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Beyond Borders in Private Equity

A quantitative study unveiling the drivers of return in
cross-border buy-and-build strategies

Bachelor's Programme in International Business

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Abstract

The aim of this thesis is to determine what drives the return in cross-border buy-and-build (B&B) strategies, and if the drivers and the return generated in cross-border B&B strategies differ from those in domestic strategies. Drawing upon prior research of B&B strategies and cross-border M&A, the thesis provides an overview of the current studies on value drivers in private equity, and B&B strategies, with an additional focus on implications of cross-border M&As. To test the hypotheses, a quantitative study with a deductive approach was employed. Variables were constructed using secondary data from Orbis M&A, together with supplementary data from additional sources. The conducted analysis indicates that cross-border B&Bs generate higher returns than their domestic counterparts. Cross-border B&B results in greater multiple expansion, which could be attributed to the associated complexity premium. For operating improvements, no notable differences were found between domestic and cross-border B&Bs. However, operating improvements were found to be the primary drivers of return in cross-border B&Bs, indicating the importance of synergistic effects between add-ons. By replicating this thesis using proprietary data, the generalisability of these findings could be increased, thus contributing to a deeper understanding of cross-border B&B strategies.

Keywords: private equity, buy-and-build, cross-border, multiple expansion, operating improvements, value creation

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1.Introduction

Private equity (henceforth PE) revolves around pooling capital from investors, purchasing firms, increasing the value of these, and then selling them for a profit (Investopedia, 2024). Their influence and importance in the global economy has increased significantly over the past decade, with total assets under management globally growing by 430% from 2010 to 2022 (S&P Global, 2024), reaching 7.6 trillion USD (Gunter et al. 2023). Throughout this period, traditional value creation methods in PE have become increasingly commoditized (Braun et al. 2017), and more sophisticated strategies have grown in importance (Hammer et al. 2022b). One such is the buy-and-build (henceforth B&B) strategy, where the PE firm acquires a company (the platform), which is then used to make additional acquisitions (add-ons) (Bansraj et al. 2020). The goal is to expand the scale and reach of the combined entity before selling it (Bansraj et al. 2020). This strategy made up 46% of the total PE buyout volume in 2023 (McKinsey, 2024), which indicates its substantial importance in the alternative investment landscape. Following its growing prevalence, and economic significance, researchers have demonstrated increased interest in B&Bs. However, the value drivers and returns of cross-border B&B, and how these differ compared to domestic B&B, still remain largely unexplored.

Given its increased importance, research has recently directed its focus towards B&B strategies. Several studies have taken an empirical approach to investigate the performance of PE-backed B&B strategies and found superior returns (Hammer et al 2022a; Hammer et al. 2022b; Heisig et al. 2022; Homs, 2019; Nikoskelainen & Wright, 2007). Moreover, prior research by Hammer et al. (2021) has indicated that a significant portion (21%) of B&B strategies are cross-border, involving at least one add-on acquisition from a country different from that of the platform company.

Findings relating to cross-border B&B strategies are still inconclusive. Some research has found evidence that cross-border B&B strategies outperform domestic strategies (Brigl et al. 2016), or pointed to factors which might lead to such an outcome (Hammer et al. 2020). Others have reached inconclusive results (Acar, 2017) or shown no differences (Heisig et al. 2022; Homs, 2019). Moreover, some papers have decomposed the performance of B&B strategies, but not in a

comparative setting between cross-border and domestic (Bansraj et al. 2022; Hammer et al. 2022a; Hammer et al. 2022b; Heisig et al. 2022; Haliwela, 2018). Comparative research has been conducted, but has been centred around a single driver of value (Hammer et al. 2020, Acar, 2017). Hence, there is a gap in the prior research investigating the returns from cross-border B&Bs, and the different drivers in the value creation process of cross-border and domestic B&Bs.

On a global level, markets have become increasingly interconnected; therefore, understanding the dynamics of cross-border transactions is crucial. This thesis contributes to this understanding by dissecting outcomes of PE-backed B&B strategies across borders, offering insights that may influence future academic research and practical investment strategies. To achieve these goals, the research question posed is: *"What drives the return in cross-border B&B strategies, and do drivers and returns differ compared to domestic strategies?"*. In pursuit of answers, this thesis will utilise a dataset comprising both domestic and cross-border B&B transactions to conduct statistical tests, aiming to uncover the nuances in performance and value creating drivers between these strategies. Supporting this aspiration, the thesis will draw upon a broad spectrum of literature, including general findings in PE, specific studies on B&B strategies, and insights from cross-border mergers and acquisitions (henceforth M&A) research to create a comprehensive background for discussing the findings.

2. Theory and Hypotheses

2.1 Recent developments in PE

Studies conducted by Degeorge et al. (2016), Arcot et al. (2015), and Jenkinson and Sousa (2015), have documented an increase in the number of secondary buyouts in PE; meaning PE firms purchasing a company currently owned by another PE firm. Concurrently, research by Braun et al. (2017) and Harris et al. (2023) has noted a decline in the persistence of performance among PE firms. This refers to the consistency of returns across successive funds managed by the same firm. Braun et al. (2017) attribute this trend to two factors. Firstly, they point to increasing competition for deals, leading to fewer proprietary deals and a higher proportion of acquisitions being marketed through auctions. Likely, this results in less favourable entry prices for PE firms. Furthermore, the efficiency of traditional PE techniques such as financial engineering and governance have diminished (Hammer et al. 2017). According to Braun et al. (2016) this decline in efficacy stems from the commoditization of the aforementioned investment techniques among PE firms. Secondly, Braun et al. (2017) mention that the typical operational improvements imposed on portfolio firms by PE managers have become widely adopted across the market, thus reducing the potential for operational enhancements. In response, Hammer et al. (2017) note that PE firms have increasingly turned to B&B strategies to drive returns. This shift is supported by Brigl et al. (2016), who report that the percentage of PE deals involving add-ons has risen significantly, from 20% in 2000 to 53% in 2012, indicating a growing preference for inorganic growth strategies. Having outlined the reasons behind the increased prevalence of B&B strategies, the next section will provide a foundational understanding of B&B strategies.

2.2 B&B strategies

2.2.1 What is buy-and-build?

Bansraj et al. (2022) describe the B&B strategy as a hybrid approach, combining features of the serial acquisition strategy typically used by operational firms, with the leveraged buyout method prevalent in private equity transactions, that involves acquiring firms using significant amounts of debt. According to Bansraj et al. (2022), the returns in B&B strategies are largely a result of

growth. In their paper, the authors identify three principal sources of growth. First, operational synergies, emerging from the integration of the different firms. Secondly, inorganic growth, stemming from the consolidation of multiple companies. Thirdly, the "PE effect", referring to enhancements in financial management, governance and operations.

In his seminal work on the B&B strategy, Smit (2001) described the goal of the strategy as leveraging strengths and capabilities of the platform company across an expanded scope. The ultimate goal is further described by Smit, as consolidating a market or industry, which typically require a longer time commitment and planning horizon, compared to other common PE strategies. The longer time commitment creates a tradeoff, as PE firms are generally advised to keep holding periods short to maximise internal rate of return (henceforth IRR) (Cumming et al. 2005). This tradeoff has been explored by Hammer et al. (2020), who argue that the tradeoff will be between quantity of acquisitions (boost hypothesis) and complexity of acquisitions (transformation hypothesis). Using a control group of companies not owned by PE firms, they found that PE ownership leads to a significant increase in the number of acquisitions, but that the complexity of transactions were similar to the group not owned by PE. This finding is in line with the framework presented by Smit (2001) which underscores the role of market consolidation in B&B strategies.

2.2.2 Platform company characteristics

Research by Borell and Heger (2013) claims that a common characteristic of platform companies is having spare capacity. They explain that this trait, combined with acquiring add-ons with higher utilisation, allows the platform company to reach greater efficiency and overall performance. This is done through reallocating resources and capacity within the combined entity. Other factors which have been highlighted as important include: being scalable, having a healthy financial position, using assets efficiently, possessing the right IT-infrastructure, and having a strong management team (Borell & Heger, 2013; Haliwela, 2018; Hammer et al. 2018; MacArthur, 2019). Interestingly, Hammer et al. (2018) also found that M&A experience significantly increases a firm's likelihood of becoming a platform. They justify this using holding period constraints previously covered, arguing that a company that quicker integrates additional firms, at lower transaction costs, is more attractive.

2.2.3 PE firm characteristics

Hammer et al. (2017) provided evidence that B&B strategies are generally pursued only by top-performing PE firms, with 16% of PE firms accounting for 80% of all add-on acquisitions. The authors highlight how experience and reputational capital are what distinguish these top PE firms from those less engaged in B&B strategies. These strengths lead to greater deal flow and networking capabilities, which likely make employing B&B strategies more attainable for top PE firms (Hammer et al. 2017). Other studies also highlight that PE firms actively assist their portfolio companies in reducing information asymmetries and expanding networks (Borell & Heger, 2013), capabilities that are likely more developed in established PE firms.

2.2.4 Market characteristics

In discussing market characteristics, Smit (2001) claimed that the B&B strategy should be pursued particularly in fragmented markets without a clear market leader. This was later proven to be the case by Hammer et al. (2017) who found evidence that B&B strategies were most prevalent in moderately fragmented industries. The authors further highlight how these markets typically have a large pool of potential platform companies of the appropriate size, while still allowing for consolidation to occur. Borell and Heger (2013) provide an additional explanation, highlighting that antitrust agencies typically are less involved in fragmented industries. Having established the underlying logic of B&B strategies together with its key characteristics, the following section will disentangle the performance factors of PE.

2.3 PE value drivers

In order to measure the performance of the B&B strategy, the factors that drive returns must be defined. Following Achleitner et al. (2011), these factors have been divided into (1) improvements in operating performance, (2) increase in valuation multiples and (3) de-leveraging. According to Guo et al. (2011), operating improvements may include removing inefficient assets, increasing the efficiencies of existing assets, or enhancing profitability through other means. Multiple expansion consists of selling the company at a greater valuation multiple than upon purchase (Corporate Finance Institute, n.a.). Typically, the multiple used is enterprise

value (EV) to EBITDA (EV/EBITDA), but due to limited data availability, EV to sales (EV/Sales) have also been commonly used (e.g. Hammer et al. 2020, Hammer et al. 2022a; Hammer et al. 2022b). This lever is usually pursued with a strategy called "multiple arbitrage" (MacArthur et al. 2019), where the firm increases sales, aiming to exploit the propensity of buyers to assign greater multiples to larger companies (Ben-Zion & Shalit, 1975). Lastly, deleveraging refers to the decrease in net debt from the time of acquisition to the time of sale, resulting in an increased proportion of equity value to debt (Guo et al. 2011; Kaplan & Strömberg, 2009).

Scholars have found that a mix of these levers are used to drive value (Hammer et al. 2022a). However, the general view is that de-leveraging has decreased in importance, whereas operational improvements have increased (Puche et al. 2015). This aligns with the previous discussion on how certain value-enhancing actions are becoming commoditized, forcing PE firms to adopt more sophisticated strategies. Brown and Yi (2023) emphasise that PE representatives consider EBITDA growth to be the main driver for buyout success, which is also in line with the view presented by Puche et al. (2015). Given that de-leveraging appears to be the least significant variable for driving returns, in conjunction with the unavailability of data on capital structure, this thesis will solely focus on multiple expansion and operating performance as the primary drivers of value in the B&B strategy.

2.3.1. Operating improvements

The empirical evidence of improvements in operating performance post buy-out is generally very strong. Kaplan (1989) and Smit (1990) both found increases in profitability post buyouts due to operational improvements. Importantly at this time, Smit (1990) also showed that neither elimination of underperforming assets, nor layoffs were entirely responsible for the improvements. Instead, efficiency-based methods, such as improvements in working capital, made large impacts. Similarly, Lichtenberg and Siegel (1990) found evidence of total factor productivity improvements post-buyout.

More recently, Cumming et al. (2007) summarised many of the findings before 2007, concluding that overall, buyouts improve performance of firms. Most recently, Puche et al. (2015) used a

large sample, covering 45 countries, and found operational improvements responsible for the greatest portion (~50%) of value created in buyouts. Among these operational improvements, sales growth contributed the most significantly (Puche et al. 2015). Hence, there is generally a consensus that buyout leads to improvements in operating performance, although the size of these improvements are quite inconsistent. For example, Guo et al. (2008) who looked at the period between 1990 and 2006 in a US public-to-private context, found much smaller operating improvements than previous researchers. Similar findings were made by Acharya et al. (2013). One should therefore be careful to what degree to expect these improvements. In addition, those studies conducted in the US (e.g. Kaplan, 1989; Lichtenberg & Siegels, 1990; Smit, 1990) are subject to particular selection biases due to the limited information on private companies available in the US. These studies therefore often look at companies which subsequently go public, sell public bonds, or are public-to-private deals. All of these factors can increase risk that the sample is not representative of the population of buyouts. However, similar results have been replicated in a European context (e.g. Bergström et al. 2007), where accounting information for private companies is available, thus eliminating potential selection bias.

2.3.2 Multiple expansion

Many studies have underscored the significance of multiple expansion in generating excess return in buyout transactions. For instance, Guo et al. (2011) discovered that 18% of buyout returns can be attributed to changes in industry valuation multiples, thus highlighting how industry conditions affect returns. Following this, Achleitner et al. (2011) suggested that the ability to effectively time the market is critical for PE firms. In contrast, when analysing transactions in Western Europe, Acharya et al. (2013) found that buyouts led to an improvement in EV/EBITDA multiples of 1.1 relative to sector peers, suggesting that these gains were due to factors other than industry trends. Further, Puche et al. (2015) analysed the relative contributions of different value drivers in buyouts, finding that EBITDA multiples specifically had a relative effect on performance of 15%.

While it is evident that changes in multiples are influenced by general market conditions, they are also driven by operational improvements within firms. This was shown by Achleitner et al. (2011) who found a significant positive correlation between sales growth and EBITDA

multiples. In their paper, analysing 1980 buyouts in Europe and North America, they observed that for every 10% increase in sales, the EBITDA multiple increased by 1%. This is likely the result of buyers paying premium for past growth as a proxy for future growth, which is in line with Opler and Titman (1993) description of EBITDA multiple as a proxy for expected growth. Additionally, sales growth may specifically result in higher exit valuations, as increased size helps firms overcome the liability of smallness (Achleitner, 2011). Liability of smallness could be due to smaller firms having less assets (Aldrich & Auster, 1986) and being more geographically concentrated (Viva, Ragozzino & Trigeorgis, 2020), making them more vulnerable to external shocks. Lastly, managerial weakness for smaller firms could also negatively affect results (Chowdhury & Lang, 1996).

Entry pricing is also an important factor for multiple expansion. Bargeron et al. (2008) analysed premiums paid in US public-to-private acquisitions between 1980 and 2005, observing that PE firms paid lower premiums compared to other acquirers. The authors suggest that PE firms are compelled to purchase at lower prices because they are less likely to realise synergies compared to corporate buyers. Having covered the central value drivers in PE more broadly, the focus will now be shifted towards the role of these drivers in the B&B context.

