

Private Equity Sponsorship: A Study of Value Creation and Operational Performance Beyond the Holding Period

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Abstract

Private equity firms are often credited with transforming businesses behind closed doors, but do their interventions endure under the public market spotlight? While performance improvements during private equity ownership are well established in prior research, this study shifts focus to operational outcomes following the transition to public ownership. Using a sample of 1,306 European IPOs from 2000 to 2015, the post-IPO performance of PE-backed firms is compared to that of non-PE-backed counterparts. Operating performance is assessed using three key metrics: Operating Cash Flow Ratio, EBITDA Margin, and Asset Turnover. The results show that PE-backed firms outperform on a relative basis across all three metrics, with significant differences confirmed through statistical and comparative analyses. However, both groups display a decline in absolute performance post-IPO. Subsample analyses reveal that the extent of outperformance varies by time period, geography, and sector. Additional tests on leverage and investment behavior further contextualize the findings, indicating a post-IPO shift in capital structure among PE-backed firms while showing no evidence of window dressing. Overall, the findings suggest that private equity ownership is associated with enduring operational advantages that persist beyond the transition to public markets.

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1 Introduction

The introductory chapter aims to provide the reader with an overview of the subject by outlining the context, addressing the core research question, and clarifying the study’s overarching purpose and scope.

1.1 Background

The modern form of private equity and leveraged buyouts emerged as a prominent investment model in the 1980s, as Jensen (1989) highlighted the increasing role of LBOs in corporate acquisitions. As LBO activity expanded during the decade, Jensen (1989) predicted that leveraged buyout firms would eventually become the dominant corporate structure, driven by their emphasis on efficiency, governance, and value creation.

Between 2018 and 2022, private equity sponsors invested €553 billion in European businesses, and as of 2022, more than 27,000 PE-backed companies in Europe collectively employed 10.9 million people (Invest Europe, 2024). Private equity is embedded in every major business sector across Europe, and the influence and reach of these private capital market sponsors are undeniable. However, precisely defining private equity and fully understanding its impact remains a complex challenge.

In highly generic terms, private equity encompasses various forms of investment in companies that are not publicly traded (Andersson et al, 2025). A more specific and arguably more accurate description is that private equity refers to a specialized investment model in which firms acquire established businesses with the aim of enhancing operating efficiency and profitability before ultimately exiting through an IPO, strategic sale, or secondary buyout (Kaplan & Strömberg, 2009). Kaplan and Strömberg (2009) state that, unlike venture capital firms, which primarily fund early-stage companies, private equity firms focus on acquiring majority control of mature firms, implementing financial and managerial restructuring to drive value creation.

Jensen (1989) characterized private equity as a governance structure that addressed key inefficiencies in traditional public corporations. He argued that private equity firms,

through concentrated ownership stakes, high-powered incentives for investment professionals, and lean organizational structures, created a more efficient alternative to publicly traded firms. In contrast to corporations with dispersed ownership, low leverage and weak governance mechanisms, private equity firms employed highly leveraged capital structures, performance-based managerial compensation, and active oversight to drive improvements and value creation.

Ultimately, one could argue that the "eclipse of the public corporation" and the superiority of the private equity governance model, as predicted by Jensen (1989), may not have been too far from the truth. The allocation of capital to private equity has expanded significantly in recent decades, with global closed-end private capital funds managing \$14.7 trillion as of 2022 (Barclays, 2024). Moreover, private equity continues to attract reputable institutional investors such as endowments, insurance companies, and corporate and public pension funds (Kaplan & Strömberg, 2009), at what seems to be an ever-increasing pace, further reinforcing the growing dominance and influence of this investment model.

1.2 Problematicization

Although the influence of financial sponsors and private equity in the financial sector and the broader economy is undeniable, their long-term impact on portfolio companies remains ambiguous. Private equity firms themselves have been highly profitable, consistently generating superior returns compared to public market investments (Harris et al, 2014). However, a long-standing debate persists regarding whether private equity creates sustained long-term operational value in its portfolio companies or merely generates high returns for themselves and their limited partners.

A key characteristic of the private equity model is its fixed investment horizon, shaped by the structure of PE funds (Kaplan & Strömberg, 2009). Private equity firms typically raise capital through closed-end funds, where investors commit capital to be deployed within a set time frame. A standard fund has a lifespan of ten years, with an investment period of up to five years, followed by a five- to eight-year window to exit investments and return capital to investors. Although this structure incentivizes value creation within a relatively short time

period, it also raises concerns about short-termism and window dressing, particularly in the years leading up to an exit.

A qualitative study by Ross and Hopkins (2011) highlights that buy-side analysts, such as those at institutional investment funds, express the greatest concern over window dressing in PE-backed IPOs, particularly when the private equity firm has held the company for only a short period. This raises the question of whether operational improvements implemented during PE ownership are truly sustainable or merely optimized to enhance valuations at exit. The need to deliver strong short-term performance to attract future fundraising rounds further intensifies the incentive for private equity firms to maximize perceived value at the time of divestment, rather than ensuring long-term stability.

Despite valid concerns surrounding short-termism in private equity and its potential impact on non-investor stakeholders, such as employees, the broader effects of PE ownership remain complex. A common critique is that private equity firms focus on cost-cutting and workforce reductions to drive margin expansion. However, data suggests that PE-backed companies have been significant drivers of employment growth in Europe, contradicting the perception of widespread job losses. In 2022, net job creation in PE-backed firms was 7.2%, far exceeding the European average (Invest Europe, 2024). This suggests that while private equity can pursue efficiency improvements, it also fosters business expansion and job creation.

Another frequently raised concern is that PE-backed firms may present overly adjusted or even manipulated financial figures to enhance the attractiveness of their portfolio companies at exit. Earnings management refers to temporary adjustments to financial statements to inflate performance, and critics argue that this practice may be more prevalent in PE-owned firms. However, Katz (2009) finds that PE-backed firms actually engage in less earnings management compared to non-PE-backed firms. The study attributes this to, among other things, reputational considerations, as PE firms regularly bring companies to market and rely on trust from investors and potential buyers. Engaging in aggressive financial adjustments could damage their credibility and long-term ability to sell portfolio companies at strong valuations. Rather than distorting financial statements, PE firms have a vested interest in maintaining transparent and credible reporting practices, as their ability to consistently bring companies to market depends on sustaining investor confidence.

This study focuses specifically on assessing the long-term impact of private equity sponsorship on operational performance metrics for companies that have been exited through an IPO. The decision to limit the scope to IPO exits is primarily driven by data availability constraints, as publicly accessible financial data for PE-backed firms is generally more comprehensive following a public listing. Previous research has examined the effects of private equity ownership, with an overarching consensus that PE sponsorship is associated with operational performance improvements during the holding period. However, less attention has been devoted to analyzing the development of portfolio companies post-exit.

The studies that have addressed this question vary in focus and have produced partially mixed results. Some research suggests that all firms, regardless of sponsor backing, experience a decline in operational performance post-IPO. Others indicate that PE-backed firms sustain performance advantages even in the public market due to enhanced governance and financial discipline. Conversely, some findings suggest that operational improvements may diminish over time, potentially due to financial optimization or window dressing before exit. Ultimately, no definitive consensus has been reached regarding the effects of PE ownership beyond the holding period. Additionally, the majority of prior research has been conducted using relatively old datasets, with a primary focus on the American capital markets. Given this background and the growing influence of PE-backed companies, this study aims to analyze European IPOs between 2000 and 2015, providing a more recent and region-specific perspective on the long-term operational impact of private equity sponsorship.

1.3 Research Question

Building on the background and problematization, this study will endeavor to address the following research question:

Do PE-backed companies outperform non-PE-backed companies post-IPO?

1.4 Purpose

This study addresses the underexplored area of long-term operating performance post-IPO, contributing to the academic debate on whether PE ownership delivers sustained value or merely short-term enhancements. By examining this topic, the research seeks to provide a foundation for future studies, offering relevant insights for various stakeholders. For General Partners, the findings are relevant as the post-exit performance of portfolio companies could have reputational effects, particularly in reinforcing concerns about window dressing by sponsors. Additionally, for minority owners, management, and other internal stakeholders who remain directly or indirectly invested in the long-term performance of the business, the study offers valuable insights into the potential long-term implications of PE-backing. Ultimately, the findings aim to benefit both academia and industry practitioners by shedding light on the long-term impact of sponsor involvement.

1.5 Delimitations

This study examines all European IPOs completed during the period 2000–2015. Listings after 2015 are excluded due to the implementation of the new accounting standard IFRS 16 in 2019 (PwC, 2016), which impacts financial metrics and could distort the study’s data and results. By adopting a 16-year time frame, the analysis captures a variety of economic cycles, reducing the risk of bias caused by exceptionally strong or weak market conditions, such as the financial crisis. The longer time frame also allows for a comparison of empirical results across different periods and cycles. Furthermore, the geographically diverse dataset ensures that the findings can be generalized while also enabling an analysis of whether the results are more pronounced in specific regions. To maintain consistency and reliability, the study adopts S&P Capital IQ’s sector classification and excludes the financial, real estate, and healthcare sectors, as the accounting practices and key metrics for these industries differ significantly from those of other sectors, making direct comparisons unsuitable. This combined approach ensures the robustness of the analysis while addressing potential biases and inconsistencies. A more detailed review of the study’s selection criteria is presented in section *3.3 Selection and Delimitations*.

2 Literature Review

The literature review provides a comprehensive understanding of private equity, including its definition and the theoretical foundations of its value creation strategies. It then examines the foundational theories underlying the study, along with key prior research in the field. Finally, hypotheses are formulated for each selected operational metric, serving as the basis for addressing the research question.

2.1 Private Equity

2.1.1 Private Equity and Value Creation

Private equity has been widely examined in research, yet distinctions between different types of financial sponsors remain relatively fluid. As discussed in *1.1 Background*, private equity is commonly defined as an investment model where firms acquire established businesses to enhance operational efficiency and financial performance before exiting through a private sale or public offering (Kaplan & Strömberg, 2009). While this study focuses on PE-backed IPOs, it acknowledges that categorizations of financial sponsors are not absolute. The specific selection criteria applied in this paper are detailed in section *3.3.4 Sponsor Type*.

A key characteristic of private equity is its active ownership approach. PE firms typically acquire controlling stakes and implement strategic changes to improve profitability and efficiency. Kaplan and Strömberg (2009) outline three primary mechanisms for value creation. Governance engineering aligns management incentives with ownership, often by increasing executive equity participation and linking compensation to firm performance. Financial engineering involves capital structure optimization, enforcing financial discipline to ensure efficient capital allocation. This mechanism is closely linked to free cash flow theory, discussed in section *2.2.1 Free Cash Flow*, as high debt levels can constrain managerial discretion and prevent inefficient investments. Operational engineering focuses on restructuring and industry-specific improvements to enhance business performance (Kaplan & Strömberg, 2009).

Beyond these mechanisms, PE ownership provides additional advantages and effects that enhance a firm’s credibility, resources, and strategic positioning (Caselli & Negri, 2021). The certification effect arises from private equity’s rigorous due diligence, signaling quality to external stakeholders and enhancing access to capital markets. The network effect reflects PE firms’ industry connections, enabling portfolio companies to establish key partnerships and strengthen business relationships. The knowledge effect stems from PE firms’ operational expertise, often applied through strategic guidance and management support. Lastly, the financial effect results from improved access to capital, as PE-backed firms typically benefit from lower costs of equity and stronger credibility among lenders and investors.

2.1.2 IPO as an Exit Strategy

An initial public offering (IPO) is one of the primary exit strategies employed by private equity firms to realize returns on their investments. While alternative exit routes such as strategic sales or secondary buyouts are common, an IPO can offer PE firms the opportunity to achieve high valuations, particularly in strong market conditions (Folus & Boutron, 2015). Favorable financial market sentiment tends to make IPOs a particularly attractive divestment strategy, as investors are more willing to pay premium valuations for newly listed firms.

Despite these advantages, IPOs present challenges for private equity firms. The process involves high transaction costs, extensive regulatory requirements, and, in many cases, restrictions on full divestment at the time of listing. Additionally, concerns over earnings quality and potential window dressing in the period leading up to an IPO raise questions about whether operational improvements achieved under PE ownership are sustainable in the long term (Folus & Boutron, 2015). This study focuses specifically on IPOs as an exit strategy to assess the post-exit operating performance of PE-backed firms, particularly due to data availability concerns. The methodology and selection criteria related to this focus are further detailed in chapter 3 *Methodology and Data Description*.

