ERASMUS UNIVERSITY ROTTERDAM

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MSc Economics & Business

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The effects of Buy-and-Build strategies on the economic performance of platform companies

Abstract

This research investigates how private equity-backed Buy-and-Build ("B&B") strategies affect the economic performance of platform companies. The sample consists of 61 European private equity-backed platform companies, spanning the years 2008-2014. Six performance measures are used: Return on Sales, Return on Assets, Return on Equity, EBITDA margin, EBIT margin and the Cash Flow to Sales ratio. The Wilcoxon signed-rank test is used to determine whether economic performance increases by testing the change in performance for multiple time windows. Multiple regression techniques are used to determine which factors influence economic performance. Results show no significant increase in economic performance for all time windows. Multiple regressions report that increased leverage negatively impacts economic performance, while a higher net working capital to Sales ratio improves economic performance. Finally, it remains unclear whether the number of employees impacts economic performance. Concluding, highly levered platform companies generate lower economic performance and platform companies can benefit from increasing their net working capital.

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Preface and acknowledgements

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1. Introduction

The private equity ("PE") sector has experienced a meteoric rise in the last four decades, as it is a profitable business for both investors and PE firm managers (Schillinger, 2018). It is therefore no surprise that the number of PE firms has skyrocketed, rising from just 24 firms in 1980 to over 6600 firms in 2015 (Economist, 2016). This exploding PE market has also sparked the interest of the academic world, leading to numerous publications on the performance of PE funds and the performance of the underlying companies owned by these PE funds. For instance, Harris, Jenkinson and Kaplan (2014) find that PE funds outperform the S&P500 index by roughly three percent annually and Kaplan (1989b) describes the positive effects of leveraged buyouts ("LBO") on operating performance.

However, with more and more PE firms entering the market, the number of profitable opportunities declines severely. This forces PE firms to innovate their value creation strategies, leading to the rise of the Buy-and-Build ("B&B") strategy. In this strategy, PE firms first acquire a mature, well established company to function as a platform ("platform company"), which is subsequently integrated with smaller companies ("add-on companies") that are acquired afterwards. The share of this strategy in the total amount of PE deals has climbed rapidly over the years, rising from 20% of the PE deals in 2000 to 53% in 2012 (Brigl et al., 2016). Research into the performance of these B&B strategies is rather limited. Brigl et al. (2016) find that B&B strategies generate an average IRR of 31.6%, whereas standalone deals only generate an average IRR of 23.1%. Other research by Hoffmann (2008) shows that nearly 75% of a sample of 21 German B&B deals generates an IRR of 25% or higher. However, research that delves into the effects of B&B strategies on the economic performance of platform companies and which factors influence the economic performance seems to be lacking severely. This thesis attempts to fill that gap by answering the following question:

"How do Buy-and-Build strategies affect the economic performance of platform companies?"

To answer that question a sample of 61 platform companies engaged in B&B strategies is analysed. The sample spans the years 2008-2014 and the platform companies in the sample are located in the 15 core European Union countries ("EU-15 countries"). Data is obtained from the BvD Orbis and Zephyr databases. The Orbis database is a comprehensive database containing full financial reports on 279 million companies worldwide, while the Zephyr database contains data on over 1.7 million M&A, PE, VC transactions and IPOs worldwide. Economic performance refers to measurable indicators of performance and is defined by six distinct performance measures based on financial data from the Orbis database: the Return on Sales, Return on Assets, Return on Equity, EBITDA margin, EBIT margin and the Cash Flow to Sales ratio. These performance measures are also used in their industry-adjusted form, following the methodology of Smit and Volosovych (2013). The industry-adjusted form is used to control for exogenous influences unrelated to B&B strategies, enabling the

distinction between improvements due to B&B strategies on the one hand and industry-influenced improvements on the other hand.

Analysis of previous literature on M&A transactions identifies several key performance-influencing factors. Three hypotheses are based on these key factors, while a fourth hypothesis focuses on the change in performance between two points in time. These key factors are firstly leverage, as financial engineering plays an important role in LBOs (Guo, Hotchkiss and Song, 2011). Secondly, the ratio of net working capital to sales ("NWC to Sales") as it is a significant factor in explaining operating performance (Smith, 1990). Finally, the number of employees is included as a proxy for restructuring activities, which are often conducted when PE firms acquire a company (Davis et al., 2014). Other controlling variables are also included, such as the initial leverage, the initial economic performance and the size of the platform company. The methodology to answer the main question of this thesis is divided in two segments. Firstly, the Wilcoxon signed-rank test is used for the time windows [0;1], [0;2], [-1;1] and [-1;2] and determines whether economic performance of platform companies increases between two points in time as a result of being involved in a B&B strategy. Secondly, the influence of multiple factors on economic performance is tested using univariate, multivariate and panel regression techniques.

The results can be summarised as follows. Firstly, results suggest there is little to no evidence that economic performance of platform companies increases for all time windows. Note however that due to data restrictions only the three years following the first B&B add-on can be tested, while improvements in economic performance may only occur at a later stage. This caveat is also noted in the discussion. Secondly, the initial performance of the platform company exhibits a significant positive relation with economic performance during the B&B strategy, which indicates that the initial characteristics of the platform company seem to matter for future performance. Thirdly, leverage has a significant negative relation with economic performance. An increased leverage ratio negatively affects economic performance, possibly due to increased debt repayments and higher interest expenses. This finding is in contrast with other research on LBOs (e.g. Guo, Hotchkiss and Song, 2011), who find that increased leverage actually results in higher cash flows. This finding could also be due to the previously mentioned caveat of limited data, which restricts the possibility of measuring economic performance at later stages in the B&B strategy. Fourthly, the NWC to Sales ratio exhibits a significant positive relation with economic performance. This finding underlines the importance of working capital management. It is in contrast with earlier research however, Smith (1990) for example finds that reducing the NWC to Sales ratio has a positive influence on economic performance. In this context the findings imply that platform companies may operate on insufficient working capital and increasing working capital enables the platform company to operate more efficiently and more profitably. Fifthly, the number of employees as proxy for restructuring activities seems to be significantly related to economic performance, but the results from the three regression techniques oppose each other in terms of their signs. Therefore, the relation between the number of employees

and economic performance remains unclear and is subject to further research. Finally, the size of the platform company is unrelated to economic performance, indicating that platform companies do not significantly profit from factors associated with larger size, such as increased bargaining power with suppliers.

The thesis will proceed as follows. Section two will provide an extensive literature review, followed by the development of the hypotheses in section three. Section four will discuss the dataset and its descriptive statistics and section five will describe the methodology in detail. Section six will provide a comprehensive overview of the results. Section seven will provide concluding remarks along with a discussion on the limitations of this research and recommendations for future research.

2. Literature review

The following section is dedicated to previous literature on the PE sector as a whole, the performance of PE funds and a closer look on B&B strategies in particular.

2.1 Private equity as part of M&A

Private equity is the collective term for several categories of investments, such as leveraged buyouts, venture capital, growth capital and mezzanine financing. Investors dedicate an amount of wealth to a PE firm, which uses the pool of money to invest in undervalued or underperforming companies (Fenn et al., 1995). PE firms are usually registered as partnerships or limited liability companies, with the investors considered as limited owners of the fund and the PE firm managers as general partners ("GP") of the fund. The largest clients of PE firms are institutional investors, such as pension funds and insurance companies, followed by wealthy individuals and other types of investment funds. By using such a structure, the investors' liability is restricted to their invested amount and the PE firm takes on unlimited liability (Kaplan & Strömberg, 2009). A fund is usually set up for the duration of ten years, with the option to extend for three years. Most PE funds are closed-end, which entails investors committing a certain amount of money which can be used for investments and management fees. The PE firm then has an amount of time to call on the commitments of outside investors, usually within five years. The PE firm has five to eight years to return the investment to their investors (Metrick & Yasuda, 2010). The GPs of the fund receive a percentage of the committed capital and a percentage of the employed capital when investments are made. The GPs also earn the carried interest, which fluctuates around 20 to 25% of the fund's annual profit (Metrick & Yasuda, 2010).

PE consists of several categories of investment, but the leveraged buyout is the largest category today, with USD 221b capital raised for buyout funds in 2016 alone (Bain & Company, 2017). In a typical LBO transaction, a PE firm will agree to buy a pre-determined company, using a mix of different types of debt and the equity provided by the investors. This mix of debt and equity is not set in stone and differs over time and region, but a typical LBO in Europe in 2007 used a mix of 35% equity and 65% debt (de Maeseneire & Brinkhuis, 2012). After the acquisition, the PE firm will take control of the company and will introduce their own management team in most cases. The road to an increased company value and returns for the investors has evolved over the years and can be roughly separated in three waves. The first wave during the 1980s was mostly focused on improving financial leverage and benefiting from the tax deductibility of interest (Smit, 2007). In the 1990s value creation shifted from improving large conglomerates to growth related improvements (Wright et al., 2001). The latest wave of the 2000s shifted to improvements in operational performance to create value (Meerkatt et al., 2008).

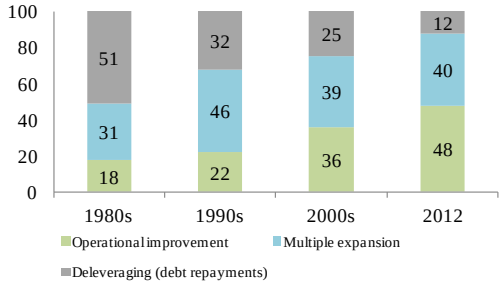
After a typical holding period of three to five years, the acquired company is sold off to realise the profits, which can be done in multiple ways. The most popular way in 2016 was selling to a strategic buyer, with 67% of the exits completed that way (Bain & Company, 2017). Because strategic buyers

can benefit from economies of scale and scope, they incorporate the value of strategic options in their bid, resulting in a higher bid and thus a higher premium for the selling party. This makes selling to strategic buyers the preferred exit strategy (Folus & Boutron, 2015). Exiting by selling to another PE firm, a secondary buyout, has increased in popularity over the years, from around 0.1% in 2000 to 21% in 2016. Although a secondary buyout might not create value for the target company, it can be favourable for the selling party. Reaching the maximum duration of the holding period is often mentioned as a reason to sell. The fact that most secondary buyouts occur when the market is "cold", indicates that buyers other than PE firms are simply not interested due to market conditions (Wang, 2012). The least employed exit strategy is sale via IPO, with 12% of exits in 2016 occurring this way. IPOs have the potential to result in the highest valuation of a company, but because of several drawbacks this exit strategy is the least preferred (Fenn et al., 1997). One major disadvantage is the direct costs associated with an IPO, which can amount to 15% of the gross proceeds (Ritter, 1987). Furthermore the PE firm might be restricted from selling its entire stake in the company, forcing them to retain ties to their former company (Folus & Boutron, 2015).

2.2 Value creation in private equity

As discussed previously in this section, the way PE firms have created value over the years has changed. The most important factors, leverage, multiple arbitrage and operational improvements, have always been present, but their relative importance has changed since the 1980s (Brigl et al., 2016).

Figure 1: Contribution to value creation in PE deals (%)



Source: Brigl et al., 2016

2.2.1 Taking on debt

Taking on relatively large amounts of debt is a key characteristic of LBO transactions, as it has several benefits. Jensen (1986) first described the disciplinary influence of debt on managers. Agency costs are reduced due to the fact that large amounts of debt require high debt repayments and result in high interest costs. This reduces the free cash flow and ensures that managers can not engage in wasteful spending. The results of increased discipline are underlined by Guo, Hotchkiss and Song (2011), who find that for 192 deals over the period 1990-2006 an increase in leverage results in a significant increase of cash flows.

As leveraged buyouts are characterised by relatively high debt burdens, the interest expenses increase. Since interest is a tax-deductible expense, the total amount of tax paid will decline due to this deducted amount of interest. This phenomenon is known as the tax shield (Myers, 2001). Kaplan (1989a) shows that tax benefits are a serious source of wealth gains in management buyouts, while Graham (2000) shows that the tax benefit of debt can be as much as 9.7% of firm value. Finally, Guo, Hotchkiss and Song (2011) find that tax benefits, along with changes in operating performance and industry multiples, largely explain the realised returns to capital.

However, debt is not completely without its disadvantages. Together with a rising amount of debt comes a higher cost of bankruptcy (Myers, 1984). A higher debt load also leads to more inflexibility, which increases financial risk and can deprive the company of possible positive NPV projects. Optimising leverage has become standard practice over the years, not only in the PE industry but also in most private and public companies. This results in less attention to leverage in the modern age of PE and more attention to other factors such as multiple arbitrage.

2.2.2 Multiple arbitrage

Multiple arbitrage revolves around the EBITDA multiple, which is often used in PE. The EBITDA multiple is defined as enterprise value ("EV") over earnings before interest, tax, depreciation and amortisation ("EBITDA") and is used to determine both the price on entry as well as the price at exit. The average EBITDA purchase price multiple in PE transactions was 10.4x EBITDA in 2016 (Bain & Company, 2017). Assuming that the EBITDA stays constant over the course of the holding period, an increase in EBITDA multiple will lead to a higher enterprise value at the moment of exit. Assuming that net debt stays constant as well, a higher enterprise value at the exit will lead to higher equity returns for investors. Multiple expansion is a fundamental factor in explaining equity returns and is the product of skill by the PE firm, rather than luck (Achleitner et al., 2011). Multiple expansion also occurs in regular, publicly traded companies, but not to the same extent as companies owned by PE firms. This further implies that PE firms actively try to enhance their EBITDA multiple (Acharya et al., 2013). Expansion of multiples can be achieved in several ways, of which the phenomenon known as 'multiple riding' is considered the most important. Multiple riding refers to the ability to buy an asset at a low price and sell when it is at a high price, implying that experienced fund managers can use market timing to their advantage (Loos, 2006). Other interpretations are also possible, a higher exit multiple can be achieved by boosting sales, improving the future prospects of the company or by skilful PE negotiations (Achleitner et al., 2010). The most recent shift focuses on more material changes to the company by improving the operational performance.

2.2.3 Improving operating performance

The latest shift of attention focuses on operational improvements to increase the enterprise value of the portfolio company. PE firms use target selection procedures to select companies that have the potential to be improved. Potential operational improvements include changes in strategy, improving production lines, cutting costs and changing or training the management team (Kaplan & Strömberg, 2009). Kaplan (1989b) shows that LBOs have a positive influence on the operating performance, the ratio of operating income to sales was increased by ten to twenty percent on average. Smith (1990) finds that optimisations in working capital also have a positive influence on operating performance. Further evidence is given by Harris, Siegel and Wright (2005), who find that the total factor productivity of production facilities in the United Kingdom increased after management buyouts ("MBO"). This result is supported by Boucly, Sraer and Thesmar (2011), who find for 839 French deals in the three

years after an LBO that targets had increased their profitability compared with their peers and grew faster than their peers. Furthermore they increased their capital expenditures more than their peers, which is an indicator of potentially profitable investment opportunities, leading to further increases in profitability. Similar results were obtained by Bergström, Grubb and Jonsson (2007), who study Swedish LBOs in the period 1998-2006. Results show that these PE-backed LBOs have a significantly higher operating performance after the buyout. The increased performance is solely attributed to tangible improvements to the target, rather than being the result of labour force restructurings, leverage or management ownership. The final word on operational improvements is given by Cumming, Siegel and Wright (2007), who conclude that independent of methodology, time periods, measures and geographical location, LBOs and especially MBOs have a significant positive effect on operating performance and improve work practices overall.

Although most see the virtues of PE, some still argue that PE also has its downsides.

2.3 Criticism on PE practices

Since its inception in the 1950s, PE has experienced a steady growth, which would eventually lead to the first boom period of the leveraged buyout in the 1980s. This surge in PE activity culminated in the well documented takeover of RJR Nabisco by KKR. This heavily contested takeover was completed for USD 31.1b, a record that stood for over seventeen years (Burrough & Helyar, 2010).

Along with the rise of the leveraged buyout came increasing criticism on the PE firms and their practices in profiting from their acquired companies. Especially in the 1980s the 'corporate raider' tactic was widely used, which contributed greatly to the negative image PE has been dealing with since then. With this tactic investors would actively search for undervalued companies and assets and finance these purchases with high-yield debt, the so-called junk bonds. Instead of improving the company using financial, governance and operational engineering, the investors quickly resold the companies or assets leaving them with expensive debt burdens (Eddey, 1991).

Nowadays most critique focuses on destroying profitability in the long run, decreasing employment and evasion of taxes (Economist, 2016).

2.3.1 Destruction in the long run

A popular view on PE states that PE firms swoop in on profitable, stable-growth firms and then start to slash costs to maximise profits in the short run. Critics accuse PE firms of gutting companies to obtain profits, for example by cutting employment, selling underperforming assets and forgoing on long-term investments (Farzad, 2013). As discussed previously, there is sufficient evidence that suggests that operating performance improves during the holding period. However, performance after the holding period might deteriorate. Cao and Lerner (2009) examine this statement by looking at private-to-public PE transactions via the IPO exit method. They find that such IPOs consistently outperform regular IPOs, without signs of deterioration of returns over the years. It is also obvious which IPOs were 'quick flips', as these IPOs underperform their regular counterparts. This suggests that PE firms do not

destroy firm value and potentially profit in the future, at least in the case where these companies go public.