2.4 B&B - Performance

Throughout the last two decades, the performance of B&B strategies have been analysed by several scholars. For the purpose of this thesis, the previous research can be divided into two main categories; articles focusing on the performance of B&B strategies more generally (Hammer et al. 2022a; Hammer et al. 2022b; Nikoskelainen & Wright, 2007), and papers that separate cross-border and domestic B&B strategies, to differing extents (Acar, 2017; Brigl et al. 2016; Hammer et al 2020; Hammer et al. 2021; Heisig et al. 2022; Homs, 2019). Notably, a large majority of the literature is published within the last decade, indicating the increased emphasis placed on B&B strategies within the PE literature. Below follows a review of the literature that does not distinguish between domestic and cross-border B&B strategies.

2.4.1 General B&B literature

Hammer et al. (2022b) analysed a sample of 278 PE buyouts that implemented B&B strategies. They discovered that each add-on acquisition increased the enterprise value compounded annual growth rate (CAGR) by 3.5% and the EV/Sales multiple by 35%, leading them to conclude that B&B strategies, on average, create value. Moreover, Hammer et al. (2022a) analysed a sample of 3,399 buyouts from 1997 to 2020 and compared these to a matched sample of strategic acquisitions. The authors found that B&B deals yielded equity IRRs of up to 10 percentage points higher than those of the closest matches in the non-B&B sample. Similarly, Heisig et al. (2022) found that B&B strategies yield higher EV CAGR than non-B&B acquisitions, analysing a sample of 971 PE-backed add-ons between 2002 and 2020. The authors attributed the difference to the add-on sourcing effect. This effect involves PE pursuing multiple arbitrage by acquiring add-ons with lower multiples than the platform company. When the add-on sourcing effect was removed, no difference was found between the B&B and non-B&B sample. The authors suggest that the add-on sourcing effect is influenced by good sourcing teams, industry-diversifying acquisitions, annual inorganic EBITDA effect (i.e. the increase in EBITDA of the platform company through add-on acquisitions) and frequency of transactions (i.e. number of add-ons divided by holding period). Moreover, Nikoskelainen and Wright (2007) analysed UK management buyouts and found add-ons to be the main driver of leveraged buyout returns. The authors argue that add-ons allow for increases in scale which decrease investment risk. Further they state that increased size allows firms to make efficiency gains by leveraging economies of scale. Overall, prior PE research has consistently shown that PE-backed B&B strategies outperform strategic acquirers and other PE strategies. In the next section, the literature that makes a distinction between cross-border and domestic strategies will be covered.

2.4.2 Cross-border B&B literature

Prior research has reached no clear consensus regarding the performance differences between domestic and cross-border B&B. On one hand, Brigl et al. (2016) present evidence of superior returns from cross-border B&B strategies, while Hammer, et al. (2020) highlight factors which should lead to greater returns. On the other hand, Acar (2017) presents inconclusive results, and other scholars suggest there are no differences (Heisig et al. 2022; Homs, 2019).

Among research indicating a higher return of cross-border strategies, Hammer et al. (2020) found that cross-border B&Bs yielded 40% higher exit multiples compared to domestic counterparts. This analysis was based on a sample of 432 PE-backed add-ons from 1997 to 2015. The authors suggest that the premium pricing upon exit is due to international acquisitions incurring higher transaction costs. This implies that cross-border B&Bs are more challenging to replicate than domestic ones, thereby justifying a premium. Several scholars support the notion of higher transaction costs in cross-border acquisitions, attributing it to factors such as different legal regimes and accounting standards (Rossi & Volpin, 2004), difficulties in coordinating cultural disparities (Ahern et al. 2015) and difficulties to direct and monitor operations (Kang & Kim 2008). Authors have argued that PE firms with experience can mitigate these costs (Hammer et al. 2018). Additionally, firms that are more skilled at mitigating transaction costs are more likely to engage in cross-border acquisitions (Holloway et al. 2016). Further, research done in a collaboration between HHL Leipzig Graduate School of Management and Boston Consulting Group by Brigl et al. (2016) indicates that cross-border B&Bs generate an average IRR of 38.2%, which is more than 11 percentage points higher than the corresponding value for domestic B&Bs. The authors propose that opportunities for cross-selling, economies of scale, and multiple expansion are key drivers behind these significant differences between cross-border and domestic B&Bs. Additionally, the authors find that smaller platform firms generate greater returns than their larger counterparts.

Prior research indicating no superior returns from cross-border strategies include Heisig et al. (2022) who found the add-on sourcing effect to be the reason for higher returns in B&B strategies overall. The study did not find any difference in the add-on sourcing effect for cross-border buyouts, thus indicating similar returns of cross-border and domestic B&Bs. In addition, Homs (2019) did not find support for the notion that international add-ons benefit the efficiencies of the platform company, when testing for acquirer's superior returns in cross-border B&Bs. However, the author acknowledges that the limited sample of cross-border B&Bs in the studied sample of 91 B&B strategies, could be the reason behind this finding. Besides articles supporting or not supporting cross-border B&Bs yielding higher returns, there is also research presenting inconclusive results. Although limited by a small sample of 55 strategies and statistical significance, Acar's (2017) results indicate that cross-border B&Bs result in greater

revenue increases compared to domestic ones. At the same time, the author found cross-border strategies to underperform domestic strategies in terms of EBITDA growth and EBITDA margin. Overall, prior literature does not present a clear consensus on the returns of cross-border B&Bs. Therefore, this study will explore the field of cross-border mergers and acquisitions to uncover insights that could enhance the understanding of these strategies.

2.4.3 Cross-border M&As

In their work, Hitt and Pisano (2003) highlight the opportunities of cross-border M&A, claiming they can lead to rapid inorganic growth, increased profits, and more stable revenues through geographic diversification. Further, Kotabe (1990) claims that cross-border M&A can be a tool for acquiring new knowledge and resources, which is enhanced when these acquisitions are highly integrated. Additionally, these acquired innovative capabilities can be further strengthened by synergies and economies of scope between firms (Hoskisson & Hitt 1988). On the other hand, significant challenges have also been identified. One of the central challenges identified in cross-border M&As is agency problems, which can potentially result in lower efficiency (Moeller & Schlingemann, 2005). Another central challenge relates to national cultural differences, which cause managerial complexities and reduce shareholder value (Rahahleh & Wei, 2013). These challenges have been highlighted by Chatterjee et al. (1992) to be particularly significant when strong integration is required. Barkema et al. (1996) takes this further, highlighting the challenge of accommodating not only the national culture of the foreign country, but also the corporate culture, which is referred to as double-layered acculturation. Challenges not directly relating to culture are also highlighted by Black et al. (2001). They note how differences in national accounting standards can increase the complexities in cross-border transactions as firm valuations become more difficult. Bertrand and Zitouna (2008) take another perspective and suggest that large national differences can allow for realisation of more synergistic and complementary effects. Building on these opportunities and challenges, along with the previously covered performance of B&B strategies, the next section will introduce the first hypothesis.

2.4.4 Returns in cross-border B&B

Based on the existing literature on B&B strategies, there appears to be a consensus that these strategies, compared to other PE approaches, generate superior returns. However, the literature comparing cross-border to domestic B&Bs is less clear. Although fewer scholars report superior returns from cross-border B&Bs, those in favour present clear empirical evidence (Brigl et al. 2016; Hammer et al. 2020). In contrast, studies pointing in the opposite direction, either only identify contributing factors (Heisig et al. 2022), or suffer from small sample sizes (Acar, 2017; Homs, 2019). Additionally, in viewing research on cross-border M&A, together with more general studies of PE, there seems to be reason to believe that PE firms can overcome some of the challenges associated with cross-border transactions, leaving them with opportunities left to exploit. Thus, the following hypothesis was created:

H1: *Cross-border B&B strategies yield higher returns (IRR) compared to domestic B&B strategies.*

2.5 Value drivers in B&B

Beyond testing for the returns of cross-border B&B strategies, this thesis will also analyse the different drivers in their value-creation process. This is highly relevant and has yet to be explored in a comparative setting between domestic and cross-border B&Bs. Multiple scholars have already decomposed the value drivers of B&B strategies (Bansraj et al. 2022; Hammer et al. 2022a; Hammer et al. 2022b; Heisig et al. 2022; Haliwela, 2018), however, they do not directly compare these decomposed value drivers between domestic and cross-border B&Bs. Hammer et al. (2020) and Acar (2017) have compared these strategies, but centred their research on multiples and operating performance, respectively. Hence, this section of the literature review will present the findings of these scholars to formulate testable hypotheses of the difference in value drivers between cross-border B&B strategies and their domestic counterparts.

2.5.1 Buyout-pricing

Buyout pricing can significantly impact the feasibility of realising multiple expansion, and is therefore an important aspect to consider. If a PE firm pays a premium for acquiring a platform company, the entry multiples will be elevated, making further expansion more challenging. Prior research has indicated that B&B strategies can increase buyout-premiums, as these are subject to similar synergies for which non-private equity acquires pay premiums (Hammer et al. 2018). Later, Hammer et al. (2021) analysed the premiums paid by PE firms when purchasing platform companies in foreign countries, finding the EV/Sales multiple to be 25-37% higher compared to domestic buyouts. The authors attribute this to informational disadvantages and lower bargaining power. In terms of premiums paid for add-ons in cross-border strategies, Acar (2017) observed that platform companies pay a premium of 0.94 in terms of EV/EBITDA, compared to domestic platform companies. Smit (2001) explains that the value of add-ons should account not only for their intrinsic value but also their flexibility and synergistic value. Connecting this with Viva et al. (2020) highlighting that cross-border acquisitions generally offer greater flexibility, an argument can be made which justifies why cross-border add-ons command a premium.

2.5.2 Multiple expansion in B&B

Hammer et al. (2022a) found B&B strategies to yield greater returns than non-B&B strategies, suggesting the result was largely due to a 5 percentage points higher EV/EBITDA CAGR for B&B strategies. Moreover, Hammer et al. (2022b), found that every add-on acquisition increases the EV/Sales CAGR. The importance of multiple expansion is also highlighted by Heisig et al. (2022) who found EV/EBITDA CAGR to be a major value driver. However, the study found no performance difference between PE-backed B&B strategies and non-PE buyouts when removing the add-on sourcing effect. In addition, the effect was not greater for cross-border B&B strategies compared to domestic ones. Therefore, according to Heisig et al., one should not expect to see a difference between the multiple expansions of domestic and cross-border strategies. In contrast, Hammer et al. (2020) found that cross-border B&Bs render 40% higher exit multiples than non-B&B PE deals, while domestic B&B did not have a statistically significant difference to non-B&B strategies. The author attributes this to a premium paid for the increased complexity of cross-border B&B due to higher transaction costs. Taking a broader view; it is hypothesised that cross-border generate greater return than domestic strategies, and prior literature suggest that

multiple expansion is a central value driver in B&B. With this in mind it is likely that a notable portion of the hypothesised outperformance is driven by multiple expansion. Based on this reasoning and the results of Hammer et al. (2020), the following hypotheses were created:

H2.1: *Cross-border B&B strategies result in greater multiple expansion than domestic B&B, measured by EV/Sales CAGR.*

H2.2: *Cross-border B&B strategies result in greater multiple expansion than domestic B&B, measured by EV/EBITDA CAGR.*

2.5.3 Operating improvements in B&B

In addition to multiple expansion, improved operating performance, both through margin expansion (EBITDA margin) and top-line growth, is another central driver whereby PE firms create value. Bansraj et al. (2022) provide evidence supporting operating improvements in multiple areas of B&B. These improvements come from traditional PE methods such as financial, governance, and operational engineering (Bansraj et al. 2022). Additionally, they occur through operational synergies, especially restructuring synergies, which allow acquired companies to reallocate assets among themselves, thus increasing efficiency (Bansraj et al. 2022). Moreover, Hammer et al. (2022a), find sales growth to be significantly higher for B&B strategies, compared to margin improvement The authors argue that top-line synergies, such as cross-selling, pricing harmonisation and joint branding, can be achieved relatively quickly, while cost synergies driving margin improvements takes more time to achieve. Moreover, Haliwela (2018) found that B&B strategies boost EBITDA margin, specifically when (1) investment horizon is extended which enables consolidation of fragmented markets and (2) when the chosen platform company is scalable. In contrast, Heisig et al. (2022) concluded that EBITDA growth does not significantly impact the exit price. The authors provide two potential explanations for this finding. First, the buyer of the platform company may lack sufficient information about the company and its add-ons, rendering it difficult to distinguish between different types of EBITDA growth, i.e. organic or inorganic (Heisig et al. 2022). Secondly, some buyers place lower emphasis on operating growth, making them less willing to pay the premium associated with a faster-growing firm (Heisig et al. 2022).

Research specifically examining value creation through operating improvements in cross-border B&B strategies is limited. One scholar examining this is Acar (2017). He looked specifically at growth in sales, EBITDA and EBITDA margin, and found cross-border outperforming domestic only in terms of revenue growth, whereas these strategies did worse in both EBITDA margin and EBITDA. However, based on the small sample size of the study no definitive conclusions can be drawn. In addition, cross-border M&A research has also highlighted the more stable revenue streams that can result from such acquisitions (Hitt & Pisano, 2003). Further, findings discussed earlier from Moeller and Schlingemann (2005) highlight increased agency problems from cross-border transactions resulting in inefficiencies, thus implying lower EBITDA margins in cross-border M&A.

To summarise, prior research has indicated operating improvements in top-line growth, for B&B strategies in general and especially for cross-border strategies. Adding to this, M&A research has highlighted the potential for greater sales resulting from cross-border acquisitions. In terms of margin improvements, there are few scholars indicating substantial growth for B&B strategies in general, and none for cross-border strategies. Additionally, M&A research generally highlights challenges in this domain. Therefore, the following hypothesise was created:

H3.1: *Top-line growth (Sales CAGR) is greater for cross-border B&B strategies, than for domestic B&B strategies.*

H3.2: *Margin expansion (EBITDA margin CAGR) is lower for cross-border B&B strategies, than for domestic B&B strategies.*

Out of the two main value drivers, operating performance and multiple expansion, previous studies have predominantly indicated that multiple expansions account for the largest portion of returns in cross-border B&Bs. This finding is significant given the challenges in achieving operational synergies through add-ons, a complexity underscored by several articles on B&B strategies. Furthermore, there is less research suggesting a notable impact from improved

operational performance in both general and cross-border B&B strategies. Therefore, the following hypotheses were formulated:

H4.1: *Multiple expansions (EV/Sales CAGR) have a greater contribution to the returns of cross-border B&B strategies (IRR), compared to improvements to the operating performance (Sales CAGR).*

H4.2: *Multiple expansions (EV/EBITDA CAGR) have a greater contribution to the returns of cross-border B&B strategies (IRR), compared to improvements to the operating performance (EBITDA margin CAGR).*

3. Method

3.1 Research design

This thesis employs a deductive approach, starting with established theories to develop hypotheses that are subsequently evaluated through statistical testing (Bryman & Bell, 2011). In the early phases of developing the research question, potential areas of research were discussed with representatives from three prominent Swedish PE firms. This collaboration aimed to ensure that the research was relevant for practitioners. A cross-sectional research design was applied, collecting data from various unique B&B strategies, each consisting of at least three events: entry, add-on, and exit, which were combined into a single item. The sample was then divided into two groups: cross-border and domestic. A B&B strategy was classified as cross-border if the platform company and at least one add-on originated from different countries. The objective of this design was to explore the relationship between the dependent variable, Internal Rate of Return, and the independent variables: Sales CAGR, EBITDA margin CAGR, EV/Sales CAGR, and EV/EBITDA CAGR. The hypothesis testing procedure was structured as follows: seven hypotheses were formulated based on prior research. Secondary data was then sampled from the Orbis M&A database, and supplemented with additional data. Thereafter, the data were operationalized. After consulting with the statistics department at LUSEM, the hypotheses were tested using descriptive statistics, Cohen's D effect size, Student's t-test, and Multiple Linear Regression. All statistical analyses were conducted using PHStat in Excel and SPSS.

