al. (2020) find that nuances in the carried-interest mechanisms to the benefit of the general partners do yield better fund performance, which suggests an imperfect bargaining power used to leverage better historic performance into higher compensation schemes, while however not fully extracting the net-of-fee advantage from the limited partners. The bargaining power of funds appears to be further influenced by market dynamics. Schmidt and Wahrenburg (2004) note that restrictive covenants in limited partnership agreements decrease with growing committed capital supply.

At investment level, more active buyout funds obtain higher leverage ratios through increased buyout debt relative to bank debt with extended maturity terms and at more favourable loan spreads (Demiroglu & James, 2010). Further, Demiroglu and James (2010) argue that such negotiation benefits tie into reputational advantages and allow private equity funds to secure better credit conditions in buyouts, especially in favourable credit markets. The sophistication of private equity funds in negotiating debt terms also becomes apparent in the

[6] Transaction fees charged by buyout funds typically amount to 1-2% of the transaction volume, while annual monitoring fees are frequently dependent on portfolio company performance and equal 1-5% of the EBITDA. The majority of fund agreements require the general partner as fund managers to return the majority of transaction fees and 80% of the monitoring fees to the limited partners (Metrick & Yasuda, 2010).

ex-ante inclusion of relevant contingencies sets into the loan contracts (e.g., pricing grids and financial covenants), which are designed to guide common renegotiations of debt conditions over the loan term (Roberts & Sufi, 2009). Favourable deviations from agreed covenants are exploited to renegotiate improved conditions in principal amounts, pricing and maturity (Roberts & Sufi, 2009). In terms of target company governance Cronqvist and Fahlenbrach (2013) observe that private equity funds – as "most sophisticated and financially savvy principals" (p. 1) – use their bargaining advantage from concentrated ownership to redesign executive contracts of the portfolio company management towards more cash-flow sensitive compensation metrics.

Another strand of literature has turned its attention to the role of advisors and lawyers in the negotiation of deals. Graham et al. (2017) explore the effect of financial advisors in United States mergers and acquisitions and find that target-industry specialised consultant firms yield additional returns in acquisitions, which they relate to improved entry pricing and the specialised advisor supporting the acquirer "by pricing the target more accurately and/or better negotiation" (p. 96). Leledakis et al. (2021) confirm this finding for acquisitions of privately held targets in the United States banking industry. Assessing the role of transaction lawyers, Bengtsson and Bernhardt (2014) detect a value creating relationship of legal counsel in the context of venture capital investments. While successful investment matching between venture capital funds and entrepreneurs hinges on the contracting experience of such entrepreneurs, a lack of experience of the entrepreneur can effectively be compensated by legal counsel with venture capital specific experience. In their regression analysis Bengtsson and Bernhardt (2014) reject the hypothesis of the lawyers being a driver of negotiation outcomes, but portray the role of the transaction lawyer as an "effective translator", i.e. limiting the lawyers' influence to the ability of translating specific contract provisions (e.g. redemption, conversion and participation rights) to the entrepreneur. Complementing this research Litvak (2009) argues that the negotiation and bargaining of acquisition agreements is indeed not "simply delegated to lawyers" (p. 195) evidencing different contractual outcomes that originate from the very same law firm. This appears to be intuitive and aligns with the perception of private equity funds as strong principals (Cronqvist & Fahlenbrach, 2013). Jastrzębski (2019) contributes similar findings and states for the role of transaction lawyers "overall value creation is true mainly for the case where new legal instruments are created" (p. 284). From a negotiation strategic point of view Badawi and De Fontenay (2019) complement the literature on the role of advisors with respect to the alleged "first-drafter advantage". For mergers targeting listed companies in the United States Badawi and De Fontenay (2019) find a limited advantage for merger agreements,

which however does not extend to clauses with a direct monetary effect. The authors speculate however that this effect could trace back to the stronger principal in the negotiation demanding the right of providing the first draft (Badawi & De Fontenay, 2019).

4.3 Acquisition Agreement Clauses

The acquisition agreement performs an important role in alleviating information asymmetries by informing and securing economic decisions, ultimately resulting in an "efficient trade" (Choi & Triantis, 2010, p. 852). Looking through the deal specific elements, Coates (2015) notes a basic pattern of reappearing provisions on pricing, deal structure and indemnity regimes. The clauses also have a high relevance in legal practice as the majority of acquisition agreements attracts disputes based on these contractual elements (Coates, 2012), which specify the price determination including earn outs and risk allocations through material adverse change (MAC) clauses, indemnities as well as warranties and representations.[7] Adopting a buyside perspective, Patschureck et al. (2015) recognise these instruments to be key risk management measures, which govern the exposure between signing and closing of the acquisition – e.g. with respect to the purchase price determination and MAC clauses – and the post-closing period based on the payment mechanism (including earnouts) and the warranty and indemnification regime. From a practitioners' point of view, these clauses are also part of the framework periodically covered in studies published by law firms, for example CMS (2020), and legal organisations like the publication by the American Bar Association (2019). Following this framework in the analysis, I draw on a set of clauses, which are discussed in the following before proceeding with an explanation of the data and approach in the subsequent sections.

Earnout clauses split the overall consideration paid to the seller into two components with an unconditional component centred around closing of the transaction and the second component – the earnout part – paid at a contractually agreed later date contingent on pre-determined economic target metrics (Erel, 2018). The conditional earnout payment is most commonly attached to accounting measures. Cain et al. (2011) find earnouts on average represent 33% of the total transaction value, a term of 2.6 years after closing and more than 80% of earnout clauses are contingent on sales or earnings figures. This observation among United States companies between 1994 and 2003 also aligns with more recent insights into

[7] On the difference between warranties and representations Coates (2015) remarks "Formally, a representation is a statement of fact, including actions that can be so interpreted, such as giving someone a set of financial statements, whereas a warranty is a promise that a representation is true and reliable. M&A contracts do not typically distinguish between them, but include them together without identification." (p. 8).

European mergers and acquisitions where in 79% of earnout clauses either sales, EBIT or EBITDA are the preferred determinant of earnout clauses, and the majority of agreements encompass an earnout period ranging between 12 and 36 months (CMS, 2020). From a conceptual point of view, earnouts therefore possess characteristics similar to a European call option, which only result in a gain upon maturity if exceeding the pricing threshold, however accompanied by default and litigation risk in the case of earnouts (Battauz et al., 2021). Based on their structure, earnout provisions are an effective tool to reconcile valuation disagreements by the contracting parties over a certain holding period (Kohers & Ang, 2000). The introduction of an earnout mechanism is thereby beneficial to the acquirer in two ways: It shifts valuation uncertainties to the seller (Lukas et al., 2012), being conditional on realising certain growth opportunities, and aligns the interests of any retained owner-managers with those of the buyer (Datar et al., 2001). Along with the alignment of interest, earnout clauses reduce moral hazard effects in information disclosure and future performance predictions (Cain et al., 2011). Depending on the confidence the seller has in the target company, earnouts can provide a strong signal of quality effectively reducing adverse selection problems and alleviate uncertainty for the buyer (Quinn, 2013). Further, Bates et al. (2018) point to the liquidity and financing advantage the earnout provides to the buyer, especially in constrained credit market environments. Consistent with the economic advantageousness to the buyer, Barbopoulos and Sudarsanam (2012) provide evidence for value creation by including earnouts in the post-acquisition period among a set of large set of United Kingdom acquisitions. This positive effect continues to hold when takeover premia increase (Barbopoulosa & Adrab, 2016).

Within the wider domain of transaction pricing, the determination of the final purchase price payable is a key element of mergers and acquisitions for which legal practice and academic research observe two competing concepts: The closing accounts mechanism and the locked box concept (Tsao, 2016). As a potentially “complementary mechanism” (p. 32), but unrelated to the use of earnouts, the pricing mechanism determines the final sale price for the target company payable by the buyer to the seller on a much shorter time horizon around the closing of the acquisition (Choi, 2017). The concepts of closing accounts and locked box mechanisms differ in their accounting methodology, legal drafting and the time economic ownership is transferred to the buyer. The locked box concept transfers economic ownership of the target based on a past reference (locked box) date and leaves downside risks occurring after the locked box date with the buyer until control over the target company is ultimately handed over to the buyer at completion of the transaction (O'Sullivan et al., 2011). While covenants might mitigate unpermitted leakages between the locked box and completion date, the

alternative of using completion accounts determines the purchase price based on the company conditions at or (shortly) after closing upon transfer of the legal ownership in the target company to the buyer. Closing accounts then draw on the closing date financial statements to derive the appropriate equity value based on the contractually agreed enterprise value and methodology adjusting the purchase price for changes in net debt, working capital and cash-/debt-like items as per the closing date balance sheets (PwC, 2021a). In comparison of the concepts, the downside protection for the buyer is more effective under the purchase price adjustment at closing, which allows material adjustments for the purchase price at closing and allocates risk of adverse developments until completion to the seller. Depending on the size of the transaction and potential regulatory approvals needed for the completion of the transaction, the time period between signing and closing typically spans across several months. As a result, the level of protection is generally higher for the buyer if the purchase price is based on completion accounts (Grub & Meyding, 2012).

A fundamentally important part of the acquisition agreement concerns representations and warranties, which reflect the nature and structure of the acquired business including material risk and liability positions (Miller & Segall, 2017). The warranties and representations are statements describing inter alia the financial, operational, legal, tax and technical quality of the target business.[8] By including these statements into the acquisition agreements, the asymmetry of information on the target is balanced among the parties and substantial cost of verifying relevant information can be reduced. Griffith (2020) characterises representations and warranties as the "engine driving the exchange of information in the deal, motivating its production and ensuring its credibility, thus improving price accuracy" (p. 1842). As a fundamental example for such statements, the share seller warrants to have full ownership and authority to freely dispose of the shares in the transaction. Representations and warranties that the target company is e.g., free of pending court lawsuits or tax litigation, foster the seller's disclosure on any existing disputes in the form of schedules listing the exceptions to such representations. This is especially important in acquiring private companies with far fewer disclosure requirements compared to their publicly listed peers. As a result, the collective of statements serves as a detailed framework of facts, details and undertaking commitments under which the transaction parties enter into the transfer of the buyout target. In case of a breach,

[8] This enumeration of potential aspects does not intend to be conclusive. Representations and warranties commonly cover intellectual property rights, human resources, environmental, insurance, IT and further aspects as well. Depending on the drafting of the acquisition agreement, these factual statements need to be true at signing and/or closing of the envisaged acquisition. Further details are provided by Miller and Segall (2017) and Reed et al. (2007).

indemnifications act in concert with the representation and warranties serving as "important risk-sharing or burden-allocating devices" (p. 11) and from an economic point of view resemble an insurance-like policy for the acquirer (Coates, 2015). Affirming the value of this agreement section, Coates (2015) reports that representations and warranties are the most extensive section of acquisition agreements and consume almost 40% of the contracts' wording.

Surrounding this security regime, customarily a complex network of provisions governs the admissibility and enforceability of claims, which arise from indemnification commitments, for example based on a breach of a representation or warranty. These indemnification obligations of the seller to the buyer are frequently subject to caveats including knowledge qualifiers and connected to de minimis rules, baskets, deductibles, and maximum liability amounts, also referred to as caps. All these elements underline the insurance-like nature of the representation, warranty and indemnification framework, while further adding to the complexity of the agreement (Karsten et al., 2020). De minimis rules introduce a minimum amount, which any individual claim must meet or exceed to access the compensation provisions under the acquisition agreement. Otherwise, any claim falling short of the de minimis threshold will be disregarded for indemnification purposes. In negotiations, such de minimis thresholds are often derived based on a percentage of the total purchase price and argued on the grounds of practicability and cost efficiency on the sell side (Von Barnekow & Hansen, 2013). Another limitation for buy side claims – once in excess of the de minimis threshold – are basket rules, which introduce a minimum aggregate amount of eligible claims necessary to be entitled to demand compensation from the seller. The effect of the basket resembles an own-risk deductible in insurance policies (Coates, 2015) depending on the baskets being either defined as "first dollar baskets" covering the full loss once the basket amount is reached or "excess only baskets", which capture solely the amount above the basket requirement (Griffith, 2020). In addition to the entry thresholds for asserting claims, acquisitions agreements may also specify maximum limits of overall liability, often referred to as liability caps. Such liability caps are defined or derived as a percentage of the overall transaction value and typically amount to less than 50% of the deal value (CMS, 2020). Complementing the restrictions according to amount, survival periods limit the time frame for indemnification rights of the buyer, which are frequently set between 12 and 24 months (Pugh, 2019). Upon expiry of the survival period, the risk allocated to the seller shifts back to the buyer. Any discovery of breaches or defects in the representations and warranties are then to be borne by the buyer without contractual remedies against the seller. Both, liability caps and survival periods, can be subject to certain carve outs, e.g., regarding legal title in the sold shares or taxes, granting the buyer extended rights with

respect to damages suffered in selected and fundamental areas of risk concern (Kramer Levin, 2021).