Other arguments are that PE firms sacrifice long-term profits for short-term performance by cutting long-term investments. Research by Lerner, Sorensen and Strömberg (2011) focuses on long-term investments by using patenting activity as a proxy for innovation. In their sample of 472 LBO transactions the authors find no evidence that LBOs sacrifice long-term investments. Instead, they find that LBO firm patents are cited more frequently, which is a proxy for economic importance. This further weakens the argument that PE firms destroy value.

Other arguments focus on the reduction of jobs as a part of cost cutting.

2.3.2 Employment

Job and wage cuts are often associated with cost cutting, resulting in employees suffering from the presence of a PE firm. It is expected that such cuts lead to improved efficiency and productivity, but the political implications of these gains are unwanted. Research shows that worries on job cuts are justified, employment at subdivisions of target firms falls three percent in the two years following a buyout and falls six percent over the following five years (Davis et al., 2014). However, when taking into account the creation of new jobs within other divisions of the target firm, net job destruction falls to one percent in the two years following a buyout. This reallocation of jobs benefits the target firm, as the total factor production ("TFP") rises by 2.1 log points, which roughly corresponds with a 2.1% increase. This is a direct result of aggressive job reallocations and investment/divestments in profitable and loss-generating subdivisions respectively. Buyouts may affect employment rates, but also benefit the productivity per worker and the productivity of target firms as a whole (Davis et al., 2014). A final argument that is often raised is linked to taxation.

2.3.3 Evasion of taxes

PE has been widely criticised in recent years over the tax advantages enjoyed by PE-backed firms and the PE firms themselves. Critique is mainly focused on the low effective tax rates, sophisticated tax planning schemes and more generally the aggressive management of tax liabilities for PE firms and their portfolio companies (e.g. Kinsley (2007), Murray (2007) and Beck (2007)). Badertscher, Katz and Olhoft-Rego (2009) show that PE-backed companies experience significantly lower marginal tax rates compared to their matched peers. They also find that PE-backed companies engage significantly more in aggressive tax planning schemes compared to their counterparts. This effectively supports public critiques on the tax avoidance by PE firms and their portfolio companies.

The following section will focus on the performance of PE in general and the performance of the specific B&B strategy.

2.4 Performance of PE funds

The performance of PE investments has been researched extensively. The majority of research is focused on the performance of PE funds in comparison with major stock indices. The standard

measure of performance is the Internal Rate of Return ("IRR"), which is the annual yield of an investment based on the underlying cash flows (Berk & DeMarzo, 2014). Roughly two schools of thought can be distinguished from existing studies: on one hand the studies that find PE fund underperformance and on the other hand the studies that find outperformance of PE funds compared to market measures.

2.4.1 PE fund underperformance

Underperformance of PE funds has been extensively covered over the years. Most research is focused on the United States, due to its sheer amount of PE firms, but also their accounting rules regarding the disclosure of financial information (Bain & Company, 2017). Phalippou and Gottschalg (2009) use the Thomson Venture Economics database to derive a dataset consisting of 852 funds, spanning from 1980-2003. They find that PE funds underperform the S&P500 index by three percent per annum, net of fees. When adjusting for risk, this underperformance increases even further to six percent per annum. A seminal paper by Kaplan and Schoar (2005) also uses Thomson's Venture Economics database and examines the returns of 746 PE funds over the period 1985-2001. They find an average underperformance of ten percent compared to the S&P500 index.

However, a recent paper by Stucke (2012) delving into the underlying data of this Venture Economics database, finds several anomalies. The largest problem related to this database is the apparent ceasing of data updates, resulting in significant and severe downward biased errors in calculations pertaining to performance of PE funds. Consequently, many empirical results obtained with this database may not be replicable using corrected data.

Studies using other databases do exist and mainly find that PE funds outperform a benchmark.

2.4.2 PE fund outperformance

Several studies document the outperformance of PE investments over different timeframes and are mostly focused on the United States. Ljungqvist and Richardson (2003) find that PE funds started between 1981 and 1993 generate an average IRR of 19.81%, net of fees, while the S&P500 index yields a return of 14.1% in the same time period, implying an excess return of nearly six percent. Harris, Jenkinson and Kaplan (2014) find outperformance of three percent annually compared to the S&P500 index for nearly 1,400 U.S. buyout funds started in the period 1984-2008. Further evidence is presented by Higson and Stucke (2012) who find an average outperformance of the S&P500 index by five percent per annum for the period 1980-2008, rising to eight percent per annum when PE firms established in the period 2006-2008 are excluded. A final say on the matter is given by Phalippou (2012). Acknowledging the deficits of certain datasets, Phalippou uses publicly available data on buyout fund returns to examine performance. The dataset contains 392 U.S. based funds and spans from 1993-2010. Results show an average outperformance of the S&P500 index by 5.7% per annum. This study further shows that buyout funds mainly invest in small and value companies, indicating that a size premium is in order. This size premium refers to the phenomenon that companies with lower

market capitalisations seem to generate higher returns than companies with higher market capitalisations (Horowitz et al., 2000). When accounting for this size premium, the average return of buyout funds is in line with small cap indices, such as the synthetic Fama-French small cap index and the DFA micro-cap index, which are both composed of companies with lower market capitalisations and are thus subject to the size premium.

Explanations for outperformance differ, but most are focused on illiquidity and persistence.

2.4.3 Explanations of outperformance

A consensus as to why PE might outperform public markets has not been reached, but most explanations are based on the premise of persistence in PE returns and investors requiring an illiquidity premium for holding their investment.

2.4.3.1 Persistence of PE returns

The phenomenon of persistence is based on the belief that PE firms who have performed well in the past, will also perform well in the future. These outperforming funds are the so-called "top-quartile funds". Being able to label a fund as a top quartile-fund generates special attention, which in turn increases the potential inflow of cash in new funds (Harris et al., 2012). Studies show that persistence does exist, e.g. Kaplan and Schoar (2005) find substantial persistence in LBO and VC funds across the time period 1980-2001. A possible explanation to this persistence is also given by Kaplan and Schoar (2005), who argue that heterogeneity between the skills of GPs can ensure persisting returns for consecutive funds. The study by Kaplan and Schoar (2005) is extended and validated by Harris, Jenkinson, Kaplan and Stucke (2014). They find significant evidence for persistence in pre-2000 funds, especially for VC funds. For post-2000 LBO funds however, persistence seems to have largely disappeared. Previous fund performance has no significant predictive power for LBO funds after the year 2000. Repeats of this analysis with another dataset from Preqin yield the same results, further validating the conclusions of this study. The authors give two explanations why persistence seems to have disappeared after the year 2000. Firstly, it is possible that the buyout business as a whole has changed, with operating engineering increasing in importance (Kaplan & Strömberg, 2009). Secondly, learning effects could have contributed in reducing the skill differences between GPs, ultimately leading to a reduction in persistence. The disappearance of persistence post 2000 was also found by Korteweg and Sorensen (2017), who studied a Preqin dataset consisting of 1924 funds started between 1969 and 2001. Results show that past performance is noisy, with a low signal-to-noise ratio, which indicates that past performance fluctuates heavily. Noisy past performance implies that past performance is not a trustworthy indicator of future performance. Finally, Braun, Jenkinson and Stoff (2017) use a unique cash flow dataset consisting of data on 13,523 portfolio companies owned by 865 buyout funds to investigate performance persistence. Their results also show that persistence has largely disappeared in recent years. This finding is consistent with a maturing PE sector, heavily

increasing competition for deals, the standardisation of financial engineering and valuation techniques and the increased switching of professionals between PE firms.

Other explanations of PE outperformance are mainly related to the illiquidity premium.

2.4.3.2 Illiquidity of PE investments

PE is an illiquid asset class by nature, making it costly and difficult to exit (Franzoni et al., 2012). To compensate for the illiquidity of assets, investors will demand an illiquidity premium. This premium is widely researched and is significantly positive for countries across the globe (Amihud et al., 2015). Proponents of the illiquidity argument therefore argue that PE funds do not outperform common stock indices, but that the amount of outperformance simply is a premium for holding illiquid assets. For example, Franzoni, Nowak and Phalippou (2012) research liquidity in private equity and find an illiquidity premium of about three percent annually, nullifying any notion of outperformance. Ljungqvist and Richardson (2003) find excess returns of nearly six percent in their research, but also note that this might just be a compensation for holding a ten-year illiquid investment. Harris, Jenkinson and Kaplan (2014) also note that the illiquidity of PE investments can lead to a higher required rate of return than a comparable holding in a stock index. Furthermore they identify a commitment risk when investing in PE, due to capital allocation uncertainty to achieve a target portfolio. The costs of illiquidity and commitment are expected to vary across a population of investors and might thus be the cause of PE outperformance.

Overall, PE seems to create value for their portfolio companies and for their investors. PE is an ever evolving financial discipline that constantly undergoes change. One of the latest innovations is the introduction of the Buy-and-Build strategy ("B&B"), which represents a new way of creating value for portfolio companies. The following section is dedicated to the key aspects of the B&B strategy.

2.5 Buy-and-Build strategy

The B&B strategy can generally be described as a form of a serial acquisition strategy (Bansraj & Smit, 2017). In B&B strategies the acquirer is a PE firm which first acquires a mature platform company, which has distinct core competencies (Prahalad & Hamel, 1990). These platform companies are active in industries characterised by low growth, low margins and high fragmentation (Brigl et al., 2016). These characteristics favour B&B strategies, because low growth, low margins and high fragmentation imply the following: the industry mostly consists of mature companies and is highly fragmented, which makes it easier to consolidate several smaller companies with the platform company. Platform companies target companies in the same industry to either widen or deepen their exposure in a specific industry and aim to profit from synergies and multiple expansion (Smit, 2001). These target companies are referred to as "add-on" companies and are usually smaller than the platform and plagued by problems such as inefficient management (Loos, 2006). Add-on companies

typically have their own core competencies, which generate value when combined with the core competencies of the platform company (Prahalad & Hamel, 1990).

A framework for capturing the value creation of B&B strategies is proposed by Smit and Trigeorgis (2004). The framework is built around the standard Net Present Value ("NPV") framework and is expanded to envelop the option-like characteristics of B&B strategies. The standard NPV analysis only looks at the value of the platform company, which ignores the value created by financial leverage and synergies. The expanded NPV framework as proposed by Smit and Trigeorgis also includes synergies created by add-on acquisitions, which gives rise to a more reliable framework to analyse the value creation of B&B strategies.

Research by Nikoskelainen and Wright (2007) indicates that B&B strategies might be successful. Their study of 321 exited UK buyouts in the period 1995-2004 shows that returns are driven by the size of the buyout and the acquisitions done by portfolio companies before exit. Further outperformance of the traditional LBO is the result of both operating and financial synergies, which are obtained when separate companies form a combined entity. Operating synergies are the result of the combined entity being able to better utilise their combined assets to increase both profits and growth. Operating synergies consist of four types: economies of scale and scope, increased pricing power from reduced competition and higher market share, increased growth in new or emerging markets and the combination of functional strengths of the separate entities (Damodaran, 2015). Financial synergies on the other hand often result in an increased debt capacity, tax benefits, lower cost of capital and diversification (Damodaran, 2015). Research by Devos, Kadapakkam and Krishnamurthy (2009) shows that the synergy gains in a sample of 264 mergers average 10.03% of the combined equity value of two merging firms. Of this total 10.03%, 8.38% is attributed to operating synergies, while the remaining 1.64% is attributed to financial synergies. However, mergers do not come free of costs and can even fail completely. Integration costs can be substantial and differences in culture and lack of a defined business plan can ruin a potentially beneficial merger, as was the case in the merger between the American and German car manufacturers Chrysler and Daimler (De Noble et al. (1988), Watkins (2007)). B&B strategies are therefore certainly not guaranteed to succeed and the risk of failure must not be underestimated. Although B&B strategies might bear a risk of failure, the potential upside can be significant.

2.5.1 Performance of Buy-and-Build strategies

Studies on the performance of B&B strategies are limited, but results from existing literature tend to show that B&B strategies can deliver significant returns. A limited study by Hoffmann (2008) on 21 German B&B cases shows that nearly 75% of these B&B deals returned an IRR of 25% or higher. A more recent study from Brigl et al. (2016) shows that B&B strategies outperform standalone PE deals. Their research focuses on 2,732 exited deals between 1998 and 2012 and finds an average IRR of 31.6% for B&B deals and an average IRR of 23.1% for standalone deals. It does not come as a

surprise then that the share of PE deals involving “add-on” acquisitions rose from 20% in 2000 to 53% in 2012 (Brigl et al., 2016).

After the exploration of existing literature on both private equity in general and B&B strategies in particular, the following section will develop the hypotheses on which this research is based.

3. Development of hypotheses

The research question remains:

"How do Buy-and-Build strategies affect the economic performance of platform companies?"

This question will be answered in several steps, by developing a set of hypotheses that can explain how economic performance is influenced by B&B strategies.

3.1 Outperformance

The seminal paper by Guo, Hotchkiss and Song (2011) researches whether the most recent wave (1990-2006) of public-to-private PE transactions still creates value. Research of 192 U.S. based LBOs reports market- and risk-adjusted returns of nearly 41% based on invested capital. Results also show that the operating performance of these LBOs significantly exceeds the operating performance of their industry-matched benchmark firms. Furthermore, Kaplan (1989b) finds improvements in several measures for economic performance for a sample of management buyouts, such as Earnings before Interest and Taxes ("EBIT"), net cash flow, Return on Sales ("ROS") and Return on Assets ("ROA"). Results show increases, net of industry changes, of 24% for EBIT, up to 80% for net cash flow and 20% for both ROS and ROA. Applying the results of Guo, Hotchkiss and Song (2011) and Kaplan (1989b) to B&B strategies leads to the following hypothesis:

Hypothesis 1: *"Platform companies engaged in B&B strategies significantly increase their economic performance"*

3.2 Financial engineering

Guo, Hotchkiss and Song (2011) also study the effect of leverage on cash flow performance. They find that companies with larger increases in their leverage ratio following a buyout consistently experience increased economic performance. Acharya et al. (2013) find that for European PE funds, around 50% of the generated IRR is the result of an increased leverage ratio in the portfolio companies. Following from Jensen (1986) and Kaplan (1989a), this is the result of reduced agency costs by disciplining management and directly increasing cash flow by profiting from increased tax shields. This results in the following hypothesis:

Hypothesis 2: *"An increased leverage ratio will lead to increased economic performance for platform companies engaged in B&B strategies"*

3.3 Working capital management

Net working capital ("NWC") is the capital needed to continue the daily operations of a company. It is a common measure of liquidity, efficiency and an indicator of short-term financial health. NWC is defined as the difference between current assets and current liabilities and determines to what extent a company can cover their short-term liabilities. Positive NWC is associated with good financial health,

since it indicates that the company is liquid and can cover any short-term expenses and liabilities. However, too high levels of NWC can also be indicators of inefficiency. For example, high levels of inventory increase the NWC and reduce the level of cash available for positive NPV projects. Optimising the NWC is therefore necessary, especially in the case of LBOs. Baker and Wruck (1989) show that the LBO of O.M Scott & Sons Company could service their high debt load partially due to working capital management. Smith (1990) also shows that reductions in the NWC to Sales ratio improve the operating performance of 58 MBOs in the period 1977-1986. In the case of B&B strategies, optimising NWC is key, in order to comply with the high debt load and to improve economic performance. This leads to the following hypothesis:

Hypothesis 3: *"A reduced level of the NWC to Sales ratio will lead to increased economic performance for platform companies engaged in B&B strategies."*

3.4 Restructuring effects

As described previously, PE firms rely on restructuring companies to improve their performance. Restructuring often coincides with forced layoffs for employees and is thus a subject of social importance (Amess & Wright, 2012). As shown by Goergen, O'Sullivan and Wood (2011), employment decreases as a result of restructuring activities undertaken by PE firms. However, they do not find evidence that changes in employment affect the productivity or profitability of the company. Similar results are obtained by Davis et al. (2014) regarding employment reductions, however they do find that the total productivity of the company increases when employment is reduced. In the case of B&B strategies, this leads to the following hypothesis:

Hypothesis 4: *"A decrease in the number of employees will lead to higher economic performance for platform companies engaged in B&B strategies"*

A hypothesis regarding the effects of cross-border deals versus domestic deals on economic performance was considered, but discarded due to a lack of data.
The following section will focus on the dataset, its sources and its descriptive statistics.

4. Data and descriptive analysis

This section is dedicated to the dataset and its descriptive statistics and will feature a comprehensive overview of the sample and variables.

4.1 Data collection

To construct a dataset on B&B transactions the Zephyr and Orbis databases by Bureau van Dijk are used. Zephyr is a comprehensive database containing information on over 1.7 million M&A, PE, VC transactions and IPOs since 1997. Previous literature on private equity mainly uses databases from Venture Economics, Preqin and Burgiss (e.g. Kaplan & Schoar (2005), Harris et al. (2014)), but interest in Zephyr has increased in recent years. Usage has increased in both PE research (Rigamonti et al., 2016) as well as in M&A research (Erel et al., 2015), indicating the reliability and validity of Zephyr.