3.2 Sample construction

Previous research has identified significant barriers to studying B&B strategies. For example, Bansraj et al. (2022) highlighted that no commercial database includes B&B strategies as coherent sequences, including the entry acquisition of the PE firm into the platform company, the add-on acquisition, and the exit transaction. This necessitates a need for researchers to map B&B strategies largely through desktop research (e.g. Bansraj et al. 2022; Hammer et al 2017). Additionally, data availability is sparse due to lenient requirements for private firms to disclose financial information (Bansraj et al. 2022), and the general lack of mandatory disclosure for deal

data. Some previous researchers (Acharya et al. 2013; Heisig et al. 2022) have circumvented this challenge by using proprietary data collected from Fund of Funds; an investment fund that pools capital from multiple investors to invest in a portfolio of other funds (Sokołowska, 2016).

Zephyr has been widely used in prior research (Acar, 2017; Haliwela, 2018; Hammer et al. 2013; Hammer et al. 2022a, Hammer et al. 2022b; Homs, 2019) and is known for having broad coverage of private firm acquisitions (Erel et al. 2015). Often, this data has been supplemented with information from Orbis (Acar, 2017; Hammer, 2020). Recently, Zephyr and Orbis have created a joint product "Orbis M&A", which combines the extensive transaction data from Zephyr with the financial data from Orbis. Based on previous research, and following a comparative test between Capital IQ and Orbis M&A, the latter demonstrated greater data availability and was consequently chosen when constructing our sample.

Details on how previous researchers constructed their samples are often limited. In many instances, crucial steps in the methodology are either inadequately covered or presented in a conceptual manner. Efforts to replicate previous sample constructions using these descriptions have thus led to significantly different samples than those originally reported. This discrepancy can potentially be attributed to changes in functionality due to the merger of Zephyr and Orbis, but more likely due to the general lack of detailed descriptions in previous research. Consequently, there was a need to develop a new approach to construct the sample. This method consisted of two complementary methods; (1) *the automated matching method*, and (2) *the desktop method*.

3.2.1 The automated matching method

The *automated matching method* consists of four stages, which each individual B&B had to pass through to be added to the final sample. These were: (I) identifying potential B&B strategies, (II) verifying the authenticity of B&B strategies, (III) ensuring all add-ons within each strategy are included, and (IV) adding complementary data when necessary. If a strategy made it to this stage, and enough data was available for it to be analysed in at least one of the hypotheses, it was included in the final sample.

I. Identifying potential B&B strategies:

First, the *PE entry* dataset was constructed using the following filters in Orbis M&A:

- Deal financing: *'PE' or 'Leveraged Buyout'*
- Time period: *From '01/01/1997 to 01/01/2017' with deal statuses 'Completed - confirmed' or 'Completed - assumed'*
- Deal value: *'All deals with known value (including estimates)'*

This resulted in 44,075 matches. The aim of this dataset is to encompass all known PE entries from 1997 to 2017. We chose this period because data availability prior to 1997 is essentially non-existent in Orbis M&A (Bollaert & Delanghe, 2015). The cutoff date, January 1, 2017, was selected to have a high likelihood that the firm had already been exited by the PE firm. Something previous research tends to indicate happens on average 3.6-5.8 years after entry (Haliwela, 2018; Joenväärä, 2022; Valkama, 2013).

Subsequently, we constructed the *transactions* dataset containing potential PE exits and add-on acquisitions. To ensure potentially viable transactions were not omitted, we employed a very broad set of filters:

1. Deal type: *'IPO - Targets with VC/PE investment only', 'Acquisition, Institutional buy-out', 'Joint-venture', 'Management buy-in', 'MBI/MBO', 'Management buy-out', 'Demerger', 'Merger'* – intended to include all transaction types.
2. Deal status: *'Completed - confirmed', 'Completed - assumed' from '01/01/1997 to 01/01/2024'*

Using these filters, 1,531,679 transactions were captured in the *transactions* file. Once exported, a Python program was constructed and used to identify matches between the *PE entry* file and the *transactions* file.

Two different approaches were applied to find matches:
1. Exit Identification:

- Criteria: If a company listed as a "target" in the *PE entry* dataset appears again as target in the *transaction* dataset, it is flagged as a potential exit.
- Logic: This match suggests that the company, initially acquired by a PE firm, has been subsequently sold.

2. Add-on acquisition identification:
   - Criteria: If a company listed as a "target" in the *PE entry* dataset appears as an "acquirer" in the *transaction* dataset, it is flagged as a potential add-on acquisition.
   - Logic: This indicates that the platform company, after being acquired by the PE firm, has made acquisitions, which could mean that a B&B strategy is taking place.

After applying the matching criteria described above, an additional program was constructed and used to refine the dataset. This program was designed to compile and filter a new file comprising only those transactions that were potentially part of a B&B. This was done through only including those transactions where:

1. Entry: The platform company had been acquired by a PE firm.
2. Add-on: That same platform company completed at least one add-on acquisition.
3. Exit: That platform company was eventually sold by the PE firm.

The intention of the process was to isolate complete potential B&B transaction sequences. This resulted in a sample of 322 possible B&B sequences.

II. Verifying the authenticity of B&B strategies

To enhance the validity of our analysis, we implemented verification methods for all data entries. The aim was to ensure that the entries were actually PE owned B&B strategies. In line with Hammer et al. (2022a), if no direct information was found supporting the existence of an explicit B&B strategy, but the potential platform made two or more acquisitions within a short time frame after being acquired, they were added, as this would indicate a B&B strategy. Following, we will outline the steps taken to increase the likelihood that those transaction sequences in our final sample were legitimate B&B strategies. If sufficient evidence were found in any of the

below listed steps, the B&B strategy was added to stage III. E.g. if enough evidence was found in step (a) listed below, no further information confirming the strategy was deemed necessary.

First, (a) we read deal comments provided by Orbis M&A to identify indicators that a B&B strategy was pursued. Secondly (b), we conducted google searches for the platform company's name in conjunction with terms such as "buy-and-build", "add-on", "bolt-on", and "tuck-in". Thirdly (c), we assess whether the PE investor explicitly identifies itself as a "buy-and-build" investor on its official website, or whether it emphasises strategies related to inorganic growth. Lastly (d), we examine the platform company's website, particularly the "News" and "About Us" sections, to look for evidence that a B&B strategy was pursued.

III. Ensuring all add-ons were included

In the next step, we attempted to identify additional transactions linked to the strategy, not previously captured. For this purpose, Orbis M&A was sometimes used if additional information surfaced implying that another company (e.g. holding company) could have been used to make acquisitions for the platform. Besides this, a method very similar to the one described in stage two was implemented, with only tiny adjustments. Illustratively, similarly to step (b) the search was instead conducted with the platform company name and terms such as "acquisition" and "acquirers", and similar to step (d) the "News" section and potential "Our History" sections were analysed for potential additional acquisitions taking place during the PE ownership period.

IV. Adding complementary data

At this stage, some strategies were missing only one or two data points necessary to be included in the final sample. As a result, additional searches were made to find the missing data. This data could sometimes be found in press releases, SEC-filings and websites such as Companies Houses in the UK, and Allabolag in Sweden. The strategies that had made it to this stage were added to the sample if enough data was available for it to be analysed in one of the tests employed in this thesis. This resulted in 74 strategies being added to the sample through the *automated matching method*.

3.2.2 The desktop method

The previous method has several limitations. One such limitation is that ownership structures in B&Bs can be quite complex, and that many platform companies change identity during the B&B process (Bansraj et al. 2022). The *automated matching method* described earlier will not be able to capture these strategies. Therefore, we applied a more manual method to supplement the aforementioned approach and further strengthen the sample. In this supplemental method, we used the "Buy & Build" filter in Orbis M&A. This filter is intended to flag individual transactions linked to B&B strategies. Unfortunately, the filter seems to miss many obvious B&B transactions, and flag many non-B&B strategies, which is why this filter was not used in the *automated matching method*. On this basis, the following filtering was applied to construct the initial sample:

1. Sub-deal type: *'Buy & Build'*
2. Time Period: *With status 'Completed - confirmed', 'Completed - assumed' from '01/01/1997 to 01/01/2024'*

The filtering resulted in 28,253 matches, which was too many to manually analyse. Thus, this dataset was divided into multiple smaller groups based on five criterias. These criterias included data availability in: deal value, deal stake, sales and EBITDA, and deal comments including "add-on", "tuck-in", "bolt-on", "platform", "additional acquisitions" or "inorganic". For each criteria fulfilled, the transaction received a point, which was subsequently used for determining how to prioritise analysing the matches. Starting with the group which had received the most points, we employed an almost identical method as outlined in stage one through four in the *automated matching method*. However, stage two became more comprehensive as it included finding all related transactions. Additionally, Orbis M&A was used more comprehensively in the *desktop method* for this purpose.

Of the approximately 28,253 transactions captured in the filtering, enough time was available to manually analyse the 2,500 with most points. Of these 2,500, only 9 strategies met the criteria for inclusion. The reason for obtaining such a low number was primarily due to limited data availability and deficiencies in the filtering system.

3.3 Sample description

The final sample includes 83 unique B&B strategies, which conducted 161 add-on acquisitions. The sample frame used was PE platform buyouts between 1/1-1997 and 1/1-2017 together with availability of: deal value and deal stake, for all transactions in the B&B strategy. Two subsamples were also created; the Sales subsample including 79 observations, and the EBITDA subsample including 68 observations. The additional sample frame for the Sales subsample was availability of: sales and EV figures, and the additional sample frame for the EBITDA subsample was availability of: sales, EBITDA and EV figures. Due to the limited data availability, the final sample obtained constitutes a non-randomized data sample. The sample is made up of secondary data from the Orbis M&A database, complemented with data from platform company websites, news articles, the website of PE firms, different filings, etc.

The theoretical population includes all B&B transactions that have been conducted globally until 2024. The exact population count is unknown, but is almost certainly substantially greater than the potential B&B transactions included in the Orbis M&A database. The reason being that many B&B transactions are not publicly disclosed and since data availability before 1997 is essentially non-existent (Bollaert & Delanghe, 2015). Hence, when testing hypotheses, inferences are primarily made regarding the observations in our sample, and inferences about the theoretical populations should be made with caution. Lastly, the data sample could potentially have selection biases. First, due to an overrepresentation of larger transactions as these would likely get more publicity. Secondly, due to an overrepresentation of B&B strategies that have yielded higher returns, as PE firms could be more inclined to publicly disclose financial figures for these.

3.4 Variables

3.3.1 Dependent variable

IRR: The dependent interval scale variable Internal Rate of Return was computed for each identified B&B strategy. IRR provides the discount rate for which the Net Present Value of all transactions equals zero, and has been used by several scholars to analyse the return on

investment for B&B strategies (e.g. Brigl et al. 2016; Hammer et al. 2022a). For the computation of the Internal Rate of Return, the acquisition of the platform company and the subsequent add-on acquisitions (deal value) represent negative cash flows for the PE firm, while exit transactions (deal value) of the platform company represent a positive cash flow. In the case of several exits (with deal value and deal stake available), each exit was considered as an individual inflow of cash. In the case of several exits (with deal value and deal stake unavailable for some exits), we generalised the exit with known figures to correspond to a complete exit.

3.3.2 Independent variables

Sales CAGR: The Compounded Annual Growth Rate for sales is an interval scale variable and is used as the proxy for revenue synergies and improvements in top-line operational performance. The sales figures for the platform company at the time of investment, combined with the sales figures of subsequent add-on acquisitions at the time they are acquired, are collectively used as the beginning value. The sales figure at the time the PE firm sells the platform company is used as the exit variable.

$$Sales\ CAGR = (Sales_{Exit} \div (\ Sales_{Entry} + Sales_{Add-on\ 1} + ... + Sales_{Add-on\ n}))^{1/t} - 1$$

EBITDA margin CAGR: The Compounded Annual Growth Rate for EBITDA margin is an interval scale variable and is used to measure improvements in margins, a component of operating performance. This enables operationalization of the EBITDA margin growth from the PE firm's purchase of the platform company to the sale of the platform company.

$$EBITDA\ margin\ CAGR = (EBITDA\%_{Exit} \div\ EBITDA\%_{Entry})^{1/t} - 1$$

EV/Sales CAGR: The Compounded Annual Growth Rate for Enterprise Value/Sales is an interval scale variable and is used to measure multiple-expansion in EV/Sales. This enables operationalization of the change in the EV/Sales multiple from the PE firm's purchase of the platform company, to the sale of the platform company.

$$EV/Sales\ CAGR = (EV/Sales_{Exit} \div\ EV/Sales_{Entry})^{1/t} - 1$$

EV/EBITDA CAGR: The Compounded Annual Growth Rate for Enterprise Value/EBITDA is an interval scale variable and is used to measure multiple-expansion in EV/EBITDA. This enables operationalization of the change in the EV/EBITDA multiple from the PE firm's purchase of the platform company, to the sale of the platform company.

$$EV/EBITDA\ CAGR\ =\ (EV/EBITDA_{Exit}\ \div\ EV/EBITDA_{Entry})^{1/t} - 1$$

3.3.4 Control variables

Hofstede's Cultural Index: The control variable Hofstede Cultural Index is a ratio scale variable. It includes the difference in regards to the four factors of Hofstede's cultural index; *individualism, masculinity, uncertainty avoidance* and *power distance* (Hofstede & Bond, 1984), between the platform company's country-of-origin and the add-on company's country-of-origin. In the case of multiple add-on acquisitions of companies from different countries, an average value of the differences between the platform company's country-of-origin and each individual add-on company's country-of-origin will be calculated. Based on previous research highlighting the challenges related to cultural differences (Barkema et al. 1996; Chatterjee et al. 1992; Rahahleh & Wei, 2013), the variable enables a more nuanced analysis of the implications of cultural differences in cross-border B&Bs.

$$Hofstede's\ Cultural\ Index\ =\ \sqrt{(\Sigma_{i=4}^{4}(C_{Platform} - C_{add-on})^{2})}\ \div\ 4$$

Industry: The nominal categorical variable industry is based on the U.S. Securities and Exchange Commission's Standard Industrial Classification (SIC) Code List (U.S. Securities and Exchange Commission, 2021). The SIC Code for portfolio companies in the sample is collected from the Orbis M&A database, and the level of analysis is limited to the first digit of the four-digit SIC code, indicating major economic division, to allow for a greater sample of companies in regards to industry classification.