Adding to the network of risk-allocating provisions, sale and purchase agreements consider MAC clauses. These stipulate events or types of events between signing of the acquisition agreement and closing of the transaction, so-called material adverse events, which grant the buyer the right to rescind from the agreement. Complex MAC clauses may accommodate different types of risks covering broader market risks in the economy, performance risks pertaining to the target company – including financials and the retention of key customers and management personnel – as well as other exposures of the target company until closing (Miller, 2009). The negotiation of MAC clauses has become a key matter of contracting and proposes an elegant solution to moral hazard after signing the deal, encouraging the seller to maintain reasonable investment behaviour and present a discouraging force from assuming risks outside the ordinary course of business, which would otherwise be hard to contractually define in each aspect (Gilson & Schwartz, 2005). Denis and Macias (2013) echo the high relevance of MAC clauses from a practical point of view arguing that "2/3 of the terminated acquisitions and 80% of the renegotiated acquisitions" (p. 821) are triggered by MAC clauses, underlining their high economic significance considering offer prices in public takeovers decrease by more than 14.8% in case of MAC-triggered renegotiations.

Tax considerations are not only an integral part of corporate activity, but also of fundamental importance for mergers and acquisitions (Stumpf-Wollersheim & Horsch, 2019). Beyond engineering a tax-efficient acquisition structure, tax advisors secure the value of the transaction by identifying and properly managing tax risks by way of pricing adjustments and negotiating tax warranties and representations as well as indemnifications in the acquisition agreement (Field, 2019). The tax sections of the acquisition agreements not only allocate filing and payment responsibilities to ensure compliance for all periods surrounding the transaction date, but also extend to the representations and warranties outlining the target's tax affairs and environment (August, 2013). The field of taxes has a particular relevance because even the most careful due diligence cannot cover each and every risk of dispute, which is also reflected in the growing attention taxes have long received in acquisition agreements (Houle, 1991). Considering the statute of limitations for tax assessment relating to the pre-deal periods, tax is a frequent area for stand-alone indemnification regimes and commonly carved out with individual survival periods (Kramer Levin, 2021).

During the process of bargaining the parties frequently revisit the initial term sheet, which the parties generally agree on a non-binding basis before entering into the iterative exchange of

acquisition agreement drafts to arrive at a final and binding version (Brown & Wiles, 2016). As noted in the introduction, this paper intends to provide a review of selected key provisions only, which are of recurrent nature as identified in academic literature and highlighted by the practical observations reflected in market studies. The specifics of transactions may call for additional clauses, which go beyond the scope of this paper, e.g. non-compete arrangements, solicitation limitations, operating covenants or break fees.[9] Coates (2012) further points to recitals, definitions and miscellaneous terms taking up around 15% of the contract and extensive disclosure schedules attached to the contract, which "set the scene" for the contractual provisions. The range of terms required and depth of detail in the provisions and disclosures will thereby always face a tradeoff among the costs for drafting, enforceability, and potential litigation of the contract (Choi & Triantis, 2010). Also, the necessity for certain sections will depend on whether the deal is structured as an asset deal or a share deal considering the latter involves a more extensive need for contract provisions as the legal entity is acquired with all its historic rights and legacy risks.

4.4 Data Sample

The data set covers 53 private equity acquisitions of European target firms over the time period 2010-2020. The data is sourced from a large global consulting firm, which provides advisory services in connection with corporate and buyout transactions. The acquisition agreements have been evaluated in accordance with the methodology outlined in Chapter 4.5 and anonymised within the firm. From the total set of contracts obtained for my research, only the acquisition agreements with at least one part of the transaction showing private equity affiliation are included, i.e. the analysis excludes transactions that are negotiated solely between non-private equity parties. Further the sample is restricted to share deals to provide an equal breadth of contractual analysis across the transactions considering asset deals will frequently require less risk protection measures. Also, I restrict the share deal sample to acquisitions of majority shareholdings in the target company, thereby excluding minority acquisitions of less than 50% in the target company to avoid potential distortions from the specifics of minority investments. This leaves a total of 44 acquisitions contracts relating to private equity buyout transactions.

[9] For further contractual measures, cf. to the contributions of Samila and Sorenson (2011) on noncompete covenants, Antoniades et al. (2016) on no-shop provisions, Coates (2015) discussing operating covenants and May (2005) on break fees. For further contractual clauses see Coates (2016) with further references.

The contracts enter the data set irrespective of the side of engagement of the source firm, i.e., the source firm may or may not be engaged on the private equity side of the deal. The source firm was advising the sell or buy side and in some cases on both sides with separate project teams and varying degrees of involvement. Such involvement ranged from providing a broader spectrum of services in relation to financial, tax and operational aspects of the contract to only limited advice on selected topics, e.g., assisting with the wording and negotiation of the tax or purchase price section. Without exception, all contracts in the sample involve outside legal counsels distinct from the source firm and "holding the pen" on the overall contract.

The 44 transactions completed by virtue of the sample sale and purchase agreements represent the negotiation results among 72 distinct principals, whereby a group of private individuals is qualified to be acting as one unique group of principals. The 72 principals in the sample are almost equally balanced showing 38 unique private equity sponsors and 34 non-private equity affiliated parties with 26 corporate parties and 8 private or founder family groups. There is no combination of parties to the agreement that occurs more than once in the transaction sample. Among the re-appearing seven private equity sponsors and one corporate sponsor only one fund sponsor is involved in more than two transactions and represented by three different law firms in the various sell-side and buy-side transactions. The private equity funds included in the sample are on average 22.5 years old based on their year of establishment and signing of the transaction (interquartile range between 14.3 and 28.8 years with a median age of 20.5 years) and have a mean total of €24.8bn (median €8.0bn) under management across their funds. Across all contractual agreements, I identify 50 distinct law firms based on the legal representatives in the notarisation or notices section in the contract. The identified law firms represent either side of the negotiation, while no law firm represents both sides in any transaction. Interestingly, only three of the six private equity sponsors with more than one transaction in the sample are represented by the same law firm in their multiple transactions.

The target companies transferred based on the agreements are predominantly small- and medium-sized transactions considering transaction values. These transaction values (headline prices of the acquisition agreements) show an interquartile range spanning from €83.1m to €278.3m with a median of €128.2m and an average of €307.9m. Consistent with buyout transactions targeting more mature companies – as opposed to e.g., venture capital investments – the average age of the target company is 40.4 years (median: 27.0 years). Based on the first two digits of the Industry Classification Benchmark (ICB) code classifications, the target companies covered by the sample operate in a range of various industries including real estate (21), industrials (8), health care (5), consumer discretionary and basic materials (3 each),

technology (2) as well as utilities and financials (1 each). **Table 4.1** summarises the key characteristics of the target companies and involved funds.

Investigating the formal structure of the sample agreements, I find that the average sale and purchase agreement contains 25,069 words (median: 25,268 words) for the main body of the agreement. Following Coates (2015) analysis on the structure of U.S. merger and acquisition agreements, I explore the various sections in the buyout acquisition contracts. Consistent with Coates (2015), the largest part of the agreements is typically consumed by the representation and warranties section (average 18% of total words). In conjunction with the indemnification provisions (11%) and separate tax clause (10%), the three elements of key risk-allocation take up 39% of the total agreement. This observation remains materially unchanged across all transaction sizes. Based on the enterprise values, I define three size categories to distinguish smaller size transactions showing headline prices below €100m (16 transactions), medium sized transactions ranging between €100m and €500m (21 transactions) and large size transaction exceeding €500m (7 transactions). The constant relative size of the risk-governing sections underlines their importance and might imply that increasing transactions sizes go along with increased operating complexity, which in turn requires comparatively more language on representations and warranties. The second largest single section in the agreement sample concerns the purchase price (average 13% of total words), which defines and allocates the agreed price including payment computation, terms, currency and required securities. Further, the pricing section will specify the details of any deferred payments like earnout provisions. Equally pronounced in terms of length, the closing section and covenants each take up c. 10% of the agreements.

Table 4.1: Transaction and Private Equity Fund Characteristics

Transaction Statistics *Targets and Private Equity Funds*	**Mean**	**Standard Deviation**	**First Quartile**	**Third Quartile**	**Observations**
Target Company					
Enterprise Value (€m)	307.86	778.38	83.06	278.31	44
Company Age at Transaction	40.39	477.65	16.00	41.00	44
Private Equity Funds					
Fund Size (€bn)	24.84	37.56	2.15	26.59	38
Fund Age at Transaction	22.50	12.41	14.25	28.75	38

The table shows the financial characteristics of the target firms and private equity funds in the transaction year. The enterprise values of the target companies are presented in millions of Euro (€m) and the fund size measured in assets under management are presented in billions of Euro (€bn). The ages at transaction are presented in years based on the year of establishment and the transaction year. The private equity fund characteristics are presented for the distinct funds and show the characteristics of the first transaction for funds with multiple transactions.

Table 4.2: Structure and Length of Contract Sample

Structure and length of transaction agreeements Mean (median) of words, average % included below word count	**All deal contracts**	**Smaller size transactions** below €100m	**Medium size transactions** above €100m, below €500m	**Large size transactions** above €500m
Section				
Preamble / Recitals	987	1,193	854	917
describing the purpose of the contract	(798)	(985)	(725)	(759)
	4%	6%	3%	3%
Definitions and Interpretation	1,764	846	1,809	3,729
explanation of contractual terms and notes on interpretation (if included as separate section)	(1,452)	(463)	(1,675)	(2,406)
	6%	4%	7%	10%
Structure of Transaction	1,535	1,123	1,712	1,942
outlining the scope, mechanism and timing of assets and securities to be sold as part of the transaction	(1,471)	(842)	(1,575)	(1,683)
	6%	5%	7%	6%
Purchase Price	3,095	2,975	3,000	3,655
incl. payment terms, escrow, securities or earnouts	(3,013)	(2,269)	(3,116)	(3,381)
	13%	14%	12%	11%
Closing	2,528	2,079	2,729	2,953
incl. closing conditions, waivers, actions and closing date financial statements	(2,564)	(1,497)	(2,709)	(3,343)
	10%	10%	11%	9%
Representations & Warranties	4,534	3,769	4,530	6,295
incl. buy- and sell-side representations and warranties	(4,135)	(3,222)	(4,257)	(4,982)
	18%	19%	17%	18%
Indemnification	2,747	2,209	2,984	3,265
remedy provisions for breaches of warranties, representations and other indemnification understandings	(2,677)	(2,039)	(2,894)	(2,931)
	11%	11%	12%	10%
Taxes	2,392	1,822	2,481	3,426
separate section governing tax matters incl. warranties, representations, cooperation and indemnifications	(2,461)	(1,870)	(2,638)	(3,545)
	10%	9%	10%	11%
Covenants	2,567	2,182	2,362	4,061
relating to pre-Closing and post-Closing period	(2,652)	(2,429)	(2,560)	(3,519)
	10%	11%	9%	12%
Termination	924	761	1,030	976
governing recission rights and implications	(709)	(585)	(848)	(1,064)
	4%	4%	4%	3%
Miscellaneous	1,997	1,458	2,181	2,678
i.a. Announcements, Notices, Governing Law, Arbitration and Confidentiality	(1,834)	(1,278)	(1,923)	(2,326)
	8%	8%	8%	8%
Total	25,069	20,415	25,673	33,896
	(25,268)	(20,212)	(25,396)	(31,460)
Number of observations	44	16	21	7

The table shows the structure of the contractual agreements for the entire sample as well as different size categories, which are defined by the transaction values. The median section lengths are indicated in brackets below the average figures for the respective sections. The percentage figures indicate the average share of the respective section in relation to the total agreement length.

While the covenant sections include both pre- and post-closing rules of conduct for both parties, the majority of covenants address the seller's operation of the target business until completion of the transaction, which is specified in terms of conditions and actions in the closing section. These sections are framed by the preamble or recitals briefly introducing the general objective of the contract (taking up 4% of the agreement length), the catalogue of definitions and interpretations used in the contract (6%) and structure of the transaction outlining the deal mechanics and deal perimeter (6%). Relative to the economic magnitude terminations entail, the termination section only requires a small part of the buyout agreements (4%), which aligns with the observation of 3% among private and public target deal contracts (Coates, 2015). **Table 4.2** provides an overview on the structure and length of the agreements included in the sample.

Shedding additional light on the characteristics of the sample agreement provisions, the de minimis thresholds span an interquartile range between €20,000 and €56,250 representing less than 0.05% of the transaction value both in terms of average and median negotiated de minimis amounts. Considering the basket clause structure on aggregate level, this implies that around 10 individual claims surpassing the de minimis thresholds will be needed to meet the basket requirement with an interquartile range between €162,500 and €500,000. This also becomes evident in the mean basket threshold of 0.388% (median 0.294%) relative to the headline price of the concluded agreement. In terms of overall liability limitation, I observe most caps among the sample are set up to 20% of the purchase price with a median of 10.00% (average of 20.87%). Three transaction agreements in the sample do not specify any maximum amount of aggregate liability. The liability regime typically survives 18 to 24 months following closing of the transaction for the general indemnifications, which excludes separate tax indemnifications and fundamental warranty liabilities, e.g. legal title in the sold shares, which are frequently carved out from the general survival periods in favor of extended claim periods. Among the separate tax indemnification regimes, various types of limitation periods apply, which make diverse use of absolute and dynamic limitation periods. The two most common tax indemnity types either foresee a purely dynamic limitation period of 3-6 months after the respective historic tax year becomes time barred for changes (15 agreements fall into this category) or combine a dynamic survival period of 6 months with an absolute maximum liability period of 5-7 years after closing (14 agreements). The remaining agreements consider an absolute time limitation ranging from 6-60 months (9 agreements) or do not consider a separate tax indemnification regime (6 agreements). **Table 4.3** presents an overview of the distribution in terms of absolute and relative liability limitation in the sample.