The Orbis database on the other hand contains extensive information on over 279 million companies worldwide, ranging from past and current shareholders to financial data. However, financial data in Orbis is only available for the past ten years, restricting the time period of the dataset. To ensure sufficient available financial data post-transaction the time period is set to 2008-2014. Although Zephyr and Orbis both contain information on companies and transactions worldwide, the geographical focus of this dataset is on the 15 core countries of the European Union ("EU-15"). The EU-15 countries are listed in Table A1 in the Appendix, ordered by PE market magnitude.

To create a comprehensive dataset, both Zephyr and Orbis are used in conjunction, applying the following steps. Firstly, the deal types *"institutional buyout"*, "*management buy-in"* and *"management buy-out"* are selected for the period 2018-2014. The deal financing must then be categorised as either *"leveraged buyout"* or as "*private equity"*. Furthermore, a minimum acquired stake of 50% is imposed to ensure that the PE firm gains control. This step results in 1,553 completed deals by PE firms. The target firms in these deals are subsequently considered to be potential platform companies. Secondly, the potential platform companies from the first step are scanned to check if they were engaged in a transaction after being acquired by a PE firm. This results in 259 transactions by the potential platform companies, which can be considered as potential add-ons. Thirdly, cases in which the platform company acquires multiple add-on companies, only the initial add-on company is included in the sample to avoid double counting. After a manual check of the deal comments, deal rationale and ownership history, the final sample contains 61 platform companies, which have acquired a total 145 add-on companies.

4.2 Financial variables

To analyse economic performance, several measures of economic performance are required. Financial data is gathered from Orbis and then transformed to the variables of interest. The variables are based on key financial data, such as revenue, net profit, EBITDA, EBIT, cash flow, total assets, equity and

total debt. The measures of economic performance that will be used throughout this study are Return on Sales ("ROS"), Return on Assets ("ROA"), Return on Equity ("ROE"), EBIT margin, EBITDA margin and Cash Flow to Sales ratio ("CFS"). Detailed definitions of these performance measures can be found in Table A3 in the Appendix. These measures of economic performance will also be used in their industry-adjusted form. This industry adjustment is based on a set of matched peer companies. By using an industry adjustment, a distinction can be made between the effects of B&B strategies and the effects of any other industry-specific developments that could influence performance. The following section will explain the industry adjustment in more detail.

Other variables are used to determine what exactly affects the measures of economic performance. These include the leverage ratio, the NWC to Sales ratio ("NWC to Sales") and the number of employees. Detailed information on the usage of these variables is discussed further in the methodology section.

The fiscal year in which the platform company acquires the first add-on company will henceforth be defined as t_0 and is regarded as the start of the B&B strategy. The fiscal years prior and post to the first add-on transaction are defined as t_{-k} and t_{+j} respectively. The following section will describe the implementation of the industry adjustment in detail.

4.3 Industry adjustment

In order to test the effects of B&B strategies on platform companies, a distinction between organic and inorganic improvements in performance has to be made. Improvements in the various performance measures can occur naturally due to exogenous influences, which have to be controlled for in order to truly test the effects of B&B strategies. Therefore, an industry adjustment is implemented in the various performance measures.

The industry adjustment is based on a matched peer group of up to five listed companies, following the methodology of Smit and Volosovych (2013) and Kaplan (1989b). The matching procedure is based on the NACE Rev 2. code of the platform company. This code consists of four numbers and is used to identify the industry in which a company is active. A peer group of up to five listed companies located in EU-15 countries is matched to each platform company based on the three digit-level of the NACE Rev 2. code. In case of insufficient available data, the two digit-level is used. A breakdown of the platform companies by NACE industry identifier can be found in Table A2 in the Appendix. All peer groups combined, the total dataset consists of 175 listed companies across 36 distinct industries.

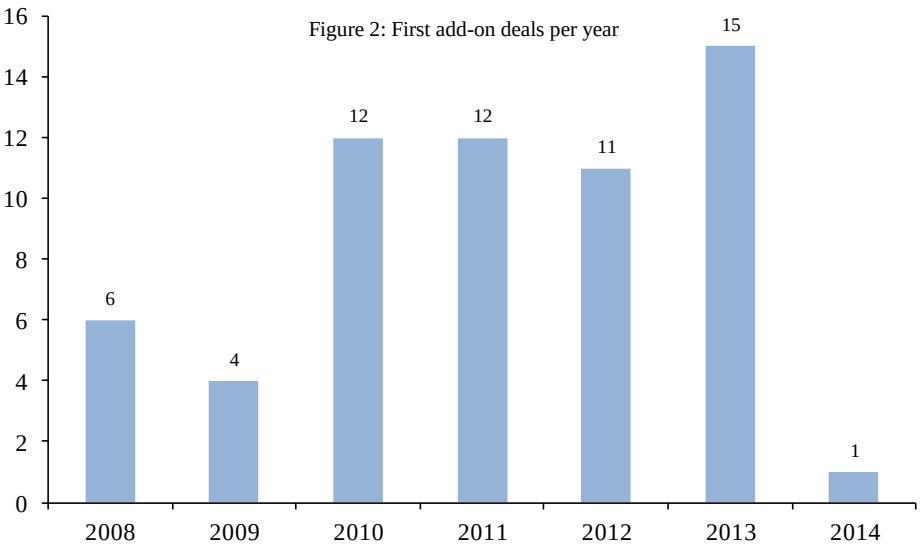
The industry-adjusted performance measures are calculated by subtracting the median value of the matched industry peer group from the value of the performance measure. For example the industry-adjusted ROS at t_{+2} equals the ROS at t_{+2} for a certain platform company, minus the median ROS at t_{+2} of the matched peer group. The median is used to negate the possible effect of outliers in the industry-matched peer group. This technique is also used to calculate the change in an industry-adjusted

performance measure. For example, the change in industry-adjusted ROS equals the industry-adjusted ROS at t_{+2} minus the industry-adjusted ROS at t_{-1}.

The next section will focus on the descriptive statistics of the dataset.

4.4 Descriptive statistics

Figure 2 shows the distribution of first add-on deals per year, which can be considered as the start of the B&B strategy. The start of the sample time period coincides with the financial crisis, which was kick-started by the fall of Lehman Brothers in September 2008 (Shiller, 2012). This becomes apparent in figure 2, as the years 2008 and 2009 show a lower number of first add-ons compared to the following years. This relatively low number of first add-ons can be explained by the large decrease in syndicated lending, dropping by 79% compared to the peak of the credit boom in the second quarter of 2007 (Ivashina & Scharfstein, 2010). The years 2010 and onwards show a significant increase in first add-ons however, marking the start of the PE market recovery (Bain & Company, 2011). Figure 3 shows the amount of platform companies per country in the dataset. The figure shows that Great Britain has the largest amount of platform companies with 25, followed by Finland at a considerable distance with 11. This figure roughly corresponds with the EU-15 countries sorted by absolute PE market activity in 2017 (see the Appendix, table A1).



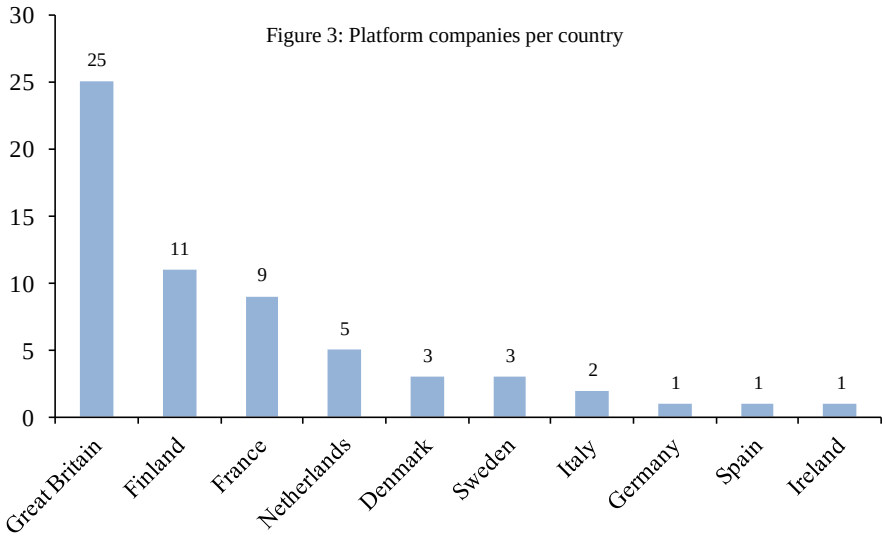


Table 1 displays the descriptive statistics of the financial variables.

Table 1 – Descriptive statistics of financial variables

Table 1 contains descriptive statistics of the dataset. Statistics are denoted in percentages, except for the leverage ratio and the PE holding period. The leverage ratio is the ratio of total debt over total assets, the NWC to Sales ratio is the ratio of net working capital over sales and the PE holding period is measured in years and months. The full sample contains 61 platform companies performing B&B strategies performed between 2008 and 2014. T_{-1} and t_{+2} denote the years prior- and post-buyout respectively. Descriptions of the performance measures can be found in the Appendix.

		(1)	(2)	(3)
Performance measure				
		t_{-1}	t_{+2}	Δ
Return on Sales	Mean	-0.72%	7.59%	8.31%
	Median	2.42%	3.52%	1.10%
	St. dev.	0.581	0.186	
Return on Assets	Mean	4.04%	3.60%	-0.45%
	Median	0.99%	2.05%	1.06%
	St. dev.	0.114	0.085	
Return on Equity	Mean	51.76%	-8.05%	-59.81%
	Median	16.60%	13.13%	-3.46%
	St. dev.	2.092	1.290	
EBITDA margin	Mean	9.72%	16.16%	6.44%
	Median	12.02%	10.29%	-1.73%
	St. dev.	0.303	0.186	
EBIT margin	Mean	2.02%	9.99%	7.97%
	Median	7.84%	7.52%	-0.33%
	St. dev.	0.340	0.151	
Cash flow to Sales	Mean	4.56%	15.53%	10.97%
	Median	5.64%	6.89%	1.25%
	St. dev.	0.551	0.357	
Leverage ratio	Mean	0.682	0.678	-0.004
	Median	0.701	0.697	-0.004
	St. dev.	0.283	0.278	
NWC to Sales ratio	Mean	-4.584	0.219	4.803
	Median	0.048	0.053	0.005
	St. dev.	32.187	1.080	
PE holding period	Average		5 years and 8 months	
	Median		5 years and 5 months	
	St. dev.		2.030	

The descriptive statistics seem ambiguous at first sight. Overall some performance measures seem to increase between t_{-1} and t_{+2}, but large differences between the mean and median change in column (3) can be observed. This indicates that the mean could be influenced by outliers. The following section will further describe how this influence is handled.

Firstly, the median statistics show increases in both ROS and ROA as well as the CFS ratio between t_{-1} and t_{+2}, indicating that B&B strategies could have a positive influence on performance. Secondly, the ROE, EBITDA margin and EBIT margin show negative developments over time, albeit relatively small. This could indicate that B&B strategies have no significant influence or might even worsen performance over time. Note that the standard deviation of the ROE is relatively large for both t_{-1} and t_{+2}, pointing towards high variations of the ROE in the sample. Thirdly, the leverage ratio decreases very slightly, indicating that PE firms might not increase the amount of debt significantly compared to the total assets the target possesses. Fourthly, the NWC to Sales ratio is heavily influenced by outliers at t_{-1}, as can be observed from the mean and standard deviation at t_{-1}. The median difference between t_{-1} and t_{+2} shows a small positive change, indicating that PE firms do not pay attention to the optimisation of net working capital. Finally, the average holding period of PE firms exceeds five years, which is consistent with the notion that B&B strategies are characterised by larger investment horizons than standard LBOs (Smit & Trigeorgis, 2004).

The following section will describe in detail the methodology used to analyse the dataset.

5. Methodology

To analyse the effects of B&B strategies on economic performance, the methodology will consist of two distinct approaches. Firstly, to analyse whether platform companies increase their performance and industry-adjusted performance, the Wilcoxon signed-rank test is used, following Guo, Hotchkiss and Song (2011). Secondly, to analyse the factors that influence economic performance, univariate and multivariate and panel regression models are used.

5.1 Wilcoxon signed-rank test

Due to the non-normal distribution of the data and limitations to the sample size, a simple t-test will not suffice. In such cases, the use of nonparametric tests will yield the most robust results (Moore et al., 2011). The Wilcoxon signed-rank test is a nonparametric test that compares two matched samples with non-normal distributions and can be used as an alternative to the paired t-test (Siegel, 1956). This test uses the median instead of the mean to negate the effects of any outliers.

Let t_0 denote the moment at which the first add-on deal is made, which is considered as the start of the B&B strategy. To analyse whether economic performance increases, the time windows [0;1], [0;2], [-1;1] and [-1;2] are tested. Wider time windows are preferable, but not achievable due to data limitations. Firstly, the absolute differences are calculated for each platform company in the dataset. These differences are then ranked from smallest to largest difference and assigned a score based on their rank, denoted by R_i. Next, the test statistic W is calculated as follows:

$$W = \sum_{i=1}^{N} [(x_1 - x_2) * R_i] \tag{1}$$

Where X_1 and X_2 denote the performance measures of the platform companies at certain time points, e.g. the EBIT margin of platform company X at t_{-1} and t_{+1}. For a sample size (N) larger than 10, the *z*-score is calculated as follows:

$$z = \frac{W}{\sigma_w} = \frac{\sum_{i=1}^{N} [(x_1 - x_2) * R_i]}{\sqrt{\frac{N(N+1)(2N+1)}{6}}} \tag{2}$$

The resulting z-score then yields a *p*-value which is used to reject or accept the following hypotheses:

$$H_0: median_{t-k} = median_{t+j}$$

$$H_a: median_{t-k} \neq median_{t+j}$$

With k and j representing the years pre- and post-buyout of the time windows, e.g. with the time window [-1;2], k takes the value 1 and j takes the value 2.

Calculating the industry-adjusted performance only alters the first step. Instead of the raw performance measures, the industry-adjusted performance measures are plugged in, after which the rest of the steps is performed as described above. The industry-adjusted performance measures are calculated as described in section 4.3.

The second part of the analysis will delve deeper into the explanatory factors of economic performance.

5.2 Regression framework

Determining whether B&B strategies significantly increase economic performance is only one part of the puzzle. Finding the determinants of economic performance in B&B strategies is equally important. Following the methodology of Hammer et al. (2017) and Smit & Volosovych (2013), univariate and multivariate OLS regression models are employed to test the significance of singular and multiple determinant factors. The regression frameworks will take the following form:

$$y_i = \beta_{i1} x_{i1} + \varepsilon_i \tag{3}$$

$$y_i = \beta_1 x_{i1} + \beta_2 x_{i2} + \cdots + \beta_n x_{in} + \varepsilon_i \tag{4}$$

Where the dependent variable y_i denotes the measures of economic performance. X_{in} denotes the independent variables, β_n denotes the coefficient for those independent variables and ε_{it} denotes the error term with mean zero. To mitigate the possible presence of heteroskedasticity, i.e. that the standard deviations of the variables are non-constant over time, robust standard errors are used. In this case, the use of White standard errors corrects for the presence of heteroskedasticity in the sample (White, 1980). Furthermore, to negate the effects of outliers, the data is winsorized at the 1% and 99% level. The uni- and multivariate regressions are performed multiple times for each performance measure and each performance measure is tested industry-adjusted as well as non-adjusted.

5.2.1 Univariate regression framework

Multiple independent variables are created to measure their effect on the performance measures and are tested one by one in the univariate regressions following (3) and combined in different models for the multivariate regressions, following (4). The variable "*Initial leverage"* is defined as the ratio of total debt over total assets at t_{-1} and controls for the pre-buyout leverage ratio of the platform company. "*Leverage change"* is the difference in leverage ratio between t_{-1} and t_{+2} and measures the effect of financial engineering on performance due to lowered agency costs and disciplinary effects (Jensen, 1986). "*NWC to Sales"* is defined as the ratio of net working capital and sales at t_{+2}. Finally, following Goergen, O'Sullivan and Wood (2011), the variable "*Delta employees"* is defined as the percentage change in the number of employees between t_{-1} and t_{+2}. The percentage change is calculated by dividing the difference in number of employees between t_{-1} and t_{+2} by the number of employees of the platform company at t_{-1}. The change in employees is a proxy for restructuring

activities by PE firms and captures the effect of restructuring on the economic performance of the platform company. The dependent variables are the values of the performance measures at t_{+2} and the change in the industry-adjusted performance measures between t_{-1} and t_{+2}. A correlation matrix of these independent variables can be found in the Appendix, table A4.

5.2.2 Multivariate regression framework

The multivariate regressions are conducted in multiple forms for each performance measure, following Guo, Hotchkiss and Song (2011). The dependent variables are equal to the dependent variables in the univariate regressions, i.e. the dependent variables are the values of the performance measures at t_{+2} and the change in the industry-adjusted performance measures between t_{-1} and t_{+2}.

The regression forms consist of the independent variables used in the univariate regressions, i.e. *"Initial leverage", "Leverage change", "NWC to Sales"* and *"Delta employees"*. The variable "*Size"* is also included and is defined as the natural logarithm of total assets of the platform company at t_{+2}. The significance of these variables combined is tested using the F-test (Moore et al., 2011). The initial industry-adjusted performance measure at t_{-1} is also added as independent variable. This technique is used to test the effect of industry performance on the performance measure of interest.

5.3 Panel analysis

The panel analysis is conducted to further complement the multivariate OLS regressions. Panel data is comprised of both cross-section as well as time series data, enabling a higher accuracy in estimating model parameters and giving an improved control over the impact of omitted variables (Hsiao, 2003).