2.2 Theoretical Framework

2.2.1 Free Cash Flow

Free cash flow represents the surplus of cash flows a company generates after undertaking positive net present value (NPV) investments (Jensen, 1986). The free cash flow theory is based on the idea that companies striving to manage their resources efficiently cannot afford an abundance of excess cash flows, as this could lead to irresponsible spending (Berk & DeMarzo, 2019). Excessive cash flows provide executives with incentives to reinvest profits back into the business, often with the aim of increasing the size of the organization under their control (Berk & DeMarzo, 2019; Jensen, 1986). This growth motivation commonly stems from managerial incentives such as increased power, salary, prestige, and visibility (Berk & DeMarzo, 2019; Jensen, 1986; Murphy, 1985). Berk and DeMarzo (2019) further argue that human fallibility, including greed, can drive management to pursue unprofitable projects while disregarding the consequences.

Managers motivated by organizational expansion may engage in value-destroying activities, such as making unnecessary investments and acquisitions, hiring unneeded staff, expanding unprofitable divisions, or failing to shut down underperforming business units (Berk & DeMarzo, 2019). This often results in the company growing to a size that exceeds management’s capacity to oversee it effectively (Jensen, 1986).

For management to engage in these value-destructive activities, access to capital is required (Berk & DeMarzo, 2019). Jensen (1986) argues that one effective way to curb such behavior is by increasing the company’s leverage. While high levels of debt introduce financial risk, they also impose discipline on management by creating a need to allocate resources more prudently. This financial pressure leads to more deliberate decision-making, enhancing capital efficiency and benefiting the organization.

Free cash flow theory has long been associated with PE investments, as these transactions typically involve significant leverage (Kaplan & Strömberg, 2009). The high levels of debt often require portfolio companies to pledge their assets and cash flows as collateral (Wright, 2013). As a result, management in portfolio companies is compelled to manage

resources and execute investments with greater care and consideration (Jensen, 1986).

2.2.2 Agency Cost

Jensen and Meckling (1976) introduced agency theory, which explains the problems and costs that arise due to the separation of ownership and control within a company. The theory describes how managers act as agents on behalf of the board and shareholders, who serve as the principals. A fundamental issue arises because these groups are driven by different interests and incentives. Jensen and Meckling argue that when management owns less than 100% of a company, they are more likely to consume perks at the company's expense rather than focus on maximizing shareholder value. This occurs because managers do not bear the full cost of such perks or enjoy the full benefit of any increase in shareholder value. Consequently, companies that are entirely owned by management incur no agency costs.

To mitigate these conflicts of interest, principals can implement monetary incentive programs for agents, but these measures themselves generate agency costs. Jensen and Meckling further contend that it is generally impossible for principals to ensure that agents always act in the principals' best interest without incurring some level of these costs.

Jensen and Meckling (1976) categorize agency costs into three components. The first, monitoring expenditures, refers to the costs incurred by principals to oversee and influence agents, such as the expenses associated with maintaining a board of directors or implementing employee stock incentive programs. The second, bonding expenditures, involves costs borne by agents to strengthen their credibility with principals. The third component, residual loss, arises when agents act contrary to the principals' best interests, resulting in a loss of value.

Agency costs are particularly relevant during an IPO, as highlighted by Jain and Kini (1994). At the time of an IPO, management often reduces its ownership stake, which can lead to increased agency costs. Lower ownership reduces management's exposure to the financial consequences of its actions, potentially resulting in overinvestment or unnecessary expenditures that the company and ultimately shareholders must bear.

2.2.3 Window Dressing

One behavior closely associated with information asymmetry is window dressing, which refers to the tendency to temporarily improve financial statements through accruals to make a company appear more attractive than it is (Michala, 2019). As a result, reported profits may be inflated relative to actual cash flows. If investors rely on these overstated earnings without recognizing the impact of generous accruals, they risk overpaying for the company (Teoh et al, 1998).

The question of whether sponsor firms engage in window dressing remains debated (Ross & Hopkins, 2011). Degeorge and Zeckhauser (1993) argue that the decline in performance following the IPO of a reverse leveraged buyout (LBO) cannot be fully explained by hypotheses related to behavioral changes or high leverage. Instead, they find that information asymmetry consistently accounts for the deterioration. Their research shows that reverse LBOs significantly outperform comparable companies in the period leading up to their IPO, only to underperform in subsequent years. Moreover, companies brought back to the public market after a period of private ownership often coincide with a peak in their operating performance, which Degeorge and Zeckhauser attribute to information asymmetry between owners and the market. Pereira and Sousa (2017) report similar findings, though not for PE-backed firms specifically, showing that operating performance tends to be stronger before, rather than after, the IPO. They attribute this trend to management engaging in window dressing to present a period of strong operating results prior to going public. However, Degeorge and Zeckhauser also find that companies previously taken private through an LBO and subsequently re-listed perform better operationally compared to other types of IPOs.

Private equity firms and sponsors aim to maximize their returns when exiting portfolio companies, as they have a fiduciary duty to deliver the best possible results for their partners and investors (Ross & Hopkins, 2011). According to Ross and Hopkins, investors are aware of sponsor firms' incentives to maximize the exit value of portfolio companies, making window dressing a significant concern for buy-side analysts. On the other hand, Katz (2009) finds that PE-backed companies tend to exhibit higher earnings quality and deliver superior returns to shareholders, driven by professional ownership, stricter monitoring, and

incentives to maintain a strong reputation. Katz’s study suggests that these factors result in less earnings management and more conservative accounting practices among PE-backed firms.

2.3 Literature and Past Research

2.3.1 Foundations of Post-IPO Operating Performance Research

The academic discussion surrounding private equity and its long-term impact on portfolio companies has been heavily influenced by Jensen (1989), who argued that the leveraged buy-out (LBO) structure presents a superior governance model compared to the widely dispersed ownership of public corporations. He suggested that public firms suffer from inefficiencies due to weak managerial incentives, excessive free cash flow, and misaligned interests between shareholders and executives. In contrast, he suggested that PE-backed firms benefit from concentrated ownership, financial discipline, and stronger governance mechanisms, leading to greater efficiency and value creation.

Building on Jensen’s arguments, Jain and Kini (1994) were among the first to empirically examine the post-IPO performance of newly listed firms in the United States, assessing whether companies maintain their pre-IPO operational efficiency after going public. Their study analyzed a sample of 682 U.S. IPOs from 1976 to 1988 and found that, on average, firms experience a decline in operating performance in the years following their listing. By measuring changes in EBITDA/assets, operating cash flow/assets, capital expenditures/assets, and asset turnover, they identified a consistent deterioration in key financial metrics, leading them to conclude that firms struggle to sustain their pre-IPO performance. While their study does not focus specifically on PE-backed IPOs, it provides a crucial foundation for analyzing whether private equity sponsorship mitigates or exacerbates this post-IPO decline.

The question of whether PE-backed firms outperform their non-sponsored counterparts post-IPO remains debated. While some research suggests that private equity ownership leads to sustained improvements in governance and efficiency, others argue that performance gains during the PE holding period may be temporary, with some firms exhibiting signs of

window dressing before their public listing. The following section explores these competing perspectives by reviewing key empirical studies on the subject.

2.3.2 Financial Sponsorship and Long-Term Operating Performance

Extending the discussion on post-IPO performance, Kaplan and Strömberg (2009) review the broader role of leveraged buyouts and private equity in driving operational improvements. Their paper, drawing on the governance theories outlined by Jensen (1989) and the post-IPO performance research pioneered by Jain and Kini (1994), concludes that PE-backed firms exhibit strong efficiency gains during the holding period, driven by active governance, cost discipline, and financial restructuring. However, a notable limitation of their discussion is that it primarily focuses on operational improvements during private ownership, with limited emphasis on long-term performance post-IPO. Additionally, their paper mostly provides a broad discussion of global private equity markets rather than a focused empirical analysis.

The question of whether performance improvements persist beyond the PE holding period has been examined in greater depth by studies on reverse leveraged buyouts (RLBOs). Degeorge and Zeckhauser (1993) analyze U.S. firms that were taken private by PE sponsors, restructured, and later re-listed through an IPO. Their study examines 62 RLBOs from 1983 to 1987 and finds that these companies demonstrate strong financial performance leading up to the IPO but experience post-IPO deterioration relative to comparable firms. By some, this pattern has been interpreted as evidence of financial optimization or window dressing before exit, raising concerns that some PE-backed firms may prioritize maximizing short-term valuations rather than ensuring long-term sustainability.

Similarly, Pereira and Sousa (2017) examine post-IPO performance in European capital markets, focusing on 555 IPOs between 1995 and 2006. Their findings suggest that firms from emerging markets experience a sharper decline in operational efficiency compared to those from developed markets. The study attributes these differences to earnings management and IPO timing strategies, reinforcing concerns that some firms, sponsor-backed or not, may engage in short-term optimizations rather than fostering long-term operational stability.

A crucial counterpoint to these concerns is presented by Katz (2009), who specifi-

cally investigates earnings management in PE-backed IPOs in the U.S. The study examines whether PE-backed firms strategically inflate financial figures before exit to enhance valuations. Contrary to common criticisms, Katz finds that PE-backed firms engage in less earnings management compared to non-PE-backed firms. The study attributes this to reputational considerations, as private equity firms frequently bring companies to market and depend on investor trust for future fundraising and exits. Engaging in aggressive financial adjustments could damage credibility, making it more difficult for PE firms to sell portfolio companies at strong valuations over time.

Building on this, Jain and Kini (1995) extend their earlier research by analyzing the impact of financial sponsors on post-IPO performance, particularly venture capital (VC)-backed firms in the United States. Their study examines 272 U.S. IPOs from 1976 to 1988 and finds that VC-backed firms tend to outperform non-sponsored firms post-IPO. The study attributes this outperformance to active monitoring, governance improvements, and enhanced financial discipline. While their research focuses on venture capital rather than private equity, their findings support the notion that active financial sponsorship can mitigate post-IPO underperformance through governance mechanisms.

These studies collectively illustrate the ongoing debate surrounding PE-backed IPOs. While private equity firms appear to drive operational improvements during the holding period, post-IPO performance remains contested, with some studies highlighting sustained advantages and others pointing to reversions in financial metrics after exit. Additionally, the majority of empirical research on this topic has been conducted on U.S. firms, with relatively few studies focusing on European PE-backed IPOs. Given the growing role of private equity in European capital markets, further research is needed to better understand how these firms perform beyond their PE ownership period.

2.4 Critical Assessment Theoretical Framework and Literature

The theoretical foundation of this study is based on well-established frameworks such as free cash flow theory (Jensen, 1986), agency cost theory (Jensen & Meckling, 1976), and the concept of window dressing (Teoh et al, 1998; Degeorge & Zeckhauser, 1993; Pereira & Sousa,

2017). While these theories have been widely applied in private equity research, their age raises questions about their continued relevance given the structural and strategic shifts in the industry over the past decades. Private equity today operates under different conditions, with changes in governance models, regulatory environments, and value creation strategies. Consequently, while these theories remain useful in explaining incentives and mechanisms, their applicability to more recent market developments may be more limited.

A similar concern applies to much of the empirical literature, which largely relies on data samples from earlier periods. Many of the foundational studies on post-IPO operating performance, such as Jain & Kini (1994; 1995) and Degeorge & Zeckhauser (1993), analyze data from before the 2000s. This presents a potential issue for comparability, as private equity has evolved significantly in terms of its investment approach, operational involvement, and market influence. While these studies offer valuable insights, they may not fully reflect the evolving nature of private equity and its impact on IPO performance in recent decades.

Another limitation of prior research is its predominant focus on U.S. capital markets. The majority of studies analyzing post-IPO performance, including those by Jain & Kini (1994; 1995) and Katz (2009), examine firms listed in the U.S., with relatively little attention given to European IPOs. While some research, such as Pereira & Sousa (2017), provides insights into European markets, studies explicitly comparing PE-backed and non-PE-backed IPOs in a European setting remain limited. Given differences in financial markets, regulatory frameworks, and economic conditions, findings from U.S.-based studies may not necessarily translate directly to the European landscape.