Considering the wide range of distinct negotiating principals and involved law firms, there should be no substantial concern of a bias tainting the analysis. Particularly, the sample does not include any recurring combination of buying and selling parties in different transactions. The varying fields and sides of involvement of the source firm should further provide for a low level of selection bias (if any) and at the same time hold the sample clear of any publicity bias. The fund and transaction characteristics also indicate representation of the different size classes of the European private equity landscape including small to large size funds as well as transaction sizes.

Table 4.3: Overview on Selected Agreement Provisions

Agreement Statistics *Observations among clause negotiation outcomes*	**Mean**	**Median**	**First Quartile**	**Third Quartile**	**Observations**
Absolute terms (€)					
De Minimis Threshold	63,264	36,250	20,000	56,250	36
Basket Threshold	655,550	275,000	162,500	500,000	30
Liability Cap	40,229,391	17,817,475	6,000,000	50,000,000	41
Survival Period (months)	23	18	18	24	44
Relative to transaction value (%)					
De Minimis Threshold	0.042%	0.037%	0.011%	0.060%	36
Basket Threshold	0.388%	0.294%	0.117%	0.596%	30
Liability Cap	21.889%	10.000%	4.061%	20.000%	41

The table show the distribution of selected agreement metrics determining the scope of indemnification claims of the buyer against the seller. The absolute terms are shown in Euro unless indicated otherwise.

4.5 Method

The analysis framework builds on two steps. First, I develop a framework to translate the purchase agreement provisions into a score. Thereby, I quantify results of clause negotiations and operationalise negotiation power for the subsequent analysis. In operationalising the outcome, I use two scoring frameworks to reflect time trends visible in market studies in merger and acquisition contracting and to mitigate subjectivity. The first framework will draw on a scoring approach, which remains static across time, while the second framework will evaluate the contract provisions relative to market practices of the respective contracting year. The developed scores will be used as dependent variables in a regression analysis to estimate the impact of private equity backed negotiators. The regression analysis employs a variety of fund, deal and market specific variables to assess the determining factors in negotiation power. Given

the novelty of the approach and interpretation of agreement clauses, the approach is explained in some more detail.

4.5.1 Developing a Framework to operationalise Contractual Outcomes

Following the approach used by Bengtsson and Sensoy (2011) in venture capital contracting, the individual provisions contained in the sale and purchase agreements are translated into scores, which are subsequently aggregated to describe the buyside friendliness of the sale and purchase agreement ("SPA") in an overall contract score (also referred to as the "SPA Score"). Conscious of the diverse deal-specific requirements acquisition agreements can call for, the framework is calibrated to capture recurring elements of merger and acquisition contract negotiation (Reed et al., 2007). The selection of provisions is coded in terms of buyside friendliness by allocating risks to the seller or granting the buyer additional rights. Each provision is scored using a scale ranging from zero to one and subsequently the coded provisions are aggregated to arrive at the SPA Score. This approach of linear aggregation follows the methodology used by Gompers et al. (2003) to construct a governance index measuring shareholder rights. While the linear aggregation implicitly assumes an equal weight of importance of the scored provisions, which might not necessarily apply to each transaction, it mitigates the subjectivity connected with introducing alternative weightings. The linear aggregation is not only intuitive, but also well suited for the homogenous measurement units considered in the scoring approach (Groh et al., 2010). In the following I provide a brief overview of the included provisions and respective coding.

I measure the pricing mechanism in two dimensions to account for closing and post-closing consideration. With respect to post-closing adjustments through earnouts, I code the inclusion of an earnout (1) considering the financing benefit as well as economic advantageousness outlined in Chapter 4.3. The absence of an earnout is reflected by a score of (0). While the inclusion of an earnout clause transfers part of the post-closing business risks to the seller, I include another risk distributing variable, which captures the buyer's exposure to risk between signing and closing based on the agreed purchase price mechanism. For purchase price mechanisms drawing on a fixed purchase price (locked box mechanism) my approach assigns (0), while purchase price adjustments as per closing of the transaction result in a value of (1) considering the reduced risk of adverse business development after signing and availability of price adjustments despite the potential simplicity advantage a locked box mechanism might offer (PwC, 2021b).

For the non-price provisions of the indemnification network, multiple elements account for the buyside's ability to assert claims. The intervals for the coding approach follow the classifications used by the CMS European Market Studies on acquisition agreements to provide for a consistent approach across both specifications of the dependent variable. First, the inclusion of a de minimis provision is coded as (1) if not present at all, (0.5) if the de minimis threshold is set up to 0.1% of the purchase price and (0) if the de minimis threshold equals or exceeds 0.1% of the purchase price. Second, I evaluate existing basket requirements and consider its detrimental effect. The absence of a basket clause is coded as (1). In agreements where it is included, I distinguish between basket clauses admitting the entire amount to be claimed (0.5) or basket clauses allowing only the amount in excess of the basket threshold (0). Liability caps limiting the overall amount to be claimed are coded (1) if set to more than 50% of the purchase price or not present at all and (0) if such limitation is set below 10% of the purchase price. Liability caps between 10% up to and including 50% are coded (0.5). Alongside the amounts, I include temporal restrictions through liability limitation periods, which are measured in months from the closing date. I distinguish between acquisition agreements that foresee limitation periods of longer than 24 months including cases of no limitation period (1), periods between 12 and 24 months (0.5) and limitation periods of 12 months or less (0). Finally, I account for separate tax indemnifications and code the unavailability of a separate tax indemnification clause (0) and its inclusion with (1).

The inclusion of a MAC (material adverse change) clause serves as a crucial mechanism to allocate risks, mostly to the seller (Talley et al., 2012), which is considered in the coding, disregarding the fluctuating movements in the breadth of MAC definitions and exceptions (Choi & Triantis, 2010). While there is a frequent and diverse use of exceptions in the definition of MAC events in United States contracts, e.g. carving out general market shocks, currency driven changes or modification of accounting principles (Talley et al., 2012), significantly less usage of MAC clauses applies to European acquisition agreements (CMS, 2020). This suggests comparatively higher bargaining power of the buyer when MAC clauses are present. Although this observation certainly does not render the defined exceptions irrelevant, it appears sensible to employ a binary scoring approach for the use of MAC clauses in the analysis of European buyout transactions. Therefore, the inclusion of a MAC clause is coded (1) if present as a buyer friendly clause and (0) if not. The distribution of the provision coding is presented in **Table 4.4**.

Conscious of changes in the negotiation environment and legal practices in contracting over time, I develop a second score ("Adjusted SPA Score") to relate the provision characteristics to European market practices in mergers and acquisitions in the year of agreement. This is an

Table 4.4: Overview on Scoring Dimensions

Scoring dimensions of transaction agreements

Earnout

The seller is entitled to additional purchase price payments contingent on the satisfaction of certain performance metrics of the target company acquired in the transaction.

	Not included = 0	Included = 1
Private Equity Transactions	38	6

Purchase Price Mechanism

The purchase price is determined either on a locked box concept leaving adverse developments until the Closing date with the acquirer or the agreement foresees a Closing Accounts concept, which determines the purchase price based on accounts as per the Closing date.

	Locked Box = 0	Closing Accounts = 1
Private Equity Transactions	12	32

De Minimis Provision

The ability of the purchaser to assert contractual claims is limited by a de minimis threshold. To ensure comparability the de minimis amount is related to the purchase price.

	De Minimis ≥ 0.1% of purchase price = 0	De Minimis < 0.1% of purchase price = 0.5	No De Minimis = 1
Private Equity Transactions	3	33	8

Basket

Basket restrictions specify an threshold of total admissible claims required to demand indemnification. Basket provisions might either allow the full amount to be claimed or only admit the amount in excess of the basket threshold.

	Basket only admitting excess amount = 0.0	Basket allowing full claim = 0.5	No Basket = 1
Private Equity Transactions	7	23	14

Liability Cap

The liability of the seller is limited by caps, which provide for a maximum amount of contractual claims.

	Liability Cap amount set below 10% of puchase price = 0	Liability Cap amount set ≥ 10%, but ≤ 50% of purchase price = 0.5	Uncapped Liability or cap set in excess of 50% of purchase price = 1
Private Equity Transactions	15	19	10

Survival period

Time limitations applying to general indemnification regime excluding claims after the expiration of the survival period.

	Limitation period ≤ 12 months = 0	Limitation period > 12 months, but ≤ 24 months = 0.5	Limitation period expires > 24 months = 1
Private Equity Transactions	8	27	9

MAC Clause

Material adverse changes as defined per the acquisition agreement grant the buyer the right to rescind from the agreement.

	No MAC Clause = 0	MAC Clause = 1
Private Equity Transactions	29	15

Tax Indemnification

The contract provides for a sepaarte tax indemnity clause taking into account special warranties and a tax-specific indemnification regime to allocate tax risks relating to pre-closing time periods to the seller.

	No separate tax indemnity = 0	Separate Tax indemity included = 1
Private Equity Transactions	6	38

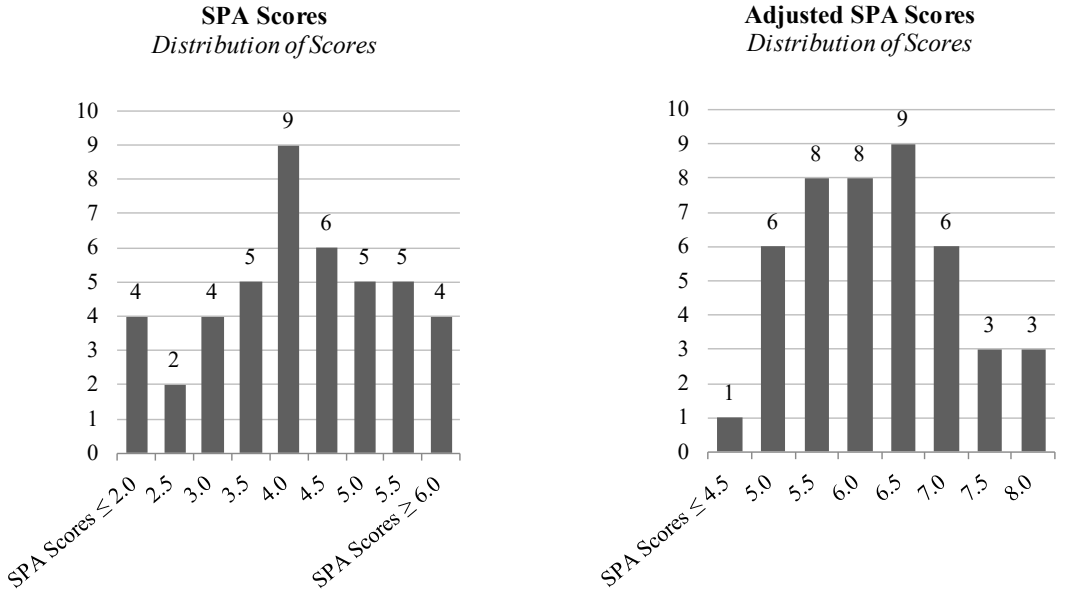
The table shows the considered agreement clauses including scoring dimensions and number contracts of private equity sponsored transactions, which are subject to the respective provisions.

important step to mitigate subjectivity of clause benefits, which might otherwise be attached to "hard coding" buyer-friendliness irrespective of general transaction contracting. Accordingly, clauses adhering to common market practice in the year of the agreement should receive a lower score than provisions offering above-market protection, which is reflected in the Adjusted SPA Score. Consistent with the geographic scope of the data, the CMS European Market Studies should be most suitable considering the representativeness from 4,609 deals analysed over the time period 2007-2020. To the author's knowledge, it is also the most representative annual study on European merger and acquisition contracting providing detailed insights into the use and design of clauses in acquisition agreements covering all types of involved parties including corporate investors, family firms and private equity funds.

To construct the Adjusted SPA Score, the same set of clauses is considered, but based on an inverted coding approach. Each provision is first coded (1) – accounting for a 100% score – and subsequently there is subtraction of the percentage share of contracts exhibiting a more buyer friendly clause as observed in the respective year's market study. Considering the example of a 12-month liability limitation period agreed in a 2015 transaction, 46% of the surveyed deals in the CMS European M&A Study 2016 show longer (and thus more favourable) limitation periods. The resulting score for the clause would therefore be 0.54. The same applies to binary clause considerations and allows the scoring model to follow the trajectory of market trends and show the shades of negotiations more closely. The growing popularity of earnouts between 2013 (14% of acquisitions including an earnout) and 2020 (21%) would reduce the earnout score for a non-inclusion from 0.86 to 0.79. The results and score distributions of the coding framework for the SPA Score and Adjusted SPA Score are presented in **Figure 4.1**.

The SPA Score results show an interquartile range between 3.50 and 5.00 with a mean of 4.18 (median: 4.00) and the Adjusted SPA Scores have an interquartile range between 5.45 and 6.56 with a mean of 5.93 (median: 5.88). Based on the dispersion, both scoring results are roughly normally distributed. For the SPA Scores 77% of the results lie within one standard deviation and similarly 66% of the Adjusted SPA Scores centre in this way around the mean. For both score measures, 95% or more of the results range within two standard deviations around the mean, all results lie within three standard deviations of the mean.