The dependent variables are the six unadjusted performance measures for the time window t_{-1} to t_{+3}. The independent variables are included as follows: *"Leverage ratio"*, which is defined as the ratio of total debt over total assets. *"Number of employees"*, which is defined as the natural logarithm of the number of employees. *"NWC to Sales"*, which is defined as the ratio of net working capital to sales. "*Size"*, which is defined as the natural logarithm of the total assets of the platform company. All independent variables will follow the time window t_{-1} to t_{+3}.

The panel regressions will take the following form:

$$y_{it} = \alpha + \beta_{it} x_{it} + \eta_i + \upsilon_t + \varepsilon_{it} \quad (5)$$

Where the dependent variable y_{it} denotes the performance measures from t_{-1} to t_{+3}, X_{it} denotes the independent variables and ε_{it} denotes the error term. The terms η_i and υ_t denote firm and year fixed effects respectively and are tested for significance using the likelihood ratio test ("LRT"). Firm and year fixed effects are included to control for heterogeneity across the platform companies and time-varying effects respectively (Allison, 2009). The significance of these fixed effects separately and combined is tested with the likelihood ratio test, which compares the goodness of fit of two models. In this case, the model without fixed effects is tested against the model with firm fixed effects only, year

fixed effects only and the model with a combination of firm and year fixed effects. The goodness of fit is tested with both an F-test as well as a χ^2-test.

5.4 Variance decomposition

To test the relative importance of the independent variables on the performance measures, the analysis of covariance ("ANCOVA") framework is used. This framework enables the decomposition of the total variance to determine the individual effects of the previously described factors on the performance measures. The following model estimate is used, following Lemmon et al. (2008):

$$y_{it} = \alpha + \beta_1 x_{i1} + \eta_i + \upsilon_t + \varepsilon_{it} \quad (6)$$

Where β_i and X_i denote the independent variables and their coefficients, η_i denotes the firm fixed effects, υ_t denotes the year fixed effects and ε_{it} denotes the error term.

By including the independent variables one by one, the explanatory power of each independent variable can be measured by observing changes in the adjusted R^2. The adjusted R^2 measure is a modified version of the R^2 measure and is used because it controls for the amount of variables in the model. This feature is needed to distinguish the individual effects of adding a variable (Brooks, 2008). The values of the variables are deduced from the change in adjusted R^2 and range from minus one to one, with a total sum of one for the values of the variables combined. The value determines the relative effect of that variable on the explanatory power of the model, e.g. a value of 0.40 indicates that a variable contributes 40% to the adjusted R^2 and therefore to the explanatory power of the model. The contributions of the fixed effects towards the adjusted R^2 could be considered separate for each platform company and for each year. However in the context of this research it is more interesting to consider the contributions of these effects combined. Therefore when firm (year) fixed effects are added, all platform companies (years) are considered simultaneously, while dropping one of the observations to avoid perfect multicollinearity.

The following section will focus on the robustness checks of the results.

5.5 Robustness checks

Although the proposed research design is suited to test the effects of B&B strategies on economic performance, the presence of possible problems and biases cannot be disregarded. Typical errors such as omitted variable bias, sample selection bias and outliers in the data can skew the results, leading to erroneous conclusions. To address these issues, several measures are taken to minimise the impact of such biases.

Firstly, as described previously the median is used in both the industry adjustments as well as the Wilcoxon signed-rank test, to avoid possible problems related to outliers in the dataset. Secondly, the dataset is winsorized at the 1% and 99% level for the univariate, multivariate and panel regressions as well as the variance decomposition to reduce the influence of extreme outliers without deleting observations. Thirdly, the inclusion of year and firm fixed effects ensures that time-variant and firm-

variant factors are held constant in the panel regressions. Failing to include fixed effects can have a significant impact on the results, possibly leading to erroneous conclusions. Fourthly, the industry-adjusted pre-buyout performance at t_{-1} is added in the univariate and multivariate regressions, to control for factors that can influence performance but are not directly related to the B&B strategy. This technique is also employed by other researchers, e.g. Guo, Hotchkiss and Song (2011) and Borell & Heger (2013). Finally, the multivariate OLS regressions are checked for robustness by re-estimating these regressions using the dependent variables at a different moment in time, i.e. at t_{+3} instead of t_{+2}. This method is used to validate the results of the multivariate OLS regressions.

The next section will contain the results of the tests and regressions described in this section.

6. Results

This section provides the results of the Wilcoxon signed-rank tests, regressions and robustness checks. The results section is structured as follows. Firstly, the results of the Wilcoxon signed-rank test are discussed. Secondly, the results of the various regression models are discussed. Finally, the variance decomposition is discussed.

6.1 Wilcoxon signed-rank test

Table 2 reports the changes in performance measures for all platform companies between t_{-k} and t_{+j}. For example, the window [-1;1] for the ROS reports an unadjusted change between t_{-1} and t_{+1} of 0.019. The unadjusted percentage change of the ROS for this time window equals 103.73%. This implies that the median ROS has increased by the absolute value 0.019, which in turn implies a percentage increase of 103.73%. Furthermore, the numbers in brackets imply that there are 43 observations for the ROS and time window [-1;1], of which 26 were positive.

Table 2 – Changes in performance measures from pre-B&B strategy to post-B&B strategy

Table 2 reports median changes and percentage changes of all performance measures for all platform companies for various timeframes, from fiscal year pre-start of the B&B strategy (t_{-1}) to two years post-start B&B strategy (t_{+2}), with the start of the B&B strategy at t_0. Unadjusted Δ is the median absolute difference between t_{-k} and t_{+j}. Unadjusted % Δ reports the percentage difference of these median values. Industry-adjusted Δ equals the change of the platform company minus the median change of the performance measures for a matched set of firms with the same three-digit NACE code. Industry-adjusted % Δ reports percentage differences. Number of observations and positive observations are reported next to the statistic (# observations, # positive observations). Significance levels are based on the two-tailed Wilcoxon signed-rank test. ***, **, * and $^{+}$ denote levels that differ significantly from zero at the 1%, 5%, 10% and 15% confidence level respectively.

	Changes in performance measure from year k to year j			
Performance measure	0 to 1	0 to 2	-1 to 1	-1 to 2
Return on Sales				
Unadjusted Δ	0.007 (51, 27)	0.003 (53, 31)	0.019* (43, 26)	0.012* (44, 28)
Unadjusted % Δ	19.08%	8.89%	103.73%*	50.52%*
Industry- adjusted Δ	-0.007 (51, 27)	0.005 (53, 29)	0.009 (43, 24)	0.019* (44, 27)
Industry-adjusted % Δ	-72.16%	17.79%	25.83%	53.42%*
Return on Assets				
Unadjusted Δ	0.017 (54, 25)	-0.003 (55, 29)	0.020 (45, 22)	0.021 (46, 25)
Unadjusted % Δ	85.36%	-12.99%	225.66%	145.55%
Industry- adjusted Δ	0.013^{+} (54, 24)	0.006 (55, 28)	0.009 (45, 24)	0.030 (46, 25)
Industry-adjusted % Δ	68.82%$^{+}$	27.48%	23.95%	80.26%
Return on Equity				
Unadjusted Δ	0.015** (52, 21)	0.044 (52, 23)	-0.047** (44, 17)	-0.014^{+} (44, 19)
Unadjusted % Δ	15.80%**	46.46%	-26.61%**	-9.07%$^{+}$
Industry- adjusted Δ	-0.005** (52, 20)	0.021 (52, 25)	-0.050** (44, 19)	-0.011 (44, 22)
Industry-adjusted % Δ	-23.57%**	92.19%	-221.59%**	-102.69%
EBITDA margin				
Unadjusted Δ	0.006 (46, 24)	-0.020 (46, 22)	0.011 (39, 22)	0.009* (39, 21)
Unadjusted % Δ	5.01%	-15.43%	9.45%	7.53%*
Industry- adjusted Δ	-0.026 (46, 23)	-0.024 (46, 23)	-0.006 (39, 19)	0.002^{+} (39, 21)
Industry-adjusted % Δ	-254.38%	-998.21%	-29.53%	7.29%$^{+}$
EBIT margin				
Unadjusted Δ	0.003 (52, 29)	0.005 (53, 26)	0.004* (44, 22)	0.010*** (45, 25)
Unadjusted % Δ	4.26%	6.85%	5.54%*	13.17%***
Industry- adjusted Δ	0.003 (52, 27)	-0.0009 (53, 27)	0.007 (44, 21)	0.025** (45, 25)
Industry-adjusted % Δ	17.96%	-4.76%	21.84%	79.30%**
Cash Flow to Sales				
Unadjusted Δ	0.007 (47, 22)	0.003 (47, 24)	0.027* (39, 23)	0.015^{+} (39, 23)
Unadjusted % Δ	8.76%	3.97%	53.93%*	25.70%$^{+}$
Industry- adjusted Δ	-0.009 (47, 22)	-0.009 (47, 19)	0.018^{+} (39, 23)	0.019 (39, 23)
Industry-adjusted % Δ	-71.41%	-71.81%	41.60%$^{+}$	48.66%

Table 2 reports the results of the Wilcoxon signed-rank test, which tests if there are significant differences between two points in time for six distinct performance measures.

The Return on Sales measure shows significant performance increases for the unadjusted change of 103.73% and 50.52% at the 10% confidence level, for the time windows [-1;1] and [-1;2] respectively. This indicates that the ROS for the window [-1;1] more than doubled and for the window [-1;2] ROS increased by little over half. The industry-adjusted change for ROS shows a slightly lower increase than the non-adjusted change. After industry adjustment, the window [-1;2] remains significant at the 10% level with an increase of 53.42% with regards to the ROS. The window [-1;1] still shows an increase, however it is now insignificant. This implies that there is some evidence that suggests that B&B strategies might result in an increase of net profit, which in turn increases the ROS measure.

The Return on Assets measure reports insignificant values for the unadjusted changes, although the median changes are mainly positive. The industry-adjusted change reports a significant percentage increase of 68.82% for the [0;1] window at the 15% confidence level, but no significant changes in the other industry-adjusted time windows. This implies that B&B strategies do not significantly influence the return generated by the assets of the platform company.

The Return on Equity measure shows somewhat contradictory results for the unadjusted change. The time window [0;1] shows an increase of 15.80%, which is significant at the 5% confidence level. The time window [0;2] also shows an increase, albeit an insignificant increase. The time windows [-1;1] and [-1;2] show the opposite, a 26.61% and 9.07% decrease of ROE, significant at the 5% and 15% confidence level respectively. The industry-adjusted change adds to that by reporting a 23.57% and 221.59% decrease for the windows [0;1] and [-1;1] respectively, both significant at the 5% confidence level. The results of this measure imply that B&B strategies might decrease the return generated by the equity of the platform company.

The EBITDA margin measure mainly reports insignificant changes in both the unadjusted and industry-adjusted measure. There only seems to be a significant improvement for the window [-1;2]. The unadjusted change increased by 7.53%, while the industry-adjusted change increased by 7.29%. These figures are significant at the 10% and 15% confidence level respectively. These results imply that B&B strategies can positively influence the EBITDA margin generated by platform companies.

The EBIT margin measure reports insignificant changes, except for the unadjusted change for the windows [-1;1] and [-1;2] and for the industry-adjusted change for time window [-1;2]. The unadjusted change for the window [-1;1] shows an improvement of 5.54%, which is significant at the 10% confidence level. The unadjusted and industry-adjusted changes for the window [-1;2] show improvements of 13.17% and 79.30%, which are significant at the 5% and 10% confidence level respectively. These findings imply that B&B strategies positively influence the EBIT margin of platform companies.

Finally, the Cash Flow to Sales ratio reports significant improvements only for the windows [-1;1] and [-1;2]. The unadjusted change for the window [-1;1] improved by 53.93%, which is significant at the 10% confidence level. The industry-adjusted change for the window [-1;1] improved by 41.60%, which is only significant at the 15% confidence level. The unadjusted change for the window [-1;2] shows an improvement of 25.70%, which is significant at the 15% confidence level. The industry-adjusted change for the same window is insignificant however. These results imply that the level of Cash Flow to Sales could be influenced positively by B&B strategies.

Overall, the evidence towards the hypothesis of improved performance due to B&B strategies is limited. For most performance measures the only window that yields significant results is the window [-1;2], suggesting that substantial time is required before economic performance is positively influenced. Furthermore, improvements in performance measures due to B&B strategies should also result in significant industry-adjusted changes. However, from table 2 it becomes apparent that the industry-adjusted changes are less significant than their unadjusted counterpart.

These findings are somewhat consistent with research by Smit and Volosovych (2013), who find that the operating performance of 89 SBOs does not improve or even worsens during the PE holding period. These results come with one important caveat however: B&B strategies tend to have a longer investment horizon and the integration of add-on companies might take significant time before positive returns are able to be generated, which could lead to significantly improved performance measures at later stages of the B&B strategy. As the data restricts the usage of wider time windows, this potential explanation remains uninvestigated.

In conclusion, due to a lack of evidence the following hypothesis is rejected:

Hypothesis 1: *"Platform companies engaged in B&B strategies significantly increase their economic performance"*

Six distinct performance measures for multiple time windows show weak or insignificant evidence to suggest that B&B strategies significantly increase the economic performance of platform companies. The next section will discuss the results of the univariate regressions.

6.2 Univariate regressions

Tables 3a through 3f report the results of the univariate regressions with all six performance measures as dependent variables. A correlation matrix of the independent variables used in these regressions can be found in the Appendix, table A4.

Table 3a – Univariate regressions with unadjusted and industry-adjusted ROS

Table 3a reports the results of the univariate OLS regressions, linking two forms of one performance measure as the dependent variable to five pre-defined independent variables. Robust standard errors are reported in parentheses below the corresponding coefficient. ***, **, * and + denote levels that differ significantly from zero at the 1%, 5%, 10% and 15% confidence level respectively. Data is winsorized at the 1% and 99% level. The exp. sign column indicates the expected sign of the variables' coefficient based on the hypotheses, with the first sign applying to all uneven columns and the second sign applying to all even columns. ROS t_{+2} represents the level of the Return on Sales at t_{+2}, or two fiscal years after the start of the B&B strategy. Δ adj. ROS equals the difference in Return on Sales between t_{-1} and t_{+2} minus the difference in median Return on Sales for an industry-matched peer group based on the three-digit NACE code between t_{-1} and t_{+2}. Descriptions of financial and independent variables can be found in the Appendix and in Section 5.2 respectively.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dependent variable	Exp. sign	ROS t_{+2}	Δ adj. ROS	ROS t_{+2}	Δ adj. ROS	ROS t_{+2}	Δ adj. ROS	ROS t_{+2}	Δ adj. ROS	ROS t_{+2}	Δ adj. ROS
Initial leverage		-0.220**	0.043								
		(0.092)	(0.187)								
Leverage change	(+)/(+)			-0.224*	-0.452						
				(0.134)	(0.325)						
NWC to Sales	(-)/(-)					-0.050	-0.032				
						(0.059)	(0.162)				
Delta employees	(-)/(-)							-0.004***	0.053***		
								(0.001)	(0.002)		
Size										0.007	0.007
										(0.014)	(0.046)
Adjusted R^2		0.103	0.000	0.019	0.009	0.012	0.000	0.000	0.632	0.000	0.000
Observations		46	44	46	44	56	43	38	36	57	44

Table 3b – Univariate regressions with unadjusted and industry-adjusted ROA

Table 3b reports the results of the univariate OLS regressions, linking two forms of one performance measure as the dependent variable to five pre-defined independent variables. Robust standard errors are reported in parentheses below the corresponding coefficient. ***, **, * and + denote levels that differ significantly from zero at the 1%, 5%, 10% and 15% confidence level respectively. Data is winsorized at the 1% and 99% level. The exp. sign column indicates the expected sign of the variables' coefficient based on the hypotheses, with the first sign applying to all uneven columns and the second sign applying to all even columns. ROA t_{+2} represents the level of the Return on Assets at t_{+2}, or two fiscal years after the start of the B&B strategy. Δ adj. ROA equals the difference in Return on Assets between t_{-1} and t_{+2} minus the difference median Return on Assets for an industry-matched peer group based on the three-digit NACE code between t_{-1} and t_{+2}. Descriptions of financial and independent variables can be found in the Appendix and in Section 5.2 respectively.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dependent variable	Exp. sign	ROA t_{+2}	Δ adj. ROA	ROA t_{+2}	Δ adj. ROA	ROA t_{+2}	Δ adj. ROA	ROA t_{+2}	Δ adj. ROA	ROA t_{+2}	Δ adj. ROA
Initial leverage		-0.098**	0.089+								
		(0.039)	(0.061)								
Leverage change	(+)/(+)			-0.162**	-0.237**						
				(0.064)	(0.110)						
NWC to Sales	(-)/(-)					0.014	-0.062***				
						(0.018)	(0.023)				
Delta employees	(-)/(-)							-0.003***	0.002*		
								(0.001)	(0.002)		
Size										-0.002	0.008
										(0.006)	(0.008)
Adjusted R^2		0.111	0.000	0.095	0.113	0.000	0.109	0.002	0.000	0.000	0.000
Observations		46	46	46	46	56	45	38	38	57	46