Furthermore, the purposes and scope of previous studies have varied, leading to methodological inconsistencies that make direct comparisons across studies difficult. Some research focuses on operating performance post-IPO, while others examine governance effects, earnings management, or IPO timing strategies. These differences in research objectives, performance metrics, and benchmarking techniques can impact conclusions regarding the long-term effects of private equity ownership.

This study strives to apply a similar methodology to prior research to facilitate comparability while acknowledging that differences in scope and delimitations inevitably exist.

The specific selection criteria and methodological approach used in this study are further detailed in chapter 3 *Methodology and Data Description*. By focusing on a comprehensive sample of European IPOs between 2000 and 2015, this study provides a more recent and regionally relevant perspective on whether private equity-backed firms sustain their performance advantages post-IPO or if observed improvements are primarily short-term in nature. This study also aims to deepen the analysis beyond historical research by segmenting the full sample and incorporating metrics that extend beyond direct operational performance. The gaps and limitations in existing research underscore the relevance of this study, reinforcing the need for continued examination of private equity’s long-term impact on portfolio companies beyond the holding period.

2.5 Hypotheses

The formulation of hypotheses in this study is grounded in the underlying theoretical framework and prior research on private equity and post-IPO performance. Previous studies suggest that while PE-backed firms often experience a decline in operating performance post-IPO, they may still retain an advantage over non-PE-backed firms on a relative basis. Furthermore, it is plausible that this relative advantage stems from the structural and strategic changes implemented during private ownership. However, the extent to which these advantages persist beyond the holding period remains debated and requires further examination using a more recent data sample.

This study applies a quantitative approach to examine whether PE-backed firms exhibit statistically significant differences in operating performance compared to their non-PE-backed counterparts after going public. The examined operational variables, further detailed in section 3.4 *Operational Metrics*, largely align with those used in previous research and serve as the basis for assessing potential differences in post-IPO performance.

To systematically address this, the hypotheses presented below serve to determine whether any statistically significant differences are observed, shedding light on the extent to which private equity sponsorship influences operational outcomes beyond the point of exit. Ultimately, the hypotheses formulated below serve as the foundation for addressing the re-

search question: Do PE-backed companies outperform non-PE-backed companies post-IPO?

H0_a: *There is no statistically significant difference in Operating Cash Flow Ratio between PE-backed and non-PE-backed companies post-IPO.*

H1_a: *There is a statistically significant difference in Operating Cash Flow Ratio between PE-backed and non-PE-backed companies post-IPO.*

H0_b: *There is no statistically significant difference in EBITDA Margin between PE-backed and non-PE-backed companies post-IPO.*

H1_b: *There is a statistically significant difference in EBITDA Margin between PE-backed and non-PE-backed companies post-IPO.*

H0_c: *There is no statistically significant difference in Asset Turnover between PE-backed and non-PE-backed companies post-IPO.*

H1_c: *There is a statistically significant difference in Asset Turnover between PE-backed and non-PE-backed companies post-IPO.*

3 Methodology and Data Description

This chapter presents the formal methodology of the study, detailing the data sources, outlining the delimitations, providing an overview of the selected operational value creation metrics, the statistical methodology and concluding with a critical discussion of the methodological approach.

3.1 Overarching Methodology

This study aims to contribute to the academic literature and research on private equity and financial sponsorship by examining the long-term operational impact of PE ownership. Specifically, it investigates whether PE-backed firms exhibit distinct post-IPO operating performance compared to non-PE-backed counterparts. This is assessed by analyzing and comparing the operational development of both groups after their IPOs using selected operational metrics, providing a structured evaluation of performance differences and addressing the central research question.

To ensure comparability with prior research, this study follows the foundational methodological approaches of prominent empirical studies on post-IPO performance while incorporating a deeper complementary and subset analysis to further enhance the robustness of any conclusive results. Jain and Kini (1994; 1995) and Pereira and Sousa (2017) employ similar operational metrics, making their frameworks particularly relevant. This paper largely mirrors their methodologies while applying them to a more recent and geographically distinct dataset, facilitating comparisons with earlier findings.

The structure of this study closely aligns with Jain and Kini (1995), who analyzed the operational development of venture capital-backed firms relative to non-VC-backed firms. Following a similar approach, this study utilizes cross-sectional data to compare performance between PE-backed and non-PE-backed firms. A Mann-Whitney U-Test is first conducted to identify statistically significant differences in operational metrics between the two groups. For variables that exhibit statistical significance in this test, a regression analysis is subsequently performed to control for external factors that may influence the results. This ensures that

any observed differences in post-IPO operating performance can be more reliably attributed to PE sponsorship rather than other firm-specific or macroeconomic factors. Furthermore, subsample and complementary tests will be conducted to assess whether observed effects are more pronounced in specific contexts and to gain deeper insights into underlying differences between the treatment group and the control group.

By employing this structured methodology, the study seeks to provide empirical insights into whether private equity financing has a lasting impact on portfolio companies post-IPO or if observed differences are primarily short-term effects. The detailed methodology, including data selection, variables, and statistical methods, is further outlined in the subsequent sections.

3.2 Data Sources

This study relies on secondary data obtained from S&P Capital IQ, a widely recognized financial database used by professionals and leading institutions. While secondary data inherently carries the risk of inaccuracies or potential biases in data collection (Bryman & Bell, 2017), S&P Capital IQ is widely utilized in the financial industry for company research, investment analysis, and strategic planning (NYU, n.d.). Additionally, the database profiles over 99% of the world’s market capitalization (Stockholm School of Economics, n.d.), offering both quantitative and qualitative datasets, which further supports its credibility as a research tool. To further validate the dataset’s completeness, the base sample was cross-checked against SDC Platinum, an established financial database specializing in global IPO and M&A transactions, yielding highly consistent sample sizes, which reaffirms the reliability of the data.

3.3 Selection and Delimitations

3.3.1 Time Frame

This study focuses on all European companies that were initially listed during the period 2000–2015. The analysis does not include listings after 2015 due to the implementation of the

new accounting standard IFRS 16 in 2019 (PwC, 2016). IFRS 16 affects financial metrics, which could distort the data and results of the study. An extended time frame ensures that the study captures a variety of economic cycles, which reduces the risk of bias in the empirical results due to periods of exceptionally strong or weak market conditions, such as the financial crisis. The inclusion of a longer time frame also ensures that the extent of any empirical results can be compared between different time periods and cycles. Ultimately, the selected time frame strikes a balance between data availability and recency while ensuring a sufficiently large sample to generalize significant results and draw meaningful conclusions.

3.3.2 Geography

The study focuses on all European IPOs completed during the selected time frame, excluding Russia. The inclusion of a geographically diverse set of IPOs allows for the generalization of findings while enabling an analysis of whether empirical results are more pronounced in specific regions. This approach provides a broader perspective on IPO performance while facilitating regional comparisons to identify potential variations in the observed outcomes.

Russia has been excluded due to concerns regarding the availability and reliability of financial data. This decision stems from discrepancies in regulatory and structural factors that may distort financial data and affect the comparability of operational performance metrics. Additionally, no private equity-backed companies headquartered in Russia were part of the base sample, further justifying this exclusion.

3.3.3 Sector

The analysis adopts S&P Capital IQ's sector classification. Consistent with prior research, the study excludes the financial and real estate sectors, as the accounting practices and key financial metrics for these industries differ significantly from those of other sectors, making comparisons unreliable and potentially inaccurate. Furthermore, the healthcare sector has also been excluded, as a substantial share of the initial sample within this sector consisted of companies that had yet to generate any revenue and were still in the development phase at the time of their IPO, thereby rendering their historical operating metrics irrelevant. As a result,

the final sample consists of IPO companies classified under the following primary sectors: Communication Services, Consumer Discretionary, Consumer Staples, Energy, Industrials, Information Technology, Materials and Utilities.

3.3.4 Sponsor Type

This study has, to the extent possible, given the data available in the S&P Capital IQ database, aimed to restrict the sponsor-backed sample to companies owned by private equity firms, thereby excluding early-stage venture capital-backed IPOs. However, it is important to note that the included IPOs have not been examined on a fund-by-fund basis, and the distinction between PE and VC sponsors is often ambiguous. Additionally, many sponsors, particularly larger firms, manage funds with varying investment strategies, some leaning toward VC and others toward traditional buyout investments. Ultimately, the S&P Capital IQ categorization of managed investment style has been supplemented with a qualitative assessment of any omitted data points to enhance the accuracy of sponsor classification to the greatest extent possible.

3.3.5 Transaction Type

This study is limited to IPOs of common shares, excluding listing venue changes and transactions involving preference shares exclusively. Ultimately, the focus is to analyze differences in operating performance between PE-backed and non-PE-backed companies as they transition from private to public ownership

3.4 Operational Metrics

3.4.1 Operating Cash Flow Ratio

Operating cash flow, or OCF, measures the inflows and outflows of cash directly associated with a company's core operations (Jain & Kini, 1994). It is widely recognized in the literature as a key metric for comparison (Jain & Kini, 1994; Degeorge & Zeckhauser, 1993; Kaplan, 1989), although its interpretation can vary among authors. In this study, the applied

operating cash flow metric is similar to the one used by Jain and Kini (1994), which specifically focuses on a simplified measure of cash flows from operating activities. This metric is particularly valuable for comparative analysis as it intends to isolate cash flows related to operational activities, allowing for an assessment of operational differences before and after an IPO. Deflating OCF by total assets normalizes the performance metric, reducing the risk of skewed results due to firm size differences and facilitating more meaningful comparisons across companies.

$$\text{Operating Cash Flow Ratio: } (EBITDA - \text{Capital Expenditures}) / \text{Total Assets} \quad (1)$$

$$\Delta \text{ Operating Cash Flow Ratio} = \text{OCF Ratio}_{t+3} - \text{OCF Ratio}_{t-1} \quad (2)$$

3.4.2 EBITDA Margin

The second selected operating variable is change in EBITDA Margin. This metric allows the study to capture any differences in a company's ability to maintain or enhance operational profitability post-IPO. Unlike an absolute measure of EBITDA, which can be influenced by various factors, a margin-based metric normalizes operating performance, reducing the risk of biases arising from revenue fluctuations.

$$EBITDA: \text{Earnings Before Interest, Taxes, Depreciation and Amortization} \quad (3)$$

$$EBITDA \text{ Margin} = EBITDA / \text{Total Revenue} \quad (4)$$

$$\Delta EBITDA \text{ Margin} = EBITDA \text{ Margin}_{t+3} - EBITDA \text{ Margin}_{t-1} \quad (5)$$

3.4.3 Asset Turnover

The Asset Turnover ratio measures how effectively a company manages its resources by relating total revenue to its total assets (Fraser & Ormiston, 2016). The higher the Asset Turnover, the less capital the company's operations require. Conversely, a decreasing Asset Turnover indicates that the asset base is growing relatively faster than total revenue. The ratio is a metric utilized in prior research by Jain and Kini (1994). According to Jain and

Kini (1994), the Asset Turnover ratio can provide an understanding of differences in operating performance among companies several years after undergoing an IPO.

$$\text{Asset Turnover: Total Revenue} / \text{Total Assets} \quad (6)$$

$$\Delta \text{ Asset Turnover} = \text{Asset Turnover}_{t+3} - \text{Asset Turnover}_{t-1} \quad (7)$$

3.5 Complementary Metrics

The complementary metrics introduced in this section are not direct measures of operating performance but serve to provide additional context on financial characteristics and investment behavior within the dataset. These metrics are included to facilitate an examination of differences in capital structure and investment patterns between PE-backed and non-PE-backed firms, helping to contextualize potential drivers of performance variations observed in the main results.