S&P 1200 CAGR: The Compounded Annual Growth Rate for the Standard and Poor's 1200 stock market index is an interval scale variable. The S&P 1200 is a global stock market index that includes ~70% of global market capitalization (S&P Global, 2024), and is used as the proxy

for the general economic conditions, similar to prior studies (e.g. Acar, 2017). For every identified B&B strategy in the sample, the corresponding S&P 1200 CAGR is computed between the year of acquisition of the portfolio company and the year for which the platform company was sold by the PE firm.

$$S\&P\ 1200\ CAGR = (S\&P\ 1200_{Ending\ Value} \div S\&P\ 1200_{Beginning\ Value})^{1/t} - 1$$

Add-ons: The control variable Add-ons is a ratio scale variable that represents the number of add-on acquisitions conducted for each identified B&B strategy. Based on prior research suggesting that PE ownership greatly boosts the number of acquisitions made (Hammer et al. 2013; Hammer et al. 2020; Hammer et al. 2022b), it is of importance to control for the potential impact this may have on the result.

Holding period: The control variable Holding period is a ratio scale variable that represents the time in years between the acquisition and the sale of the platform company. As previous research has indicated the inverse relationship between IRR and the holding period (Cumming et al. 2005), it is important to control for the holding period in the data analysis.

3.5 Description of data analysis

For the data analysis, Cohen's D effect size, Student's t-test, and regression analyses were performed in Excel and SPSS. Additionally, a Mann-Whitney U test was originally included, but rendered very similar results to the Student's t-test, and was therefore excluded. For the statistical analysis of the first hypothesis, the data was grouped in two subsamples, cross-border and domestic, and Cohen's D effect size and Student's t-test were conducted to test for differences in the means of the two groups. Cohen's D compares the means between two groups. The effect size is computed by dividing the absolute difference in means between the two groups with the standard deviation of the entire sample (i.e. the combined standard deviation of the two groups). The results display how many standard deviations that lie between the means of the two groups. For hypotheses 2.1, 2.2, 3.1 and 3.2, two subsamples were created based on the available data of sales figures and EBITDA figures; one sample of observations with complete sales and EV figures, and one sample of observations with complete sales, EBITDA and EV figures. These

two subsamples were subsequently grouped in cross-border and domestic. Cohen's D effect size and Student's t-test were conducted to test for differences in the means of the groups for each of the four hypotheses.

Hypothesis 4.1 and 4.2, were tested through regression analysis in Excel using PHStat. For hypothesis 4.1, the dataset consisted of cross-border observations with available sales and EV figures. EV/Sales CAGR and Sales CAGR were used as the independent variables, and IRR as the dependent variable. For the testing of hypothesis 4.1, two regression models were created. Model 1, including only the dependent and independent variables, and Model 2, for which all five control variables were added; Hofstede Cultural Index, Industry, S&P 1200 CAGR, Add-ons and Holding period. For hypothesis 4.2 the dataset consisted of cross-border observations with available sales, EBITDA and EV figures. EV/EBITDA CAGR and EBITDA Margin CAGR were used as the independent variables, and IRR as the dependent variable. As for hypothesis 4.1, two regression models were constructed. Model 1, including only the dependent and independent variables, and Model 2, for which the five control variables were added.

3.6 Reliability and Validity

In terms of reliability there are some potential issues for this thesis. Given the limited data availability of private equity transactions in general and the complexity of identifying B&B transactions, there are potential problems with the stability of this thesis. As previously discussed, the theoretical population count is unknown, but is likely substantially greater than the B&B transactions found in Orbis M&A. Consequently, our small sample of 83 B&B strategies is likely not completely representative of the entire population, especially given the non-randomized sampling method. This implies that the stability of this thesis is likely limited. On the other hand, inter-observer consistency is expected to be relatively high as the variables used in this thesis (e.g. Sales CAGR, EBITDA margin CAGR and EV/Sales CAGR), minimises opportunities for alternative interpretations. Additionally, while the identification of specific B&B strategies requires some personal judgement, based on the clear methodology and definitions for the classification of such (see section 3.2), the inter-observer consistency should be intact. Similarly, while desktop research could give rise to inconsistencies, the internal

reliability should be rather high given the thorough and rigid methods developed for the collection of data (see section 3.2.1 & 3.2.2), and since Orbis M&A was the primary source of data.

The validity of this thesis is expected to be relatively high. As no proxies are used when measuring multiple expansion and operating improvements (i.e. the variables used correspond to the concepts tested), both face- and construct validity are expected to be high. Similarly, concurrent validity is also expected to be high since the use of Sales, EBITDA margin, EV/Sales and EV/EBITDA for measuring operating performance and multiple expansion is praxis within the PE research field, and has been used in many prior studies (e.g. Acar, 2017; Haliwela, 2018; Hammer et al 2020; Hammer et al 2022a Heisig et al. 2022). Lastly, as a non-randomised sampling method was used, there are some potential issues regarding the external validity of this thesis. This implies that findings in this thesis should be generalised with caution. To increase the external validity of this study, a ridgid methodology was applied to ensure the inclusion of legitimate B&B transactions. Further details about the generalizability of this study will be discussed in the limitations section.

4. Result

Research Question: *"What drives the return in cross-border B&B strategies, and do drivers and returns differ compared to domestic strategies?"*

4.1 Descriptive statistics

Table 1 presents descriptive statistics for the total sample and for domestic and cross-border B&B strategies, respectively. For the total sample the average IRR is 25.0% and the median IRR is 18.6%. Cross-border strategies have a greater average (32.9%) and median (25.0%) IRR, compared to the average (18.6%) and median (15.1%) IRR for domestic strategies. The standard deviation for the total sample is 30.5%, with cross-border strategies having a higher standard deviation of 37.6%, compared to 21.8% for domestic strategies. Domestic strategies make up a majority of the sample with 46 observations, compared to 37 cross-border strategies. The total sample set has a kurtosis of 10.08. This indicates that the data is leptokurtic and has a sharper-rising centre peak than that of a normal distribution (Berenson et al. 2019). Lastly, the skewness statistics of 2.60 for the entire sample, 1.54 for the domestic B&Bs, and 2.44 for the cross-border B&Bs, indicates a right-skewed distribution (appendix C figure 1 and 2).

Table 1: Descriptive statistics for the Internal Rate of Return for the entire sample.

	Total Sample IRR	Domestic IRR	Cross-border IRR
Mean	0.250	0.186	0.329
Median	0.186	0.151	0.250
S.D.	0.305	0.218	0.376
Minimum	-0.149	-0.149	-0.099
Maximum	1.860	1.044	1.860
Range	2.009	1.193	1.959
Skewness	2.60	1.54	2.44
Kurtosis	10.08	4.31	7.57
Count	83	46	37

Table 2: Descriptive statistics of Sales CAGR and EV/Sales CAGR for the Sales subsample.

	Variable	Mean	Median	S.D.	Skewness	Kurtosis	Count
Total	Sales CAGR	0.084	0.041	0.176	0.96	1.42	79
	EV/Sales CAGR	0.085	0.035	0.235	2.00	7.74	79
Domestic	Sales CAGR	0.094	0.042	0.182	1.28	1.88	45
	EV/Sales CAGR	0.072	0.023	0.204	1.37	3.25	45
Cross-border	Sales CAGR	0.070	0.040	0.170	0.46	0.64	34
	EV/Sales CAGR	0.102	0.059	0.273	2.25	9.01	34

Table 2 displays the descriptive statistics for the Sales subsamples, including the 79 observations for which sales figures could be retrieved. The mean Sales CAGR for the total Sales subsample is 8.4%, and domestic strategies have a higher mean Sales CAGR of 9.4% compared to cross-border strategies with 7.0%. The standard deviation of Sales CAGR is 17.6% for the total subsample. Between domestic (18.2%) and cross-border strategies (17.0%), there is only a small difference in the standard deviation for Sales CAGR. The kurtosis of 1.88 for domestic strategies and 0.64 for cross-border strategies indicates a platykurtic distribution of Sales CAGR values for both groups, with thinner tails compared to a normal distribution.

As can be observed in Table 2, the mean EV/Sales CAGR is 8.5% for the total Sales subsample, 7.2% for the domestic strategies, and 10.2% for cross-border strategies. The standard deviation of EV/Sales CAGR is 23.5% for the total Sales subsample, with a greater standard deviation among cross-border strategies (27.3%) compared to domestic strategies (20.4%). The kurtosis of 3.25 for the domestic strategies indicates an almost mesokurtic distribution, similar to a normal distribution, while the kurtosis of 9.01 for the cross-border strategies displays a leptokurtic distribution, with a sharper-rising centre peak than that of a normal distribution.

Table 3: Descriptive statistics for EBITDA Margin CAGR and EV/EBITDA CAGR for the EBITDA subsample.

	Variable	Mean	Median	S.D.	Skewness	Kurtosis	Count
Total	EBITDA Margin CAGR	0.004	0.000	0.145	-0.79	6.50	68
	EV/EBITDA CAGR	0.143	0.059	0.333	4.15	23.21	68
Domestic	EBITDA Margin CAGR	-0.013	0.000	0.115	-1.47	5.05	39
	EV/EBITDA CAGR	0.099	0.044	0.159	0.79	1.51	39
Cross-border	EBITDA Margin CAGR	0.027	0.002	0.177	-0.76	6.29	29
	EV/EBITDA CAGR	0.201	0.061	0.474	3.19	12.01	29

Table 3 displays the descriptive statistics for the EBITDA subsample, including the 68 observations for which EBITDA figures could be retrieved. The mean EBITDA margin CAGR for the total EBITDA subsample is 0.4%, and domestic strategies have a lower mean EBITDA margin CAGR of -1.3% compared to cross-border strategies with 2.7%. The standard deviation of the EBITDA margin CAGR is 14.5% for the total subsample, 11.5% for domestic strategies and 17.7% for cross-border strategies. Thus, there is a greater variation in EBITDA margin CAGR among cross-border strategies, compared to domestic strategies. The kurtosis of 5.05 for domestic strategies and 6.29 for cross-border strategies, indicates a leptokurtic distribution of Sales CAGR values for both groups, with a sharper-rising centre peak than that of a normal distribution.

The mean EV/EBITDA CAGR is 14.3% for the entire EBITDA subsample, 9.9% for domestic strategies and 20.1% for cross-border strategies (Table 3). The standard deviation of EV/EBITDA CAGR is 33.3% for the total subsample, 15.9% for domestic strategies and 47.4% for cross-border strategies. This means there is a substantially greater variation in EV/EBITDA CAGR values among cross-border strategies, compared to domestic. The kurtosis of 1.51 for the domestic strategies indicates a platykurtic distribution, and the kurtosis of 12.01 indicates a strong leptokurtic distribution of EV/EBITDA CAGR values for cross-border strategies.

Table 4: Mean, standard deviation, and Pearson correlation matrix for continuous variables in the Sales and EBITDA subsamples.

	Mean	S.D.	1	2	3	4	5	6
Dependent Variable								
1. IRR	0.30	0.39						
Independent Variables								
2. Sales CAGR	0.07	0.17	0.56***					
3. EV/Sales CAGR	0.10	0.27	0.36**	-0.31				
Control Variables								
4. Hofstede	10.06	6.29	0.14	0.30	-0.37**			
5. Holding Period	6.74	3.17	-0.36**	-0.05	-0.30	-0.14		
6. Add-ons	1.71	1.09	0.61	0.05	0.04	0.31	0.04	
7. S&P1200 CAGR	0.07	0.05	0.50***	0.35**	0.32	-0.05	-0.40**	0.17

*n=34, *p<0.10; **p<0.05; ***p<0.01*

	Mean	S.D.	1	2	3	4	5	6
Dependent Variable								
1. IRR	0.32	0.39						
Independent Variables								
2. EBITDA Margin CAGR	0.03	0.18	0.18					
3. EV/ EBITDA CAGR	0.20	0.47	0.02	0.06				
Control Variables								
4. Hofstede	10.26	6.20	0.22	-0.19	0.05			
5. Holding Period	6.72	3.03	-0.35	-0.03	-0.15	-0.33		
6. Add-ons	1.76	1.15	0.02	0.02	0.03	0.33	0.01	
7. S&P1200 CAGR	0.07	0.05	0.43**	0.28	0.33	0.00	-0.52***	0.06

*n=29, *p<0.10; **p<0.05; ***p<0.01*

Table 4 displays a Pearson correlation matrix for the continuous variables in the Sales- and EBITDA subsamples. As the sampling method applied is not randomised, the significance of the correlation between variables should be interpreted with caution. According to Cohen (1988, 1992), if Pearson's r varies more than 0.5, the effect size is large. Following this logic, there are strong correlations between IRR and Sales CAGR (0.56), and between IRR and S&P 1200 CAGR (0.50), for the Sales subsample. For the EBITDA subsample, there is only a strong correlation between Holding period and S&P 1200 CAGR of -0.52.

4.2 Inferential statistics

To test the hypothesised differences between domestic and cross-border B&Bs, and the relative contribution of value drivers for cross-border strategies, effect size and inferential statistical tests were performed in Excel and SPSS. To test for the differences in IRR, multiple expansion and operating improvement between domestic and cross-border B&Bs, the effect size was tested using Cohen's D. For benchmarking purposes the Student's t-test was also performed in SPSS. However, due to the violation of the assumption of random sampling, the results should be interpreted with caution. Thus, the rejection of null hypotheses will be based on the Cohen's D effect size. Lastly, a regression analysis was conducted in Excel using PHStat to determine the relationships between the independent variables (including control variables) and the dependent variable, IRR. The following hypotheses were tested:

H1: *Cross-border B&B strategies yield higher returns (IRR) compared to domestic B&B strategies.*

H2.1: *Cross-border B&B strategies result in greater multiple expansion than domestic B&B strategies, measured by EV/Sales CAGR.*

H2.2: *Cross-border B&B strategies result in greater multiple expansion than domestic B&B strategies, measured by EV/EBITDA CAGR.*

H3.1: *Top-line growth (Sales CAGR) is greater for cross-border B&B strategies, than for domestic B&B strategies.*

H3.2: *Margin expansion (EBITDA margin CAGR) is lower for cross-border B&B strategies, than for domestic B&B strategies.*

H4.1: *Multiple expansions (EV/Sales CAGR) have a greater contribution to the returns of cross-border B&B strategies (IRR), compared to improvements to the operating performance (Sales CAGR).*

H4.2: *Multiple expansions (EV/EBITDA CAGR) have a greater contribution to the returns of cross-border B&B strategies (IRR), compared to improvements to the operating performance (EBITDA margin CAGR).*

Table 5: Statistical results from Cohen's D and Student's t-test, for comparison between domestic- and cross-border B&B strategies.