Table 3c – Univariate regressions with unadjusted and industry-adjusted ROE

Table 3c reports the results of the univariate OLS regressions, linking two forms of one performance measure as the dependent variable to five pre-defined independent variables. Robust standard errors are reported in parentheses below the corresponding coefficient. ***, **, * and + denote levels that differ significantly from zero at the 1%, 5%, 10% and 15% confidence level respectively. Data is winsorized at the 1% and 99% level. The exp. sign column indicates the expected sign of the variables' coefficient based on the hypotheses, with the first sign applying to all uneven columns and the second sign applying to all even columns. ROE t_{+2} represents the level of the Return on Equity at t_{+2}, or two fiscal years after the start of the B&B strategy. Δ adj. ROE equals the difference in Return on Equity between t_{-1} and t_{+2} minus the difference in median Return on Equity for an industry-matched peer group based on the three-digit NACE code between t_{-1} and t_{+2}. Descriptions of financial and independent variables can be found in the Appendix and in Section 5.2 respectively.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dependent variable	Exp. sign	ROE t_{+2}	Δ adj. ROE	ROE t_{+2}	Δ adj. ROE	ROE t_{+2}	Δ adj. ROE	ROE t_{+2}	Δ adj. ROE	ROE t_{+2}	Δ adj. ROE
Initial leverage		-0.274	-1.367**								
		(0.245)	(0.607)								
Leverage change	(+)/(+)			-0.524+	-2.406**						
				(0.321)	(1.060)						
NWC to Sales	(-)/(-)					0.141	0.208				
						(0.108)	(0.153)				
Delta employees	(-)/(-)							-0.017***	0.029**		
								(0.004)	(0.013)		
Size										0.018	0.211*
										(0.049)	(0.113)
Adjusted R^2		0.001	0.126	0.005	0.127	0.008	0.000	0.000	0.000	0.000	0.090
Observations		46	44	46	44	56	43	38	36	57	44

Table 3d – Univariate regressions with unadjusted and industry-adjusted EBITDA margin

Table 3d reports the results of the univariate OLS regressions, linking two forms of one performance measure as the dependent variable to five pre-defined independent variables. Robust standard errors are reported in parentheses below the corresponding coefficient. ***, **, * and + denote levels that differ significantly from zero at the 1%, 5%, 10% and 15% confidence level respectively. Data is winsorized at the 1% and 99% level. The exp. sign column indicates the expected sign of the variables' coefficient based on the hypotheses, with the first sign applying to all uneven columns and the second sign applying to all even columns. EBITDA margin t_{+2} represents the level of the EBITDA margin at t_{+2}, or two fiscal years after the start of the B&B strategy. Δ adj. EBITDA margin equals the difference in EBITDA margin between t_{-1} and t_{+2} minus the difference in median EBITDA margin for an industry-matched peer group based on the three-digit NACE code between t_{-1} and t_{+2}. Descriptions of financial and independent variables can be found in the Appendix and in Section 5.2 respectively.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dependent variable	Exp. sign	EBITDA margin t_{+2}	Δ adj. EBITDA margin	EBITDA margin t_{+2}	Δ adj. EBITDA margin	EBITDA margin t_{+2}	Δ adj. EBITDA margin	EBITDA margin t_{+2}	Δ adj. EBITDA margin	EBITDA margin t_{+2}	Δ adj. EBITDA margin
Initial leverage		-0.179^{+}	0.140								
		(0.119)	(0.148)								
Leverage change	(+)/(+)			-0.373**	-0.303						
				(0.179)	(0.223)						
NWC to Sales	(-)/(-)					0.071	0.018				
						(0.070)	(0.100)				
Delta employees	(-)/(-)							-0.005***	0.015***		
								(0.001)	(0.001)		
Size										0.053***	0.029
										(0.019)	(0.034)
Adjusted R^2		0.041	0.000	0.078	0.020	0.026	0.000	0.000	0.284	0.162	0.008
Observations		41	39	41	39	52	39	34	32	52	39

Table 3e – Univariate regressions with unadjusted and industry-adjusted EBIT margin

Table 3e reports the results of the univariate OLS regressions, linking two forms of one performance measure as the dependent variable to five pre-defined independent variables. Robust standard errors are reported in parentheses below the corresponding coefficient. ***, **, * and + denote levels that differ significantly from zero at the 1%, 5%, 10% and 15% confidence level respectively. Data is winsorized at the 1% and 99% level. The exp. sign column indicates the expected sign of the variables' coefficient based on the hypotheses, with the first sign applying to all uneven columns and the second sign applying to all even columns. EBIT margin t_{+2} represents the level of the EBIT margin at t_{+2}, or two fiscal years after the start of the B&B strategy. Δ adj. EBIT margin equals the difference in EBIT margin between t_{-1} and t_{+2} minus the difference in median EBIT margin for an industry-matched peer group based on the three-digit NACE code between t_{-1} and t_{+2}. Descriptions of financial and independent variables can be found in the Appendix and in Section 5.2 respectively.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dependent variable	Exp. sign	EBIT margin t_{+2}	Δ adj. EBIT margin	EBIT margin t_{+2}	Δ adj. EBIT margin	EBIT margin t_{+2}	Δ adj. EBIT margin	EBIT margin t_{+2}	Δ adj. EBIT margin	EBIT margin t_{+2}	Δ adj. EBIT margin
Initial leverage		-0.175**	0.316+								
		(0.076)	(0.197)								
Leverage change	(+)/(+)			-0.204+	-0.415						
				(0.126)	(0.293)						
NWC to Sales	(-)/(-)					0.052	-0.013				
						(0.053)	(0.090)				
Delta employees	(-)/(-)							-0.005***	0.041***		
								(0.002)	(0.002)		
Size										0.021*	0.020
										(0.012)	(0.037)
Adjusted R^2		0.092	0.050	0.027	0.018	0.024	0.000	0.007	0.666	0.034	0.000
Observations		47	45	47	45	57	44	39	37	58	45

Table 3f – Univariate regressions with unadjusted and industry-adjusted CFS ratio

Table 3f reports the results of the univariate OLS regressions, linking two forms of one performance measure as the dependent variable to five pre-defined independent variables. Robust standard errors are reported in parentheses below the corresponding coefficient. ***, **, * and + denote levels that differ significantly from zero at the 1%, 5%, 10% and 15% confidence level respectively. Data is winsorized at the 1% and 99% level. The exp. sign column indicates the expected sign of the variables' coefficient based on the hypotheses, with the first sign applying to all uneven columns and the second sign applying to all even columns. CFS t_{+2} represents the level of the Cash Flow to Sales at t_{+2}, or two fiscal years after the start of the B&B strategy. Δ adj. CFS equals the difference in Cash Flow to Sales between t_{-1} and t_{+2} minus the difference in median CFS for an industry-matched peer group based on the three-digit NACE code between t_{-1} and t_{+2}. Descriptions of financial and independent variables can be found in the Appendix and in Section 5.2 respectively.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dependent variable	Exp. sign	CFS t_{+2}	Δ adj. CFS	CFS t_{+2}	Δ adj. CFS	CFS t_{+2}	Δ adj. CFS	CFS t_{+2}	Δ adj. CFS	CFS t_{+2}	Δ adj. CFS
Initial leverage		-0.134	0.258								
		(0.131)	(0.228)								
Leverage change	(+)/(+)			-0.242	-0.485						
				(0.186)	(0.333)						
NWC to Sales	(-)/(-)					-0.046	-0.098				
						(0.075)	(0.176)				
Delta employees	(-)/(-)							-0.004***	0.037***		
								(0.001)	(0.002)		
Size										0.050***	-0.008
										(0.018)	(0.059)
Adjusted R^2		0.010	0.009	0.016	0.020	0.000	0.000	0.000	0.412	0.138	0.000
Observations		41	39	41	39	52	39	34	32	52	39

The univariate regressions in the tables 3a through 3f give an initial indication which factors influence the absolute performance of platform companies and which factors influence the outperformance of platform companies over their industry-matched counterparts. To this end the unadjusted performance measures at t_{+2} and the change in industry-adjusted performance measures between t_{-1} and t_{+2} are used as dependent variables in the univariate regressions. This design enables the differentiation between drivers of absolute performance on one hand and the drivers of outperformance of industry-matched peers on the other hand.

Column (1) consistently reports the same sign, albeit with varying significance levels. Column (1) shows that the initial leverage of the platform company at t_{-1} has a negative impact on the economic performance of the platform company later on, at t_{+2}. This negative sign implies that a higher initial leverage negatively influences the economic performance during the B&B strategy.

Column (2) reports positive signs for the regression between the change in industry-adjusted performance and initial leverage, except for table 3c which focuses on the ROE. The significance levels of these values are generally insignificant however, indicating that the initial leverage does not influence the change in industry-adjusted performance.

Columns (3) and (4) report the influence of the change in leverage between t_{-1} and t_{+2} on the performance measures. For both forms of all performance measures, the result is a negative sign with varying significance levels. This implies that when leverage increases due to involvement in B&B strategies, economic performance decreases. This is in contrast with the expected sign deduced from the hypothesis regarding the leverage ratio. However, considering that higher leverage is paired with higher debt repayments and interest costs, it is somewhat unsurprising that higher leverage can suppress economic performance.

Columns (5) and (6) report the impact of the NWC to Sales ratio on the performance measures. With the exception of the change in industry-adjusted ROA, all figures are insignificant. Furthermore, the adjusted R^2 reported for these regressions is extremely low, implying that the NWC to Sales ratio explains almost zero of the variation in the performance measures. This indicates that the NWC to Sales ratio might not play a significant role in explaining economic performance of platform companies engaged in B&B strategies.

Columns (7) and (8) report the effect that the change in employees between t_{-1} and t_{+2} has on the economic performance of platform companies. For all columns (7), the reported figure is significantly negative, which implies that an increase in the number of employees at t_{+2} compared to t_{-1} leads to lower economic performance at t_{+2}. Conversely, a decrease in the number of employees at t_{+2} compared to t_{-1} leads to higher economic performance at t_{+2}. This finding supports the notion that a reduction in the number of employees as a proxy for restructuring activities increases the economic performance of platform companies. However, column (8) reports significantly positive figures for all performance measures. This implies that when the change in employees increases, the change in industry-adjusted performance also increases. Conversely, when the number of employees decreases at

t_{+2} compared to t_{-1}, the change in industry-adjusted performance between t_{-1} and t_{+2} decreases. This is in contrast with the findings from column (7), which suggest that decreases in number of employees improve economic performance. It is also contrary to the expected sign of the coefficient, which should be negative if the hypothesis related to the number of employees were to hold. Further tests will therefore be needed to reach a conclusive answer.

Columns (9) and (10) report the effect of the size of the platform company on the performance measures. Both columns (9) and (10) report mainly positive figures, but with limited significance. Only the absolute values of the EBIT margin, EBITDA margin and CFS ratio seem to be significantly positively related to the size of the platform company. This implies that larger companies can improve their economic performance through factors related to size, such as improved bargaining power with suppliers.

Overall, the univariate regressions show some indicators that the described variables can influence economic performance. The multivariate regressions will further show whether the results from the univariate regressions still hold.

The following section is dedicated to the multivariate regressions, after which the panel regressions and the variance decomposition are discussed.

6.3 Multivariate regressions

The tables 4a through 4f report the results of the multivariate regressions.

Table 4a – Multivariate regressions with unadjusted and industry-adjusted ROS

Table 4a reports the results of the multivariate OLS regressions, linking two forms of one performance measure as the dependent variable to six pre-defined independent variables. Robust standard errors are reported in parentheses below the corresponding coefficient. ***, **, * and + denote levels that differ significantly from zero at the 1%, 5%, 10% and 15% confidence level respectively. Data is winsorized at the 1% and 99% level. The exp. sign column indicates the expected sign of the variables' coefficient based on the hypotheses. The left exp. sign column refers to the signs for columns (1)-(3), while the right exp. sign column refers to the signs for columns (4)-(6). ROS t_{+2} represents the level of the Return on Sales at t_{+2}, or two fiscal years after the start of the B&B strategy. Δ adj. ROS equals the difference in Return on Sales between t_{-1} and t_{+2} minus the difference in median Return on Sales for an industry-matched peer group based on the three-digit NACE code between t_{-1} and t_{+2}. Descriptions of financial and independent variables can be found in the Appendix and in Section 5.2 respectively.

		(1)	(2)	(3)		(4)	(5)	(6)
Dependent variable	Exp. sign	ROS t_{+2}	ROS t_{+2}	ROS t_{+2}	Exp. sign	Δ adj. ROS	Δ adj. ROS	Δ adj. ROS
Adj. ROS t_{-1}		0.155***	0.115*	0.283***		-0.811***	-0.855***	-0.570***
		(0.058)	(0.063)	(0.093)		(0.084)	(0.084)	(0.114)
Initial leverage			-0.270**	-0.232**			-0.294**	-0.281**
			(0.110)	(0.112)			(0.116)	(0.131)
Leverage change	(+)		-0.430***	-0.365***	(+)		-0.439***	-0.365**
			(0.138)	(0.133)			(0.158)	(0.155)
NWC to Sales	(-)			-0.092+	(-)			-0.105*
				(0.057)				(0.056)
Delta employees	(-)			0.012**	(-)			0.022***
				(0.005)				(0.006)
Size		0.004	-0.006	-0.008		0.008	-0.003	-0.010
		(0.016)	(0.013)	(0.013)		(0.019)	(0.016)	(0.017)
Adjusted R^2		0.107	0.294	0.448		0.782	0.822	0.843
F-test			5.467	5.602			50.685	31.533
Observations		44	44	35		44	44	35

Table 4b – Multivariate regressions with unadjusted and industry-adjusted ROA

Table 4b reports the results of the multivariate OLS regressions, linking two forms of one performance measure as the dependent variable to six pre-defined independent variables. Robust standard errors are reported in parentheses below the corresponding coefficient. ***, **, * and + denote levels that differ significantly from zero at the 1%, 5%, 10% and 15% confidence level respectively. Data is winsorized at the 1% and 99% level. The exp. sign column indicates the expected sign of the variables' coefficient based on the hypotheses. The left exp. sign column refers to the signs for columns (1)-(3), while the right exp. sign column refers to the signs for columns (4)-(6). ROA t_{+2} represents the level of the Return on Assets at t_{+2}, or two fiscal years after the start of the B&B strategy. Δ adj. ROA equals the difference in Return on Assets between t_{-1} and t_{+2} minus the difference in median Return on Assets for an industry-matched peer group based on the three-digit NACE code between t_{-1} and t_{+2}. Descriptions of financial and independent variables can be found in the Appendix and in Section 5.2 respectively.

		(1)	(2)	(3)		(4)	(5)	(6)
Dependent variable	Exp. sign	ROA t_{+2}	ROA t_{+2}	ROA t_{+2}	Exp. sign	Δ adj. ROA	Δ adj. ROA	Δ adj. ROA
Adj. ROA t_{-1}		0.262***	0.193**	0.360***		-0.561***	-0.600***	-0.495***
		(0.073)	(0.081)	(0.123)		(0.105)	(0.109)	(0.150)
Initial leverage			-0.088*	-0.049			-0.060	-0.037
			(0.051)	(0.063)			(0.057)	(0.066)
Leverage change	(+)		-0.214***	-0.215***	(+)		-0.212***	-0.220***
			(0.060)	(0.063)			(0.079)	(0.082)
NWC to Sales	(-)			-0.044**	(-)			-0.037
				(0.019)				(0.031)
Delta employees	(-)			-0.002***	(-)			0.000
				(0.001)				(0.001)
Size		-0.001	-0.004	0.000		0.007	0.004	0.011
		(0.007)	(0.005)	(0.007)		(0.007)	(0.006)	(0.010)
Adjusted R^2		0.140	0.344	0.387		0.426	0.513	0.517
F-test			6.889	4.780			12.869	7.419
Observations		46	46	37		46	46	37

Table 4c – Multivariate regressions with unadjusted and industry-adjusted ROE

Table 4c reports the results of the multivariate OLS regressions, linking two forms of one performance measure as the dependent variable to six pre-defined independent variables. Robust standard errors are reported in parentheses below the corresponding coefficient. ***, **, * and + denote levels that differ significantly from zero at the 1%, 5%, 10% and 15% confidence level respectively. Data is winsorized at the 1% and 99% level. The exp. sign column indicates the expected sign of the variables' coefficient based on the hypotheses. The left exp. sign column refers to the signs for columns (1)-(3), while the right exp. sign column refers to the signs for columns (4)-(6). ROE t_{+2} represents the level of the Return on Equity at t_{+2}, or two fiscal years after the start of the B&B strategy. Δ adj. ROE equals the difference in Return on Equity between t_{-1} and t_{+2} minus the difference in median Return on Equity for an industry-matched peer group based on the three-digit NACE code between t_{-1} and t_{+2}. Descriptions of financial and independent variables can be found in the Appendix and in Section 5.2 respectively.