3.5.1 Debt Ratio

Debt levels and leverage are examined to assess differences in financing structures both between and within the groups over time. Higher leverage is often associated with private equity ownership, as financial engineering plays a key role in PE-backed firms. This metric is particularly relevant in the context of the theoretical framework, including the theory introduced in section 2.2.1 *Free Cash Flow*, which highlights the potential benefits of higher debt levels in imposing financial discipline. The analysis seeks to determine whether this characteristic is evident in the sample and whether changes in leverage post-IPO may contribute to performance discrepancies between the groups. Total debt is defined according to S&P Capital IQ standards, encompassing both long- and short-term borrowings as well as financial lease obligations.

$$\text{Debt Ratio: Total Debt} / \text{Total Assets} \quad (8)$$

$$\Delta \text{ Debt Ratio} = \text{Debt Ratio}_{t+3} - \text{Debt Ratio}_{t-1} \quad (9)$$

3.5.2 Capital Expenditure Ratio

A relative measure of capital expenditure is included as a complementary metric in the study to examine investment patterns before and after the IPO, as well as differences in spending behavior between PE-backed and non-PE-backed firms. This metric has been employed in previous research, including Jain & Kini (1995), to assess how capital expenditures evolve in the years surrounding a public listing. Examining these trends provides a basis for evaluating whether PE-backed firms exhibit different investment behavior post-IPO and offers a foundation for the discussion on window dressing, as outlined in section 2.2.3 *Window Dressing*.

$$CapEx\ Ratio: Capital\ Expenditure / Total\ Revenue \quad (10)$$

$$\Delta CapEx\ Ratio = CapEx\ Ratio_{t+3} - CapEx\ Ratio_{t-1} \quad (11)$$

3.6 Subsets

To further refine the analysis, the base sample is segmented into subsets based on time period, geography, and sector. This segmentation allows for a more detailed examination of potential variations in operating performance across different market conditions, regional contexts, and industry dynamics. By analyzing these subsets, the study seeks to assess whether the significance of any observed differences between PE-backed and non-PE-backed firms is consistent across varying conditions or if certain effects are more pronounced in specific groups.

3.6.1 Time Period

The sample is divided into two distinct eight-year periods: 2000–2007 and 2008–2015. This segmentation allows for an assessment of how private equity’s impact on post-IPO performance may have differed before and after the 2008 financial crisis, a major structural shift in global financial markets. By comparing these two periods, the analysis captures potential variations in performance across different economic conditions, distinguishing between the pre-crisis and post-crisis environment.

3.6.2 Geography

To examine potential regional differences, in accordance with the regional segmentation outlined by the United Nations M49 standard (n.d.), the sample is segmented into two geographic subsets: Northwestern Europe¹ and Southeastern Europe². This classification allows for an assessment of whether the effects of private equity sponsorship differ based on regional market structures, regulatory environments, and economic conditions.

3.6.3 Sector

The sectoral segmentation follows the classification outlined in section *3.3.3 Sector*, which applies the S&P Capital IQ framework. Any observed differences in operating performance across these subsets could provide an indication of whether private equity's influence is more pronounced in specific sectors.

3.7 Statistical Methodology

3.7.1 Mann-Whitney U-Test

To determine whether statistically significant differences in operating performance exist between PE-backed and non-PE-backed IPOs, this study applies the Mann-Whitney U-Test. This test is comparable to a t-test but does not require the data to be normally distributed (Körner & Wahlgren, 2015). It is designed to identify differences between two groups, in this case, the treatment group consisting of PE-backed firms and the control group of non-PE-backed firms. The test ranks all observations across the groups and evaluates the difference in rank-sums between the two groups (Wilcoxon, 1945). For the purpose of comparative analysis, this study employs the median instead of the mean to mitigate the impact of outliers (Kaplan, 1989; Jain & Kini, 1994).

¹Northwestern Europe: Denmark, Estonia, Finland, Greenland, Guernsey, Iceland, Ireland, Isle of Man, Latvia, Lithuania, Norway, Sweden, United Kingdom, Austria, Belgium, France, Germany, Liechtenstein, Luxembourg, Monaco, Netherlands, and Switzerland.

²Southeastern Europe: Belarus, Bulgaria, Czech Republic, Hungary, Poland, Republic of Moldova, Romania, Slovakia, Ukraine, Albania, Andorra, Bosnia and Herzegovina, Croatia, Cyprus, Gibraltar, Greece, Italy, Malta, Montenegro, North Macedonia, Portugal, San Marino, Serbia, Slovenia, Spain, and Vatican City.

The Mann-Whitney U-Test will be used to evaluate significant differences between PE-backed and non-PE-backed groups at $t-1$ (one year pre-IPO) and $t+3$ (three years post-IPO), as well as the change from $t-1$ to $t+3$, aiming to capture differences in operating performance and post-IPO value creation. This timeframe has been used in previous research, including Kaplan (1989) and Jain & Kini (1994; 1995) and strikes a practical balance between allowing sufficient time for post-IPO performance evaluation and ensuring reliable data availability. The test evaluates the null hypothesis that no statistically significant difference exists between the two groups. If the null hypothesis cannot be rejected, it indicates that no significant statistical difference exists (Barber & Lyon, 1996) which, in the context of this study, would suggest that PE-backed firms do not perform meaningfully better or worse than their non-PE-backed counterparts. This allows for an assessment of whether differences exist and, if so, the extent to which PE firms contribute to long-term operational value creation in their portfolio companies. The Mann-Whitney U-Test will also be applied in complementary and subset analyses to determine the statistical significance of any observed differences, with the metrics and segmentations detailed in sections *3.5 Complementary Metrics* and *3.6 Subsets*.

For the test to be valid, two conditions must be met: (1) the observations must be rankable, and (2) the groups must be independent of each other. Both conditions are satisfied within the study’s dataset. The Mann-Whitney U-Test, and other similar statistical models have been widely applied in studies of this nature, including Kaplan (1989) and Pereira and Sousa (2017).

In addition to the Mann-Whitney U-Test, the Wilcoxon Signed-Rank Test is applied to assess significant differences within the PE-backed and non-PE-backed groups between $t-1$ and $t+3$. The test ranks the absolute differences between paired observations and compares the sums of positive and negative ranks to determine whether the median difference significantly deviates from zero. Both tests will be conducted using the statistical programming software R.

3.7.2 Ordinary Least Squares Regression

To further investigate the impact of private equity sponsorship on operating performance, this study employs an Ordinary Least Squares (OLS) regression analysis. This approach allows for the examination of whether statistically significant differences in performance, as identified by the Mann-Whitney U-Test, can be robustly attributed to private equity ownership while controlling for other influencing factors.

The OLS regression will be applied to any operational metrics that exhibit significant differences between PE-backed and non-PE-backed firms in the initial non-parametric tests. The objective is to isolate the effect of private equity sponsorship by accounting for potential confounding variables that may also influence post-IPO performance. These additional independent variables, referred to as control variables, help to ensure that any observed differences in operating performance are not driven by other underlying firm characteristics.

Regression model formula:

$$y_i = \beta_1 D^{PE} + \beta_2 TransactionValue + \beta_3 Float + \beta_4 D^{TIME} + \beta_5 D^{GEOGRAPHY} + \beta' D^{SECTOR'} \quad (12)$$

Regression variables definitions:

D^{PE}	Binary PE variable indicating whether the firm is PE-backed (1) or non-PE-backed (0).
$TransactionValue$	Transaction value of the IPO measured in million USD.
$Float$	Percentage of shares publicly traded 180 days after the IPO.
D^{TIME}	Binary variable indicating whether the IPO occurred between 2000 and 2007 (1) or between 2008 and 2015 (0).
$D^{GEOGRAPHY}$	Binary variable indicating whether the IPO occurred in southeastern Europe (1) or in northwestern Europe (0).

D^{SECTOR} A vector of binary variables representing all S&P Capital IQ’s sector classifications, except for Industrials, which serves as the reference category. The included sectors are Communication Services, Consumer Discretionary, Consumer Staples, Energy, Industrials, Information Technology, Materials, and Utilities.

3.7.2.1 Independent Variables

The inclusion of independent control variables ensures that the regression captures other factors that could impact operational outcomes, thereby enhancing the internal validity of the analysis. This approach aims to provide a clearer understanding of whether private equity sponsorship contributes to superior operating performance post-IPO.

The transaction value variable serves as a proxy for company size, with a logarithmic transformation ($\ln$) applied to address skewness in distribution, ensuring a more balanced representation in the regression analysis. Including this variable allows the model to control for any differences in operational performance that may be driven by firm size rather than private equity sponsorship.

The float percentage, defined as the proportion of shares publicly traded 180 days after the IPO, captures the extent of ownership dispersion post-listing, which is particularly relevant in connection with agency cost theory. The 180-day dispersion window ensures that lock-up agreements and other temporary restrictions do not skew the results. Since both float percentage and transaction value relate to firm characteristics that could influence performance, their inclusion strengthens the model’s ability to isolate the effect of private equity sponsorship. Both variables have been used in prior research, including Jain & Kini (1995), where similar measures were applied to assess post-IPO performance.

Time period, geography, and sector classifications are included as categorical variables to account for structural differences that could influence operating performance. These factors control for any variations in market conditions, regional economic environments, and industry-specific characteristics that might otherwise confound the relationship between private equity sponsorship and post-IPO outcomes.

3.7.2.2 Regression Diagnostics and Model Validation

To assess the validity of the regression model and ensure that key assumptions of the ordinary least squares (OLS) estimation hold, several diagnostic tests will be conducted. These tests evaluate potential issues related to heteroskedasticity, autocorrelation, multicollinearity, normality of residuals, and model specification errors. If present, such issues could distort the reliability of the estimated coefficients, potentially indicating that the model does not accurately capture the underlying relationship between the independent and dependent variables.

To test for heteroskedasticity, the Breusch-Pagan test is applied, assessing whether the variance of the error terms remains constant across observations. A failure to meet this assumption indicates heteroskedasticity, which can lead to inaccurate estimates and unreliable statistical inferences if not properly addressed.

Autocorrelation, or correlation between residuals across observations, is evaluated using the Durbin-Watson test. In the presence of autocorrelation, standard errors may be misestimated, leading to inflated t-statistics and misleading significance levels.

The Jarque-Bera test examines whether the residuals follow a normal distribution, which is necessary for the validity of hypothesis testing and confidence intervals. This test assesses skewness and kurtosis, with deviations from normality potentially indicating misspecifications in the model or the presence of outliers that require adjustment.

To test whether the relationship between independent and dependent variables is correctly specified, the Ramsey RESET test is performed. This test detects functional form misspecifications by assessing whether nonlinear combinations of independent variables add explanatory power to the model. A significant result may suggest the need for transformations or the inclusion of additional explanatory variables.

Finally, Variance Inflation Factor is examined to determine if multicollinearity is present. If this is the case, the independent variables are excessively correlated, which could distort coefficient estimates and reduce the reliability of inference.

By conducting these diagnostic tests, the study ensures that the regression model meets the necessary statistical assumptions, reinforcing the reliability of the estimated effects

of private equity sponsorship on post-IPO operational performance.

3.7.3 Statistical Significance Levels

According to Dougherty (2016), the significance level represents the probability of committing a Type I error, meaning the incorrect rejection of a true null hypothesis. The most commonly applied significance level in statistical research of this type is 5%, indicating a 5% probability of rejecting a correct null hypothesis. A significance level of 1% provides an even stronger threshold, reducing the likelihood of Type I errors and ensuring that only highly significant results lead to rejection of the null hypothesis.

In this study, a 5% significance level is applied to assess statistical relationships. This threshold is particularly relevant when evaluating the hypotheses in section 2.5 but will also be used for complementary tests that, while not directly tied to the stated hypotheses, contribute to a broader understanding of the data.

3.8 Methodology Discussion

3.8.1 Sample Selection and Attrition Analysis

Exhibit 1: Attrition Analysis

	PE-backed	Non-PE-backed
Screened base sample	549	2,571
# excluded by category		
Sectoral delimitation	-175	-812
Data availability	-32	-561
Scope and incorrect classification	-119	-115
<i>Final sample</i>	<i>223</i>	<i>1,083</i>

With reference to section 3.3 *Selection and Delimitations*, an initial screen for PE-backed transactions and a reverse screen for non-PE-backed transactions were conducted using S&P Capital IQ. This screening process identified IPOs closed between 2000-01-01 and 2015-12-31

for companies headquartered in Europe. As shown in **Exhibit 1**, this process yielded an initial sample of 549 and 2,571 transactions for the sponsor-backed and non-sponsor-backed groups, respectively.

Subsequently, sectoral filters were applied, and thereafter an assessment of data availability was performed for the study period spanning $t-1$ (one year pre-IPO) to $t+3$ (three years post-IPO). A significant number of transactions were excluded at this stage due to data limitations, primarily stemming from delistings due to bankruptcies and acquisitions.

Finally, a manual review of the remaining transactions was conducted to verify, as accurately as possible, that the sponsor-backed transactions were indeed PE-backed. This process also included an assessment of the initial sectoral and geographic classifications, as automated by S&P Capital IQ, to ensure accuracy, leading to additional exclusions where misclassifications were identified.