Comparison	Groups				Effect Size	Student's t-test
	Domestic	n=	Cross Border	n=	Cohen's D	p-value
1	IRR	46	IRR	37	0.299	0.044
2.1	EV/Sales CAGR	45	EV/Sales CAGR	35	0.236	0.597
2.2	EV/EBITDA CAGR	39	EV/EBITDA CAGR	29	0.331	0.272
3.1	Sales CAGR	45	Sales CAGR	35	0.177	0.560
3.2	EBITDA Margin CAGR	39	EBITDA Margin CAGR	29	0.145	0.299

Table 5 presents the Cohen's D effect size, together with the Student's t-test for each of the five groupwise comparisons relating to hypothesis 1, 2.1, 2.2, 3.1 and 3.2. Cohen's D reveals an effect size for comparison 1 of 0.299 (p-value=0.044), for comparison 2.1 of 0.236 (p-value=0.597), and for comparison 2.2 of 0.331 (p-value=0.272). A Cohen's D effect size between 0.2-0.5 indicates a small difference in means between groups (Burns & Burns, 2008). On this basis there is a difference in means for the groups in comparison 1, 2.1 and 2.2. Consequently, the null hypothesis of no difference between means is rejected, and based on the higher mean IRR for cross-border B&Bs, hypothesis 1 stating that cross-border strategies yield higher returns than domestic strategies is supported. Based on the higher mean EV/Sales CAGR for cross-border B&Bs, hypothesis 2.1 stating that EV/Sales CAGR is greater for cross-border strategies compared to domestic strategies is supported. Based on the higher mean EV/EBITDA CAGR for cross-border B&Bs, hypothesis 2.2 stating that EV/EBITDA CAGR is greater for cross-border strategies compared to domestic strategies is also supported. The results for comparison 3.1 and 3.2, which show Cohen's D effect sizes of 0.177 and 0.145 respectively, fall

below the acceptance criterion of 0.2. Consequently, hypothesis 3.1, stating that Sales CAGR is greater for cross-border strategies compared to domestic strategies is rejected. Furthermore, hypothesis 3.2, stating that EBITDA margin CAGR is lower for cross-border strategies compared to domestic strategies, is also rejected.

Table 6: Regression analysis of multiple expansion and operating improvements on the Internal Rate of Return.

Hypothesis 4.1			Hypothesis 4.2		
Variables	*Model 1*	*Model 2*	Variables	*Model 1*	*Model 2*
Intercept	0.10	0.12	Intercept	0.31	0.09
Sales CAGR	1.69***	1.52***	EBITDA Margin CAGR	0.39	0.23
EV/Sales CAGR	0.82***	0.80***	EV/EBITDA CAGR	0.01	-0.13
Hofstede		0.01	Hofstede		0.02
Holding period		-0.01	Holding period		0.00
Add-ons		-0.01	Add-ons		-0.03
Industry		0.00	Industry		-0.02
S&P1200 CAGR		0.51	S&P1200 CAGR		3.35
F-Significance	0.00	0.00	F-Significance	0.66	0.34
R Square	0.63	0.67	R Square	0.03	0.29
Adjusted R Square	0.61	0.58	Adjusted R Square	-0.04	0.05
*n=34, *p<0.10; **p<0.05; ***p<0.01*			*n=29, *p<0.10; **p<0.05; ***p<0.01*		

To test hypothesis 4.1, a regression model was constructed for the 34 cross-border strategies where sales figures were available for both the platform company and all subsequent add-on acquisitions (Table 6). To assess the applicability of using a linear regression, the four assumptions: linearity, independence of errors, normality of error, and equal variance, were tested. Linearity and equal variance are verified through residual scatterplots (appendix C figure 3 and 4), and no clear violations of these assumptions are found. The independence of errors is not applicable as the thesis is cross-sectional, and since no individual B&B strategy directly interferes with any other. To test for normality of error, Q-Q plots are constructed for both dependent and independent variables (appendix C figure 5-7), revealing no clear deviation from normality. For the testing of hypothesis 4.1, two regression models are used. Model 1 includes IRR as the independent variable, with Sales CAGR and EV/Sales CAGR as the independent variables. The model is significant at 1% level of significance, with a F-Significance of 0.00 and an adjusted R Square of 0.61. Both independent variables are significant at the 1% level of

significance. Sales CAGR has a coefficient of 1.69, and EV/Sales CAGR has a coefficient of 0.82 For Model 2, the control variables Hofstede's Cultural Index, Holding period, Add-ons, Industry and S&P 1200 CAGR, are added to the model. None of the control variables are statistically significant at 5% level of significance, and the adjusted R Squared decreases by 0.03 to 0.58. The model is statistically significant at 1% level of significance (F-Significance=0.00) and both the independent variables remain significant at 1% level of significance. The coefficient for Sales CAGR decreases by 0.17 to 1.52 and the coefficient for EV/Sales CAGR decreases by 0.02 to 0.80. Contrary to hypothesis 4.1, suggesting a greater coefficient for EV/Sales CAGR compared to Sales CAGR, the opposite is found. Consequently, hypothesis 4.1 is rejected.

To test hypothesis 4.2, two regression models were constructed based on the 29 cross-border observations for which EBITDA figures could be obtained. Before executing the regression analysis, the four assumptions, linearity, independence of errors, normality of error, and equal variance, were tested. The independence of errors is not applicable as the thesis is cross-sectional, and since no individual B&B strategy directly interferes with any other. The QQ-plots (appendix C figure 8-10) reveals a deviation from normality, while the residual plots (appendix C figure 11 and 12) does not indicate any clear violations of the assumptions of linearity and equal variance. This indicates that the data does not fit a linear regression model perfectly. The linear regression output renders no significance for Model 1 and Model 2, with a F-Significance of 0.66 and 0.34, respectively. As a result, hypothesis 4.2 is rejected.

5. Discussion

5.1 Hypothesis 1: Cross-border B&B performance

H1: *Cross-border B&B strategies yield higher returns (IRR) compared to domestic B&B strategies.*

The mean (32.9%) and median (25.0%) IRR for cross-border B&Bs was found to be higher than for domestic strategies (18.6% and 15.1%). Further, Cohen's D effect size of 0.299 was above the rejection criteria of 0.2. Additionally, the Student's t-test also indicated a significant difference in means at 5% level of significance (p-value=0.044). It is therefore concluded that the hypothesis is supported. Besides the higher IRR, the standard deviation is notably greater for cross-border (37.6%) than domestic strategies (21.8%), implying that while cross-border strategies render higher returns, there is also a greater variation.

Prior research by Brigl et al. (2016), found that cross-border strategies yield an average IRR of 38.2%, compared to 21.1% for domestic strategies. The difference in return between domestic and cross-border strategies found by them (11.1%) is smaller than the difference in this thesis (14.3%). At the same time, the analysis revealed a lower average return for both domestic and cross-border strategies. A potential explanation for this discrepancy could be that Brigl et al. also found that investments into smaller platform companies yield greater IRR. Since their paper was written in a collaboration with Boston Consulting Group, it is plausible that the authors had access to proprietary data. In contrast, this thesis relied solely on public information, which is likely skewed towards larger transactions. This could be a possible explanation for the discrepancy in results between the two studies. Further, Brigl et al. (2016) attributed the superior returns of cross-border B&B to cross-selling between add-ons, economies of scale, and multiple expansion, which are factors likely contributing to the results in this thesis.

Heisig et al. (2022) who specifically examined the add-on sourcing effect as a driver of performance, found no evidence that this differs between domestic and cross-border B&Bs.

However, as this thesis shows greater returns for cross-border strategies, either there was a difference in the add-on sourcing effect between the samples, or other factors drove the returns. Moreover, we know that PE firms with deal experience can mitigate transaction costs (Hammer et al. 2018), which are typically greater in cross-border transactions (Hammer et al. 2020), and that firms better at mitigating transaction costs are more likely to engage in cross-border acquisitions (Holloway et al. 2016). Thus, PE firms are more likely to engage and mitigate transaction costs, in cross-border transactions. Because of these greater transaction costs, buyers could be willing to pay premiums (Hammer et al. 2020) proportional to transaction costs they would typically incur through completing these transactions themselves. Findings by Hammer et al. (2017), indicating that B&B strategies are concentrated to top PE firms, can further strengthen this point. According to them, B&B is limited to top PE firms, as these have superior deal access, which is necessary to effectively execute this strategy. Consequently, it is reasonable to assume that international deal access is even more restricted to the top performing PE firms, meaning an even smaller portion of elite PE firms pursue cross-border B&B. As mitigating transaction costs seem to be an important skill of PE firms, top PE firms should be able to mitigate these the most, thus increasing the replication premium even more. Hence, this could explain the higher returns in cross-border B&Bs.

Studies on cross-border M&A have highlighted opportunities in acquiring new knowledge, resources, and realising synergies as key advantages (Kotabe, 1990; Hoskisson & Hitt, 1988). Looking at value drivers in B&B, the PE effect and synergies have been highlighted as central factors (Bansraj et al. 2022). Connecting these fields to the findings in cross-border B&B, plausible explanations to the outperformance of cross-border B&B could include that PE firms are particularly efficient in realising the advantages in cross-border transactions, perhaps due to the PE effect described by Bansraj et al. Furthermore, the PE effect, and subsequent experience in conducting transactions, could allow PE firms to help platform companies realise synergies. These synergies might be greater in cross-border transactions (Bertrand & Zitouna, 2008), but could generally be harder to realise, as integration is particularly costly in these transactions (Chatterjee et al. 1992).

Prior research has indicated that moderately fragmented markets constitute the ideal market for PE firms to pursue B&B strategies (Hammer et al. 2017). Such industries typically feature a sufficiently large pool of platform companies of the appropriate size, while still allowing for potential consolidation (Hammer et al. 2017). In this perspective, while some markets may have attractive platform companies to invest in, the ability to conduct a large amount of add-on acquisitions within the national market may be limited. By pursuing a cross-border B&B strategy, PE firms have a wider array of platform companies to choose from and a potentially greater number of moderately fragmented markets to consolidate. This in turn implies that cross-border strategies could result in greater returns given the increased ability to tap into attractive national markets.

In this discussion, we concluded that cross-border B&B strategies generate superior returns, at least for the sample analysed in this thesis. Multiple potential explanations were explored to gain a better understanding of the underlying reasons. Explanations included the potential of an additional add-on sourcing effect, not previously found. Other plausible reasons discussed were the ability of top PE firms to mitigate both transaction costs, and other challenges, typically associated with cross-border transactions. This should lead PE firms with advantages of cross-border transactions, while the downsides are smaller. Finally, the argument was made that the international market has more potential add-ons than the domestic market, thus, PE firms have more add-ons to choose from.

5.2 Hypothesis 2: Multiple expansion

H2.1: *Cross-border B&B strategies result in greater multiple expansion than domestic B&B, measured by EV/Sales CAGR.*

H2.2: *Cross-border B&B strategies result in greater multiple expansion than domestic B&B, measured by EV/EBITDA CAGR.*

The results reveal a Cohen's D effect size exceeding the threshold of 0.2. As a result, both hypothesis 2.1 and 2.2 are accepted, although the less applicable Student's t-test renders no

significant differences in means (p-values below 0.05). This indicates that cross-border B&Bs lead to greater multiple expansions compared to their domestic counterparts. For EV/Sales, the average multiple CAGR is 7.2% for domestic strategies, and 10.2% for cross-border strategies, with cross-border having a greater standard deviation of 27.3% (compared to 20.4% for domestic). For EV/EBITDA, this thesis shows directionally similar results, with cross-border having a greater multiple expansion CAGR of 20%, whereas domestic strategies have only 9.9% on average. The differences in standard deviation in this test is much larger, with cross-border having a value of 47.4% (compared to domestic 15.9%) - implying that cross-border deals have much larger variation.

Heisig et al. (2022), used a similar approach to the one applied in this thesis when defining cross-border. In their research, they found no difference in the add-on sourcing effect between domestic and cross-border strategies. This implies that the PE firm does not pay a premium when making add-on acquisitions abroad. Acar (2017) finds the opposite in his research, instead seeing that cross-border add-ons are purchased with premiums. As this thesis has not tested for whether add-ons are purchased at a premium, the findings by either Acar or Heisig could be apparent in the sample of this thesis. However, the greater CAGR found for cross-border B&B transactions would be more difficult to reach if Acar's findings are correct.

The results in this thesis are directionally in line with the large exit premium found by Hammer et al. (2020). They partly attributed this exit premium to the high complexity of cross-border M&A, which usually carries large transaction costs, thus making strategies harder to replicate. Drawing parallels between the findings of Hammer et al. (2020) and Heisig et al. (2022), it could be argued that this result is likely supported by PE firms' particular ability to avoid transaction costs as argued in the discussion of hypothesis 1. Building on the discussion about the first hypothesis; if PE firms can make acquisitions at lower transaction costs, this should result in them being able to realise larger multiple expansions. This line of reasoning is based on the fact that strategic acquirers, or even investors in an IPO, could be willing to pay a premium the size of transaction costs they would have incurred if the transactions were completed under their ownership. Acleitner (2011) argues that PE professionals hold superior negotiation skills, which can be helpful both when purchasing firms at lower multiples and selling them at greater. This

skill might be one factor allowing PE firms to mitigate transaction costs as argued by Hammer et al. (2018), which should be particularly important in cross-border transactions with greater default transaction costs. Other factors which allow PE professionals to mitigate transaction costs and improve bargaining position could be broad networks and strong ties to different markets, thus reducing information asymmetries (Borell & Heger, 2013), or having a better bargaining position due to a high deal flow (Hammer et al. 2017. Further, the structure of PE deals might give them a better position to grant performance incentives, which might reduce the large costs related to monitoring discussed by Kang and Kim (2008). Concluding this point, being better at avoiding transaction costs, and not paying a premium at entry when conducting cross-border add-ons, could explain some of the exit premiums seen in the cross-border group.

The timing effects of top PE firms could be another mechanism responsible for at least some portion of the greater multiple expansion observed in the cross-border sample. Buying low and selling high is highlighted by Achleitner (2011) as an important skill for succeeding in PE. In the discussion covering hypothesis 1, assertions by Hammer et al. (2017) was highlighted to make the argument that cross-border B&B strategies are likely predominantly undertaken by the most elite PE firms. These top PE firms should have superior skills in terms of market timing capabilities. Drawing on these insights and speculations, it is plausible to assert that some part of the outperformance in multiple expansion observed in a cross-border sample, could stem from top PE firms' ability to time the market, rather than operationally improve the companies.

In relation to the concept of "liability of smallness", growing in size should lead to a greater multiple, as the smallness discount is reduced. With this perspective, it is possible that the superior multiple expansion of cross-border B&Bs is a result of firms outgrowing their domestic market and moving internationally, which could intersect with avoiding liability of smallness. This idea, although not explicitly stated by Brigl et al. (2016) is in line with their findings that smaller platforms generate greater returns, which could imply that medium and large firms have already outgrown their liability of smallness. This explanation might be too generalised; however, there could be an overlap between the mechanisms for avoiding the liability of smallness and internationalising. For example; if firms are geographically dispersed, they might be better at reacting to external shocks (Viva, Ragozzino & Trigeorgis, 2020), they also have

more potential credit institutions and investors which can give them access to capital. Further, international expansion can create more stable revenue streams, due to different economic conditions in different markets (Hitt & Pisano, 2003). These are all factors which can justify a greater multiple, as it decreases the risk associated with the firm. This is in line with reasoning by Nikoskelainen and Wright (2007), arguing a key feature of add-ons is decreasing investment risk through increasing scale.

In addition, Smit's (2001) framework can offer another explanation to the greater multiple CAGR seen in the cross-border sample. Smit views add-ons as options, offering the acquiring firm increased flexibility in responding to changes in market conditions. From this perspective, flexibility has monetary value, and if cross-border add-ons allow for greater flexibility, they are worth more. Some researchers clearly claim that cross-border add-ons are more flexible (Viva et al. 2020), which thereby creates rationale for the end-buyer being willing to pay a premium for the more flexible entity, over a purely domestic, less flexible firm. Consequently, this would result in greater multiple expansion for the cross-border B&Bs.