		(1)	(2)	(3)		(4)	(5)	(6)
Dependent variable	Exp. sign	ROE t_{+2}	ROE t_{+2}	ROE t_{+2}	Exp. sign	Δ adj. ROE	Δ adj. ROE	Δ adj. ROE
Adj. ROE t_{-1}		0.182**	0.277***	0.316**		-0.811***	-0.704***	-0.665***
		(0.077)	(0.095)	(0.137)		(0.079)	(0.088)	(0.119)
Initial leverage			-0.639**	-0.785+			-0.759***	-0.890**
			(0.303)	(0.483)			(0.284)	(0.437)
Leverage change	(+)		-1.224**	-1.394**	(+)		-1.305***	-1.470**
			(0.500)	(0.610)			(0.498)	(0.583)
NWC to Sales	(-)			-0.113	(-)			-0.023
				(0.158)				(0.150)
Delta employees	(-)			0.003	(-)			0.010
				(0.014)				(0.012)
Size		0.064	0.050	0.060		0.097+	0.081+	0.098
		(0.065)	(0.054)	(0.090)		(0.063)	(0.051)	(0.087)
Adjusted R^2		0.092	0.234	0.191		0.756	0.808	0.800
F-test			4.282	2.336			46.219	23.734
Observations		44	44	35		44	44	35

Table 4d – Multivariate regressions with unadjusted and industry-adjusted EBITDA margin

Table 4d reports the results of the multivariate OLS regressions, linking two forms of one performance measure as the dependent variable to six pre-defined independent variables. Robust standard errors are reported in parentheses below the corresponding coefficient. ***, **, * and + denote levels that differ significantly from zero at the 1%, 5%, 10% and 15% confidence level respectively. Data is winsorized at the 1% and 99% level. The exp. sign column indicates the expected sign of the variables' coefficient based on the hypotheses. The left exp. sign column refers to the signs for columns (1)-(3), while the right exp. sign column refers to the signs for columns (4)-(6). EBITDA t_{+2} represents the level of the EBITDA margin at t_{+2}, or two fiscal years after the start of the B&B strategy. Δ adj. EBITDA equals the difference in EBITDA margin between t_{-1} and t_{+2} minus the difference in median EBITDA margin for an industry-matched peer group based on the three-digit NACE code between t_{-1} and t_{+2}. Descriptions of financial and independent variables can be found in the Appendix and in Section 5.2 respectively.

		(1)	(2)	(3)		(4)	(5)	(6)
Dependent variable	Exp. sign	EBITDA t_{+2}	EBITDA t_{+2}	EBITDA t_{+2}	Exp. sign	Δ adj. EBITDA	Δ adj. EBITDA	Δ adj. EBITDA
Adj. EBITDA t_{-1}		0.266^{+}	0.262*	0.539***		-0.643***	-0.643***	-0.340***
		(0.169)	(0.150)	(0.119)		(0.176)	(0.169)	(0.110)
Initial leverage			-0.046	-0.064			-0.022	-0.040
			(0.105)	(0.085)			(0.119)	(0.084)
Leverage change	(+)		-0.340**	-0.216*	(+)		-0.251^{+}	-0.115
			(0.153)	(0.108)			(0.171)	(0.114)
NWC to Sales	(-)			-0.006	(-)			0.009
				(0.060)				(0.068)
Delta employees	(-)			0.006**	(-)			0.009***
				(0.002)				(0.002)
Size		0.059**	0.053*	0.018		0.048^{+}	0.045	0.007
		(0.026)	(0.027)	(0.014)		(0.030)	(0.032)	(0.022)
Adjusted R^2		0.327	0.370	0.674		0.453	0.453	0.410
F-test			6.582	11.704			8.873	4.594
Observations		39	39	32		39	39	32

Table 4e – Multivariate regressions with unadjusted and industry-adjusted EBIT margin

Table 4e reports the results of the multivariate OLS regressions, linking two forms of one performance measure as the dependent variable to six pre-defined independent variables. Robust standard errors are reported in parentheses below the corresponding coefficient. ***, **, * and + denote levels that differ significantly from zero at the 1%, 5%, 10% and 15% confidence level respectively. Data is winsorized at the 1% and 99% level. The exp. sign column indicates the expected sign of the variables' coefficient based on the hypotheses. The left exp. sign column refers to the signs for columns (1)-(3), while the right exp. sign column refers to the signs for columns (4)-(6). EBIT t_{+2} represents the level of the EBIT margin at t_{+2}, or two fiscal years after the start of the B&B strategy. Δ adj. EBIT equals the difference in EBIT margin between t_{-1} and t_{+2} minus the difference in median EBIT margin for an industry-matched peer group based on the three-digit NACE code between t_{-1} and t_{+2}. Descriptions of financial and independent variables can be found in the Appendix and in Section 5.2 respectively.

		(1)	(2)	(3)		(4)	(5)	(6)
Dependent variable	Exp. sign	EBIT t_{+2}	EBIT t_{+2}	EBIT t_{+2}	Exp. sign	Δ adj. EBIT	Δ adj. EBIT	Δ adj. EBIT
Adj. EBIT t_{-1}		0.116	0.080	0.331**		-0.895***	-0.903***	-0.559***
		(0.086)	(0.086)	(0.151)		(0.113)	(0.110)	(0.128)
Initial leverage			-0.160*	-0.150+			-0.067	-0.069
			(0.087)	(0.095)			(0.107)	(0.110)
Leverage change	(+)		-0.253*	-0.202+	(+)		-0.280*	-0.218*
			(0.135)	(0.125)			(0.152)	(0.123)
NWC to Sales	(-)			-0.016	(-)			-0.001
				(0.068)				(0.069)
Delta employees	(-)			0.011+	(-)			0.016***
				(0.007)				(0.006)
Size		0.025*	0.018+	0.015		0.010	0.006	-0.011
		(0.015)	(0.013)	(0.020)		(0.015)	(0.013)	(0.019)
Adjusted R^2		0.086	0.157	0.295		0.757	0.764	0.747
F-test			3.046	3.442			36.553	18.247
Observations		45	45	36		45	45	36

Table 4f – Multivariate regressions with unadjusted and industry-adjusted CFS

Table 4f reports the results of the multivariate OLS regressions, linking two forms of one performance measure as the dependent variable to six pre-defined independent variables. Robust standard errors are reported in parentheses below the corresponding coefficient. ***, **, * and + denote levels that differ significantly from zero at the 1%, 5%, 10% and 15% confidence level respectively. Data is winsorized at the 1% and 99% level. The exp. sign column indicates the expected sign of the variables' coefficient based on the hypotheses. The left exp. sign column refers to the signs for columns (1)-(3), while the right exp. sign column refers to the signs for columns (4)-(6). CFS t_{+2} represents the level of the CFS ratio at t_{+2}, or two fiscal years after the start of the B&B strategy. Δ adj. CFS equals the difference in CFS ratio between t_{-1} and t_{+2} minus the difference in median CFS ratio for an industry-matched peer group based on the three-digit NACE code between t_{-1} and t_{+2}. Descriptions of financial and independent variables can be found in the Appendix and in Section 5.2 respectively.

		(1)	(2)	(3)		(4)	(5)	(6)
Dependent variable	Exp. sign	CFS t_{+2}	CFS t_{+2}	CFS t_{+2}	Exp. sign	Δ adj. CFS	Δ adj. CFS	Δ adj. CFS
Adj. CFS t_{-1}		0.090	0.067	0.210*		-0.883***	-0.903***	-0.671***
		(0.102)	(0.101)	(0.108)		(0.116)	(0.117)	(0.119)
Initial leverage			-0.199*	-0.249**			-0.179^{+}	-0.235**
			(0.111)	(0.122)			(0.116)	(0.114)
Leverage change	(+)		-0.443***	-0.399**	(+)		-0.404**	-0.350**
			(0.144)	(0.155)			(0.161)	(0.152)
NWC to Sales	(-)			-0.040	(-)			-0.054
				(0.084)				(0.080)
Delta employees	(-)			0.006^{+}	(-)			0.012***
				(0.004)				(0.004)
Size		0.046**	0.031	0.004		0.037	0.023	-0.011
		(0.025)	(0.024)	(0.015)		(0.029)	(0.029)	(0.019)
Adjusted R^2		0.159	0.297	0.432		0.759	0.783	0.823
F-test			5.021	29.208			35.183	25.009
Observations		39	39	32		39	39	32

Results show that the industry-adjusted performance at t_{-1} has a significant positive influence on all performance measures at t_{+2}. This indicates that platform companies with high initial industry-adjusted performance tend to perform better as the B&B strategy progresses. This might also confirm the notion that PE firms prefer established and mature companies, which outperform their respective industries, as platform for their B&B strategy.

Furthermore, the industry-adjusted performance at t_{-1} has a significant negative influence on the difference in industry-adjusted performance measures between t_{-1} and t_{+2}. This finding implies that when a platform company did not outperform their industry before the start of the B&B strategy, i.e. they experienced negative initial industry-adjusted performance, the subsequent gap in industry-adjusted performance between t_{-1} and t_{+2} widens. In other words, platform companies that experience negative initial industry-adjusted performance tend to improve their performance more than platform companies that did not initially underperform their respective industries.

Initial leverage shows a negative relation with all performance measures and both forms of these performance measures, however these relations are only weakly significant. These results support the notion of unused debt capacity and that platform companies can benefit from increasing the leverage ratio. Related to the initial leverage is the leverage change between t_{-1} and t_{+2}, which has a significant negative relation with all performance measures and both forms of these performance measures. As the leverage ratio increases during the B&B strategy, economic performance decreases. This can be explained by the fact that the platform company experiences higher debt repayments and interest costs due to the increased debt burden. It is possible that the benefits of a higher leverage ratio as described by Jensen (1986) and Kaplan (1989a) may only be enjoyed at later stages of the B&B strategy. This finding supports the findings from the univariate regressions regarding the leverage change, but again contradicts the expected sign. The panel regressions will provide a definitive answer regarding the effects of leverage on economic performance.

The NWC to Sales ratio does not show significant results, indicating that optimising the level of net working capital has no significant effect on economic performance. This is in support of the findings from the univariate regressions, in which the NWC to Sales ratio also did not report a significant relation with the performance measures. It is however not in support of previous findings (e.g. Smith (1990)) regarding the optimisation of NWC, in which lower NWC to Sales resulted in increased economic performance.

The change in employees between t_{-1} and t_{+2} reports a significant positive relation with all performance measures, indicating that an increase in employees at t_{+2} compared to t_{-1} positively influences economic performance. This is contrary to the notion that restructuring, by optimising the workforce of the company, has a positive influence on economic performance and therefore also contradicts the expected sign of the coefficient. It is also in contrast with the findings of the univariate regressions, leading to ambiguity regarding the influence of the number of employees on economic performance.

Finally, controlling for the size of the platform company does not show significant results, implying that smaller platform companies are equally as capable of increasing economic performance as larger platform companies.

The multivariate regressions report the F-statistic which tests for joint significance of the independent variables. In all cases the F-statistic is above the critical value, implying that the null hypothesis of joint insignificance of the independent variables can be rejected at the 5% confidence level. The adjusted R^2 statistic for the most extensive models in columns (3) and (6) implies that between 19% and 84% of all variation in the dependent variable can be explained by the included independent variables. Together with the results of the F-test, the multivariate models seem reasonably capable of explaining the influence of several factors on the economic performance of platform companies engaged in B&B strategies.

Furthermore, the multivariate regressions show the same signs and significance levels as the univariate regressions, excluding the change in employees. This indicates that the relations implied by the univariate regressions also seem to hold in the presence of multiple other variables.

However, the results following from the multivariate regressions have to be treated with caution. The number of observations in each regression is limited, which can lead to inaccurate conclusions.
To further examine and validate the relations uncovered in the multivariate regressions, the following section will focus on the results of the panel regressions.

6.4 Panel regressions

Tables 5a through 5c report the results of the panel regressions.

Table 5a – Panel regressions with unadjusted and industry-adjusted performance measures

Table 5a reports the results of the panel regressions, linking the performance measure as the dependent variable to four pre-defined independent variables. Robust standard errors are reported in parentheses below the corresponding coefficient. ***, **, * and + denote levels that differ significantly from zero at the 1%, 5%, 10% and 15% confidence level respectively. Data is winsorized at the 1% and 99% level. The exp. sign column indicates the expected sign of the variables' coefficient based on the hypotheses. ROS (ROA) represent the level of the Return on Sales (Return on Assets) from t_{-1} to t_{+3}. The F-test and χ^2-test report the value of the test statistic and tests whether year fixed effects, firm fixed effects and year/firm fixed effects combined improve the model compared to the same model without the respective fixed effects. Descriptions of financial and independent variables can be found in the Appendix and in Section 5.2 respectively.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable	Exp. sign	ROS	ROS	ROS	ROS	ROA	ROA	ROA	ROA
Leverage ratio	(+)	-0.080*	-0.083	-0.077*	-0.080	-0.138***	-0.169***	-0.138***	-0.169***
		(0.043)	(0.084)	(0.043)	(0.089)	(0.024)	(0.057)	(0.024)	(0.059)
NWC to Sales	(-)	0.079***	0.086***	0.080***	0.086***	0.007**	0.002	0.007**	0.002
		(0.016)	(0.007)	(0.016)	(0.007)	(0.003)	(0.004)	(0.003)	(0.005)
Number of employees	(-)	-0.043***	-0.001	-0.043***	0.014	-0.004	-0.005	-0.004	0.001
		(0.012)	(0.033)	(0.012)	(0.042)	(0.004)	(0.025)	(0.004)	(0.029)
Size		0.027**	0.013	0.028**	0.030	-0.006	-0.021	-0.006	-0.016
		(0.012)	(0.026)	(0.012)	(0.025)	(0.005)	(0.019)	(0.005)	(0.021)
Year fixed effects		NO	NO	YES	YES	NO	NO	YES	YES
Firm fixed effects		NO	YES	NO	YES	NO	YES	NO	YES
Adjusted R^2		0.443	0.744	0.437	0.744	0.217	0.590	0.207	0.584
F-test			5.857	0.343	5.537		4.769	0.246	4.398
X^2-test			240.687	1.422	246.529		211.197	1.023	213.160
Observations		229	229	229	229	229	229	229	229

Table 5b – Panel regressions with unadjusted and industry-adjusted performance measures

Table 5b reports the results of the panel regressions, linking the performance measure as the dependent variable to four pre-defined independent variables. Robust standard errors are reported in parentheses below the corresponding coefficient. ***, **, * and + denote levels that differ significantly from zero at the 1%, 5%, 10% and 15% confidence level respectively. Data is winsorized at the 1% and 99% level. The exp. sign column indicates the expected sign of the variables' coefficient based on the hypotheses. ROE (EBITDA) represent the level of the Return on Equity (EBITDA margin) from t_{-1} to t_{+3}. The F-test and χ^2-test report the value of the test statistic and tests whether year fixed effects, firm fixed effects and year/firm fixed effects combined improve the model compared to the same model without the respective fixed effects. Descriptions of financial and independent variables can be found in the Appendix and in Section 5.2 respectively.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable	Exp. sign	ROE	ROE	ROE	ROE	EBITDA	EBITDA	EBITDA	EBITDA
Leverage ratio	(+)	0.042	-1.866***	0.077	-1.878***	-0.146***	-0.051	-0.146***	-0.055
		(0.201)	(0.667)	(0.201)	(0.543)	(0.028)	(0.048)	(0.028)	(0.050)
NWC to Sales	(-)	0.057***	0.013	0.075***	-0.014	0.034***	0.032***	0.035***	0.032***
		(0.017)	(0.026)	(0.020)	(0.032)	(0.007)	(0.004)	(0.007)	(0.004)
Number of employees	(-)	-0.047*	-0.084	-0.047*	0.278	-0.034***	-0.010	-0.034***	-0.008
		(0.025)	(0.137)	(0.025)	(0.200)	(0.009)	(0.019)	(0.009)	(0.023)
Size		0.015	0.184+	0.023	0.537***	0.034***	0.025	0.034***	0.029
		(0.032)	(0.123)	(0.032)	(0.175)	(0.009)	(0.020)	(0.009)	(0.021)
Year fixed effects		NO	NO	YES	YES	NO	NO	YES	YES
Firm fixed effects		NO	YES	NO	YES	NO	YES	NO	YES
Adjusted R^2		0.002	0.290	0.044	0.394	0.336	0.869	0.324	0.866
F-test			2.684	3.468	3.501		17.249	0.060	15.709
X^2-test			141.210	14.002	182.969		406.725	0.248	407.918
Observations		229	229	229	229	213	213	213	213

Table 5c – Panel regressions with unadjusted and industry-adjusted performance measures

Table 5c reports the results of the panel regressions, linking the performance measure as the dependent variable to four pre-defined independent variables. Robust standard errors are reported in parentheses below the corresponding coefficient. ***, **, * and + denote levels that differ significantly from zero at the 1%, 5%, 10% and 15% confidence level respectively. Data is winsorized at the 1% and 99% level. The exp. sign column indicates the expected sign of the variables' coefficient based on the hypotheses. EBIT (CFS) represent the level of the EBIT margin (Cash Flow to Sales ratio) from t_{-1} to t_{+3}. The F-test and χ^2-test report the value of the test statistic and tests whether year fixed effects, firm fixed effects and year/firm fixed effects combined improve the model compared to the same model without the respective fixed effects. Descriptions of financial and independent variables can be found in the Appendix and in Section 5.2 respectively.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable	Exp. sign	EBIT	EBIT	EBIT	EBIT	CFS	CFS	CFS	CFS
Leverage ratio	(+)	-0.118***	-0.078*	-0.120***	-0.085*	-0.129***	-0.039	-0.127***	-0.036
		(0.026)	(0.047)	(0.027)	(0.049)	(0.051)	(0.084)	(0.050)	(0.088)
NWC to Sales	(-)	0.070***	0.069***	0.069***	0.069***	0.059***	0.063***	0.060***	0.062***
		(0.010)	(0.005)	(0.010)	(0.005)	(0.010)	(0.006)	(0.010)	(0.007)
Number of employees	(-)	-0.025***	0.006	-0.025***	-0.000	-0.033***	-0.013	-0.033***	0.001
		(0.006)	(0.018)	(0.006)	(0.019)	(0.011)	(0.032)	(0.011)	(0.039)
Size		0.014**	0.021	0.014**	0.015	0.036***	0.007	0.037***	0.023
		(0.007)	(0.016)	(0.007)	(0.018)	(0.013)	(0.028)	(0.013)	(0.026)
Year fixed effects		NO	NO	YES	YES	NO	NO	YES	YES
Firm fixed effects		NO	YES	NO	YES	NO	YES	NO	YES
Adjusted R^2		0.523	0.870	0.517	0.870	0.369	0.754	0.359	0.751
F-test			12.057	0.253	11.297		7.304	0.156	6.719
X^2-test			367.091	1.051	372.375		263.095	0.649	265.574
Observations		233	233	233	233	214	214	214	214

The tables 5a through 5c report several important results. Columns (3) and (7) for the tables 5a-c report values for the F- and χ^2-test that are below their critical values, which results in a failure to reject the null hypothesis. This indicates that the model with year fixed effects does not significantly fit the data better than the model without year fixed effects. This shows that year fixed effects do not play a significant role in explaining economic performance, indicating that there is no evidence for time-varying components in the data. However, the models with firm fixed effects report F- and χ^2-test statistics that are higher than their critical values, which results in a rejection of the null hypothesis. The models with firm fixed effects therefore fit the data better than the models without firm fixed effects, indicating that there seems to be significant heterogeneity across individual platform companies. This is in accordance with Prahalad and Hamel (1990), who suggest that platform companies have core competencies that are unique to that company.