Figure 4.1: Scoring Result Overview



Scoring Results Summary Statistics	**Mean**	**Median**	**Standard Deviation**	**First Quartile**	**Third Quartile**
SPA Score	4.18	4.00	1.35	3.50	5.00
Adjusted SPA Score	5.93	5.88	0.85	5.45	6.56

The figure shows the scoring results in accordance with the evaluation approach and their distribution across the interval of possible results between the minimum of 0 and maximum of 8. The SPA Scores reflect the static coding of provisions, while the Adjusted SPA Scores respond to overall market trends in the year of concluding the agreement as inferred from European market practice studies. The Adjusted SPA Scores are displayed above using intervals up to and including the upper bound stated for the category, while excluding the results of any preceding scoring intervals.

4.5.2 Regression Analysis

For purposes of the analysis, I apply an ordinary least square (OLS) regression to assess the negotiation power of private equity fund sponsors in the sample of transactions. In the regression, the score results for the acquisition agreements are used as dependent variables with two sets of predictive variables. The first set captures the negotiation configuration reflecting the presence of a private equity sponsor being involved on the buy side (1) or sell side (-1), which are added together to appropriately reflect the potential comparative bargaining advantage of a private equity fund on either side of the transaction. The second set of predictive variables captures characteristics of the private equity fund and controls for transaction metrics as well as the market environment.

The experience of the private equity fund is proxied by age of the sponsor based on the year of their first establishment as a business and the size of the fund is accounted for in terms of committed capital. The information on committed capital is drawn from the Preqin database and used in €100m units. For the age of the fund, I rely on the funds' websites. While academic literature is ambiguous about the relationship between age, fund size and returns, both measures reflect on the degree of experience the fund accumulated (Lopez-de-Silanes et al., 2015), which might strengthen the negotiation position of the private equity fund around the acquisition agreement. For both proxies I take the natural logarithm to avoid potential issues of heteroscedasticity. As a third variable I include a categorical variable for an industry specialisation of the fund. Considering such specialisations yield additional returns in value creation over the holding period (Cressy et al., 2007; Le Nadant et al., 2018), the credibility and insight from an industry specialisation potentially affects the contractual outcome.

Further, the regression controls for the transaction characteristics including industry and age of the target company being subject to the agreed transaction as well as the size of the transaction. For capturing the industry affiliation of the target company, I identify the first two digits of the ICB code distinguishing among eleven industries. While transaction size can also be observed from the financial metrics of the target company, the regression considers the headline pricing as agreed in the acquisition agreement and uses the natural logarithm of the headline price in €10m units. In doing so, it keeps the transaction size control separate from the accounting variables of the target company, which could be distorted by earnings manipulation effects (Mao & Renneboog, 2015). The age of the target company is considered as the natural logarithm of years from the year of first establishment and the year in which the acquisition agreement is concluded.

High yield spreads are a primary driver of leveraged buyout activity, transaction pricing and fund returns (Axelson et al., 2013). To control for the private equity market environment in which the acquisition agreement is concluded I include a proxy measuring the profit potential between operating returns and buyout debt yields. This proxy is based on the debt yields to maturity as reflected in the S&P European LBO Index and the average operating yields of the STOXX Europe 600 companies measured by EBITDA over enterprise value, which are obtained from Bloomberg. The STOXX Europe 600 and S&P European LBO index are both consistent with the geographic scope of the buyout sample. In the computation of operating yields, I exclude banks and insurances, whose operating results would not be accurately depicted in EBITDA and are likewise not represented in the sample. The larger the excess of operating yields over leveraged buyout debt interest, the more likely private equity funds take advantage of the low-priced debt and increase investments, which ultimately drives a private equity boom cycle (Kaplan & Strömberg, 2009).

Table 4.5 exhibits the cross-correlations among the set of variables in the regression. Among the continuous variables the strongest negative (non-categorical) relationship relates to the private equity market indicator and the fund age. The strongest positive relationship can be found among size and age of the involved private equity funds, which implies the more experienced funds in terms of age in our sample are likewise entrusted with larger capital commitments. The expected correlation among fund size and fund age will be addressed by running the regression using fund size as an experience proxy separately. The identified cross-correlations of the remaining variables do not raise a substantial concern for collinearity. The cross-correlations of the categorical variables are shown for completeness, but likewise raise no concern for collinearity.

Table 4.5: Cross-correlation Table

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Transaction Value	1.0000							
(2) Target Industry	0.3034	1.0000						
(3) Age of Target Company	0.3076	0.3790	1.0000					
(4) PE Market Indicator	0.2602	0.1354	0.3189	1.0000				
(5) Fund Size	(0.1321)	(0.1690)	0.0258	(0.2457)	1.0000			
(6) Fund Age	(0.0848)	(0.1708)	(0.0397)	**(0.3227)**	**0.9097**	1.0000		
(7) Fund Side of Negotiation	(0.1205)	(0.1765)	(0.0835)	(0.3258)	0.9068	0.9649	1.0000	
(8) Fund Specialisation	(0.1813)	(0.2650)	(0.2037)	(0.2770)	0.5431	0.5466	0.6869	1.0000

The table provides an overview of the cross-correlations among the variables used in the OLS regression. The strongest positive and negative cross-correlations among continuous (non-categorical) variables are highlighted in bold.

4.6 Results

Considering the correlation coefficients for the dependent variable first, there appears to be no significant effect of comparative bargaining effects solely by virtue of a private equity fund negotiating the terms of the sale and purchase agreement. Similar to the insignificance of the variable capturing the constellation of negotiating funds, the size and age of the involved private equity funds does not appear to confer a direct bargaining advantage effect on the negotiation results. All three variables on the side of negotiation, fund age and fund size show positive, but insignificant correlation coefficients both on the SPA Score as well as the Adjusted SPA Score measures. The sole fund variable showing a significant correlation (at the 5% level) is fund specialisation, which is positively correlated to both dependent variable specifications and indicates – from a correlation point of view – that funds with an industry focus for transaction targets might be able to leverage their expertise of the target company's industry sector into more advantageous purchase agreement conditions on a wider scale.

From a practical point of view, this appears sensible considering the additional industry expertise could strengthen the perceived credibility and strength of negotiation arguments of the private equity fund from the point of view of the opposing party in the negotiation. Turning to the second group of variables relating to the market and target company, the private equity market indicator has a strong influence on both, the SPA Score and Adjusted SPA Score. The correlation coefficients for the market indicator variable as reported in **Table 4.6** show a strong negative effect (significant at the 0.1% level) on the buy side friendliness of the negotiation outcomes implying that favourable conditions in the buyout market with low leveraged loan spreads and increased industry returns decrease the level of risk protection in the purchase contracts. In other terms, more attractive market conditions may entail increased competition for buyout targets and weaken the private equity fund's ability to successfully negotiate the terms of the transaction in their favour. The remaining transaction variables capturing the size of the transaction as well as the age and industry of the target company show no significant correlation with the dependent variables.

The significant effect of the market conditions in the outcome of purchase agreement negotiations continues to apply in the regression results. **Table 4.7** summarises the results of the OLS regression with respect to SPA Scores and **Table 4.8** shows the regression determinants with respect to the Adjusted SPA Scores. Both tables report the regression for the first specification, which is limited to the fund variables only, and the second specification,

Table 4.6: Correlation Coefficients for Dependent Variables

Correlation Coefficients		
Dependent Variable	**(A) SPA Score**	**(B) Adjusted SPA Score**
Fund Variables		
Fund Side of Negotiation	0.2890	0.3122
Fund Age	0.2850	0.2943
Fund Size	0.2047	0.2276
Fund Specialisation	0.3090 *	0.3106 *
Target & Market Variables		
PE Market Indicator	(0.8399) ***	(0.7277) ***
Transaction Value	(0.1804)	(0.2173)
Age of Target Company	(0.2953)	(0.3437)
Target Industry	(0.1870)	(0.2309)
Number of observations	44	44

*The table presents the correlation coefficients for the two specifications of dependent variables and the independent variables. The regression variables are grouped by variables relating to the private equity fund and its buy- or sell-side position in the transaction ("Fund Variables") and variables controlling for the market environment as well as characteristics of the target company ("Transaction & Market Variables"). Panel (A) reports on the SPA Scores as dependent variable and Panel (B) shows the correlation coefficients for the Adjusted SPA Score, which follows the time trends of general contracting in European mergers and acquisitions. The significance levels for all specifications are indicated as ***0.1%, **1% and *5%. Negative values are shown in brackets.*

which accounts for the target and market characteristics. For all variants, the t statistics are shown below the regression coefficients. Based on the adjusted R^2 measures, a reasonably good fit applies to the first specification of the regression model, which increases significantly by including the additional variables in the second specification and underlines their relevance to the dynamics of the SPA Score observations in private equity contracting.

The highly significant negative effect of the private equity market variable is robust to both proxies of negotiation outcomes and suggests that the dominant factor in leveraged buyout negotiations are the conditions of the debt- and equity market environment and irrespective of the time changes in merger and acquisition agreement trends (as observed in the dynamic Adjusted SPA Score). This finding on buyout contracting is consistent with prior research results of Axelson et al. (2013) on transaction pricing and the availability of leveraged buyout debt, whereby the authors find that lenient debt terms provide for increased leverage in acquisition financing and that buyout valuations entail higher premiums paid to selling shareholders. Axelson et al. (2013) reason that the departure of financing structure choices by

Table 4.7: Determinant Analysis – Regression Results (SPA Score)

Determinant Analysis *SPA Score Results*	**Regression Specification (1)**	**Regression Specification (2)**
Dependent Variable	**SPA Score**	
Fund Variables		
Fund Side of Negotiation	(1.1624)	(1.1029)
	(0.7931)	(0.5727)
Fund Age	0.5359	0.1513
	1.4744	0.5752
Fund Size	(0.1201)	(0.0275)
	(1.0345)	(0.3485)
Fund Specialisation	0.9132	0.4070
	0.8806	0.7224
Target & Market Variables		
PE Market Indicator		(0.9232) ***
		(7.0032)
Transaction Value		0.1271
		1.0575
Age of Target Company		(0.0741)
		(0.4114)
Target Industry		NO
Number of observations	44	44
Adjusted R^2	0.1649	0.6908

*The table presents the regression coefficients based on the SPA Score as dependent variable. The two columns report on the determinant analysis for the first specification of the regression model, which is limited to the Fund Variables and the second specification of the regression model, which includes the Transaction & Market Variables. The significance levels for all specifications are ***0.1%, **1% and *5%. Negative values are shown in brackets.*

private equity funds from classic theories can be rooted in two explanations: A superior market timing of the funds to arbitrage on debt conditions or a principal-agency conflict. The results could likewise fit the set of market- and agency-driven explanations: In times of high investment attractivity, the supply and demand for attractive buyout targets reduces the ability of buyside fund negotiators to accommodate protective instruments into the acquisition agreements, which in turn curtails the indemnification and risk-allocation regime to the detriment of the acquirers. This explanation is also consistent with the increased volume of leveraged buyouts in periods of relaxed debt market conditions (Ljungqvist et al., 2020) adding competition to the investment landscape. In this case, along with increasing transaction prices the buyside quality of purchase agreements deteriorates, which poses a challenge from a return as well as risk perspective to the investing private equity funds.

Table 4.8: Determinant Analysis – Regression Results (Adjusted SPA Score)

Determinant Analysis *Adjusted SPA Score Results*	**Regression Specification (1)**	**Regression Specification (2)**
Dependent Variable	**Adjusted SPA Score**	
Fund Variables		
Fund Side of Negotiation	(0.2457) (0.1489)	(0.6440) (0.3927)
Fund Age	0.2108 0.8996	0.0704 0.3142
Fund Size	(0.0720) (0.9617)	0.0100 0.1490
Fund Specialisation	0.2841 0.4249	0.3130 0.4609
Target & Market Variables		
PE Market Indicator		(0.4707) *** (4.1935)
Transaction Value		0.0349 0.3404
Age of Target Company		(0.1304) (0.8510)
Target Industry		NO
Number of observations	44	44
Adjusted R^2	0.1007	0.3880

*The table presents the regression coefficients based on the Adjusted SPA Score as dependent variable. The two columns report on the determinant analysis for the first specification of the regression model, which is limited to the Fund Variables and the second specification of the regression model, which includes the Transaction & Market Variables. The significance levels for all specifications are ***0.1%, **1% and *5%. Negative values are shown in brackets.*

The contractual concessions to the buyout market environment may further be driven by the option-like architecture of carry compensation for private equity fund sponsors, which load further risk "in a gamble for resurgence of returns" and relinquish security features in the negotiation to win the deal (Caselli et al., 2009; Robinson & Sensoy, 2013). In other words, the carry compensation might incentivise the private equity fund sponsor to not only make riskier investments with more aggressive deal pricing, but also accept lower acquisition agreement quality with fewer protective rights. Axelson et al. (2013) exclude the market-timing hypothesis on successful debt-equity arbitrage in their results based on the derived fund returns and conclude that low high-yield spreads drive deal pricing, which is "consistent with an agency story in which private equity funds overpay for deals at times when leverage is cheap" (p. 2226). Such weighting with agency-problems potentially reflected in the low levels of buyside

protection in the sample however requires knowledge of subsequent damages and claims, especially these falling below increased de minimis levels, disregarded by stricter basket rules or arising after expired survival periods. Such data to approximate the "true cost" of reduced contract quality is hard to reliably collect as it would require a full documentation of potential claims along the lifetime of the investment irrespective of their assertion under the agreement. Such records are unavailable to us with respect to the sample of analysed acquisition agreements.