In the base sample, some transactions met multiple exclusion criteria, and for the purpose of visualization in **Exhibit 1**, exclusions were applied in the order presented in the table. Ultimately, the final sample, on which the statistical tests are conducted, consists of 223 PE-backed and 1,083 non-PE-backed transactions.

3.8.2 Reliability

Reliability, as emphasized by Bryman and Bell (2017), is crucial in conducting quantitative studies and essentially refers to the dependability of the research. The authors explain that a study with high reliability will yield consistent results regardless of who conducts it, meaning the findings are not influenced by random factors that could lead to incorrect conclusions. Since the data used for the dependent variables in this study is secondary data obtained directly from S&P Capital IQ, repeating the study under the same methodology and selection criteria should produce largely identical results. Overall, this study's reliability is deemed to be high, as all data sources, selection criteria, and the calculation and analysis of key metrics are clearly detailed and transparently presented.

3.8.3 Validity

Validity can generally be divided into two main types. The first is internal validity, which primarily relates to causality and the relationship between what is being studied and the observed outcomes (Bryman & Bell, 2017). In the context of this study, internal validity measures the extent to which any observed differences in performance between the PE-backed group and the non-PE-backed group can be attributed directly to sponsorship itself. It is critical to assess whether any potential differences in value creation are genuinely the result of sponsorship or influenced by other factors.

The second primary type of validity is external validity, which concerns whether the findings of a study are generalizable beyond its specific context (Bryman & Bell, 2017). External validity evaluates the extent to which the results can be applied to broader populations or settings outside the scope of the study.

3.8.4 Critical Methodology Assessment

While this study follows established empirical research methodologies to assess the operational impact of private equity sponsorship, several methodological challenges and limitations must be acknowledged. These relate primarily to data reliability, potential sample biases, selection considerations, attribution of any observed differences, and trade-offs in the scope of analysis. A key challenge is whether any differences in post-IPO performance between PE-backed and non-PE-backed firms can be attributed to private equity’s active involvement (treatment) rather than the extent to which PE firms select businesses that would have performed similarly regardless of sponsorship (selection).

The study relies on secondary data from S&P Capital IQ, a widely recognized financial database commonly used in both academic research and professional finance. While the credibility of this data source is discussed in section *3.2 Data Sources*, the accuracy of conclusions ultimately depends on the correctness of the underlying financial data. Any errors, inconsistencies, or biases in data collection could affect the study’s validity.

A key limitation stems from the exclusion of companies, as highlighted in *3.8.1 Sample Selection and Attrition Analysis*, primarily due to data availability concerns. The absence of

financial data can result from various factors, including differences in regulatory requirements for publishing pre-IPO financials, limitations in reporting availability following delistings due to bankruptcies or acquisitions, and inconsistencies in disclosure practices. This may lead to an underrepresentation of certain company profiles, potentially influencing the generalizability of results. While exclusions are necessary to ensure data consistency, the extent to which they impact findings remains difficult to quantify.

The sample includes IPOs across multiple sectors, following the classification outlined in section 3.3.3 *Sector*. However, an uneven distribution exists, with certain industries being overrepresented in one of the two groups. This introduces a risk that differences in performance could partially reflect sector-specific trends rather than sponsorship effects. To mitigate this, the study includes a diverse range of industries and applies a relatively long observation period to smooth out short-term sectoral fluctuations. However, the broad scope comes at the expense of a more detailed sector-level analysis, limiting the ability to isolate industry-specific private equity value creation strategies.

The selected time frame (2000–2015) balances data availability and sample size while ensuring that multiple economic cycles are captured. While transactions beyond 2015 are excluded due to data constraints and the implementation of IFRS 16 in 2019, the sample remains highly recent compared to other prominent research in the field. Nonetheless, the sample will not capture any developments in private equity and financial markets beyond this period. At the same time, the relatively long studied period may introduce structural differences in financial markets, potentially affecting comparability. To address this, the study includes a subsample analysis to examine whether the effect of PE ownership varies across different time periods.

This study exclusively examines private equity-backed companies divested via IPOs, inherently excluding firms that underwent alternative exit routes, such as trade sales or secondary buyouts. This results in an implicit divestment bias, as PE firms may prioritize taking public portfolio companies that demonstrate strong operating performance toward the end of their holding period. Consequently, the sample may not be fully representative of the broader universe of PE-backed firms. However, similar biases exist for non-PE-backed firms, as companies typically pursue an IPO only when their financial performance justifies public

listing. As a result, while selection bias is acknowledged, it is likely present in both groups, partially offsetting concerns about comparability.

Additionally, as PE sponsors may not always be able to fully divest their stake at the time of listing, some ownership may be retained for a limited period post-IPO. As a result, some sponsor influence may persist in the public environment until full divestment is completed. However, as this study primarily examines post-IPO performance at $t+3$, three years after listing, the influence of prior sponsorship is expected to diminish by the time of evaluation, mitigating concerns about ongoing direct PE impact.

A key challenge in attributing performance differences to PE sponsorship is determining whether private equity actively enhances firm performance (treatment) or merely selects higher-quality firms to begin with (selection). This is a recurring issue in studies of this nature, as performance discrepancies could stem from differences in the underlying quality of firms rather than from PE ownership itself. To account for this, a regression analysis is conducted to control for external factors that may explain performance differences beyond PE sponsorship. Additionally, complementary tests on leverage and investment patterns help identify structural differences between the groups that may influence post-IPO performance. Subsample tests further explore whether PE sponsorship effects are concentrated in specific contexts, such as certain time periods, industries, or geographies, rather than being broadly applicable across the entire dataset.

Despite these challenges, the study follows methodologies used in prior empirical research, ensuring comparability with existing findings. While certain limitations remain inherent to the study’s design, the structured methodological approach reinforces the robustness and relevance of its conclusions.

4 Empirical Results

Based on the study's theoretical framework and methodology, the following chapter presents the empirical results of the conducted statistical tests. Initially, a comparison of the PE-backed group and the control group across the selected operational metrics is conducted. Subsequently, for cases where the Mann-Whitney U-Tests indicated a statistically significant difference between the groups, a regression analysis is performed.

4.1 Descriptive Statistics

Exhibit 2: IPOs by year

IPO Year	PE-backed	Non-PE-backed	Total
2000	1	24	25
2001	0	9	9
2002	1	9	10
2003	2	1	3
2004	3	21	24
2005	10	139	149
2006	8	203	211
2007	19	194	213
2008	0	62	62
2009	0	24	24
2010	12	83	95
2011	15	74	89
2012	5	38	43
2013	25	55	80
2014	60	81	141
2015	62	66	128
<i>Total</i>	<i>223</i>	<i>1,083</i>	<i>1,306</i>

The final sample has been derived in alignment with section *3.3 Selection and Delimitations*. IPO activity fluctuates significantly over the studied period, reflecting broader macroeconomic conditions and financial market cycles. Listings were relatively low in the early 2000s, coinciding with the aftermath of the dot-com bubble, before picking up from 2005 to 2007, which aligns with a period of strong global economic growth and favorable capital market conditions.

A sharp decline is observed in 2008 and 2009, corresponding to the financial crisis, which severely disrupted capital markets and reduced public listing activity. IPO volumes rebounded in the following years, with notable peaks in 2010 and 2014, reflecting periods of market recovery and renewed investor confidence. PE-backed IPO activity follows a similar pattern, with a higher concentration of sponsor-backed listings in periods of stronger market conditions.

Exhibit 3: IPOs by country

Country	PE-backed	Non-PE-backed	Total
United Kingdom	63	166	229
Poland	8	193	201
France	31	127	158
Germany	17	109	126
Sweden	33	69	102
Italy	5	95	100
Norway	6	44	50
Spain	11	32	43
Netherlands	13	18	31
Belgium	5	24	29
Switzerland	2	26	28
Greece	3	24	27
Finland	6	13	19
Ireland	5	13	18
Luxembourg	7	11	18
Other (21)	8	119	127
<i>Total</i>	<i>223</i>	<i>1,083</i>	<i>1,306</i>

There are notable variations in IPO activity across countries, both in terms of total listings and the share of PE-backed versus non-PE-backed firms. For example, the United Kingdom, France, Sweden, and Netherlands account for a significant portion of PE-backed IPOs relative to their total listings, indicating strong private equity participation in these markets. In contrast, Poland and Germany exhibit high overall IPO volumes but a comparatively low share of PE-backed transactions, suggesting that non-sponsored firms dominate public listings in these countries, at least for the final sample.

Overall, these differences likely reflect variations in market structures, access to private capital, and the role of private equity in different economies. Additionally, while PE-

backed IPOs are present across multiple regions, their distribution suggests that private equity has played a more pronounced role in certain markets.

Exhibit 4: IPOs by sector

Sector	PE-backed	Non-PE-backed	Total
Industrials	66	280	346
Information Technology	48	206	254
Consumer Discretionary	53	183	236
Communication Services	25	139	164
Materials	13	86	99
Consumer Staples	10	83	93
Energy	4	58	62
Utilities	4	48	52
<i>Total</i>	<i>223</i>	<i>1,083</i>	<i>1,306</i>

The distribution of IPOs across sectors highlights differences in private equity involvement. Industrials, Information Technology, and Consumer Discretionary account for the highest number of total IPOs, with PE-backed firms representing a notable share within these sectors. Industrials have the highest overall IPO volume, followed by Information Technology, reflecting the concentration of listings in these industries across the observed time period. Consumer Discretionary stands out with a relatively high proportion of PE-backed IPOs, whereas Energy and Utilities have the lowest number of PE-backed listings.

4.2 Mann-Whitney U-Tests

In the following section, the results of the Mann-Whitney U-Tests are presented. The test is performed to determine whether a statistically significant difference in operating performance exists between the PE-backed and non-PE-backed group, in accordance with section 3.7 *Statistical Methodology*. The results are presented for each selected operational metric and will be employed to evaluate the corresponding hypotheses as presented in 2.5 *Hypotheses*.

4.2.1 Overview of Test Results

Exhibit 5: Mann-Whitney U-Test Results

Metric	PE-backed	Non-PE-backed	Difference
Δ OCF Ratio^a	-0.009	-0.029^{***}	0.020^{**}
Median t-1	0.068	0.053	0.015
Median t+3	0.044	0.016	0.027 ^{**}
Δ EBITDA Margin^a	-0.004	-0.018^{***}	0.014^{***}
Median t-1	0.118	0.115	0.002
Median t+3	0.106	0.085	0.021 [*]
Δ Asset Turnover^a	-0.020	-0.158^{***}	0.137^{***}
Median t-1	0.865	1.060	-0.195 ^{***}
Median t+3	0.854	0.821	0.033

a) Median change between groups, where the PE-backed and Non-PE-backed columns show the change from t-1 to t+3, while the Difference column represents the change between PE-backed and Non-PE-backed firms. ^{***}, ^{**} and ^{*} represent the significance levels at 1%, 5% and 10% respectively. Significance of the PE-backed and the Non-PE-backed groups are determined with the Wilcoxon Signed-Rank Test, while the Difference is determined using the Mann-Whitney U-Test.

4.2.2 Operating Cash Flow Ratio

H_{0a} : *There is no statistically significant difference in Operating Cash Flow Ratio between PE-backed and non-PE-backed companies post-IPO.*

Based on the Mann-Whitney U-Test conducted in this study, a statistically significant difference in Operating Cash Flow Ratio is identified. The PE-backed group outperforms at a 5% significance level, leading to the rejection of H_0 .

4.2.3 EBITDA Margin

H_{0b} : *There is no statistically significant difference in EBITDA Margin between PE-backed and non-PE-backed companies post-IPO.*

Based on the Mann-Whitney U-Test conducted in this study, a statistically significant difference in EBITDA Margin is identified. The PE-backed group outperforms at a 1% significance level, leading to the rejection of H0.

4.2.4 Asset Turnover

H_{0c} : *There is no statistically significant difference in Asset Turnover between PE-backed and non-PE-backed companies post-IPO.*

Based on the Mann-Whitney U-Test conducted in this study, a statistically significant difference in Asset Turnover is identified. The PE-backed group outperforms at a 1% significance level, leading to the rejection of H0.