The leverage ratio reports a weakly significant negative relation with all performance measures, indicating that an increase in the leverage ratio decreases economic performance. The same relation was found in the uni- and multivariate regressions, in which leverage change also negatively influenced economic performance. This relation contradicts the expected sign, as was also the case in the uni- and multivariate regressions. This finding suggests that increasing the leverage ratio decreases performance, which could be due to higher interest costs and debt repayments associated with higher leverage. The benefits of increased leverage, i.e. lower agency costs via a disciplining effect and tax shields, might require significantly more time before these benefits can affect economic performance.

The NWC to Sales ratio shows a significant positive relation with all performance measures. This relation seems to suggest that increasing the net working capital relative to sales actually improves economic performance, in contrast with findings from Smith (1990), who find that in MBOs the reduction of NWC improves economic performance. This significantly positive relation also contradicts the expected sign, which suggests that platform companies actually operate on relatively low levels of NWC and that increasing the level of NWC benefits the economic performance of the platform company. This is in stark contrast with the uni- and multivariate regressions, in which the NWC to Sales ratio did not seem to be significantly related to economic performance.

The number of employees variable reports a significant negative relation with all performance measures, indicating that economic performance increases as employment decreases. This could be explained by the simple fact that decreasing employment decreases wage costs, which results in a higher net profit. However, cutting employment is a trade-off, as laying off too much of the workforce will eventually result in understaffing and ultimately lower economic performance. For the sample of platform companies this relation indicates that employment is cut slightly as a result of restructuring activities to increase economic performance. This is in accordance with the expected sign deduced from the hypothesis regarding the level of employment. However it is in contrast with the findings from the multivariate regressions, in which the change in employees between t_{-1} and t_{+2} showed a positive relation with performance, indicating that a reduction in employment reduces economic

performance. Conclusions on the relation between economic performance and the level of employees therefore remain ambiguous and should be treated with caution.

The size of the platform company reports only a sporadically significant relation with economic performance, which is insufficient to draw any conclusions on the effect of size on performance.
The following section will discuss the results of the decomposition of variance, which is used to determine the relative effects the individual variables have on the explanatory power of the model.

6.5 Variance decomposition

Tables 6a and 6b report the results of the variance decomposition.

Table 6a – Variance decomposition

Table 6a reports the variance decomposition of all six performance measures. The variance decomposition is based on panel regressions and reports the effects of each independent variable on the adjusted R^2 of the model. The values in the table range from -1 to 1 and indicate the contribution of each variable towards the adjusted R^2 of the model and thus to the explanatory power of the model. Data is winsorized at the 1% and 99% level. Descriptions of financial and independent variables can be found in the Appendix and in Section 5.2 respectively.

	ROS					
	(1)	(2)	(3)	(4)	(5)	(6)
Year fixed effects	1.00		0.04	0.04		0.02
Firm fixed effects		1.00	0.96		0.46	0.45
Leverage ratio				0.20	0.02	0.02
NWC to Sales				0.76	0.48	0.46
Number of employees					0.04	0.06
Size					0.00	0.00
Adjusted R^2	0.013	0.342	0.349	0.353	0.744	0.744

	ROA					
	(1)	(2)	(3)	(4)	(5)	(6)
Year fixed effects	1.00		-0.02	-0.06		-0.02
Firm fixed effects		1.00	1.02		0.91	0.93
Leverage ratio				1.29	0.09	0.09
NWC to Sales				-0.23	-0.02	-0.02
Number of employees					0.02	0.02
Size					0.00	0.00
Adjusted R^2	-0.011	0.535	0.529	0.174	0.590	0.584

	ROE					
	(1)	(2)	(3)	(4)	(5)	(6)
Year fixed effects	1.00		0.08	0.50		0.06
Firm fixed effects		1.00	0.92		0.84	0.65
Leverage ratio				-0.08	0.20	0.15
NWC to Sales				0.58	0.03	0.05
Number of employees					-0.07	0.02
Size					0.00	0.07
Adjusted R^2	0.022	0.245	0.277	0.045	0.290	0.394

Table 6b – Variance decomposition

Table 6b reports the variance decomposition of all six performance measures. The variance decomposition is based on panel regressions and reports the effects of each independent variable on the adjusted R^2 of the model. The values in the table range from -1 to 1 and indicate the contribution of each variable towards the adjusted R^2 of the model and thus to the explanatory power of the model. Data is winsorized at the 1% and 99% level. Descriptions of financial and independent variables can be found in the Appendix and in Section 5.2 respectively.

	EBITDA margin					
	(1)	(2)	(3)	(4)	(5)	(6)
Year fixed effects	1.00		-0.01	-0.03		-0.01
Firm fixed effects		1.00	1.01		0.68	0.71
Leverage ratio				0.60	0.01	0.01
NWC to Sales				0.43	0.21	0.19
Number of employees					0.10	0.10
Size					0.00	0.00
Adjusted R^2	-0.005	0.592	0.609	0.197	0.869	0.866

	EBIT margin					
	(1)	(2)	(3)	(4)	(5)	(6)
Year fixed effects	1.00		0.04	0.03		0.02
Firm fixed effects		1.00	0.96		0.38	0.40
Leverage ratio				0.24	0.02	0.01
NWC to Sales				0.73	0.54	0.51
Number of employees					0.06	0.06
Size					0.00	0.00
Adjusted R^2	0.014	0.332	0.366	0.516	0.870	0.870

	CFS ratio					
	(1)	(2)	(3)	(4)	(5)	(6)
Year fixed effects	1.00		0.00	-0.01		0.00
Firm fixed effects		1.00	1.00		0.56	0.58
Leverage ratio				0.40	0.01	0.01
NWC to Sales				0.61	0.36	0.34
Number of employees					0.07	0.07
Size					0.00	0.00
Adjusted R^2	-0.002	0.424	0.435	0.220	0.754	0.751

The tables 6a and 6b both confirm the previous findings regarding the year fixed effects. The values for the year fixed effects are close to zero or even negative in some cases. This indicates that year fixed effects barely add any explanatory power to the model or might even lower the explanatory power in case of a negative coefficient. It follows that year fixed effects are insufficient to explain economic performance. Firm fixed effects however do add substantial explanatory power to the model, explaining between 38% and 93% of the variation in the performance measures when combined with all other independent variables. This further confirms the finding in the panel regressions that there is significant heterogeneity across the platform companies.

The leverage ratio accounts for a high percentage of variation when combined with year fixed effects, however this effect diminishes when year fixed effects are replaced with firm fixed effects. This indicates that the leverage ratio does not add considerable explanatory power when controlling for individual platform companies. This is somewhat in contrast with the findings of the panel regressions, in which the leverage ratio was found to have a significant impact on economic performance.

The NWC to Sales ratio has a pronounced positive effect on the economic performance in the panel regressions and accounts for a high percentage of variation when combined with year fixed effects. The NWC to Sales ratio still adds substantial explanatory power when controlling for firm fixed effects however, further supporting the findings of the panel regressions.

The number of employees variable adds some explanatory power to the model when controlling for firm and year fixed effects. It therefore seems that the number of employees does play a significant role in explaining the variation in the performance measures. However, considering the results from the univariate, multivariate and panel regressions, the effect the number of employees has on economic performance remains unclear.

Finally, the size of the platform company does not add explanatory power to the model, which in turn supports the findings of the univariate, multivariate and panel regressions. This indicates that the size of the platform company does not play a significant role in explaining economic performance.

6.6 Robustness checks

The tables A5a-A5f in the Appendix provide the results of the multivariate regression robustness checks. The results from these robustness checks seem to roughly confirm the findings of the multivariate regressions. The initial industry-adjusted performance remains a significant factor in explaining economic performance, as well as the number of employees. However, the other variables regarding the initial leverage, the leverage change, the NWC to Sales ratio and the size of the platform company are reduced in significance compared to the multivariate regressions, accompanied by relatively high standard errors. This casts a shadow of doubt over the conclusions from the multivariate regressions, although it must be noted that the number of observations are lower in the robustness check regressions. Overall, the signs of the coefficients do match between the robustness

checks and the actual multivariate regressions, albeit with differences in significance. The differences between actual sign and expected sign are also equal to the differences in actual and expected signs in the multivariate regressions. Therefore, the results from the multivariate regressions seem to hold when checking for robustness.
The final section will provide a summary of the key results.

6.7 Summary of results

The following section will present the key results and provide the implications for the hypotheses.

Firstly, table 2 reported the results of the Wilcoxon signed-rank test, which tested whether there was a significant difference in the six performance measures for four time windows; [0;1], [0;2], [-1;1] and [-1;2]. Strong significant results for improved unadjusted performance were found for the ROS, EBITDA margin and EBIT margin measures, but only for the wider time windows [-1;1] and [-1;2]. For the industry-adjusted performance only the time window [-1;2] provided significant results. The ROE measure even reported significant negative results, implying that platform companies experience a reduced return on equity when engaging in B&B strategies. These results come with a caveat however, as the long term horizon of B&B strategies might only result in improved performance measures at later stages in the B&B strategy than the tested time windows. Overall, based on the results there is insufficient evidence that suggests platform companies engaged in B&B strategies increase their economic performance, therefore the following hypothesis is rejected: **Hypothesis 1:** *"Platform companies engaged in B&B strategies significantly increase their economic performance"*

Secondly, the influence of the leverage ratio on economic performance was tested with univariate, multivariate and panel regressions and resulted in the following findings. The univariate regressions suggested that the initial leverage and the change in leverage had a significant negative effect on economic performance, while the multivariate regressions suggested the same relation, albeit with a lower significance level. The panel regressions and variance decomposition further showed that there seems to be a negative relation between the leverage ratio and economic performance and that the leverage ratio has some explanatory power when included in the model. Overall, there is significant evidence that is consistent with the notion that an increased leverage ratio leads to a significant reduction in economic performance. Therefore the following hypothesis is rejected:

Hypothesis 2: *"An increased leverage ratio will lead to increased economic performance for platform companies engaged in B&B strategies"*

Thirdly, the univariate regressions did not report any significant relation between the NWC to Sales ratio, whereas the multivariate regressions suggest a negative relation between the NWC to Sales ratio and economic performance. The panel regressions on the other hand reported a significant positive relation between the NWC to Sales ratio and economic performance, implying that an

increase in the NWC to Sales ratio positively influences the economic performance of the platform companies. The variance decomposition further showed that the NWC to Sales ratio plays a large part in explaining the variation in economic performance. Overall, there is significant evidence consistent with the notion that a reduced level of the NWC to Sales ratio reduces economic performance. Therefore the following hypothesis is rejected:

Hypothesis 3: *"A reduced level of the NWC to Sales ratio will lead to increased economic performance for platform companies engaged in B&B strategies."*

Finally, there seem to be mixed results regarding the effect of the number of employees on economic performance. The univariate regressions showed a significant negative relation with economic performance, while the multivariate regressions reported a significantly positive relation with performance. The panel regressions also reported a negative relation with economic performance, however only with low significance levels. Overall, due to the mixed results and lack of conclusive evidence, the following hypothesis is rejected:

Hypothesis 4: *"A decrease in the number of employees will lead to higher economic performance for platform companies engaged in B&B strategies"*

The following section will provide concluding remarks and a discussion.

7. Conclusion and discussion

7.1 Conclusion

The effects of PE ownership on company performance have been widely documented throughout the years and remain a topic of interest for many researchers to this day. The rise of the B&B strategy has also sparked interest among researchers and professionals, but has not resulted in the same level of extensive research. Curiously, the effects of B&B strategies on company performance remain largely undocumented. This thesis attempts to bridge this gap by investigating a sample of 61 European platform companies over the years 2008-2014. The methodology entails testing whether economic performance increases as a result of being involved in a B&B strategy and investigating what factors actually affect the economic performance of platform companies engaged in B&B strategies. The research question this thesis attempts to answer is the following:

"How do Buy-and-Build strategies affect the economic performance of platform companies?"

Initial testing on the difference in economic performance between two points in time reveals that some performance measures show slight increases for the longer time windows, with the shorter time windows reporting only insignificant changes. Adjusting for the performance of a matched industry peer group does not change the outcome. Considering these results, there is little to no significant evidence that suggests platform companies increase their economic performance after initiating a B&B strategy.

Further testing focuses on the determinants of economic performance in B&B strategies, using univariate, multivariate and panel regressions. Firstly, the initial performance of the platform company before the start of the B&B strategy positively affects economic performance, which indicates that the initial characteristics of the platform company seem to matter strongly for the performance after starting the B&B strategy. Secondly, the leverage ratio is negatively related to all performance measures, indicating that a higher leverage ratio decreases economic performance. Thirdly, the level of net working capital plays an important role in explaining economic performance. Net working capital, expressed as a ratio to sales, positively influences economic performance. Fourthly, the number of employees is treated as a proxy for restructuring. A significant relation between the level of employment and economic performance was not found, which indicates that reducing employment as a way to restructure has no effect on economic performance. Finally, the size of the platform company has no significant effect on the economic performance.

Concluding, economic performance of platform companies does not increase as a result of engaging in B&B strategies. Economic performance is affected by initial performance of the platform company, the leverage ratio and the NWC to Sales ratio. The number of employees and the size of the platform company are unrelated to economic performance.

7.2 Discussion

As is the case in any scientific paper, this research is not perfect. The presented methodology remains valid, but has some limitations.

Firstly, the sample is not completely random and can suffer from survivorship bias as failing or non-reporting platform companies are removed from the sample. Therefore, conclusions have to be interpreted cautiously. Secondly, the BvD Orbis and Zephyr databases do not directly define B&B strategies as such, so platform companies have to be inferred from the available data. These databases also only contain data of the last ten years and rely on reporting by the companies themselves, considerably constricting the size of the sample. For example, platform companies located in countries that do not demand public financial reporting will not be included in the sample, although they may be more profitable than platform companies in other countries. This leads to a potential bias in the data, which again must lead to cautious interpretation of the results. Thirdly, due to this ten year restriction of the Orbis database, the sample period has to be chosen carefully. The sample must contain enough observations in terms of number of platform companies, but must also extend far enough in terms of years. The current dataset reaches to three years post-start of the B&B strategy (t_{+3}), but considering the longer investment horizon of B&B strategies, a longer time window could be needed to identify improvements in performance. Fourthly, the matching procedure as described in the methodology section could be extended by also matching companies based on other variables other than industry, such as profitability and size (Fang, 2005). This could also be considered as an extension to this research. Finally, more variables, such as cross-border indicators and the size of the first add-on company, were considered for testing their possible influence on economic performance, but were removed due to severe data limitations.

Extensions to this research can be made in a variety of ways. Firstly, the scope could be extended in two directions. This thesis is focused only on European B&B strategies, so including other large PE markets such as the United States, Australia and Asia can yield interesting results. This would also make it possible to distinguish differences in economic performance between continents and the determinants of these possible differences. Furthermore, extending the reach of the sample beyond the period 2008-2014 can provide useful insights whether the performance of B&B strategies has differed over the years. Secondly, comparing B&B strategies with other non-B&B strategies, such as LBOs or MBOs, can yield important insights into the performance of B&B strategies. These non-B&B comparisons can be matched on industry or year of completion, and can strengthen the conclusions on the performance of B&B strategies. Finally, further research could also focus on the skill of the PE firm, which is deemed an important factor for LBO performance (Kaplan & Schoar, 2005).