The control variable proxying the negotiation constellation, i.e. capturing whether a private equity affiliated negotiator is active on the buy side, sell side or both sides of the transaction, shows no significance across all specifications. Therefore, no comparative bargaining advantage should be conveyed by the capacity of the private equity fund as an institutional investor per se. Also, the variables on fund size and fund age do not show statistical significance. Considering both, the fund and age variable, might reflect on the level of accumulated transaction experience within the fund and a possibly positive relationship between two relationships, I rerun the regression dropping the age variable and only including fund size. As pointed out by Humphery-Jenner (2012), fund size might the more suitable proxy for investment behaviour and accumulated experience. The results of the regression remain qualitatively unchanged by this alteration and underline the independence of the negotiation outcomes from mere institutional characteristics. The market indicator remains the sole statistically significant driver (at the 0.1% level) for both specifications of the dependent variable in the regression. Furthermore, the industry specialisation of the private equity fund does not show statistical significance on the strength of the sale and purchase agreement provisions.

The silence of the variables on the private equity fund's participation side as well as its characteristics indicates that the involved principals may be of equal strength in terms of capabilities. In contrast to credit risk spreads improving with fund experience (Demiroglu & James, 2010), acquisition contract terms do not necessarily improve with fund age and size. The absence of an institutional effect on bargaining outcomes may be rooted in similar characteristics of the individuals involved in the negotiation of the purchase agreement. Especially, the educational and professional ties among private equity fund managers and target management (Fuchs et al., 2021) likely extend to the side of the opposing negotiators in the transaction. Most of the private equity fund managers have past professional experience in the financing or consulting industry (Gompers et al., 2016), which can be expected for the corporate development professionals in larger corporate structures with dedicated merger and acquisition

teams. The potentially higher degree of transactional experience of private equity funds meanwhile appears to not add a marginal negotiation benefit and positively impact bargaining outcomes on a statistically significant scale. This finding is in line with Bengtsson and Bernhardt (2014), who affirm a mediating effect of reputational lawyers for principals with less transactional experience and suggests a level playing field for negotiations among repeat investors like private equity funds and less experienced merger and acquisition principals. Interestingly, the industry specialisation of private equity funds does also not show significant effects. Over the holding period, the operational expertise of a fund sponsor fosters value creation through increased growth in turnover (Le Nadant et al., 2018) and profitability margins (Cressy et al., 2007). The positive specialisation effects also extend to facilitate fundraising for follow-up funds in the domain of fund sponsor's existing industry specialisation (Gejadze et al., 2017). Meanwhile, no such industry specialisation effect can be observed on the contractual terms of the buyout in the sample. This extends existing research by Michel et al. (2020), who do not detect a relationship between the (self-) perceived bargaining power of private equity sponsors and a deal industry focus. While Michel et al. (2020) do find an expertise advantage, which translates into a higher level of perceived bargaining power of the private equity fund sponsor – allowing the private equity sponsor to discount the sell side valuation and price synergies more accurately – it stands independent from an overall industry focus of the fund. The industry focus of the fund might thus lend credibility to the negotiators, which however does not directly elevate the negotiation outcome in terms of pricing and non-pricing items for the specialised party.

The control variables accounting for the transaction target characteristics likewise remain without statistical significance on the bargaining outcome. This includes size of the transaction as well as the size and age of the target company, which is being transferred to new shareholders by way of the sale and purchase agreement. Despite the longer history and this extended potential for legacy risks attached to the company, this result is intuitive considering general statute of limitations for potential claims by third parties against the target company.

4.7 Conclusion

Private equity fund sponsors are repeat financial investors acquiring and exiting companies. Within the complex network of value creation and web of contracts, the sale and purchase agreements are an integral part, which govern pricing and risk in buyout transactions. Notably, the non-pricing terms allocate risk between the buying and selling party, both for the time leading to the completion of the transaction and following closing. Through a wide array of provisions, the purchase agreement specifies the contractual exchange, fosters collaboration and allows the parties to secure the valuation assumptions used in pricing the transaction by including representations, warranties and indemnification mechanisms. The domain of indemnifications includes insurance-like elements (Coates, 2015) with de minimis, basket thresholds, liability caps and survival period restricting the volume of potential claims both in terms of time and amount. The contractual aspects therefore present ample room for negotiation and opportunities to the involved parties. Based on the success of buyout transactions as an alternative asset class, academic literature raised the question whether or not private equity fund managers as repeat investors realise a comparative bargaining advantage, which may also contribute to value creation (Achleitner et al., 2011).

To the best knowledge of the author, this paper is first to explore the structure and advantageousness of European leveraged buyout contracts and the negotiation power of private equity sponsors. Using a twofold framework to establish the buyside friendliness, it takes into account time trends in general European mergers and acquisitions and finds that the dominant driver of favourable contract terms across all specifications is the equity return potential for private equity funds among debt-markets and operating yields, serving as a proxy for the investment attractivity in the buyout market. This finding is consistent with a market-based narrative in private equity research, which identifies the access to opportune debt markets as a driver of accelerated investment behaviour and fund returns (Ljungqvist et al., 2020). This research extends the scarce literature on negotiation outcomes and bargaining power by adding an objectified perspective to the insights of Michel et al. (2020), who relate post-deal observations of private equity fund managers to the distribution of perceived negotiation power. The results indicate that the institutional investor side of the private equity fund does not convey a comparative advantage by itself, which is further not altered by the fund's size, age or the transaction's characteristics. While an industry focus of the fund benefits value creation over the holding period (Le Nadant et al., 2018), it shows no significant effect on the contractual bargaining. Instead, a potential industry focus effect as well as accumulated transaction

experience of larger and older funds might be mediated by the availability of expert advice (Graham et al., 2017) on the side of generalist funds or less experienced parties to the contract (Bengtsson & Bernhardt, 2014).

In terms of formal organisation, European buyout contracts closely follow the structure of acquisition agreements concluded in the United States with the sections covering representations, warranties and indemnifications being the most pronounced parts of the agreement (Coates, 2015). The overall length of the agreements increases with transaction size, while the relative distribution of section contents remains roughly unchanged except for the preamble, definitions and interpretation sections, where more variation among the different transaction size classes applies. Regarding characteristics of buyout agreements, de minimis thresholds, survival periods and overall liability caps are common features of contractual risk allocation, which are included in almost all contracts of the sample. The majority of agreements entails survival periods for claims of 12-24 months and makes use of basket clauses, which typically cover the entire amount once exceeded. Only a minority of agreements protect the buyer from material adverse changes between signing and closing. Liability caps are primarily set below 50% of the purchase price and tax matters resolved by a separate warranty and indemnification regime, which typically follows the statute of limitations based on a dynamic limitation period.

Future research may follow up on these findings and may be able to relate the contractual outcomes – including the purchase price – to the initial deal term sheets and specific due diligence findings. Such future research may also provide a view on the cost of foregone risk protection in purchase agreements with lower provision quality and examine if the downsides are balanced by respective purchase price concessions in the agreements.

Bibliography

Acharya, V. V., Gottschalg, O. F., Hahn, M., & Kehoe, C. (2013). Corporate Governance and Value Creation: Evidence from Private Equity. *The Review of Financial Studies*, *26*(2), 368-402.

Achleitner, A.-K., & Figge, C. (2014). Private Equity Lemons? Evidence on Value Creation in Secondary Buyouts. *European Financial Management*, *20*(2), 406–433.

Achleitner, A.-K., Braun, R., & Engel, N. (2011). Value creation and pricing in buyouts Empirical evidence from Europe and North America. *Review of Financial Economics*, *20*(4), 146–161.

Achleitner, A.-K., Braun, R., Engel, N., Figge, C., & Tappeiner, F. (2010). Value Creation Drivers in Private Equity Buyouts: Empirical Evidence from Europe. *The Journal of Private Equity*, *13*(2), 17-27.

Achleitner, A.-K., Braun, R., Lutz, E., & Tappeiner, F. (2018). Private equity group reputation and financing structures in German leveraged buyouts. *Journal of Business Economics*, *88*(3), 363-392.

Ahlers, O., Hack, A., Kellermanns, F., & Wright, M. (2016). Opening the Black Box: Power in Buyout Negotiations and the Moderating Role of Private Equity Specialization. *Journal of Small Business Management*, *54*(4), 1171-1192.

Ahmed, A. S., & Duellman, S. (2013). Managerial Overconfidence and Accounting Conservatism. *Journal of Accounting Research*, *51*(1), 1-30.

Ajinkya, B., Bhojraj, S., & Sengupta, P. (2005). The Association between Outside Directors, Institutional Investors and the Properties of Management Earnings Forecasts. *Journal of Accounting Research*, *43*(3), 343–376.

American Bar Association. (2019). *2019 Private Target M&A Deal Points Study.* Chicago: American Bar Association.

Amess, K. (2002). Management Buyouts and Firm–Level Productivity: Evidence from a Panel of UK Manufacturing Firms. *Scottish Journal of Political Economy*, *49*(3), 304-317.

Amess, K. (2003). The Effect of Management Buyouts on Firm–level Technical Inefficiency: Evidence from a Panel of UK Machinery and Equipment Manufacturers. *The Journal of Industrial Economics*, *51*(1), 35-44.

Andrade, G., & Kaplan, S. N. (1998). How Costly is Financial (Not Economic) Distress? Evidence from Highly Leveraged Transactions that Became Distressed. *The Journal of Finance*, *53*(5), 1443-1493.

Andreassen, P. B., & Kraus, S. J. (1990). Judgmental Extrapolation and the Salience of Change. *Journal of Forecasting*, *9*, 347-372.

Ang, A., Chen, B., Goetzmann, W. N., & Phalippou, L. (2018). Estimating Private Equity Returns from Limited Partner Cash Flows. *The Journal of Finance*, *73*(4), 1751-1783.

Ang, J. S., Hutton, I., & Majadillas, M. A. (2014). Manager Divestment in Leveraged Buyouts. *European Financial Management*, *20*(3), 462-493.

Antoniades, A., Calomiris, C. W., & Hitscherich, D. M. (2016). No Free Shop: Why Target Companies Sometimes Choose Not to Buy 'Go-Shop' Options. *Journal of Economics and Business*, *88*, 36-64.

Aslan, H., & Kumar, P. (2011). Lemons or Cherries? Growth Opportunities and Market Temptations in Going Public and Private. *Journal of Financial and Quantitative Analysis*, *46*(2), 489-526.

August, J. D. (2013). Tax Due Diligence, Warranties and Indemnification in Connection with Business Acquisitions of Private Companies: Selected Topics. *William & Mary Annual Tax Conference* (pp. 92-112). Williamsburg, Virginia (United States): William & Mary Law School Scholarship Repository.

Axelson, U., Jenkinson, T., Strömberg, P., & Weisbach, M. S. (2013). Borrow Cheap, Buy High? The Determinants of Leverage and Pricing in Buyouts. *The Journal of Finance*, *68*(6), 2223-2267.

Axelson, U., Strömberg, P., & Weisbach, M. S. (2009). Why Are Buyouts Levered? The Financial Structure of Private Equity Funds. *The Journal of Finance*, *64*(4), 1549-1582.

Ayash, B., & Schütt, H. (2016). Does going private add value through operating improvements? *Journal of Corporate Finance*, *40*, 192–215.

Ayash, B., Bartlett III, R. P., & Pulsen, A. B. (2017). The determinants of buyout returns: Does transaction strategy matter? *Journal of Corporate Finance*, *46*, 342–360.

Bacon-Gerasymenko, V., Coff, R., & Durand, R. (2016). Taking a Second Look in a Warped Crystal Ball: Explaining the Accuracy of Revised Forecasts. *Journal of Management Studies*, *53*(8), 1292-1319.

Badawi, A. B., & De Fontenay, E. (2019). Is There a First-Drafter Advantage in M&A? *California Law Review*, *107*(4), 1119-1172.

Baik, B., Brockman, P. A., Farber, D. B., & Lee, S. S. (2018). Managerial Ability and the Quality of Firms' Information Environment. *Journal of Accounting, Auditing & Finance*, *33*(4), 506–527.

Bain & Company. (2020). *Global Private Equity Report 2020.* Boston: Bain & Company, Inc.

Baker, G. P., & Montgomery, C. A. (1994). *Conglomerates and LBO Associations: A Comparison of Organizational Forms.* Cambridge, Mass.: Harvard Business School.

Baker, G. P., & Smith, G. D. (1998). Redefining Value in Owner-Managed Corporations. In G. P. Baker, & G. D. Smith, *The New Financial Capitalists* (pp. 91-123). Cambridge: Cambridge University Press.

Baker, G. P., & Wruck, K. H. (1989). Organizational changes and value creation in leveraged buyouts The Case of The O.M. Scott & Sons Company. *Journal of Financial Economics*, *25*(2), 163-190.

Barber, F., & Goold, M. (2007). The Strategic Secret of Private Equity. *Harvard Business Review*, *85*(9), 53-61.

Barbopoulos, L., & Sudarsanam, S. (2012). Determinants of earnout as acquisition payment currency and bidder's value gains. *Journal of Banking & Finance*, *36*(3), 678-694.