Concluding the second hypothesis; in the sample constructed for this thesis, cross-border B&B strategies show greater growth in multiples. Some potential explanations for these results have been discussed. These potential explanations include the replication premium also covered in hypothesis 1, as well as greater bargaining power and lower information asymmetries of top PE firms. A speculation was also made that top PE firms should be better at timing the market, which could make up some of the higher returns in cross-border B&B. Avoiding liability of smallness, or at least some of the mechanisms which lead to the smallness discount, were also proposed as potential reasons. Lastly, greater flexibility of cross-border add-ons could also contribute to greater premiums of cross-border B&Bs.

5.3 Hypothesis 3: Operating improvements

H3.1: *Top-line growth (Sales CAGR) is greater for cross-border B&B strategies, than for domestic B&B strategies*

Based on Cohen's D effect size and student's t-test, there is no notable difference in means between the sales growth of cross-border and domestic B&Bs. Consequently, the null hypothesis of equal means between the two groups is not rejected. However, from a descriptive perspective, there are differences between the means of the groups, which likely has notable effects on returns. The domestic sales CAGR is 9.4%, whereas the cross-border sales CAGR 7.0%. This means that for the sample in this thesis, domestic B&B leads to greater increases in sales, compared to cross-border B&B. In terms of standard deviation, there are no notable differences, meaning the spread is similar for both strategies.

Knowing that cross-border B&Bs outperform their domestic counterparts and that sales growth is the most significant (Punche et al. 2015) or at least a primary (Hammer et al. 2022a) driver of B&Bs generally, these results are quite surprising. Building on this, findings by Brigl et al. (2016), claiming that the possibilities of cross-selling should be particularly great for cross-border B&Bs, is not supported based on the research conducted for this thesis. Lastly, the results also contradict those of Acar (2017), who found cross-border strategies to generate higher sales growth compared to domestic strategies.

Based on the descriptive statistics, domestic B&B render greater top-line growth compared to cross-border. This stands in contrast to hypothesis 3.1. A potential reason for these surprising findings could be because of what could be referred to as the complexity equilibrium. Hammer et al. (2020) analysed the impact PE ownership has on platform companies upon acquisition and noticed that platforms conducted more transactions, but not more complex transactions. In their study cross-border transactions were deemed complex. Based on these results, one could interpret that PE firms attempt to keep complexities lower if possible. Given this preference to keep complexities low, if acquisitions are cross-border, they could be more likely to be within for example the same industry, thus mitigating the total complexity of a transaction. If this is the case, the results could be viewed as less surprising. In this scenario, for example cross-selling could drive sales growth for domestic strategies, which might be easier if add-ons are in different, but related, industries. Furthermore, synergies in domestic cross-selling could be aided by more homogenous customer preferences, compared to over country lines. This could create lesser needs to adjust products, and could thus allow cross-selling to begin sooner. Another

adjacent explanation could be that cross-border acquisitions have other rationales than what was previously thought, and might be more geared towards efficiency-gains, over sales growth. However, as previously mentioned, the results from Cohen's D and Student's t-test show no notable difference in means, it may be unnecessary to place undue emphasis on them.

H3.2: Margin expansion (EBITDA margin CAGR) is lower for cross-border B&B strategies, than for domestic B&B strategies.

Similar to in H3.1, based on the Cohen's D effect size, together with the student's t-test, no differences in mean EBITDA margin CAGR was found between domestic and cross-border B&Bs. Thus, the null hypothesis can not be rejected. Interestingly, Borell & Heger (2013) who looked at B&B more generally found that add-ons boost the efficiency of the platform. Homs (2019) built upon this and did not find any evidence that this efficiency boost differs between domestic and cross-border add-ons. The result for this hypothesis is thereby generally in line with the findings by Homs. Other scholars who have made adjacent arguments include Hammer et al. (2022a). They argue that efficiency synergies necessary to obtain margin improvements should be difficult to realise in B&Bs, due to the limited holding period of PE firms. Haliwela (2018) took a slightly different approach, highlighting how these efficiencies could be realised as long as the holding period was extended, and the platform was scaleable. With the results obtained in this thesis, it would be fair to conclude that those factors highlighted by Hammer et al. (2022a) and Haliwela (2018), should generally not be different between cross-border and domestic strategies, thus motivating the results found.

Based on the descriptive statistics, there are differences in the means. For domestic B&Bs an EBITDA margin CAGR mean of -1.3% was found, and for cross-border B&B the mean was 2.7%. Hence, for the sample analysed in this thesis, cross-border B&Bs have a greater margin improvement than their domestic counterparts. Further, the standard deviation is greater in the cross-border B&Bs, which means that this group has a larger variation. In understanding these differences, Bertrand and Zitouna's (2008) arguments should be highlighted. They suggest that if differences between firms and national context are large, more synergistic and complementary effects could be realised. To exemplify: say a production company with large know-how makes

an add-on acquisition in a country with lower wages. If the company can leverage expertise from its home country while capitalising on the lower wages in the target country, it should achieve greater efficiencies. Whereas if the same company made an add-on acquisition domestically, these differences would be smaller, and thus the efficiency gains would be smaller. Moreover, the efficiency-related downsides of cross-border M&A, such as increased agency problems identified by Moeller and Schlingemann (2005), could be mitigated by the PE firms. This mitigation can occur through for example management equity stakes, which PE firms commonly use to reduce agency costs. Other potential issues raised by Moeller and Schlingemann, such as managers pushing to make acquisitions, which are not value-adding, but rather to obtain more power through increasing the size of the firm, are also likely mitigated by PE ownership. Through being better incentivised and potentially having more flexibility in aligning managers, PE firms could be in an unique position to mitigate operational inefficiencies, typical of cross-border transactions. This would leave them with many of the upsides, but few downsides.

Although the results in both H3.1 and H3.2 were insignificant, a discussion was conducted to explain the differences in means between the groups based on descriptive statistics. Surprisingly, and contrary to much of the previous literature, the cross-border B&Bs in the sample underperformed in sales, but overperformed in EBITDA margin, compared to their domestic counterparts. Potential explanations for these findings include the complexity equilibrium which could mean that cross-border and domestic strategies are more similar in complexity than what have previously been assumed. Another explanation could be the greater potential for complementary synergies between firms from different national contexts, and the lower costs of monitoring and lower risk of ulterior motives in PE led transactions.

5.4 Hypothesis 4: Value drivers in cross-border B&B

H4.1: *Multiple expansions (EV/Sales CAGR) have a greater contribution to the returns of cross-border B&B strategies (IRR), compared to improvements to the operating performance (Sales CAGR).*

The stated hypothesis seeks to test the relationship between independent variables, multiple expansion and operating improvements, and the dependent variable IRR. Based on the regression analysis for hypothesis 4.1, both the independent variables EV/Sales CAGR and Sales CAGR were significant at 1% level of significance. In Model 1, including the dependent (IRR) and independent variables, Sales CAGR had a coefficient of 1.69 and EV/Sales had a coefficient of 0.82. This implies that for every percentage point increase in Sales CAGR, the IRR of the B&B strategy is expected to increase by 1.69%, and that a percentage point increase to EV/Sales CAGR results in an expected increase of 0.82% for the IRR. When adding the five control variables in Model 2, the coefficient for Sales CAGR decreases to 1.52 and the coefficient for EV/Sales CAGR decreases to 0.80. Both independent variables remain significant at 1% level of significance. The relatively strong adjusted R Square of 0.58 and the lack of significance of the control variables is in line with prior research conducted by (Hammer et al., 2022a; Puche et al., 2015) highlighting operating improvements and multiple expansions as the main value drivers in B&B. However, contrary to hypothesis 4.1, Sales CAGR is observed to have a greater impact on the IRR than EV/Sales CAGR.

H4.2: *Multiple expansions (EV/EBITDA CAGR) have a greater contribution to the returns of cross-border B&B strategies (IRR), compared to improvements to the operating performance (EBITDA margin CAGR).*

The stated hypothesis seeks to test the same relationship as in H4.1, but instead focusing on EBITDA margin and the EV/EBITDA multiple. Contrary to the analysis of hypothesis 4.1, when using EBITDA margin CAGR and EV/EBITDA CAGR as the proxy for operating improvements and multiple expansion, no significance is found for either Model 1, with only the dependent and independent variables, nor for Model 2, where all five control variables are added. Consequently, hypothesis 4.2 is rejected, as there is no significant relationship between any variables in the models. The results should be interpreted with extreme caution due to the low sample size of 29, and the strong violation of the normality assumption (appendix C figure 8-10).

The results of hypothesis 4.1 correspond well with general PE research on value drivers which has indicated the growing importance of operational improvements (Puche et al. 2015).

Moreover, prior research of the value drivers in B&B are partly in line with the results presented in this thesis, but also show some discrepancies. The importance of Sales CAGR towards IRR is in line with Brigl et al. (2016), who attribute the superior return of cross-border strategies to both multiple expansional and operating improvements. These findings are also very similar to previous research on B&B strategies more generally, where sales growth has been identified as more important than EBITDA margin (Hammer et al. 2022a). Both Brigl et al. (2016) and Hammer et al. (2022a) attribute this to top-line synergies, such as cross-selling, pricing harmonisation, joint branding and economies of scale. Hammer et al. (2022a) specifically suggest that top-line synergies should be quicker to realise, over cost synergies. Furthermore, in line with the findings of hypothesis 4.2 Heisig et al. (2022) did not find a significant effect of EBITDA growth towards exit price. Apart from the violation of the normality assumption, this could be due to the difficulties for the buyer of the platform company to obtain sufficient information to distinguish between organic and inorganic EBITDA-growth (Heisig et al. 2022). If the buyer cannot accurately determine the source of the EBITDA-growth, it becomes difficult to use EBITDA growth as a proxy for future growth, as described by Opler and Titman (1993). Consequently, the authors argue that this results in a weaker relationship between margin-improvements and IRR. Furthermore, contrary to Heisig et al. (2022), who identified multiple expansion (EV/EBITDA CAGR) as a major contributor to total value creation, this thesis found no significant relationship between EV/EBITDA CAGR and IRR in hypothesis 4.2. In addition, the results from Heisig et al. (2022) would also suggest a greater contribution from multiple expansion through EV/Sales in hypothesis 4.1, which is not the case in this thesis.

Lastly, as covered earlier in the discussion, cross-border M&A provides certain possibilities connected to the acquisition of new knowledge and resources, subsequently leading to a greater innovative ability (Kotabe, 1990; Hoskinsson & Hitt 1990). Given the greater contribution of Sales CAGR to IRR for the sample of this thesis, capitalising on these opportunities appears to be central to generating returns for cross-border B&Bs. To account for the cultural challenges causing complexities (Rahahleh & Wei, 2013) and subsequently leading to worse returns (Chatterjeeet al. 1992), Hofstede's Cultural Index was used as a control variable. This measure was aimed to account for the impact of cultural differences towards the IRR of cross-border strategies. Interestingly, no significance was found for this variable in either regression model.

This could indicate that PE firm's are able to manage cultural challenges very effectively, perhaps due to the PE effect. It could also mean that PE firms are very aware of these challenges, and thus only conduct culturally complex transactions when there are mitigating factors, or a large upside. On the other hand, prior studies have also highlighted differences in corporate culture (Barkema et al. 1996) and complexities arising from differences in national accounting standards, as important (Black, A. Carnes, & Jandik, 2001). Hence, the Hofstede-variable may overlook certain challenges faced in cross-border B&B strategies.

Concluding the last hypotheses, Sales CAGR had the greatest effect on IRR, which was contrary to what was hypothesised, but still in line with some previous research. The results highlight the importance of overcoming cultural challenges, and thus being able to realise synergies. Surprisingly, for H4.2 no significance was found. However the violation of normality assumptions and the small sample size, are probable explanations. Lastly, the measure of cultural distance was not significant, which could be reasons for researchers to review its applicability in this type of research.

5.5 Limitations

Overall, the undisclosed nature of PE transactions and difficulties capturing entire B&B processes constitute a major limitation for this thesis. These factors make it impossible to generate random samples and significantly limit sample sizes in this field of research. Based on the analysis of 46,575 strategies, using both desktop research and a custom-developed matching program, only 83 strategies, which had complete data on both deal value and deal stake for all transactions, were identified. Brigl et al. (2016) highlighted that, as early as 2012, 53% of PE deals included add-on acquisitions. This statistic implies that the sample created for this thesis represents only a small portion of all B&B strategies. The less than ideal size of the sample likely stems from many transactions being absent from the Orbis M&A database, PEs choosing to not disclose data, and the inability of the matching program to pick up strategies in cases where, for example, platform firms changed identity throughout the process. While this is by no means unique, as prior articles have also suffered from low sample sizes (e.g. Acar 2017; Brigl et al.

2016), it limits the generalizability of the thesis and gives rise to potential sampling errors and selection biases.

The general lack of available information on private transactions, has imposed additional limitations on this thesis. First of all, deal value estimates collected from Orbis M&A were used. It was not clear how these were collected, and what sufficed as a credible enough estimate for Orbis M&A to include it. Because of this, many estimates were double-checked and generally found to be reasonable, which resulted in them being included. Secondly, with the field being largely dependent on PE firms voluntarily disclosing deal data, large selection biases are introduced. PE firms are likely incentivized to share information, when it puts them in a good light. Another selection bias stems from the differing requirements between countries regarding what financial information private companies must disclose. In many European countries, private firms are required to disclose certain financial information. This is not the case in many other markets. As a result, the sample in this thesis is largely skewed towards European deals, thus limiting the applicability of the findings to other geographies. In addition, due to the limited availability of findings, it is impractical to restrict entries to a specific time period. Consequently, the entry year of a PE firm, T0, varies across the sample. This variation may limit the generalizability of findings, as time-specific factors could affect the results. Although the S&P 1200 CAGR control variable addresses some effects, it does not cover all macroeconomic factors. Additionally, it is possible that as more attractive markets may have been consolidated, increasingly complex B&B strategies could have evolved, further challenging generalizability. Furthermore, increased competition for attractive platform firms and add-ons could potentially have reduced returns in the latter half of the time period analysed, though this potential effect could have been mitigated by PE firms' growing expertise in executing B&B strategies.

Furthermore, for the independent variables EV/Sales CAGR, EV/EBITDA CAGR and EBITDA margin CAGR, the computation was limited to the figure of the platform company upon entry and exit to compute the CAGR. This approach of using only entry and exit numbers is in line with some previous research (e.g. Hammer et al. 2020; Hammer et al. 2022a). This was also deemed fair as the scope of this thesis was centred around the main drivers affecting returns, not what affects these drivers. However, being able to also analyse the drivers of factors would have

given even more nuance to the thesis. For the multiples, it would have been interesting to see whether findings by Heisig et al. (2022) held up, and more specifically see what contribution the add-on sourcing effect has on returns. In terms of EBITDA margin, it would have added nuance to use a slightly different metric to test the findings by Borell and Heger (2013), and see how big a difference in efficiency and utilisation between the platform and add-ons plays in driving returns. With that said, it should be noted that all of these metrics are ratios, meaning add-on acquisitions affect both the numerator and denominator.