Appendix

Table A1 - EU-15 countries ordered by PE activity in 2017

Country	*Number of deals*
United Kingdom	725
Germany	587
France	466
Sweden	371
Italy	347
Spain	321
Finland	269
Netherlands	245
Denmark	178
Belgium	93
Portugal	60
Austria	58
Ireland	37
Luxembourg	18
Greece	7

Table A2 - Description of industries with associated NACE Rev 2. code

2-digit NACE code	*Description*	*Number of platform companies*
10	Manufacture of food products	2
20	Manufacture of chemicals and chemical products	2
22	Manufacture of rubber and plastic products	1
24	Manufacture of basic metals	1
25	Manufacture of fabricated metal products	2
26	Manufacture of computer, electronic and optical products	1
27	Manufacture of electrical equipment	1
29	Manufacture of motor vehicles and trailers	1
31	Manufacture of furniture	1
32	Manufacture of other products	1
33	Repair and installation of equipment	2
35	Supply of electricity, gas, steam and air conditioning	3
45	Sale of motor vehicles and motor vehicle parts	2
47	Retail trade and sale	2
49	Transport via land and pipelines	1
53	Postal and courier activities	1
55	Accommodation	3
56	Food and beverage service activities	1
62	Computer programming and consultancy activities	3
63	Information service activities	2
66	Financial services and insurance activities	3
68	Real estate activities	3
70	Management consultancy activities	1
77	Rental and leasing activities	1
78	Employment activities	1
79	Travel agency and tour operator activities	2
81	Building and landscape servicing activities	1
82	Office administration and support activities	4
85	Education activities	2
86	Human health activities	3
87	Residential care activities	5
88	Social work activities	1
96	Funeral services	1

Table A3 - Definitions of financial variables

Variable	*Definition*	*Calculation*
Return on Assets ("ROA")	Indicator of profitability compared to total assets	$\frac{Net\ profit}{Total\ assets}$
Return on Sales ("ROS")	Indicator of operational efficiency, also known as profit margin	$\frac{Net\ profit}{Operating\ revenue}$
Return on Equity ("ROE")	Indicator of profitability generated by shareholders' capital	$\frac{Net\ profit}{Total\ equity}$
EBITDA margin	Measurement of company's EBITDA (Earnings before Interest, Tax, Depreciation and Amortisation) as a part of operating revenue	$\frac{EBITDA}{Operating\ revenue}$
EBIT margin	Measurement of company's EBIT (Earnings before Interest and Tax) as a part of operating revenue	$\frac{EBIT}{Operating\ revenue}$
Cash Flow to Sales ("CFS")	Measurement of company's cash flow compared to their operating revenue	$\frac{Cash\ flow}{Operating\ revenue}$
Leverage ratio	Measurement of the ratio between total debt and total assets	$\frac{Total\ debt}{Total\ assets}$
Net Working Capital to Sales ("NWC to Sales")	Measurement of company's net working capital compared to their operating revenue	$\frac{Net\ Working\ Capital}{Operating\ revenue}$

Table A4 – Correlation matrix of independent variables related to platform companies

Table A4 reports the correlation coefficients between independent variables based on data from 61 European platform companies engaged in B&B strategies. This correlation matrix can be used to determine the interdependence of the variables on one another.

	Initial leverage	Leverage change	NWC to Sales	Δ employees	Size
Initial leverage	1.000	-0.248	-0.463	0.132	-0.261
Leverage change	-0.248	1.000	-0.099	-0.035	0.017
NWC to Sales	-0.463	-0.099	1.000	-0.085	0.260
Delta employees	0.132	-0.035	-0.085	1.000	-0.186
Size	-0.261	0.017	0.260	-0.186	1.000

Table A5a – Multivariate regression robustness checks based on ROS

Table A5a reports the results of the robustness checks on the multivariate OLS regressions, linking two forms of one performance measure as the dependent variable to six pre-defined independent variables. Variables at different points in time are used to validate the multivariate regression results. Robust standard errors are reported in parentheses below the corresponding coefficient. ***, **, * and + denote levels that differ significantly from zero at the 1%, 5%, 10% and 15% confidence level respectively. Data is winsorized at the 1% and 99% level. The exp. sign column indicates the expected sign of the variables' coefficient based on the hypotheses. The left exp. sign column refers to the signs for columns (1)-(3), while the right exp. sign column refers to the signs for columns (4)-(6). ROS t_{+3} represents the level of the Return on Sales at t_{+3}, or three fiscal years after the start of the B&B strategy. Δ adj. ROS equals the difference in Return on Sales between t_{-1} and t_{+3} minus the median Return on Sales for an industry-matched peer group based on the three-digit NACE code. Descriptions of financial and independent variables can be found in the Appendix and in Section 5.2 respectively.

		(1)	(2)	(3)		(4)	(5)	(6)
Dependent variable	Exp. sign	ROS t_{+3}	ROS t_{+3}	ROS t_{+3}	Exp. sign	Δ adj. ROS	Δ adj. ROS	Δ adj. ROS
Adj. ROS t_{-1}		0.179***	0.163**	0.302**		-0.805***	-0.826***	-0.533***
		(0.063)	(0.066)	(0.120)		(0.084)	(0.089)	(0.125)
Initial leverage			-0.091	-0.154			-0.101	-0.126
			(0.086)	(0.125)			(0.089)	(0.117)
Leverage change	(+)		-0.112	-0.151	(+)		-0.029	-0.011
			(0.157)	(0.156)			(0.177)	(0.179)
NWC to Sales	(-)			0.001	(-)			0.007
				(0.066)				(0.062)
Delta employees	(-)			0.012*	(-)			0.023***
				(0.006)				(0.007)
Size		0.006	0.003	0.003		0.016	0.013	0.013
		(0.011)	(0.010)	(0.013)		(0.014)	(0.013)	(0.014)
Adjusted R^2		0.213	0.201	0.318		0.828	0.823	0.808
F-test			3.583	3.567			48.741	24.171
Observations		42	42	34		42	42	34

Table A5b – Multivariate regression robustness checks based on ROA

Table A5b reports the results of the robustness checks on the multivariate OLS regressions, linking two forms of one performance measure as the dependent variable to six pre-defined independent variables. Variables at different points in time are used to validate the multivariate regression results. Robust standard errors are reported in parentheses below the corresponding coefficient. ***, **, * and + denote levels that differ significantly from zero at the 1%, 5%, 10% and 15% confidence level respectively. Data is winsorized at the 1% and 99% level. The exp. sign column indicates the expected sign of the variables' coefficient based on the hypotheses. The left exp. sign column refers to the signs for columns (1)-(3), while the right exp. sign column refers to the signs for columns (4)-(6). ROA t_{+3} represents the level of the Return on Assets at t_{+3}, or three fiscal years after the start of the B&B strategy. Δ adj. ROA equals the difference in Return on Assets between t_{-1} and t_{+3} minus the median Return on Assets for an industry-matched peer group based on the three-digit NACE code. Descriptions of financial and independent variables can be found in the Appendix and in Section 5.2 respectively.

		(1)	(2)	(3)		(4)	(5)	(6)
Dependent variable	Exp. sign	ROA t_{+3}	ROA t_{+3}	ROA t_{+3}	Exp. sign	Δ adj. ROA	Δ adj. ROA	Δ adj. ROA
Adj. ROA t_{-1}		0.298***	0.299***	0.286		-0.568***	-0.551***	-0.649***
		(0.098)	(0.114)	(0.203)		(0.095)	(0.132)	(0.196)
Initial leverage			-0.012	-0.030			0.010	-0.009
			(0.057)	(0.092)			(0.058)	(0.086)
Leverage change	(+)		-0.109	-0.133	(+)		-0.042	-0.059
			(0.093)	(0.106)			(0.104)	(0.101)
NWC to Sales	(-)			-0.014	(-)			0.013
				(0.048)				(0.032)
Delta employees	(-)			-0.004**	(-)			-0.001
				(0.002)				(0.001)
Size		0.003	0.002	0.003		0.016***	0.016**	0.022**
		(0.008)	(0.008)	(0.014)		(0.006)	(0.006)	(0.011)
Adjusted R^2		0.113	0.106	0.071		0.464	0.442	0.425
F-test			2.271	1.448			52.465	41.918
Observations		44	44	36		44	44	36

Table A5c – Multivariate regression robustness checks based on ROE

Table A5c reports the results of the robustness checks on the multivariate OLS regressions, linking two forms of one performance measure as the dependent variable to six pre-defined independent variables. Variables at different points in time are used to validate the multivariate regression results. Robust standard errors are reported in parentheses below the corresponding coefficient. ***, **, * and + denote levels that differ significantly from zero at the 1%, 5%, 10% and 15% confidence level respectively. Data is winsorized at the 1% and 99% level. The exp. sign column indicates the expected sign of the variables' coefficient based on the hypotheses. The left exp. sign column refers to the signs for columns (1)-(3), while the right exp. sign column refers to the signs for columns (4)-(6). ROE t_{+3} represents the level of the Return on Equity at t_{+3}, or three fiscal years after the start of the B&B strategy. Δ adj. ROE equals the difference in Return on Equity between t_{-1} and t_{+3} minus the median Return on Equity for an industry-matched peer group based on the three-digit NACE code. Descriptions of financial and independent variables can be found in the Appendix and in Section 5.2 respectively.

		(1)	(2)	(3)		(4)	(5)	(6)
Dependent variable	Exp. sign	ROE t_{+3}	ROE t_{+3}	ROE t_{+3}	Exp. sign	Δ adj. ROE	Δ adj. ROE	Δ adj. ROE
Adj. ROE t_{-1}		0.073	0.102	0.039		-0.932***	-0.896***	-0.976***
		(0.059)	(0.082)	(0.112)		(0.071)	(0.094)	(0.128)
Initial leverage			-0.139	0.077			-0.258	0.113
			(0.265)	(0.489)			(0.305)	(0.540)
Leverage change	(+)		-0.458	-0.310	(+)		-0.442	-0.157
			(0.465)	(0.607)			(0.523)	(0.649)
NWC to Sales	(-)			0.160	(-)			0.340*
				(0.206)				(0.204)
Delta employees	(-)			-0.031***	(-)			-0.026**
				(0.011)				(0.012)
Size		0.030	0.026	0.001		0.065	0.060	0.049
		(0.051)	(0.049)	(0.088)		(0.051)	(0.048)	(0.086)
Adjusted R^2		0.000	0.000	0.011		0.830	0.827	0.838
F-test			0.644	1.064			49.996	29.399
Observations		42	42	34		42	42	34

Table A5d – Multivariate regression robustness checks based on EBITDA margin

Table A5d reports the results of the robustness checks on the multivariate OLS regressions, linking two forms of one performance measure as the dependent variable to six pre-defined independent variables. Variables at different points in time are used to validate the multivariate regression results. Robust standard errors are reported in parentheses below the corresponding coefficient. ***, **, * and + denote levels that differ significantly from zero at the 1%, 5%, 10% and 15% confidence level respectively. Data is winsorized at the 1% and 99% level. The exp. sign column indicates the expected sign of the variables' coefficient based on the hypotheses. The left exp. sign column refers to the signs for columns (1)-(3), while the right exp. sign column refers to the signs for columns (4)-(6). EBITDA t_{+3} represents the level of the EBITDA margin at t_{+3}, or three fiscal years after the start of the B&B strategy. Δ adj. EBITDA equals the difference in EBITDA margin between t_{-1} and t_{+3} minus the median EBITDA margin for an industry-matched peer group based on the three-digit NACE code. Descriptions of financial and independent variables can be found in the Appendix and in Section 5.2 respectively.

		(1)	(2)	(3)		(4)	(5)	(6)
Dependent variable	Exp. sign	EBITDA t_{+3}	EBITDA t_{+3}	EBITDA t_{+3}	Exp. sign	Δ adj. EBITDA	Δ adj. EBITDA	Δ adj. EBITDA
Adj. EBITDA t_{-1}		0.298	0.304^{+}	0.784***		-0.652***	-0.648***	-0.260^{+}
		(0.218)	(0.194)	(0.160)		(0.200)	(0.192)	(0.166)
Initial leverage			0.009	-0.040			0.008	-0.028
			(0.104)	(0.100)			(0.113)	(0.097)
Leverage change	(+)		-0.195	-0.076	(+)		-0.073	0.041
			(0.167)	(0.118)			(0.165)	(0.137)
NWC to Sales	(-)			-0.020	(-)			0.042
				(0.061)				(0.076)
Delta employees	(-)			0.010***	(-)			0.012***
				(0.003)				(0.003)
Size		0.044	0.042	-0.003		0.047	0.046	0.008
		(0.037)	(0.037)	(0.014)		(0.036)	(0.038)	(0.020)
Adjusted R^2		0.267	0.256	0.724		0.438	0.405	0.359
F-test			4.003	13.687			6.964	3.705
Observations		36	36	30		36	36	30

Table A5e – Multivariate regression robustness checks based on EBIT margin

Table A5e reports the results of the robustness checks on the multivariate OLS regressions, linking two forms of one performance measure as the dependent variable to six pre-defined independent variables. Variables at different points in time are used to validate the multivariate regression results. Robust standard errors are reported in parentheses below the corresponding coefficient. ***, **, * and + denote levels that differ significantly from zero at the 1%, 5%, 10% and 15% confidence level respectively. Data is winsorized at the 1% and 99% level. The exp. sign column indicates the expected sign of the variables' coefficient based on the hypotheses. The left exp. sign column refers to the signs for columns (1)-(3), while the right exp. sign column refers to the signs for columns (4)-(6). EBIT t_{+3} represents the level of the EBIT margin at t_{+3}, or three fiscal years after the start of the B&B strategy. Δ adj. EBIT equals the difference in EBIT margin between t_{-1} and t_{+3} minus the median EBIT margin for an industry-matched peer group based on the three-digit NACE code. Descriptions of financial and independent variables can be found in the Appendix and in Section 5.2 respectively.

		(1)	(2)	(3)		(4)	(5)	(6)
Dependent variable	Exp. sign	EBIT t_{+3}	EBIT t_{+3}	EBIT t_{+3}	Exp. sign	Δ adj. EBIT	Δ adj. EBIT	Δ adj. EBIT
Adj. EBIT t_{-1}		0.128	0.098	0.293*		-0.843***	-0.884***	-0.478***
		(0.100)	(0.101)	(0.151)		(0.129)	(0.131)	(0.177)
Initial leverage			-0.117+	-0.068			-0.152+	-0.110
			(0.072)	(0.084)			(0.099)	(0.098)
Leverage change	(+)		-0.092	-0.056	(+)		-0.088	-0.034
			(0.144)	(0.123)			(0.165)	(0.131)
NWC to Sales	(-)			0.116*	(-)			0.097
				(0.058)				(0.067)
Delta employees	(-)			0.011+	(-)			0.023***
				(0.007)				(0.008)
Size		0.017	0.013	0.012		0.025	0.020	0.020
		(0.014)	(0.014)	(0.023)		(0.017)	(0.016)	(0.024)
Adjusted R^2		0.065	0.063	0.420		0.718	0.719	0.738
F-test			1.703	5.108			27.800	16.985
Observations		43	43	35		43	43	35

Table A5f – Multivariate regression robustness checks based on CFS

Table A5f reports the results of the robustness checks on the multivariate OLS regressions, linking two forms of one performance measure as the dependent variable to six pre-defined independent variables. Variables at different points in time are used to validate the multivariate regression results. Robust standard errors are reported in parentheses below the corresponding coefficient. ***, **, * and + denote levels that differ significantly from zero at the 1%, 5%, 10% and 15% confidence level respectively. Data is winsorized at the 1% and 99% level. The exp. sign column indicates the expected sign of the variables' coefficient based on the hypotheses. The left exp. sign column refers to the signs for columns (1)-(3), while the right exp. sign column refers to the signs for columns (4)-(6). CFS t_{+3} represents the level of the CFS ratio at t_{+3}, or three fiscal years after the start of the B&B strategy. Δ adj. CFS equals the difference in CFS ratio between t_{-1} and t_{+3} minus the median CFS ratio for an industry-matched peer group based on the three-digit NACE code. Descriptions of financial and independent variables can be found in the Appendix and in Section 5.2 respectively.

		(1)	(2)	(3)		(4)	(5)	(6)
Dependent variable	Exp. sign	CFS t_{+3}	CFS t_{+3}	CFS t_{+3}	Exp. sign	Δ adj. CFS	Δ adj. CFS	Δ adj. CFS
Adj. CFS t_{-1}		0.145	0.121	0.156		-0.836***	-0.877***	-0.706***
		(0.119)	(0.117)	(0.146)		(0.122)	(0.121)	(0.205)
Initial leverage			-0.103	-0.167			-0.152	-0.178
			(0.111)	(0.126)			(0.116)	(0.137)
Leverage change	(+)		-0.162	-0.118	(+)		-0.077	-0.004
			(0.167)	(0.165)			(0.188)	(0.184)
NWC to Sales	(-)			0.098+	(-)			0.101
				(0.065)				(0.086)
Delta employees	(-)			0.003	(-)			0.011+
				(0.005)				(0.007)
Size		0.045+	0.038	0.020		0.057*	0.049+	0.026
		(0.029)	(0.030)	(0.014)		(0.030)	(0.032)	(0.018)
Adjusted R^2		0.187	0.167	0.452		0.717	0.711	0.691
F-test			2.758	4.980			22.483	11.792
Observations		36	36	30		36	36	30

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