Barbopoulosa, L. G., & Adrab, S. (2016). The Earnout Structure Matters: Takeover Premia and Acquirers Gains in Earnout Financed M&As. *International Review of Financial*, *45*, 283-294.

Barney, J. B. (1986). Strategic Factor Markets: Expectations, Luck, and Business Strategy. *Management Science*, *32*(10), 1231-1241.

Barney, J. B. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, *17*(1), 99–120.

Bates, T. W., Neyland, J., & Wang, Y. (2018). Financing Acquisitions with Earnouts. *Journal of Accounting and Economics*, *66*(2-3), 374-395.

Batt, R., & Appelbaum, E. (2021). The Agency Costs of Private Equity: Why Do Limited Partners Still Invest? *Academy of Management Perspectives*, *35*(1), 45-68.

Battauz, A., Gatti, S., Prencipe, A., & Viarengo, L. (2021). Earnouts: The real value of disagreement in mergers and acquisitions. *European Financial Management*, 1-44.

Ben-David, I., Graham, J. R., & Harvey, C. R. (2013). Managerial Miscalibration. *The Quarterly Journal of Economics*, *128*(4), 1547-1584.

Bengtsson, O., & Bernhardt, D. (2014). Lawyers In Venture Capital Contracting: Theory And Evidence. *Economic Inquiry*, *52*(3), 1080-1102.

Bengtsson, O., & Sensoy, B. A. (2011). Investor Abilities and Financial Contracting: Evidence from Venture Capital. *Journal of Financial Intermediation*, *20*(4), 477-502.

Berg, A., & Gottschalg, O. (2005). Understanding Value Generation in Buyouts. *Journal of Restructuring Finance*, *2*(1), 9-37.

Bergström, C., Grubb, M., & Jonsson, S. (2007). The Operating Impact of Buyouts in Sweden: A Study of Value Creation. *The Journal of Private Equity*, *11*(1), 22-39.

Bernstein, S., & Sheen, A. (2016). The Operational Consequences of Private Equity Buyouts. *The Review of Financial Studies*, *29*(9), 2387-2418.

Bloom, N., Sadun, R., & Van Reenen, J. (2015). Do Private Equity Owned Firms Have Better Management Practices? *American Economic Review*, *105*(5), 442–446.

Boucly, Q., Sraer, D., & Thesmar, D. (2011). Growth LBOs. *Journal of Financial Economics*, *102*(2), 432–453.

Braun, R., Jenkinson, T., & Stoff, I. (2017). How persistent is private equity performance? Evidence from deal-level data. *Journal of Financial Economics*, *123*(2), 273-291.

Brealey, R. A., & Myers, S. C. (1984). *Principles of Corporate Finance.* New York: McGraw-Hill.

Brigl, M., Herrera, A., Liechtenstein, H., Meerkatt, H., Prats, J. M., & Rose, J. (2008). *The Advantage of Persistence: How the Best Private-Equity Firms "Beat the Fade".* Available at: https://mkt-bcg-com-public-images.s3.amazonaws.com/public-pdfs/legacy-documents/file15196.pdf

Brown, K. C., & Wiles, K. W. (2016). Opaque Financial Contracting and Toxic Term Sheets in Venture Capital. *Journal of Applied Corporate Finance*, *28*(1), 72-85.

Buchner, A. (2016). The Alpha and Beta of Private Equity Investments. *Working Paper, University of Passau*.

Buchner, A., Mohamed, A., & Schwienbacher, A. (2016). Does risk explain persistence in private equity performance? *Journal of Corporate Finance*, *39*, 18-35.

Butler, P. A. (2001). *The alchemy of LBOs.* New York: McKinsey and Company.

Cabrales, A., Charness, G., & Villeval, M. C. (2011). Hidden information, bargaining power, and efficiency: an experiment. *Experimental Economics*, *14*(2), 133-159.

Cain, M. D., Denis, D. J., & Denis, D. K. (2011). Earnouts: A study of financial contracting in acquisition agreements. *Journal of Accounting and Economics*, *51*(1-2), 151-170.

Carhart, M. M. (1997). On persistence in mutual fund performance. *Journal of Finance*, 57-82.

Caselli, S., Garcia-Appendini, E., & Ippolito, F. (2009). Explaining Returns in Private Equity Investments. *Working Paper, Bocconi University*.

Caselli, S., Garcia-Appendini, E., & Ippolito, F. (2013). Contracts and returns in private equity investments. *Journal of Financial Intermediation*, *22*(2), 201-217.

Chapman, J. L., & Klein, P. G. (2010). Value Creation in Middle-Market Buyouts A Transaction-Level Analysis. In D. Cumming, *Private Equity* (pp. 229-255). Hoboken, N.J.: John Wiley & Sons.

Chen, S., Thomas, J., & Zhang, F. (2016). Spring-loading future performance when no one is looking? Earnings and cash flow management around acquisitions. *Review of Accounting Studies*, *21*(4), 1081–1115.

Choi, A. H. (2017). Facilitating Mergers and Acquisitions with Earnouts and Purchase Price Adjustments. *Journal of Law, Finance, and Accounting*, *2*(1). 1-47.

Choi, A. H., & Triantis, G. G. (2010). Strategic Vagueness in Contract Design: The Case of Corporate Acquisitions. *Yale Law Journal*, *119*(5), 848-924.

Chou, D.-W., Gombola, M., & Liu, F.-Y. (2006). Earnings Management and Stock Performance of Reverse Leveraged Buyouts. *Journal of Financial and Quantitative Analysis*, *41*(2), 407-438.

Ciftci, M., & Salama, F. M. (2018). Stickiness in Costs and Voluntary Disclosures: Evidence from Management Earnings Forecasts. *Journal of Management Accounting Research*, *30*(3), 211–234.

Ciftci, M., Mashruwala, R., & Weiss, D. (2016). Implications of Cost Behavior for Analysts' Earnings Forecasts. *Journal of Management Accounting Research*, *28*(1), 57–80.

Clement, M. B. (1999). Analyst forecast accuracy: Do ability, resources, and portfolio complexity matter? *Journal of Accounting and Economics*, *27*(3), 285–303.

CMS. (2020). *CMS European M&A Study 2020.* Frankfurt a.M.: CMS.

Coates, J. C. (2012). M&A - Evidence-based M&A: Less can be more when allocating risk in deal contracts - The varied use of risk allocation provisions. *Butterworths journal of international banking and financial law*, *27*(11), 708-710.

Coates, J. C. (2015). M&A Contracts: Purposes, Types, Regulation, and Patterns of Practice. *Discussion Paper, Harvard Law School*.

Coates, J. C. (2016). Why Have M&A Contracts Grown? Evidence From Twenty Years of Deals. *Working Paper, Harvard Law School*.

Coën, A., Desfleurs, A., & L'Her, J. F. (2009). International evidence on the relative importance of the determinants of earnings forecast accuracy. *Journal of Economics and Business*, *61*(6), 453–471.

Cohn, J. B., Millis, L. F., & Towery, E. M. (2014). The evolution of capital structure and operating performance after leveraged buyouts Evidence from US corporate tax returns. *Journal of Financial Economics*, *111*(2), 469–494.

Colla, P., Ippolito, F., & Wagner, H. F. (2012). Leverage and pricing of debt in LBOs. *Journal of Corporate Finance*, *18*(1), 124–137.

Cornelli, F., Kominek, Z., & Ljungvist, A. (2013). Monitoring Managers: Does It Matter? *The Journal of Finance*, *68*(2), 431-481.

Cressy, R., Munari, F., & Malipiero, A. (2007). Playing to their strengths? Evidence that specialization in the private equity industry confers competitive advantage. *Journal of Corporate Finance*, *13*(4), 647–669.

Cronqvist, H., & Fahlenbrach, R. (2013). CEO contract design: How do strong principals do it? *Journal of Financial Economics*, *108*(3), 659–674.

Cumming, D. J. (2005). Agency costs, institutions, learning, and taxation in venture capital contracting. *Journal of Business Venturing*, *20*(5), 573–622.

Cumming, D. J., & Johan, S. A. (2014). The Investment Process. In D. J. Cumming, & S. A. Johan, *Venture Capital and Private Equity Contracting* (S. 305-317). London: Elsevier Inc.

Cumming, D., & Johan, S. (2017). The Problems with and Promise of Entrepreneurial Finance. *Strategic Entrepreneurship Journal*, *11*(3), 357–370.

Cumming, D., & Walz, U. (2010). Private equity returns and disclosure around the world. *Journal of International Business Studies*, *41*(4), 727-754.

Cumming, D., Siegel, D. S., & Wright, M. (2007). Private equity, leveraged buyouts and governance. *Journal of Corporate Finance*, *13*(4), 439–460.

Damodaran, A. (2015). *Applied Corporate Finance.* Hoboken, New Jersey: John Wiley & Sons.

Datar, S., Frankel, R., & Wolfson, M. (2001). Earnouts: The Effects of Adverse Selection and Agency Costs on Acquisition Techniques. *Journal of Law Economics and Organization*, *17*(1), 201-238.

Davis, S. J., Haltiwanger, J., Handley, K., Jarmin, R., Lerner, J., & Miranda, J. (2014). Private Equity, Jobs, and Productivity. *American Economic Review*, *104*(12), 3956–3990.

De Gooijer, J. G., & Hyndman, R. J. (2006). 25 Years of Time Series Forecasting. *International Journal of Forecasting*, *22*(3), 443-473.

De Maeseneire, W., & Brinkhuis, S. (2012). What Drives Leverage in Leveraged Buyouts? An Analysis of European Leveraged Buyouts' Capital Structure. *Accounting & Finance*, *52*, 155–182.

DeAngelo, H., & DeAngelo, L. (1987). Management Buyouts of Publicly Traded Corporations. *Financial Analysts Journal*, *43*(3), 38-49.

Dechow, P. M., Weili, G., Larson, C. R., & Sloan, R. G. (2011). Predicting Material Accounting Misstatements. *Contemporary Accounting Research*, *28*(1), 17-82.

Demiroglu, J., & James, C. M. (2010). The role of private equity group reputation in LBO financing. *Journal of Financial Economics*, *96*(2), 306-330.

Denis, D. J., & Macias, A. J. (2013). Material Adverse Change Clauses and Acquisition Dynamics. *Journal of Financial and Quantitative Analysis*, *48*(3), 819-847.

Derakhshani, S. (2014). Branding Equity Capital. *The Journal of Private Equity*, *17*(4), 9-19.

Dhaliwal, D. S., Radhakrishnan, S., Tsang, A., & Yang, Y. G. (2012). Nonfinancial Disclosure and Analyst Forecast Accuracy: International Evidence on Corporate Social Responsibility Disclosure. *The Accounting Review*, *87*(3), 723-759.

Diller, C., & Kaserer, C. (2009). What Drives Private Equity Returns? - Fund Inflows, Skilled GPs, and/or Risk? *European Financial Management*, *15*(3), 643-675.

Durand, R. (2003). Predicting a firm's forecasting ability: the roles of organizational illusion of control and organizational attention. *Strategic Management Journal*, *24*(9), 821-838.

Edgerton, J. (2012). Agency Problems in Public Firms: Evidence from Corporate Jets in Leveraged Buyouts. *The Journal of Finance*, *67*(6), 2187-2213.

Erel, I. (2018). Discussion: Financing acquisitions with earnouts. *Journal of Accounting and Economics*, *66*(2), 396-398.

Eschenröder, T., & Hartmann-Wendels, T. (2019). Performance Dependency of Secondary Buyouts on Primary Buyouts. *Working Paper, University of Cologne*.

European Commission. (2016). *Proposal for a Council Directive laying down rules against tax avoidance practices that directly affect the functioning of the internal market*. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016PC0026&from=EN.

Fairfield, P. M., Ramnath, S., & Yohn, T. L. (2009). Do Industry-Level Analyses Improve Forecasts of Financial Performance? *Journal of Accounting Research*, *47*(1), 147–178.

Fama, E. F., & French, K. R. (2000). Forecasting Profitability and Earnings. *The Journal of Business*, *73*(2), 161–175.

Ferracuti, E., & Stubben, S. R. (2019). The Role of Financial Reporting in Resolving Uncertainty about Corporate Investment Opportunities. *Journal of Accounting & Economics*, *68*(2), 1-9.

Field, H. M. (2019). Tax Lawyers as Tax Insurance. *William & Mary Law Review*, *60*(6), 2111-2184.

Francis, J., Huang, A. H., Rajgopal, S., & Zang, A. Y. (2008). CEO Reputation and Earnings Quality. *Contemporary Accounting Research*, *25*(1), 109–147.

Fuchs, F., Füss, R., Jenkinson, T., & Morkoetter, S. (2021). Winning a deal in private equity: Do educational ties matter? *Journal of Corporate Finance*, *66*, 1-18.

Gejadze, M., Giot, P., & Schwienbacher, A. (2017). Private Equity Fundraising and Firm Specialization. *The Quarterly Review of Economics and Finance*, *64*, 259-274.

Gertner, R., & Kaplan, S. N. (1996). The value maximizing board. *Working Paper, University of Chicago and NBER*.