4.3 Complementary Tests

Exhibit 6: Complementary Mann-Whitney U-Test Results

Metric	PE-backed	Non-PE-backed	Difference
Δ Debt Ratio ^a	-0.089^{***}	-0.013^{***}	-0.076^{***}
Median t-1	0.404	0.252	0.152 ^{***}
Median t+3	0.256	0.211	0.045 [*]
Δ CapEx Ratio ^a	0.001	-0.001^{***}	0.002[*]
Median t-1	0.032	0.034	-0.002
Median t+3	0.037	0.032	0.006

a) Median change between groups, where the PE-backed and Non-PE-backed columns show the change from t-1 to t+3, while the Difference column represents the change between PE-backed and Non-PE-backed firms. ^{***}, ^{**} and ^{*} represent the significance levels at 1%, 5% and 10% respectively. Significance of the PE-backed and the Non-PE-backed groups are determined with the Wilcoxon Signed-Rank Test, while the Difference is determined using the Mann-Whitney U-Test.

The complementary tests presented above serve to further examine financial and investment patterns within the sample. Specifically, debt levels are evaluated to identify potential dif-

ferences in capital structures between PE-backed and non-PE-backed firms before and after the IPO. Additionally, the Capital Expenditure Ratio is examined to observe investment patterns pre- and post-IPO across the two groups. These tests provide additional context for understanding financial characteristics and potential shifts following public listing.

4.3.1 Debt Ratio

The first complementary test is the Debt Ratio, defined as Total Debt / Total Assets. The test indicates a statistically significant difference between the PE-backed and non-PE-backed groups, as shown in **Exhibit 6**, with significance at the 1% level. At both t-1 and t+3 the PE-backed group has a higher median Debt Ratio than the non-PE-backed group, but the difference shrinks significantly over the observation period.

4.3.2 Capital Expenditure Ratio

The CapEx Ratio, defined as capital expenditure relative to total revenue, shows no statistically significant difference between the groups at the 5% significance level. However, over the observation period, the median CapEx Ratio increases for the PE-backed group and decreases for the non-PE-backed group.

4.4 Subsample Tests

To further contextualize the findings, this section examines whether the significance of observed differences in operating performance varies across key subsamples, including time period, geography, and sector. By segmenting the sample, these tests assess whether certain effects are more pronounced in specific groups, providing a more nuanced understanding of the broader dataset. In addition to testing statistical significance, these analyses help uncover patterns that may refine the interpretation of the main results.

4.4.1 Time Period

Exhibit 7: Subsample Mann-Whitney U-Test I: Time Period

Metric	IPOs between 2000 and 2007			IPOs between 2008 and 2015		
	PE-backed	Non-PE-backed	Difference	PE-backed	Non-PE-backed	Difference
Δ OCF Ratio ^a	0.018	-0.027***	0.045*	-0.015	-0.031***	0.016*
Median t-1	0.065	0.054	0.011	0.068	0.052	0.016
Median t+3	0.081	0.018	0.063**	0.032	0.012	0.020*
Δ EBITDA Margin ^a	-0.001	-0.020***	0.019	-0.005	-0.015***	0.010**
Median t-1	0.138	0.115	0.023	0.115	0.116	-0.001
Median t+3	0.129	0.082	0.047**	0.099	0.089	0.010
Δ Asset Turnover ^a	-0.070	-0.211***	0.140**	-0.006	-0.101***	0.095***
Median t-1	1.101	1.130	-0.028	0.824	0.955	-0.131
Median t+3	0.954	0.844	0.110	0.790	0.770	0.020

a) Median change between groups, where the PE-backed and Non-PE-backed columns show the change from t-1 to t+3, while the Difference column represents the change between PE-backed and Non-PE-backed firms. ***, ** and * represent the significance levels at 1%, 5% and 10% respectively. Significance of the PE-backed and the Non-PE-backed groups are determined with the Wilcoxon Signed-Rank Test, while the Difference is determined using the Mann-Whitney U-Test.

To assess whether the observed differences in operating performance vary across different market conditions and economic cycles, the full sample period of 2000–2015 is divided into two eight-year intervals: 2000–2007 and 2008–2015. Across the full sample period, as presented in section 4.2 *Mann-Whitney U-Tests*, PE-backed firms exhibit a statistically significant outperformance relative to their non-PE-backed counterparts across all three selected operational metrics.

However, as shown in **Exhibit 7**, the results diverge when segmented by time period. For the 2000–2007 period, no statistically significant differences are observed between the two groups for either EBITDA Margin or OCF Ratio, though outperformance by PE-backed firms is indicated for Asset Turnover at the 5% significance level. For the 2008–2015 period, the PE-backed firms demonstrate statistically significant outperformance at the 1% level for Asset Turnover, and at the 5% level for EBITDA Margin.

Across the segmented time periods, there is no statistically significant evidence of outperformance by the non-PE-backed group for any operational metric. It is important to note that the segmentation by time period results in significant differences in sample size,

particularly for the PE-backed group, with 44 PE-backed IPOs in the 2000–2007 period compared to 179 in 2008–2015, which may influence the statistical outcomes.

4.4.2 Geography

Exhibit 8: Subsample Mann-Whitney U-Test II: Geography

Metric	Northwestern Europe			Southeastern Europe		
	PE-backed	Non-PE-backed	Difference	PE-backed	Non-PE-backed	Difference
Δ OCF Ratio^a	-0.009	-0.026***	0.017	-0.011	-0.033***	0.023
Median t-1	0.071	0.062	0.010	0.026	0.039	-0.013
Median t+3	0.046	0.027	0.019	0.022	0.000	0.022
Δ EBITDA Margin^a	-0.004	-0.014***	0.010**	-0.012	-0.025***	0.014
Median t-1	0.115	0.107	0.008	0.129	0.128	0.001
Median t+3	0.104	0.080	0.024**	0.111	0.088	0.023
Δ Asset Turnover^a	-0.022*	-0.169***	0.147***	0.009	-0.155***	0.164***
Median t-1	0.936	1.130	-0.194***	0.652	0.966	-0.315**
Median t+3	0.885	0.842	0.043	0.663	0.789	-0.126

a) Median change between groups, where the PE-backed and Non-PE-backed columns show the change from t-1 to t+3, while the Difference column represents the change between PE-backed and Non-PE-backed firms. ***, ** and * represent the significance levels at 1%, 5% and 10% respectively. Significance of the PE-backed and the Non-PE-backed groups are determined with the Wilcoxon Signed-Rank Test, while the Difference is determined using the Mann-Whitney U-Test.

The geographic segmentation used in this study follows the classification outlined in section 3.3.2 *Geography*. In terms of changes in median values from t-1 to t+3, PE-backed firms exhibit stronger development across all operational metrics in each geographic subset, though the level of statistical significance varies.

For Northwestern Europe, which constitutes the majority of the PE-backed sample with 194 IPOs between 2000 and 2015, statistically significant outperformance is observed at the 1% level for Asset Turnover, and at the 5% level for EBITDA Margin. In Southeastern Europe, while no significant difference is noted in the OCF Ratio or the EBITDA Margin, PE-backed firms demonstrate outperformance at the 1% significance level for Asset Turnover. However, the latter results should be interpreted with caution due to the smaller sample size of only 29 PE-backed IPOs.

4.4.3 Sector

Exhibit 9: Subsample Mann-Whitney U-Test III: Sector

	PE-backed			Non-PE-backed			
Sector	t-1	t+3	Median chg ^a	t-1	t+3	Median chg ^a	Diff in Changes ^b
Communication Services							
Δ OCF Ratio	0.083	0.069	-0.021	0.083	0.030	-0.046**	0.025
Δ EBITDA Margin	0.365	0.339	-0.035	0.136	0.112	-0.014	-0.021
Δ Asset Turnover	0.393	0.414	0.018	0.913	0.749	-0.181***	0.199***
Consumer Discretionary							
Δ OCF Ratio	0.073	0.044	-0.001	0.074	0.026	-0.026***	0.025
Δ EBITDA Margin	0.113	0.093	-0.004	0.116	0.070	-0.028***	0.024***
Δ Asset Turnover	1.106	1.154	0.074	1.388	1.047	-0.211***	0.285***
Consumer Staples							
Δ OCF Ratio	0.087	0.048	-0.019	0.013	-0.003	-0.013	-0.007
Δ EBITDA Margin	0.072	0.111	0.001	0.099	0.076	-0.018*	0.018
Δ Asset Turnover	1.133	0.714	-0.323*	1.087	0.845	-0.172***	-0.151
Energy							
Δ OCF Ratio	-0.028	0.026	-0.000	0.001	-0.039	-0.025	0.024
Δ EBITDA Margin	0.347	0.307	0.008	0.207	0.094	-0.044**	0.052
Δ Asset Turnover	0.652	0.526	-0.069	0.373	0.369	-0.024	-0.045
Industrials							
Δ OCF Ratio	0.067	0.040	-0.003	0.061	0.026	-0.030***	0.027*
Δ EBITDA Margin	0.110	0.094	-0.006	0.105	0.085	-0.013***	0.007*
Δ Asset Turnover	0.889	0.867	0.012	1.105	0.903	-0.169***	0.180***
Information Technology							
Δ OCF Ratio	0.035	0.001	-0.005	0.066	0.022	-0.047***	0.042**
Δ EBITDA Margin	0.074	0.045	0.004	0.100	0.065	-0.022***	0.026*
Δ Asset Turnover	0.955	0.919	-0.233***	1.299	0.882	-0.283***	0.050*
Materials							
Δ OCF Ratio	-0.027	0.017	-0.008	0.011	-0.011	-0.005	-0.003
Δ EBITDA Margin	0.120	0.121	0.019	0.104	0.082	-0.003	0.022
Δ Asset Turnover	0.598	0.648	-0.034	0.795	0.664	-0.091***	0.057
Utilities							
Δ OCF Ratio	0.073	-0.130	-0.266	-0.014	-0.010	-0.006	-0.260***
Δ EBITDA Margin	0.487	0.342	-0.068	0.286	0.312	0.014	-0.083
Δ Asset Turnover	0.172	0.365	-0.010	0.212	0.241	0.009	-0.019

a) Median change between t-1 and t+3 within the PE-backed and Non-PE-backed groups respectively. The significance level is determined using the Wilcoxon Signed-Rank Test. b) Difference between the median changes in a), where the significance level is determined using the Mann-Whitney U-Test. ***, ** and * represent the significance levels at 1%, 5% and 10% respectively.

Using the sectoral segmentation presented in section 3.3.3 *Sector*, Mann-Whitney U-Tests are conducted for each individual sector to examine whether differences in operating performance between PE-backed and non-PE-backed firms vary by industry. The number of PE-backed IPOs within each sector differs significantly, with some sectors having relatively large samples, such as Industrials with 66 PE-backed IPOs, while others, such as Utilities and Energy, have only four each.

The results indicate that the only sector where PE-backed firms exhibit statistically significant outperformance at the 1% level for more than one of the three operational metrics is Consumer Discretionary. In contrast, for three sectors, Consumer Staples, Energy, and Materials, no statistically significant differences are observed for any of the selected metrics. While the level of significance and relative performance varies across sectors, non-PE-backed firms demonstrate statistically significant outperformance over PE-backed firms in only one instance. This occurs for the OCF Ratio in the Utilities sector, where the PE-backed sample is notably small, consisting of only four transactions.

4.5 OLS Regression

As established in section 4.2, the Mann-Whitney U-Tests indicated a statistically significant difference in operating performance between the PE-backed and non-PE-backed groups, and the null hypotheses is rejected across the board. Consequently, an OLS regression is conducted for all three operational performance metrics, with each serving as the dependent variable.

4.5.1 Regressions Diagnostics

Exhibit 10: Regression diagnostics

Metric	Breusch-Pagan	Jarque Bera	Durbin-Watson	Ramsey RESET
Δ OCF Ratio	86.372***	370.311***	-0.026	2.308*
Δ EBITDA Margin	110.903***	463.68***	0.035	0.355
Δ Asset Turnover	64.503***	145.699***	0.025	1.119

Measured on the change in operational metrics between the year t-1 and t+3. ***, ** and * represent the significance levels at 1%, 5% and 10% respectively.

To assess the suitability of the OLS regression model, a series of diagnostic tests are conducted in accordance with section 3.7.2.2. These tests evaluate key statistical assumptions to ensure the reliability of the estimated coefficients and the overall validity of the model. The tests include the Breusch-Pagan test for heteroskedasticity, the Durbin-Watson test for autocorrelation, the Jarque-Bera test for normality of residuals, the Ramsey RESET test for functional form misspecification, and the Variance Inflation Factor (VIF) to assess multicollinearity.