There is one additional limitation which was deemed necessary to cover. In discussing the direction of the research with industry professionals, we learned that buy-and-build strategies often involve more than 10 acquisitions, and in some cases, more than 50. As the sample construction for this thesis began, we found it very difficult to find data on these B&B strategies that included many add-ons. Further, based on the ratios of add-ons to platforms of prior research, the same case seems to be true for these. Hence, there seems to be a slight discrepancy between what researchers look at, and what PE professionals view as typical B&B strategies. This discrepancy, and the consequent gap which seems to exist between PE professionals and researchers in the area of B&B warrants future discussion.

5.6 Implications for practitioners

The findings of this thesis have several important implications for practitioners in private equity. The initial key finding of this thesis reveals that cross-border strategies yield higher returns. Based on the same factors which limit B&B to top PE firms (e.g. high deal inflow, large network), cross-border B&B should have even greater barriers to entry. This has central implications for practitioners, and is largely based on the importance of international deal access, and the need to mitigate the increased transaction costs in cross-border B&B. In essence, top-performing PEs conduct cross-border B&B which yield the highest returns, further segmenting their top-performing position. Hence, the essential implication for practitioners becomes (1) how to acquire capabilities needed to engage in cross-border B&B (e.g. deal access and ability to mitigate transaction costs), and for the PE firms currently engage in cross-border

B&B (2) how does the PE firm retain and refine these capabilities in a future where more PE firms try to engage in cross-border B&B.

The second key finding of this thesis is that the higher IRR of cross-border B&Bs stem from a higher multiple expansion compared to domestic strategies. It becomes evident that reducing transaction costs is crucial for practitioners, in order for them to reap the benefits of the exit premiums associated with the complexity of the transactions. For practitioners, this adds to the understanding of cross-border B&B, and underscores the importance of establishing a broad network and building strong market ties, thus decreasing information asymmetries. Further, it highlights the importance of deal flow to strengthen the bargaining position. For PE firms this could mean setting-up offices abroad at an earlier stage, and specifically recruiting professionals with strong connections in specific markets.

The last key finding of this thesis points to operating improvements, especially top-line growth, as the driver of return in cross-border B&B strategies. This implies that while multiple expansion is the predominant reason for the higher IRR of cross-border strategies, PE's ability to exploit top-line synergies are essential in driving returns more broadly. Thus, despite the complexity premium associated with cross-border B&B, operating improvements are still the main driver of value.

5.7 Recommendations for future research

This thesis presents further evidence supporting the notion that cross-border B&Bs generate higher returns than their domestic counterparts. The research indicates that the comparatively higher returns are primarily driven by multiple expansion, with operational improvements playing a minor or insignificant role. Although statistical tests showed no notable differences when comparing operating improvements between the two strategies, the descriptive statistics were directionally quite far from previous B&B research. This challenges previous assertions that sales growth is more achievable than margin expansion in cross-border B&Bs, suggesting the need for further research on this topic. Furthermore, when isolating cross-border strategies, operating improvements were found to be the primary value driver of returns.

As previously mentioned, data availability is an inherent challenge in studying PE transactions, as these investments typically involve unlisted firms. Given the unique contribution of this thesis, filling a research gap in previous literature regarding the drivers of return in cross-border strategies, redoing it using proprietary data, for example from Fund of Funds as done by Heisig et al. (2022), would likely result in a larger and more robust sample, increasing the validity of the findings. Additionally, future research could also look into the drivers of both multiple expansion and operating improvements for cross-border B&Bs. For this thesis, only qualified guesses can be made in regards to underlying drivers for these value drivers. Hence, future research would benefit from more thorough studies, specifically disentangling the drivers of these in a cross-border setting to facilitate a more nuanced discussion, ideally through conducting in-depth case studies. Moreover, future research could further explore the cultural challenges of pursuing cross-border strategies, beyond Hofstede's Cultural Index. In the discussion of this paper, possible reasons for the lack of significance observed for the Hofstede's Cultural Index control variable were discussed. As highlighted by previous research of cross-border M&As, there are challenges such as corporate culture disparities and complexities arising from different national accounting standards, which the Hofstede-variable used in this thesis might overlook. Hence, future research could benefit from including additional variables capturing these challenges, which in turn would provide a more comprehensive understanding of potential challenges faced when conducting cross-border B&B strategies.

Lastly, the existing discrepancy between practitioners' and researchers' views of what constitutes a legitimate B&B strategy should be explored. It could be beneficial to classify different types of B&B strategies in different categories based on this reasoning, as it would enable a more nuanced discussion in the literature. Given the limited availability of data for high frequency add-on strategies, if researchers were to collaborate with PE firms and thereby receive proprietary data, parts of this current gap could likely be bridged.

6. Conclusion

The purpose of this thesis was to determine the drivers of return in cross-border B&Bs, and how the return and value drivers differ compared to domestic B&Bs. To answer the research question at hand, seven hypotheses were constructed and tested using Cohen's D, Student's t-test, and Multiple Linear Regression. The results of the analysis show that cross-border B&B yield greater returns than their domestic counterparts. Plausible explanations relate to top PE's ability to mitigate disadvantages associated with cross-border transactions, thus leaving them with large upsides to exploit. Additionally, cross-border B&Bs provides PE firms with a greater number of moderately fragmented markets to consolidate. When comparing the value drivers in the two strategies, multiple expansion is found to be greater in cross-border B&B. The result may be attributed to the ability of top PE firms to mitigate information asymmetries, avoid transaction costs, and time the market. Further, overcoming the liability of smallness and a flexibility-premium associated with international add-ons could explain the result.

Although no statistically notable differences were found in operating improvements, descriptive statistics indicate greater EBITDA margin growth and lower sales growth for cross-border B&Bs. PE firms' ability to converge interests, thus lowering monitoring costs, and the complementary synergistic effects stemming from differences in national context, may be contributing factors for the higher EBITDA margin growth. The lower sales growth could stem from reduced possibilities of cross-selling, both because of fewer cross-industry B&Bs and due to less homogenous customer preferences cross-border. Lastly, the results of the analysis show that operating improvements are the greatest value driver in cross-border B&B. This highlights the importance of overcoming cultural challenges, and thus being able to realise synergies. Significant variables were only obtained when using Sales CAGR and EV/Sales CAGR as independent variables, and not when using EBITDA based equivalents. A probable explanation is the small sample size and deviation from normality.

The thesis contributes to the current research of B&B strategies. Both by separating cross-border and domestic strategies more clearly compared to previous research, and by specifically decomposing the value drivers of cross-border B&B strategies. Drawing upon prior research of

B&Bs and research of cross-border M&As, the study both assess prior findings on B&Bs and provide additional insights from cross-border transactions. The thesis provides concrete implications for practitioners by highlighting the higher returns from engaging in cross-border B&B and by providing a comprehensive understanding of the value-drivers in this strategy. By replicating this thesis with proprietary data, the validity of the result can be further strengthened, and the understanding of cross-border B&B could be deepened. Additionally, future research could benefit from studying the factors affecting the value drivers in cross-border B&B. Lastly, by exploring variables beyond Hofstede's Cultural Index as a proxy for cultural differences, a more nuanced understanding of the challenges and implications associated with cross-border B&B strategies could be reached.

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Appendix A: Authorship statement

This thesis was written by Elias Borg, Anton Nordén and Bror Nordström who equally contributed to the different parts of the paper. Each author approved of the final manuscript and is responsible for the content of this thesis.

Appendix B: AI usage statement

The following AI tools were used in writing this thesis: ChatGPT 3.5, ChatGPT 4.0, ChatGPT 4o, Grammarly, Google docs spell check. Grammarly and Google docs spell check were used continuously to flag grammatical errors and spelling mistakes. The different ChatGPT models employed were used to rephrase certain sentences and minor portions of text to enhance clarity, increase text efficiency and remove additional grammatical errors not caught by the more basic tools. Further, ChatGPT was used to create synonyms according to particular specifications. All output by ChatGPT was evaluated by the authors. These tools were more or less used for all sections of the text. Below follows example prompts for each of the three use cases presented:

Example 1: Rephrase sentences / minor portions of text:

I have just changed the narrative perspective for certain portions of a bachelor's thesis I am writing from a first person ("we") to a third person perspective. Now, some sentences have become unnecessarily long and difficult to read.

I will provide you with sentences. Your job is to propose improvements for these sentences in terms of clarity and grammatical correctness. The output should be a list of potential improvements, and the full text in which the improvements have been implemented.

Here is the first piece of text:

"This thesis includes exits up until 2024, whereas Hammer, who had the same starting point, only included transactions up until 2010. In addition, due to the sample construction method applied in this thesis, it could have an overrepresentation of larger deals as they are more likely

to get media attention, and are more likely to have available data; as they for example exit through IPOs more often."

Example 2: Coming up with synonyms

What are alternatives that can be used for "hereinafter" in the following text:

"The influence and importance of private equity (hereinafter PE) in the global economy has increased significantly over the past decade."

The options provided should be fitting for a formal text. Please provide multiple options.

Appendix C: Figures

Figure 1: QQ-Plot of IRR for the entire sample.
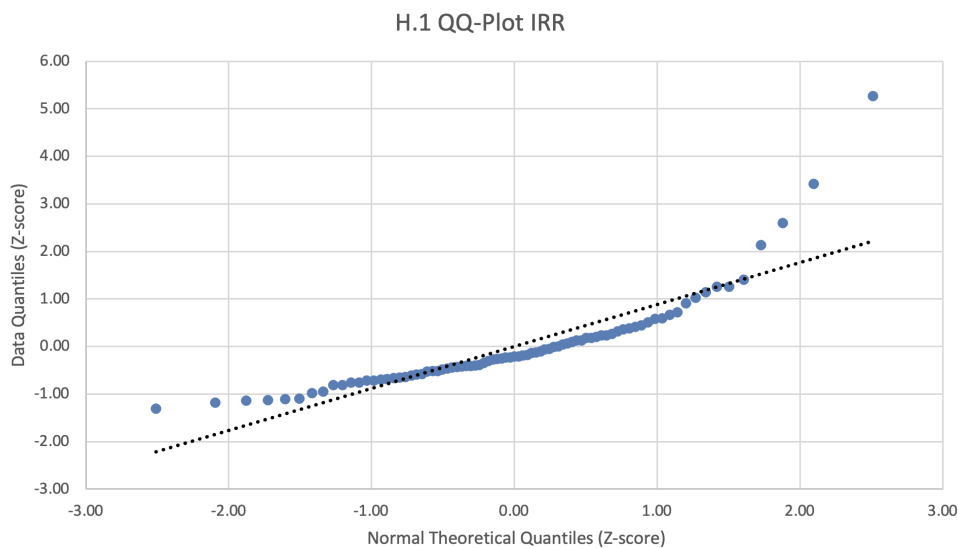
Figure 2: Histogram of IRR for the entire sample.
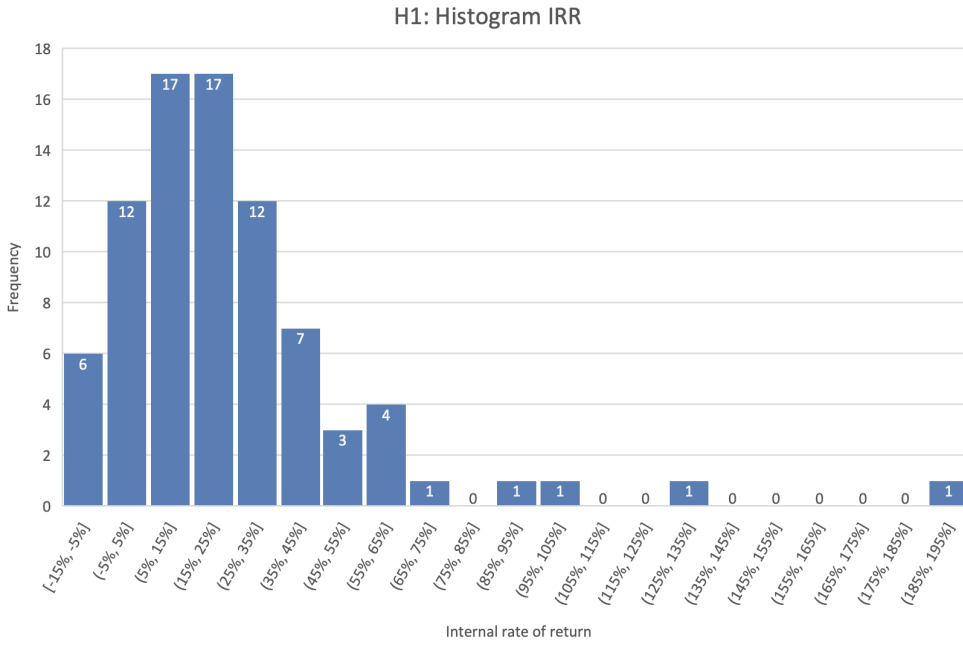
Figure 3: Residual plot of the Sales CAGR variable.
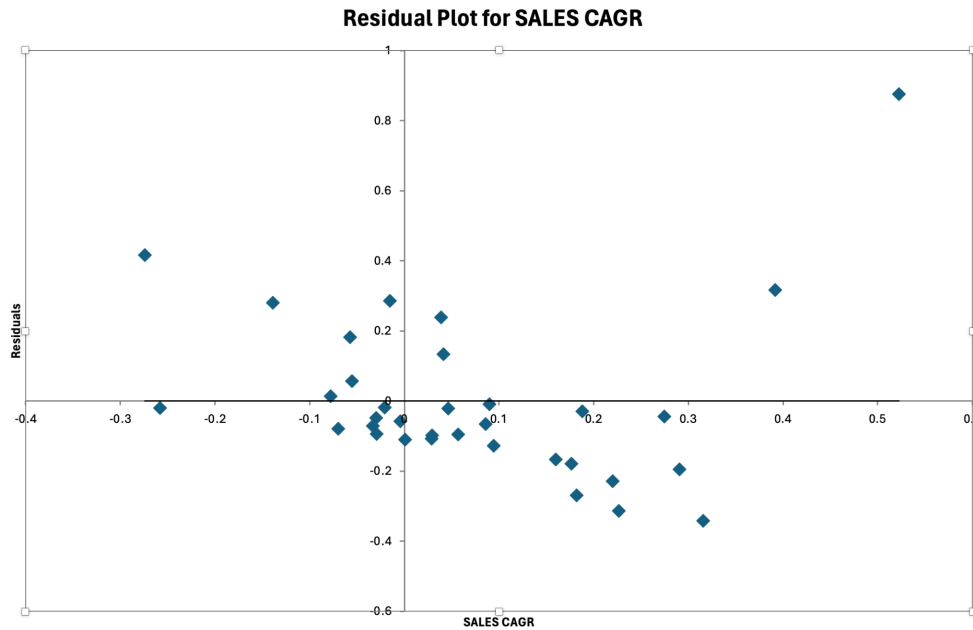
Figure 4: Residual plot of the EV/Sales CAGR variable.
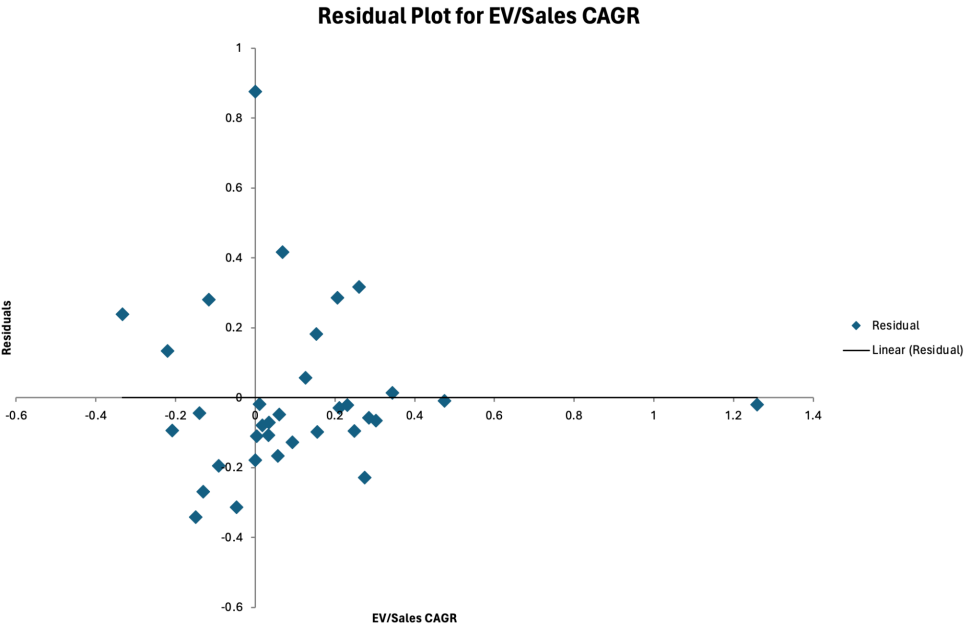
Figure 5: QQ-plot of IRR for the Sales subsample.
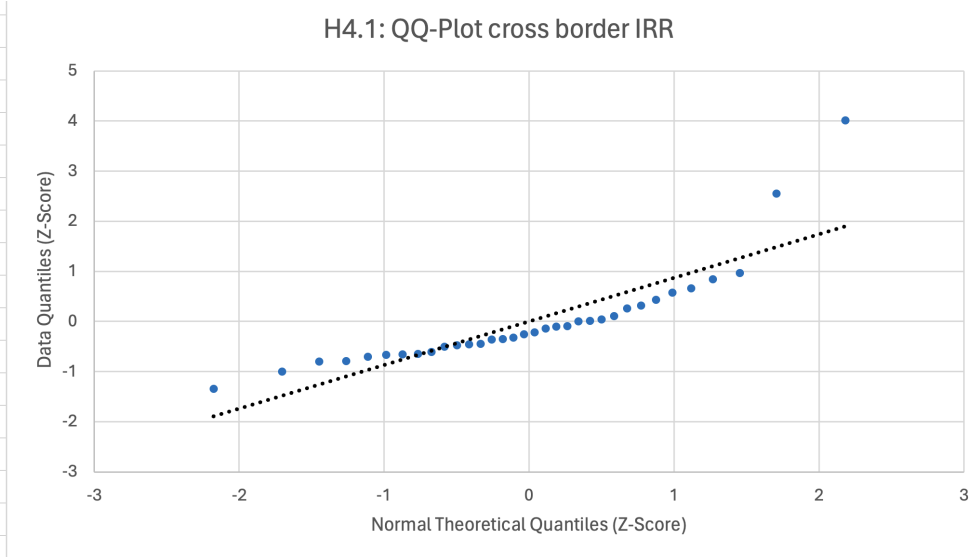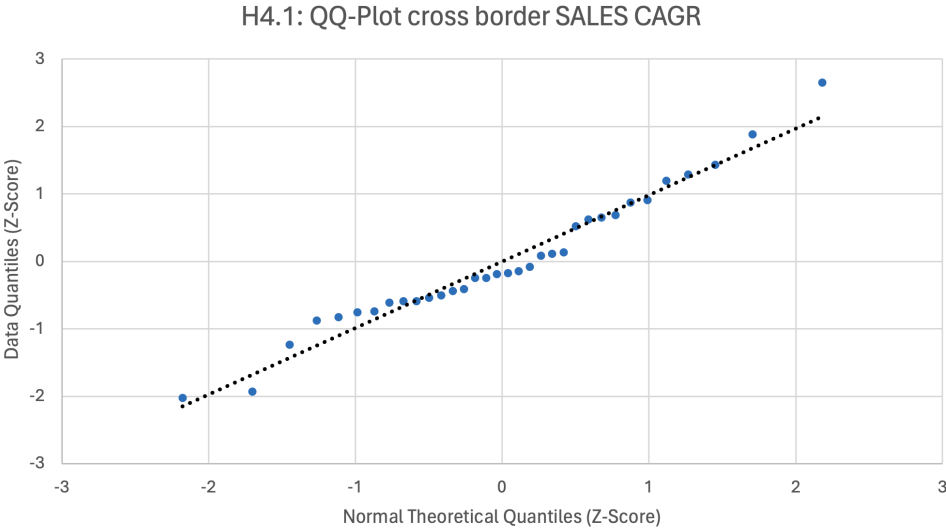
Figure 6: QQ-plot of Sale CAGR for the Sales subsample.