Ghai, S., Kehoe, C., & Pinkus, G. (2014). *McKinsey Quarterly*. McKinsey & Company. https://www.mckinsey.com/industries/private-equity-and-principal-investors/our-insights/private-equity-changing-perceptions-and-new-realities

Gilchrist, S., Sim, J.W., & Zakrajsek, E. (2014). *Uncertainty, Financial Frictions, and Investment Dynamics* (NBER Working Paper No. 20038). National Bureau of Economic Research. https://www.nber.org/papers/w20038

Gill, A., & Visnjic, N. (2015). Performance Benefits of Tight Control. *The Journal of Private Equity*, *18*(3), 41-54.

Gilligan, J., & Wright, M. (2014). *Private Equity Demystified: An Explanatory Guide* (3rd ed.). Oxford University Press.

Gilson, R. J., & Schwartz, A. (2005). Understanding MACs: Moral Hazard in Acquisitions. *Journal of Law, Economics, & Organization*, *21*(2), 330-358.

Goergen, M., O'Sullivan, N., & Wood, G. (2014). The employment consequences of private equity acquisitions: The case of institutional buy outs. *European Economic Review*, *71*, 67-79.

Gompers, P. A., & Lerner, J. (1997). Risk and Reward in Private Equity Investments: The Challenge of Performance Assessment. *The Journal of Private Equity*, *1*(2), 5-12.

Gompers, P., & Lerner, J. (1999). An analysis of compensation in the U.S. venture capital. *Journal of Financial Economics*, *51*(1), 3-44.

Gompers, P., Ishii, J., & Metrick, A. (2003). Corporate Governance and Equity Prices. *Quarterly Journal of Economics*, *118*(1), 107-155.

Gompers, P., Kaplan, S. N., & Mukharlyamov, V. (2016). What do private equity firms say they do? *Journal of Financial Economics*, *121*(3), 449–476.

Goodman, T. H., Neamtiu, M., Shroff, N., & White, H. D. (2014). Management Forecast Quality and Capital Investment Decisions. *Accounting Review*, *89*(1), 331-365.

Graham, J. R., Harvey, C. R., & Rajgopal, S. (2005). The economic implications of corporate financial reporting. *Journal of Accounting and Economics*, *40*(1–3), 3–73.

Graham, M., Walter, T. S., Yawson, A., & Zhang, H. (2017). The value-added role of industry specialist advisors in M&As. *Journal of Banking & Finance*, *81*, 81-104.

Griffith, S. J. (2020). Deal Insurance: Representation & Warranty Insurance in Mergers and Acquisitions. *Minnesota Law Review*, *104*, 1839-1920.

Groh, A. P., & Gottschalg, O. (2009). The Opportunity Cost of Capital of US Buyouts. *Working Paper, Barcelona IESE Business School*.

Groh, A. P., Liechtenstein, H., & Lieser, K. (2010). The European Venture Capital and Private Equity Country Attractiveness Indices. *Journal of Corporate Finance*, *16*(2), 205-224.

Grub, M., & Meyding, T. (2012). Risikoallokation in Unternehmenskaufverträgen – aktuelle Trends in Europa Ausgewählte Ergebnisse der CMS European M&A Study 2012. *M&A Review*, *23*(9), 348-357.

Guo, S., Hotchkiss, E. S., & Song, W. (2011). Do Buyouts (Still) Create Value? *The Journal of Finance*, *66*(2), 479-517.

Harbula, P. (2011). Operating Performance, Valuation, Leverage, and Corporate Governance of Leveraged Buy-Out Transactions: A Continental European Perspective. *Working Paper*.

Harris, R., Siegel, D. S., & Wright, M. (2005). Assessing the Impact of Management Buyouts on Economic Efficiency: Plant-Level Evidence from the United Kingdom. *The Review of Economics and Statistics*, *87*(1), 148-153.

Hartmann-Wendels, T., Stein, I. & Stöter, A. (2012). *Tax incentives and capital structure choice: Evidence from Germany* (Discussion Paper 18/2012). Deutsche Bundesbank.

Hayward, M. L. A., & Fitza, M. A. (2017). Pseudo-Precision? Precise Forecasts and Impression Management in Managerial Earnings Forecasts. *Academy of Management Journal*, *60*(3), 1094–1116.

Hendricks, B., Howell, T., & Bingham, C. (2019). How much do top management teams matter in founder-let firms? *Strategic Management Journal*, *40*(6), 959-986.

Hilary, G., & Hsu, C. (2011). Endogenous overconfidence in managerial forecasts. *Journal of Accounting and Economics*, *51*(3), 300-313.

Hilary, G., Hsu, C. Y., Segal, B., & Wang, R. (2016). The Bright Side of Managerial Over-optimism. *Journal of Accounting and Economics*, *62*(1), 46-64.

Hilary, G., Hsu, C., & Wang, R. (2014). Management Forecast Consistency. *Journal of Accounting Research*, *52*(1), 163-191.

Holthausen, R. W., & Larcker, D. F. (1996). The financial performance of reverse leveraged buyouts. *Journal of Financial Economic*, *42*(3), 293-332.

Hope, O.-K., & Kang, T. (2005). The Association between Macroeconomic Uncertainty and Analysts' Forecast Accuracy. *Journal of International Accounting Research*, *4*(1), 23–38.

Houle, L. (1991). Acquisition Agreements: Specific Tax Clauses. *Canadian Tax Journal*, *39*(5), 1245-1287.

Hribar, P., & Yang, H. (2016). CEO Overconfidence and Management Forecasting. *Contemporary Accounting Research*, *33*(1), 204-227.

Hsieh, T.-S., Song, B. Y., Wang, R. R., & Wang, X. (2019). Management earnings forecasts and bank loan contracting. *Journal of Business Finance & Accounting*, *46*(5-6), 712-738.

Hsu, D. H. (2004). What Do Entrepreneurs Pay for Venture Capital Affiliation? *The Journal of Finance*, *59*(4), 1805-1844.

Humphery-Jenner, M. (2012). Private Equity Fund Size, Investment Size, and Value Creation. *Review of Finance*, *16*(3), 799–835.

Hüther, N., Robinson, D. T., Sievers, S., & Hartmann-Wendels, T. (2020). Paying for Performance in Private Equity: Evidence from Venture Capital Partnerships. *Management Science*, *66*(4), 1756–1782.

Hutton, A. P., Lee, L. F., & Shu, S. Z. (2012). Do Managers Always Know Better? The Relative Accuracy of Management and Analyst Forecasts. Journal of Accounting Research, *50*(5), 1217–1244.

Invest Europe. (2020). *Investing in Europe: Private Equity activity 2019.* Invest Europe. https://www.investeurope.eu/research/data-and-insight

Ittner, C. D., & Michels, J. (2017). Risk-based forecasting and planning and management earnings forecasts. *Review of Accounting Studies*, *22*(2), 1005–1047.

Ivashina, V., & Kovner, A. (2011). The Private Equity Advantage: Leveraged Buyout Firms and Relationship Banking. *Review of Financial Studies*, *24*(7), 2462-2498.

Jastrzębski, J. (2019). Value Creation in Negotiations of Contractual Warranties and Indemnifications. *European Company and Financial Law Review*, *16*(3), 273-309.

Jelic, R., & Wright, M. (2011). Exits, Performance, and Late Stage Private Equity: The Case of UK Management Buy-outs. *European Financial Management*, *17*(3), 560-593.

Jelic, R., Zhou, D., & Wright, M. (2019). Sustaining the Buyout Governance Model: Inside Secondary Management Buyout Boards. *British Journal of Management*, *30*(1), 30-52.

Jenkinson, T., & Stucke, R. (2011). Who Benefits from the Leverage in LBOs? *Working Paper, Oxford University*.

Jensen, M. C. (1986). Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *The American Economic Review*, *76*(2), 323-329.

Jensen, M. C. (1988). Takeovers: Their Causes and Consequences. *The Journal of Economic Perspectives*, *2*(1), 21-48.

Jensen, M. C. (1989). The eclipse of the public corporation. *Harvard Business Review*, *67*(5), 61–74.

Jensen, M. C., & Heckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, *3*(4), 305-360.

Kahneman, D., & Tversky, A. (1973). On the psychology of prediction. *Psychological Review*, *80*(4), 237-251.

Kamoto, S. (2017). Managerial innovation incentives, management buyouts, and shareholders' intolerance of failure. *Journal of Corporate Finance*, *42*, 55-74.

Kaplan, S. N. (1989a). Management Buyouts: Evidence on Taxes as a Source of Value. *The Journal of Finance*, *44*(3), 611-632.

Kaplan, S. N. (1989b). The effects of management buyouts on operating performance and value. *Journal of Financial Economics*, *24*(2), 217-254.

Kaplan, S. N., & Ruback, R. S. (1995). The Valuation of Cash Flow Forecasts: An Empirical Analysis. *The Journal of Finance*, *50*(4), 1059-1093.

Kaplan, S. N., & Schoar, A. (2005). Private Equity Performance: Returns, Persistence, and Capital Flows. *The Journal of Finance*, *60*(4), 1791-1823.

Kaplan, S. N., & Stein, J. C. (1993). The Evolution of Buyout Pricing and Financial Structure in the 1980s. *The Quarterly Journal of Economics*, *108*(2), 313-357.

Kaplan, S. N., & Strömberg, P. (2003). Financial Contracting Theory Meets the Real World: An Empirical Analysis of Venture Capital Contracts. *The Review of Economic Studies*, *70*(2), 281-315.

Kaplan, S. N., & Strömberg, P. (2009). Leveraged Buyouts and Private Equity. *Journal of Economic Perspectives*, *23*(1), 121–146.

Kaplan, S. N., Klebanov, M. M., & Sorensen, M. (2012). Which CEO Characteristics and Abilities Matter? *The Journal of Finance*, *67*(3), 973-1007.

Karsten, C., Malmendier, U., & Sautner, Z. (2020). Lawyer Expertise and Contract Design – Evidence from M&A Negotiations. *Working Paper, University of California Berkeley*.

Kaviani, M. S., Kryzanowski, L., Maleki, H., & Savor, P. (2020). Policy uncertainty and corporate credit spreads. *Journal of Financial Economics*, *138*(3), 838–865.

Kim, J. B. (2006). Accounting flexibility and managers' forecast behavior prior to seasoned equity offerings. *Review of Accounting Studies*, *21*(4), 1361–1400.

Kim, P. H., & Fragale, A. R. (2005). Choosing the Path to Bargaining Power: An Empirical Comparison of BATNAs and Contributions in Negotiation. *Journal of Applied Psychology*, *90*(2), 373–381.

Knauer, A., Lahmann, A., Pflücke, M., & Schwetzler, B. (2014). How Much Do Private Equity Funds Benefit From Debt-related Tax Shields? *Journal of Applied Corporate Finance*, *26*(1), 85-93.

Knauer, T., & Sommer, F. (2010). The operating development of German leveraged buyouts – value enhancement due to efficiency gains? *Die Betriebswirtschaft*, *70*(5), 389-404.

Knauer, T., May, M., & Sommer, F. (2013). Corporate Governance und Unternehmenswerteffekte bei Leveraged Buyouts – State of the Art der empirischen Forschung. *Journal für Betriebswirtschaft*, *63*, 117-156.

Kohers, N., & Ang, J. (2000). Earnouts in Mergers: Agreeing to Disagree and Agreeing to Stay. *The Journal of Business*, *73*(3), 445-476.

Korteweg, A., & Sorensen, M. (2017). Skill and luck in private equity performance. *Journal of Financial Economics*, *124*(3), 535–562.

Kramer Levin. (2021). *2017 European Private Target M&A Deal Points Study, ABA*. Kramer Levin. https://www.kramerlevin.com/en/perspectives-search/2017-european-private-target-ma-deal-points-study-aba.html

Lafond, R., & Roychowdhury, S. (2008). Managerial Ownership and Accounting Conservatism. *Journal of Accounting Research*, *46*(1), 101–135.

Le Nadant, A.-L., Perdreau, F., & Bruining, H. (2018). Industry specialization of private equity firms: a source of buy-out performance heterogeneity. *Venture Capital*, *20*(3), 237-259.

Lee, J. M., Hwang, B.-H., & Chen, H. (2017). Are Founder CEOs more Overconfident than Professional CEOs? Evidence from S&P 1500 Companies. *Strategic Management Journal*, *38*(3), 751-769.

Leledakis, G. N., Mamatzakis, E. C., Pyrgiotakis, E. G., & Travlos, N. G. (2021). Does it pay to acquire private firms? Evidence from the U.S. banking industry. *The European Journal of Finance*, *22*(10), 929-931.

Lerner, J., Sorenson, M., & Strömberg, P. (2011). Private Equity and Long-Run Investment: The Case of Innovation. *The Journal of Finance*, *66*(2), 445-477.

Lev, B., & Penman, S. H. (1990). Voluntary Forecast Disclosure, Nondisclosure, and Stock Prices. *Journal of Accounting Research*, *28*(1), 49-76.

Libby, R., & Rennekamp, K. (2012). Self-Serving Attribution Bias, Overconfidence, and the Issuance of Management Forecasts. *Journal of Accounting Research*, *50*(1), 197-231.

Libby, R., & Rennekamp, K. M. (2016). Experienced Financial Managers' Views of the Relationships among Self-Serving Attribution Bias, Overconfidence, and the Issuance of Management Forecasts: A Replication. *Journal of Financial Reporting*, *1*(1), 131-136.

Lichtenberg, F. R., & Siegel, D. (1990). The effects of leveraged buyouts on productivity and related aspects of firm behavior. *Journal of Financial Economics*, *27*(1), 165-194.