In addition to these diagnostics, to mitigate the influence of extreme values and outliers on the regression results, all dependent variables are winsorized at the 5th and 95th percentiles. This procedure ensures that outliers do not unduly affect the results, contributing to the robustness and reliability of statistical inference.

The results indicate that the model does not suffer from severe multicollinearity, as the VIF values for all independent variables remain within acceptable limits. The Breusch-Pagan test indicates that heteroskedasticity is present, which does not support the assumption of constant variance in residuals. Hence, clustered standard errors at the country level are used to account for potential intra-country correlation in residuals, as firms within the same country may be influenced by similar economic conditions, regulatory frameworks, and market structures, thereby enhancing the robustness of statistical inference. The Durbin-Watson statistic falls within an acceptable range, indicating no strong presence of autocorrelation. The Jarque-Bera test suggests that residuals deviate from normal distribution, however, this is not considered a critical issue for the validity of the OLS regression in the context of this study. Finally, the Ramsey RESET test does not indicate significant functional form misspecifications, demonstrating that the regression model is correctly specified.

Overall, the diagnostic tests confirm that the OLS regression model is appropriate for analyzing the relationship between private equity sponsorship and post-IPO operational performance. The results of each individual diagnostic test are available in the appendix in section 8.2 *Regression Diagnostics*.

4.5.2 Regressions Results

Exhibit 11: OLS Regression Test Results

<i>Independent Variable:</i>	<i>Dependent Variable:</i>		
	Δ OCF Ratio ^a	Δ EBITDA Margin ^a	Δ Asset Turnover ^a
	(1)	(2)	(3)
PE Dummy	0.044** (0.018)	0.040*** (0.015)	0.126*** (0.037)
Transaction Value (ln)	-0.014*** (0.005)	-0.005 (0.004)	0.025*** (0.006)
Post-IPO Float (%)	0.068** (0.033)	0.056** (0.024)	0.044 (0.027)
Time Period	0.043** (0.018)	0.001 (0.013)	-0.108*** (0.041)
Geography Dummy	-0.007 (0.026)	-0.034 (0.024)	0.007 (0.058)
Communication Services Dummy	0.013 (0.020)	0.035* (0.020)	-0.041 (0.048)
Consumer Discretionary Dummy	-0.005 (0.025)	-0.020 (0.017)	-0.041 (0.034)
Consumer Staples Dummy	0.043 (0.035)	0.025 (0.025)	-0.024 (0.049)
Energy Dummy	0.050 (0.041)	-0.022 (0.040)	0.132** (0.056)
Information Technology Dummy	0.004 (0.039)	0.010 (0.019)	-0.095** (0.038)
Materials Dummy	0.071 (0.047)	0.056 (0.039)	0.060 (0.057)
Utilities Dummy	0.052 (0.041)	0.085* (0.044)	0.150** (0.074)
Constant	-0.013 (0.025)	-0.013 (0.020)	-0.302*** (0.046)
Observations	1,266	1,252	1,266
R ²	0.023	0.032	0.065
Adjusted R ²	0.014	0.023	0.056
Residual Std. Error	0.251 (df = 1253)	0.217 (df = 1239)	0.492 (df = 1253)
F Statistic	2.490*** (df = 12; 1253)	3.401*** (df = 12; 1239)	7.295*** (df = 12; 1253)

a) Variables are winsorized at the 5th and 95th percentiles. Standard errors clustered by country are reported in parenthesis under the coefficients. ***, ** and * represent the significance levels at 1%, 5% and 10% respectively.

The OLS Regression results show that the PE dummy is statistically significant across all three tests, reaching the 1% significance level for EBITDA Margin and Asset Turnover, and the 5% level for the Operating Cash Flow Ratio. Additionally, the regression results indicate significance for several independent variables, including Transaction Value, Post-IPO Float, and Time Period.

5 Analysis and Discussion

This chapter serves to examine and discuss the empirical results presented in the previous chapter, including a comparison with findings from prior research. The analysis aims to contextualize the results within the broader academic discourse and explore their implications for the study's objectives.

5.1 Mann-Whitney U-Tests

In section 4.2 *Mann-Whitney U-Tests*, the results from the conducted statistical tests for the selected operational performance metrics were presented. For all three metrics, the null hypothesis is rejected. In each case, the PE-backed group demonstrates statistically significant outperformance. Ultimately, the formulated metric-specific hypotheses serve as a foundation for addressing the overarching and primary research question of this study: *Do PE-backed companies outperform non-PE-backed companies post-IPO?*

5.1.1 Operating Cash Flow Ratio

As highlighted in **Exhibit 5**, the null hypothesis for the Operating Cash Flow Ratio on a relative basis to assets is rejected at the 5% significance level, confirming a statistically significant outperformance by PE-backed firms in terms of cash flow generation. At t-1, the median ratio is 0.068 for PE-backed firms and 0.053 for non-backed firms. By t+3, both groups show a decline, with PE-backed firms decreasing to 0.044 (-0.024), whereas non-backed firms experience a much larger drop to 0.016 (-0.037). The substantially smaller decline in PE-backed firms suggests that they maintain a relatively stronger ability to generate operating cash flows post-IPO compared to their non-backed peers.

5.1.2 EBITDA Margin

For EBITDA Margin, the null hypothesis is rejected at a significance level of 1%, indicating a statistically significant outperformance for the PE-backed firms. At t-1, the median EBITDA Margin for PE-backed firms is 11.8%, compared to 11.5% for non-PE-backed firms.

Post-IPO, both groups experience a decline in EBITDA Margin, with a reduction of 1.2 percentage points for PE-backed firms by $t+3$ and 3.0 percentage points for non-backed firms. This suggests that while both groups experience a decline in profitability, PE-backed firms demonstrate greater resilience in maintaining their operational profitability post-IPO.

5.1.3 Asset Turnover

For Asset Turnover, the null hypothesis is rejected at a 1% significance level, confirming a statistically significant outperformance for PE-backed firms in maintaining asset efficiency. At $t-1$, PE-backed firms have a median Asset Turnover of 0.865, compared to 1.060 for non-PE-backed firms. By $t+3$, PE-backed firms maintain a stable ratio of 0.854 (-0.011), while non-PE-backed firms experience a substantial decline to 0.821 (-0.239). This suggests that while PE-backed firms have a lower starting point at $t-1$, the group largely sustain their efficiency in asset utilization, whereas non-backed firms exhibit a notable deterioration post-IPO.

5.1.4 Mann-Whitney U-Test Results Discussion

The results of the Mann-Whitney U-Tests indicate that private equity-backed firms exhibit statistically significant outperformance compared to their non-PE-backed counterparts across all three operational metrics. This leads to the rejection of the null hypotheses, reinforcing the study's central premise that private equity sponsorship influences post-IPO operational performance. However, while PE-backed firms maintain a relative advantage, both groups experience a decline in absolute terms following their transition to public ownership.

These findings broadly align with prior research on post-IPO operating performance. Jain and Kini (1994) examine IPO firms in general, without specifically focusing on PE-backed companies, and document a deterioration in key financial metrics following public listing. Their study finds that, on average, firms struggle to sustain pre-IPO performance, suggesting that transitioning to public ownership presents structural challenges that lead to declining efficiency. Similarly, Pereira and Sousa (2017) find that post-IPO performance tends to weaken, particularly in emerging markets, highlighting that IPO firms often face

difficulties maintaining operational discipline after listing. The results of this study indicate that while the transition from private to public ownership leads to an overall operational decline, PE-backed firms sustain a performance advantage relative to their non-PE-backed peers.

The persistence of performance improvements beyond private equity ownership has been explored in related contexts. Degeorge and Zeckhauser (1993) analyze reverse leveraged buyouts (RLBOs), firms that were taken private, restructured, and later re-listed through an IPO, and find that these companies exhibit strong financial performance leading up to the IPO but deteriorate post-listing relative to comparable firms. This could suggest that some financial sponsors may engage in pre-IPO optimizations that do not necessarily translate into sustained long-term benefits, a concern that has also been raised in discussions surrounding PE-backed IPOs. However, Jain and Kini (1995), in their study of venture capital (VC)-backed IPOs, find that VC-backed firms tend to outperform non-sponsored firms post-IPO, attributing this advantage to governance improvements, active monitoring, and enhanced financial discipline. While their research focuses on venture capital rather than private equity, their findings support the notion that financial sponsorship, whether from VC or PE, can play a crucial role in mitigating post-IPO underperformance.

From a theoretical perspective, this study's findings broadly align with the mechanisms of private equity value creation (Kaplan & Strömberg, 2009). The superior relative performance of PE-backed firms post-IPO may suggest that governance, financial discipline, and operational restructuring efforts undertaken during the private ownership period contribute to lasting benefits. However, the absolute decline in performance across both groups underscores the challenges associated with transitioning from private to public ownership. This aligns with agency theory (Jensen & Meckling, 1976), which suggests that IPOs lead to increased agency costs as managerial ownership decreases, and direct oversight weakens. Furthermore, free cash flow theory (Jensen, 1986) suggests that the financial discipline imposed by PE owners may gradually erode post-IPO, potentially leading to less efficient capital allocation over time.

Ultimately, these results provide evidence that PE-backed firms outperform non-PE-backed firms post-IPO on a relative basis, offering a direct response to the study's research

question. The findings suggest that private equity ownership instills structural advantages that persist beyond the holding period. However, the broader post-IPO decline highlights that despite these advantages, no firm is immune to the operational challenges that accompany public ownership. The extent to which PE-backed firms maintain this advantage across different subsamples and trends in additional financial dimensions will be further examined in the following sections.

5.2 Complementary Tests

5.2.1 Debt Ratio

As presented in section 4.3 *Complementary Tests* and **Exhibit 6**, the results indicate a statistically significant difference in leverage between PE-backed and non-PE-backed firms at the 1% level. PE-backed firms exhibit higher leverage pre-IPO, with a median Debt Ratio of 0.404 at t-1 compared to 0.252 for non-PE-backed firms. However, this difference narrows post-IPO, as the median Debt Ratio for PE-backed firms declines to 0.256 at t+3, while the non-PE-backed group experiences a more modest decline to 0.211.

These findings, in combination with the observed absolute decline in operational performance seen in section 4.2 *Mann-Whitney U-Tests*, align with what is suggested by free cash flow theory (Jensen, 1986). High leverage pre-IPO may have acted as a disciplinary mechanism, constraining managerial discretion and limiting inefficient capital allocation. However, the post-IPO reduction in leverage could suggest that some of the financial discipline introduced under private equity ownership diminishes after exit, as firms transition to a more flexible capital structure under public ownership.

This reduction in leverage following public listing is consistent with the notion that PE-backed firms operate under stricter financial constraints pre-IPO, likely enforced by their sponsors. However, whether this reversion signals a natural capital structure adjustment or a decline in governance discipline remains an open question.

5.2.2 Capital Expenditure Ratio

The results indicate no statistically significant difference in capital expenditure levels between PE-backed and non-PE-backed firms at the 5% level. However, investment behavior appears to diverge post-IPO, as the median CapEx Ratio for PE-backed firms increases slightly from 0.032 at $t-1$ to 0.037 at $t+3$, while the non-PE-backed group declines from 0.034 to 0.032 over the same period.

If CapEx is assumed as a proxy for investment behavior, this suggests that PE-backed firms do not engage in excessive pre-IPO investment surges aimed at temporarily boosting financial performance before exit. Prior research has raised concerns about window dressing, where firms inflate pre-IPO financials through discretionary investments (Michala, 2019; Teoh et al, 1998; Ross & Hopkins, 2011). However, given that PE-backed firms do not exhibit a sharp post-IPO drop in CapEx, this could indicate that they do not systematically cut back on investments after listing, which would be expected if pre-IPO spending had been strategically inflated.

Additionally, Ross & Hopkins (2011) argue that PE firms have reputational incentives to ensure sustainable post-IPO performance, aligning with our findings that PE-backed firms continue investing rather than abruptly scaling back. Katz (2009) further supports this by showing that PE-backed firms exhibit higher earnings quality and less financial manipulation compared to non-PE-backed firms.

That said, CapEx is not a comprehensive measure of investment behavior, and firms may adjust spending in other ways, such as working capital optimization. However, within the scope of capital expenditure, these findings offer some evidence against the notion that PE-backed firms engage in aggressive pre-IPO investment distortions.