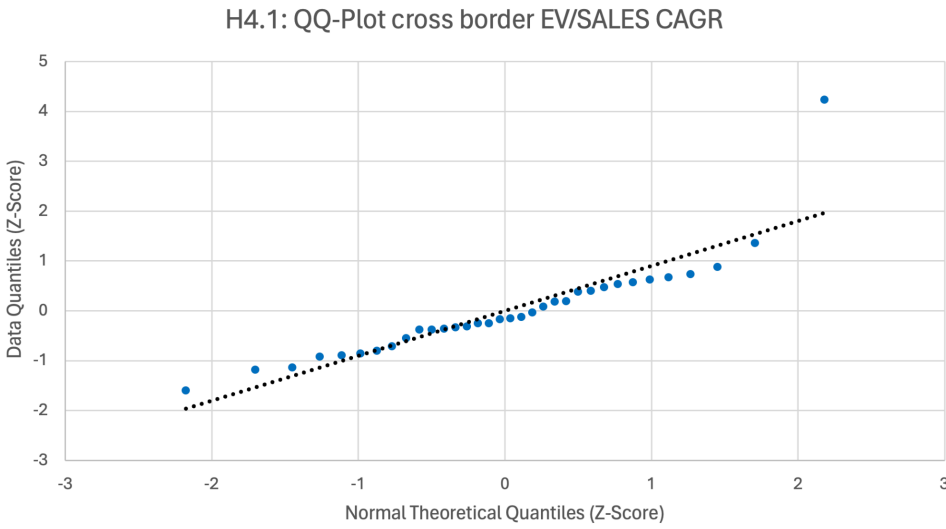**Figure 7:** QQ-plot of EV/Sales CAGR for the Sales subsample.
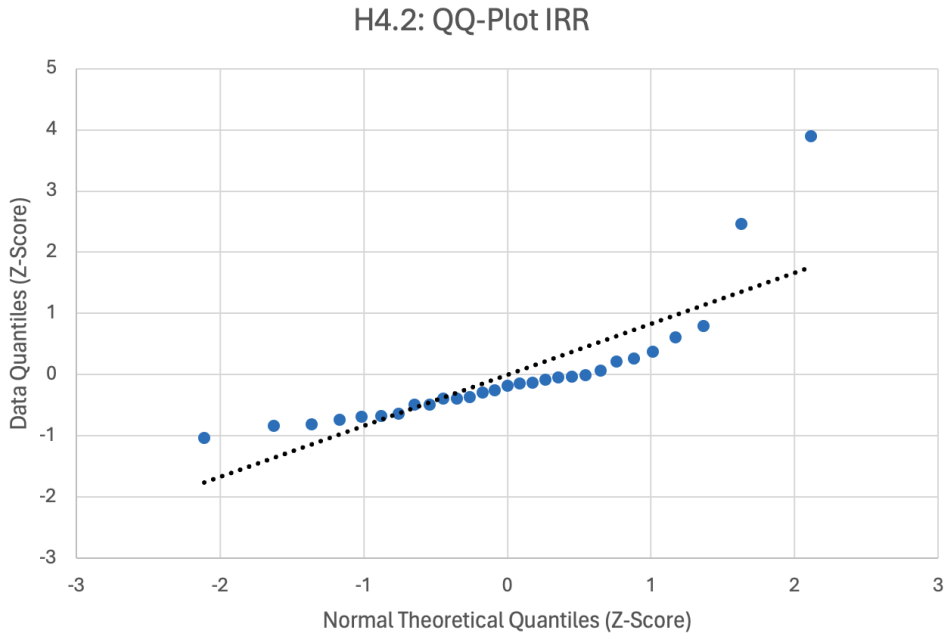
Figure 8: QQ-plot of IRR for the EBITDA subsample.

H4.2: QQ-Plot IRR

Figure 9: QQ-plot of EBITDA margin for the EBITDA subsample.

H4.2: QQ-Plot EBITDA-Margin CAGR
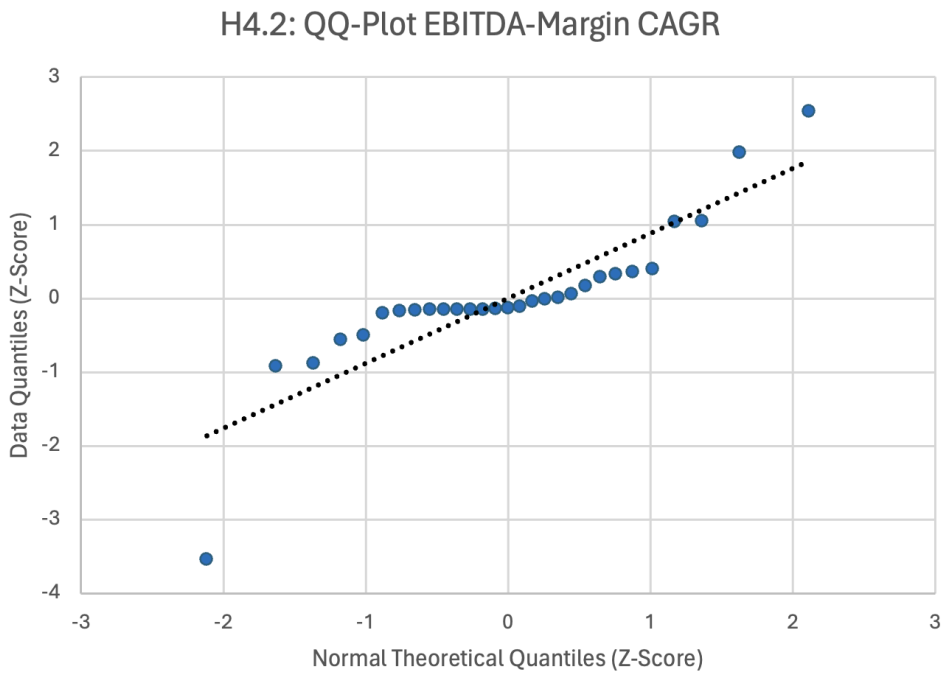
Figure 10: QQ-plot of EV/EBITDA CAGR for the EBITDA subsample.

H4.2: QQ-Plot EV/EBITDA CAGR

Figure 11: Residual plot of the EBITDA margin CAGR variable.

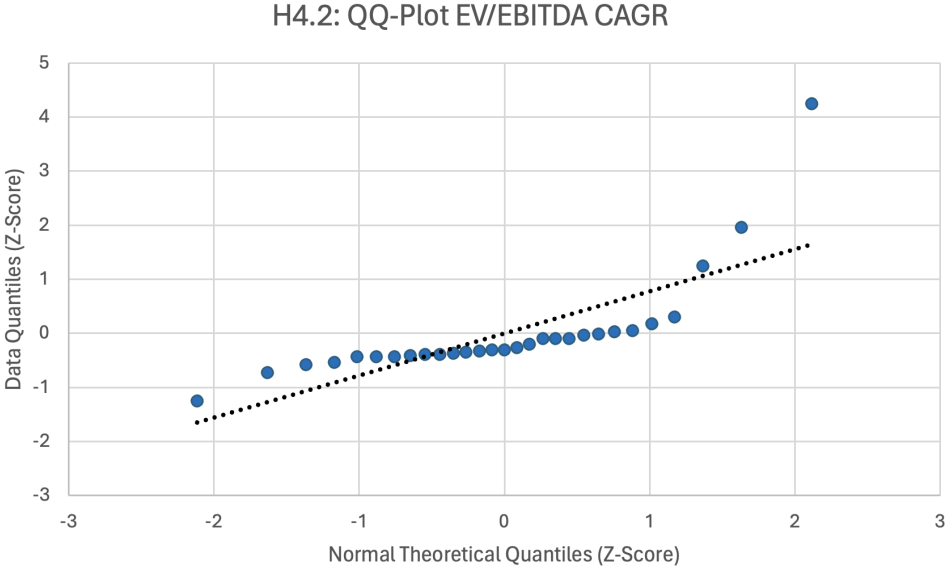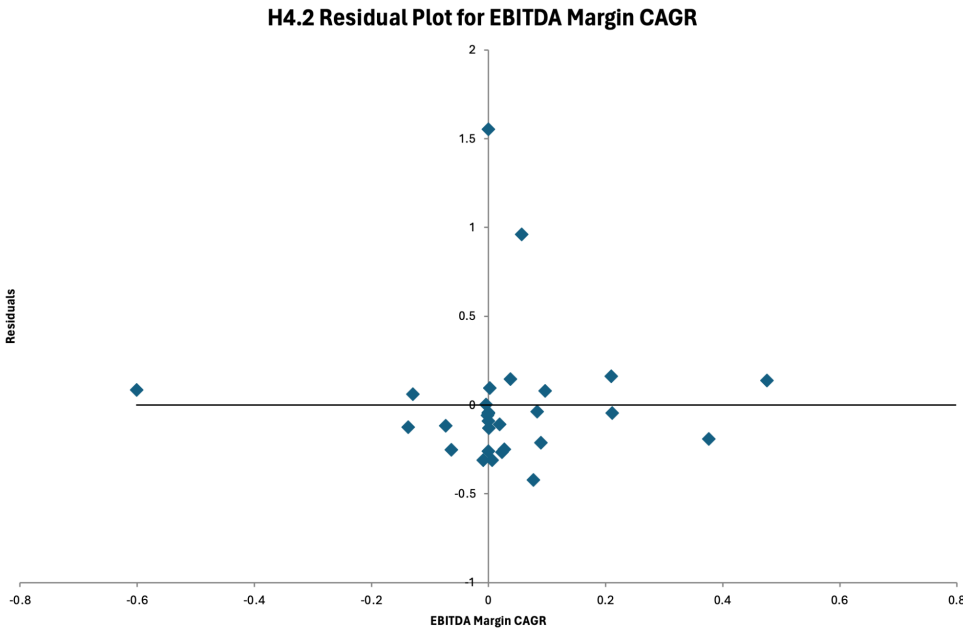H4.2 Residual Plot for EBITDA Margin CAGR

Figure 12: Residual plot of the EV/EBITDA CAGR variable.

H4.2 Residual Plot for EV/ EBITDA CAGR