Linck, J. S., Netter, J. M., & Shu, T. (2013). Can Managers Use Discretionary Accruals to Ease Financial Constraints? Evidence from Discretionary Accruals Prior to Investment. *Accounting Review*, *88*(6), 2117–2143.

Litvak, K. (2009). Venture Capital Limited Partnership Agreements: Understanding Compensation Arrangement. *University of Chicago Law Review*, *76*(1), 161-218.

Ljungqvist, A., Richardson, M., & Wolfenzon, D. (2020). The investment behavior of buyout funds: Theory and evidence. *Financial Management*, *49*(1), 3-32.

Loos, N. (2006). *Value Creation in Leveraged Buyouts: Analysis of Factors Driving Private Equity Investment Performance.* Wiesbaden: Gabler Verlag.

Lopez-de-Silanes, F., Phalippou, L., & Gottschalg, O. (2015). Giants at the Gate: Investment Returns and Diseconomies of Scale in Private Equity. *Journal of Financial and Quantitative Analysis*, *50*(3), 377-411.

Lukas, E., Reuer, J., & Welling, A. (2012). Earnouts in mergers and acquisitions: A game-theoretic option pricing approach. *European Journal of Operational Research*, *223*(1), 256-263.

Makadok, R., & Walker, G. (2000). Identifying a distinctive competence: forecasting ability in the money fund industry. *Strategic Management Journal*, *21*(8), 853-864.

Makridakis, S., Carbone, R., Fildes, R., Hibon, M., Lewandowski, R., Newton, J., . . . Winkler, R. (1982). The accuracy of extrapolation (time series) methods: Results of a forecasting competition. *International Journal of Forecasting*, *1*(2), 111-153.

Manns, J., & Anderson, R. (2013). The Merger Agreement Myth. *Cornell Law Review*, *98*(5), 1143-1188.

Mao, Y., & Renneboog, L. (2015). Do managers manipulate earnings prior to management buyouts? *Journal of Corporate Finance*, *35*, 43-61.

Matthews, G., Bye, M., & Howland, J. (2009). Operational Improvement: The Key to Value Creation in Private Equity. *Journal of Applied Corporate Finance*, *21*(3), 21-27.

May, R. (2005). Break fees: an international perspective. *International Financial Law Review*, *24*, 9-11.

Metrick, A., & Yasuda, A. (2010). The Economics of Private Equity Funds. *The Review of Financial Studies*, *23*(6), 2303–2341.

Michel, A., Ahlers, O., Hack, A., & Kellermanns, F. W. (2020). Who is the king of the hill? On bargaining power in private equity buyouts. *Long Range Planning*, *53*(2), 1-21.

Miller, E. L., & Segall, L. N. (2017). *Mergers and Acquisitions: A Step-by-Stepy Legal and Practical Guide.* Hoboken, New Jersey: John Wiley & Sons.

Miller, R. T. (2009). The Economics of Deal Risk: Allocating Risk Through MAC Clauses in Business Combination Agreements. *William & Mary Law Review*, *50*(6), 2008-2103.

Modigliani, F., & Miller, M. H. (1963). Corporate income taxes and the cost of capital: a correction. *American Economic Review*, *53*(3), 433–443.

Morck, R., Shleifer, A., & Vishny, R. W. (1988). Management Ownership and Market Valuation. *Journal of Financial Economics*, *20*, 293-315.

Muscarella, C. J., & Vetsuypens, M. R. (1990). Efficiency and Organizational Structure: A Study of Reverse LBOs. *The Journal of Finance*, *45*(5), 1389-1413.

Myers, S. C. (1984). The capital structure puzzle. *The Journal of Finance*, *39*(3), 574–592.

Myers, S. C. (2001). Capital Structure. *The Journal of Economic Perspectives*, *15*(2), 81-102.

Nickerson, R. S. (1998). Confirmation Bias: A Ubiquitous Phenomenon in Many Guises. *Review of General Psychology*, *2*(2), 175-220.

Nikoskelainen, E., & Wright, M. (2007). The impact of corporate governance mechanisms on value increase in leveraged buyouts. *Journal of Corporate Finance*, *13*(4), 511-537.

Olbert, M., & Severin, P. (2020). Private Equity and Taxes. *Working Paper, University of Mannheim*.

Opler, T., & Titman, S. (1993). The Determinants of Leveraged Buyout Activity: Free Cash Flow vs. Financial Distress Costs. *The Journal of Finance*, *48*(5), 1985-1999.

O'Sullivan, R., McNaughton, R., & Weston, G. (2011). Considering Consideration: Locked Box Valuations are an Increasingly Common Alternative to Completion Accounts. *International Financial Law Review*, *30*(2), 60-61.

Patschureck, N., Sommer, F., & Wöhrmann, A. (2015). Contract design as a risk management tool in corporate acquisitions: theoretical foundations and empirical evidence. *Journal of Management Control*, *26*(4), 279–316.

Phalippou, L., & Gottschalg, O. (2009). The Performance of Private Equity Funds. *The Review of Financial Studies*, *22*(4), 1747-1776.

Phalippou, L., Rauch, C., & Umber, M. (2018). Private equity portfolio company fees. *Journal of Financial Economics*, *129*(3), 559-585.

PitchBook. (2020). *European PE Breakdown 2019 Annual.* Seattle: PitchBook Data, Inc.

Pozen, R. (2007). If Private Equity Sized Up Your Business. *Harvard Business Review*, *85*(11), 78–87.

Preqin. (2020). *2020 Preqin Global Private Equity & Venture Capital*. London: Preqin Ltd.

Preqin. (2021). *2021 Preqin Global Private Equity & Venture Capital*. London: Preqin Ltd.

Puche, B. (2016). *Essays on Value Creation and its Determinants in Private Equity.* München: TUM.

Puche, B., Braun, R., & Achleitner, A.-K. (2015). International Evidence on Value Creation in Private Equity Transactions. *Journal of Applied Corporate Finance*, *27*(4), 105-122.

Pugh, W. (2019). Getting What You Bargained for: Avoiding Legal Uncertainty in Survival Clauses for a Seller's Representations and Warranties in M&A Purchase Agreements. *Journal of Business, Entrepreneurship and the Law*, *12*(1), 1-34.

PwC. (2019). *Private Equity Trend Report 2019.* Frankfurt a.M.: PricewaterhouseCoopers GmbH WPG.

PwC. (2020). *Private Equity Trend Report 2020.* Frankfurt a.M.: PricewaterhouseCoopers GmbH WPG.

PwC. (2021a). *Private Equity Trend Report 2021*. Frankfurt a.M.: PricewaterhouseCoopers GmbH WPG.

PwC. (2021b). *To lock or not to lock? An introduction to the locked box closing mechanism*. Retrieved July 29, 2021, from https://www.pwc.com/us/en/deals/assets/pwc-locked-box-closing-mechanism.pdf

Quinn, B. J. M. (2013). Putting Your Money Where Your Mouth Is: The Performance of Earnouts in Corporate Acquisitions. *University of Cincinnati Law Review*, *81*(1), 127-172.

Rappaport, A. (1990). The Staying Power of the Public Corporation. *Harvard Business Review*, *68*(1), 96-104.

Reed, S. F., Lajoux, A. R., & Nesvold, H. P. (2007). *The Art of M&A.* New York: McGraw-Hill.

Renneboog, L., Simons, T., & Wright, M. (2007). Why do public firms go private in the UK? The impact of private equity investors, incentive realignment and undervaluation. *Journal of Corporate Finance*, *13*(4), 591-628.

Richardson, S., Teoh, S. H., & Wysocki, P. D. (2004). The Walk-down to Beatable Analyst Forecasts: The Role of Equity Issuance and Insider Trading Incentives. *Contemporary Accounting Research*, *21*(4), 885–924.

Robbie, K., & Wright, M. (1995). Managerial and ownership succession and corporate restructuring: the case of management buy-ins. *Journal of Management Studies*, *32*(4), 527-549.

Roberts, M. R., & Sufi, A. (2009). Renegotiation of financial contracts: Evidence from private credit agreements. *Journal of Financial Economics*, *93*(2), 159–184.

Robinson, D. T., & Sensoy, B. A. (2013). Do Private Equity Fund Managers Earn Their Fees? Compensation, Ownership, and Cash Flow Performance. *The Review of Financial Studies*, *26*(11), 2760-2797.

Robinson, D. T., & Sensoy, B. A. (2016). Cyclicality, performance measurement, and cash flow liquidity in private equity. *Journal of Financial Economics*, *122*(3), 521-543.

Rogers, J. L., & Stocken, P. C. (2005). Credibility of Management Forecasts. *The Accounting Review*, *80*(4), 1233-1260.

Samila, S., & Sorenson, O. (2011). Noncompete Covenants: Incentives to Innovate or Impediments to Growth. *Management Science*, *57*(3), 425–438.

Scellato, G., & Ughetto, E. (2013). Real effects of private equity investments: Evidence from European buyouts. *Journal of Business Research*, *66*(12), 2642-2649.

Schmidt, D., & Wahrenburg, M. (2004). Contractual Relations between European Vc-Funds and Investors: The Impact of Reputation and Bargaining Power on Contractual Design. *Working Paper, Center for Financial Studies (Frankfurt am Main)*.

Schofield, G. (2020). Evidence of governance arbitrage by private equity sponsors. *Accounting & Finance*, *60*, 971–1005.

Schrand, C. M., & Zechman, S. L. (2012). Executive Overconfidence and the Slippery Slope to Financial Misreporting. *Journal of Accounting and Economics*, *53*(1), 311-329.

Schwenk, C. R. (1984). Cognitive simplification processes in strategic decision-making. *Strategic Management Journal*, *5*(2), 111-128.

Seeburger, P. (2010). *Die Performance der IPOs von Leveraged Buyouts.* Bern: Peter Lang.

Singh, H. (1990). Management Buyouts: Distinguishing Characteristics and Operating Changes Prior to Public Offering. *Strategic Management Journal*, *11*, 111-129.

Smith, A. J. (1990). Corporate ownership structure and performance: The case of management buyouts. *Journal of Financial Economics*, *27*(1), 143-164.

STOXX Ltd. (2020). *Sector Classification ICB*. Qontigo. https://www.stoxx.com/sector-classification-icb

Strack, F., & Mussweiler, T. (1997). Explaining the enigmatic anchoring effect: Mechanism of selective accessibility. *Journal of Personality and Social Psychology*, *73*(3), 437-446.

Stumpf-Wollersheim, J., & Horsch, A. (2019). *Forum Mergers & Acquisitions 2019.* Wiesbaden: Springer Gabler.

Talley, E., O'Kane, D., Kellner, C., & Stremitzer, A. (2012). The Measure of a MAC: A Machine-Learning Protocol for Analyzing Force Majeure Clauses in M&A Agreements [with comment]. *Journal of Institutional and Theoretical Economics*, *168*(1),181–208.

Tripsas, M., & Gavetti, G. (2000). Capabilities, Cognition, and Inertia: Evidence from Digital Imaging. *Strategic Management Journal*, *21*(10/11), 1147-1161.

Tsao, A. (2016). Pricing Mechanisms in Mergers and Acquisitions: Thinking Inside the Box. *University of Pennsylvania Journal of Business Law*, *18*(4), 1233-1260.

Tutuncu, L. (2019). Earnings management and performance of management buyouts. *Managerial Finance*, *45*(10/11), 1363-1381.

Tversky, A., & Kahneman, D. (1974). Judgment under Uncertainty: Heuristics and Biases. *Science*, *185*(4157), 1124-1131.

Tykvová, T. (2018). Venture Capital and Private Equity Financing: An Overview of Recent Literature and an Agenda for Future Research. *Journal of Business Economics*, *88*(3), 325-362.

Valkama, P., Maula, M., Nikoskelainen, E., & Wright, M. (2013). Drivers of holding period firm-level returns in private equity-backed buyouts. *Journal of Banking & Finance*, *37*(7), 2378–2391.

Von Barnekow, F., & Hansen, S. M. (2013). What's in a Word: The Market Practice Argument Inevitably Crops up in Any M&A Negotiation; But Is It Actually a Useful Standard. *International Financial Law Review*, *32*(8), 36-37.

Wagenaar, W. A., & Sagaria, S. D. (1975). Misperception of exponential growth. *Perception & Psychophysics*, *18*(6), 416-422.

Wilson, N., Wright, M., Siegel, D. S., & Scholes, L. (2012). Private equity portfolio company performance during the global recession. *Journal of Corporate Finance*, *18*(1), 193-205.

Wright, M., Gilligan, J., & Amess, K. (2009). The economic impact of private equity: what we know and what we would like to know. *Venture Capital*, *11*(1), 1-21.

Wright, M., Pruthi, S., Amess, K., & Alperovych, Y. (2019). Private equity: where we have been and the road ahead. *Venture Capital*, *21*(1), 51-64.

Wu, Y. (1997). Management Buyouts and Earnings Management. *Journal of Accounting, Auditing and Finance*, *12*(4), 373 -389.

Yang, X., & Chen, W. (2021). The joint effects of macroeconomic uncertainty and cyclicality on management and analyst earnings forecasts. *Journal of Economics and Business*, *116*, 1-13.

Yusof, F. M., & Aziz, A. R. (2008). Strategic adaptation and the value of forecasts: The development of a conceptual framework. *Journal of Business Economics and Management*, *9*(2), 107-114.