5.3 Subsample Tests

The results from the subsample tests as presented in section 4.4 *Subsample Tests* provide a more detailed breakdown and further insight into the robustness of the findings from the full sample analysis. While the primary results indicated statistically significant outperformance

of PE-backed firms across all three operational metrics, the segmented analysis reveals a more nuanced picture, where significance levels and observed differences vary depending on the time period, geographic region, and sector.

When dividing the sample into two time periods, 2000–2007 and 2008–2015, the overall pattern of PE-backed firms outperforming their non-PE-backed counterparts remains, though statistical significance is not uniformly present across all metrics. In the earlier period, no statistically significant difference is observed for EBITDA Margin or OCF Ratio, while PE-backed firms exhibit a significantly higher Asset Turnover at the 5% level. However, in the later period, both Asset Turnover and EBITDA Margin show statistically significant outperformance, with the former reaching significance at the 1% level. This suggests that the effect of PE sponsorship on operational performance may be more pronounced in more recent years, potentially reflecting structural changes in private equity investment strategies or evolving market conditions. Additionally, the substantial difference in sample size between the two periods, with a significantly larger number of PE-backed IPOs in the 2008–2015 period, may influence the robustness of statistical findings.

A similar pattern emerges in the geographic segmentation, where the strongest statistical support for PE-backed outperformance is found in Northwestern Europe, particularly for Asset Turnover and EBITDA Margin. In contrast, no significant difference is observed in the EBITDA Margin or OCF Ratio for Southeastern Europe, with only Asset Turnover showing a significant difference at the 1% level. However, Southeastern Europe has a notably smaller sample of PE-backed IPOs compared to Northwestern Europe, which may, in part, explain the absence of statistically significant differences. Additionally, the maturity of private equity markets varies across European regions, with Northwestern Europe historically having more established private equity ecosystems and stronger capital markets. This could contribute to differences in post-IPO outcomes, as firms in more developed markets may benefit from more extensive PE involvement and established governance practices.

Examining sectoral segmentation, the findings indicate that outperformance by PE-backed firms is less consistently observed when analyzed at the industry level. The absence of statistical significance across multiple industries suggests that PE-backed outperformance, while present at a broad level, may not be uniform when examined within specific industries.

This could be attributed to variations in PE investment strategies across sectors, as well as differences in industry dynamics that may influence post-IPO performance. Additionally, the varying sample sizes within each sector limit the ability to draw definitive conclusions, particularly in industries where the number of PE-backed IPOs are relatively low.

Overall, the subsample tests reveal that while variations exist across time periods, geographies, and sectors, there is no consistent statistical evidence that non-PE-backed firms outperform PE-backed firms in any category. Instead, the findings suggest that PE-backed firms either exhibit outperformance in certain contexts or, at the very least, perform similarly to their non-PE-backed counterparts. These results reinforce the broader conclusions from the full sample analysis, indicating that private equity sponsorship is generally associated with stronger or, at minimum, comparable post-IPO operating performance across different market conditions and segments.

5.4 Regression Tests

A recurring challenge in studies of this nature is disentangling treatment effects from selection effects, determining whether PE actively enhances long-term performance or simply invests in firms that were already positioned to outperform. By controlling for external factors such as firm size, ownership dispersion, market conditions, and industry effects, the regression analysis provides further validation that the outperformance of PE-backed firms extends beyond mere selection bias.

The PE dummy variable remains statistically significant across all three operational metrics, which in conjunction with the results from the Mann-Whitney U-Tests, indicates that private equity sponsorship is consistently associated with stronger post-IPO performance. These results suggest that PE-backed firms maintain a structural advantage in efficiency and profitability beyond the holding period, further supporting the notion that prior private equity ownership has a lasting impact on operational outcomes post-IPO.

Beyond the PE dummy, the regression also identifies other significant explanatory variables, highlighting additional factors that influence post-IPO performance. The significance of the transaction value variable might indicate that larger firms tend to exhibit more

stable financial performance after going public. The float percentage is also significant, which is in line with agency cost theory, as differences in ownership dispersion can influence governance structures and managerial decision-making post-IPO. Additionally, the significance of the time period variable suggests that broader market conditions at the time of listing may contribute to variations in post-IPO performance, aligning with the notion that economic cycles and investor sentiment influence the trajectory of newly listed firms.

Taken together, these findings reinforce the conclusion that private equity sponsorship is a key driver of superior operational performance post-IPO, even after accounting for firm-specific and external factors. The persistence of the PE variable across multiple specifications suggests that the advantages conferred during private ownership continue to yield benefits beyond the transition to public markets.

6 Conclusion and Further Research

In this chapter, a summary of the study’s results is presented, followed by the conclusions drawn from these findings. Finally, recommendations for further research are provided.

6.1 Conclusion

In a landscape where the long-term impact of private equity ownership remains debated, this study offers compelling evidence that the imprint of PE sponsorship extends well beyond the exit. By examining the post-IPO operational performance of European firms listed between 2000 and 2015, this research sheds light on how private equity shapes companies for the public markets that follow.

Across all three studied operational performance metrics, PE-backed firms demonstrate statistically significant outperformance compared to their non-sponsored counterparts. This relative advantage is confirmed through statistical and comparative analysis, and further reinforced through a regression model, where the PE variable remains significant across all specifications. The consistency of these results strengthens confidence that PE sponsorship drives operational improvements not merely attributable to firm selection.

However, despite this relative advantage, a degradation in absolute performance is observed post-IPO, with median values for all three metrics declining over the observation period. This result aligns with earlier findings in the literature, where the transition from private to public ownership has been repeatedly accompanied by diminished operational efficiency. Moreover, the subsample analysis reveals that the scale and significance of outperformance vary by time period, geography, and sector, suggesting that private equity’s influence is not uniformly distributed across all market contexts.

The complementary analysis adds nuance to these findings. PE-backed firms maintain higher leverage before the IPO but experience a notable decline in relative debt levels once listed. Since leverage is a fundamental feature of private equity ownership, the observed reduction may indicate a shift in financial discipline as sponsor oversight is removed, consistent with free cash flow theory. At the same time, the typical dispersion of managerial

ownership post-listing points to a change in governance structure, which agency cost theory links to weaker financial discipline and monitoring. In contrast, capital expenditure shows no statistically significant difference between groups, providing no evidence of systematic window dressing via pre-IPO investment distortions. Taken together, these observations suggest that operational improvements achieved during the holding period are not merely the result of pre-exit financial engineering.

Ultimately, the findings offer robust evidence that private equity sponsorship is associated with sustained operational advantages following the transition to public markets. While PE-backed firms do not escape the broader post-IPO performance decline, they maintain a relative edge in efficiency and profitability, supporting the view that private equity ownership drives structural improvements with lasting impact.

6.2 Further Research

The primary focus of future research should be to extend the findings of this study by exploring the underlying mechanisms behind the sustained outperformance of PE-backed firms. While this study confirms this relative advantage, uncovering the specific drivers of this advantage lies beyond the scope of this study and warrants further investigation.

Future studies could explore whether management incentive programs introduced under private equity ownership, such as performance-based compensation or equity stakes, remain in place and continue to influence managerial behavior post-IPO. Similarly, examining changes in board composition before and after listing could shed light on whether governance practices established during the holding period have a lasting impact. Another avenue could involve tracking strategic initiatives implemented under PE ownership, such as operational overhauls or digital transformations, to evaluate their long-term effect on firm performance. While our complementary analysis indicates that the convergence in leverage post-IPO weakens the explanatory power of capital structure, these more qualitative or structural factors may prove central to understanding the persistence of outperformance.

Although secondary to this primary line of inquiry, adjacent themes may also warrant exploration. These include examining alternative exit routes beyond IPOs, focusing on sector-

specific performance effects, or extending the analysis to different geographies. Such studies could build on this paper's subsample analyses and further contextualize the broader impact of private equity across varying market environments.

7 References

The references chapter lists all the sources cited throughout this paper, providing a comprehensive overview of the academic and professional materials that informed the study.

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8 Appendix

8.1 Shapiro Tests for Normal Distribution

8.1.1 Full Sample

Metric	Test Statistic (W)	P-value
Δ OCF Ratio	0.883	0.000
Δ EBITDA Margin	0.848	0.000
Δ Asset Turnover	0.920	0.000
Δ Debt Ratio	0.897	0.000
Δ CapEx Ratio	0.681	0.000

Measured on the change in operational metrics between the year t-1 and t+3.

8.1.2 Subsample I: Time Period

Metric	IPOs between 2000 and 2007		IPOs between 2008 and 2015	
	Test Statistic (W)	P-value	Test Statistic (W)	P-value
Δ OCF Ratio	0.833	0.000	0.929	0.000
Δ EBITDA Margin	0.942	0.000	0.702	0.000
Δ Asset Turnover	0.910	0.000	0.918	0.000

Measured on the change in operational metrics between the year t-1 and t+3.

8.1.3 Subsample II: Geography

Metric	Northwestern Europe		Southeastern Europe	
	Test Statistic (W)	P-value	Test Statistic (W)	P-value
Δ OCF Ratio	0.882	0.000	0.904	0.000
Δ EBITDA Margin	0.660	0.000	0.920	0.000
Δ Asset Turnover	0.911	0.000	0.935	0.000

Measured on the change in operational metrics between the year t-1 and t+3.

8.1.4 Subsample III: Sector

Metric	Δ OCF Ratio		Δ EBITDA Margin		Δ Asset Turnover	
	Test Statistic (W)	P-value	Test Statistic (W)	P-value	Test Statistic (W)	P-value
Communication Services	0.889	0.000	0.870	0.000	0.908	0.000
Consumer Discretionary	0.884	0.000	0.840	0.000	0.908	0.000
Consumer Staples	0.896	0.000	0.807	0.000	0.953	0.002
Energy	0.877	0.000	0.922	0.001	0.870	0.000
Industrials	0.879	0.000	0.801	0.000	0.928	0.000
Information Technology	0.893	0.000	0.885	0.000	0.949	0.000
Materials	0.872	0.000	0.819	0.000	0.875	0.000
Utilities	0.857	0.000	0.849	0.000	0.692	0.000

Measured on the change in operational metrics between the year t-1 and t+3.

8.2 Regression Diagnostics

8.2.1 Variance Inflation Factor

Independent Variable	Δ OCF Ratio	Δ EBITDA Margin	Δ Asset Turnover
PE Dummy	1.295	1.297	1.295
Transaction Value (ln)	1.306	1.309	1.306
Post-IPO Float (%)	1.201	1.207	1.201
Time Period	1.232	1.233	1.232
Geography Dummy	1.107	1.114	1.107
Communication Services Dummy	1.290	1.289	1.290
Consumer Discretionary Dummy	1.380	1.376	1.380
Consumer Staples Dummy	1.190	1.191	1.190
Energy Dummy	1.151	1.151	1.151
Information Technology Dummy	1.470	1.468	1.470
Materials Dummy	1.196	1.180	1.196
Utilities Dummy	1.143	1.144	1.143

Measured on the change in operational metrics between the year t-1 and t+3.

8.2.2 Breusch-Pagan Test

Metric	BP	df	P-value
Δ OCF Ratio	86.372	12	0.000
Δ EBITDA Margin	110.903	12	0.000
Δ Asset Turnover	64.503	12	0.000

Measured on the change in operational metrics between the year t-1 and t+3.

8.2.3 Jarque Bera Test

Metric	χ^2	df	P-value
Δ OCF Ratio	370.311	2	0.000
Δ EBITDA Margin	463.680	2	0.000
Δ Asset Turnover	145.698	2	0.000

Measured on the change in operational metrics between the year t-1 and t+3.

8.2.4 Durbin-Watson Test

Metric	Autocorrelation	D-W Statistic	P-value
Δ OCF Ratio	-0.026	2.052	0.334
Δ EBITDA Margin	0.035	1.929	0.190
Δ Asset Turnover	0.025	1.949	0.306

Measured on the change in operational metrics between the year t-1 and t+3.

8.2.5 Ramsey RESET Test

Metric	RESET	P-value
Δ OCF Ratio	2.308	0.100
Δ EBITDA Margin	0.355	0.701
Δ Asset Turnover	1.119	0.327

Measured on the change in operational metrics between the year t-1 and t+3.