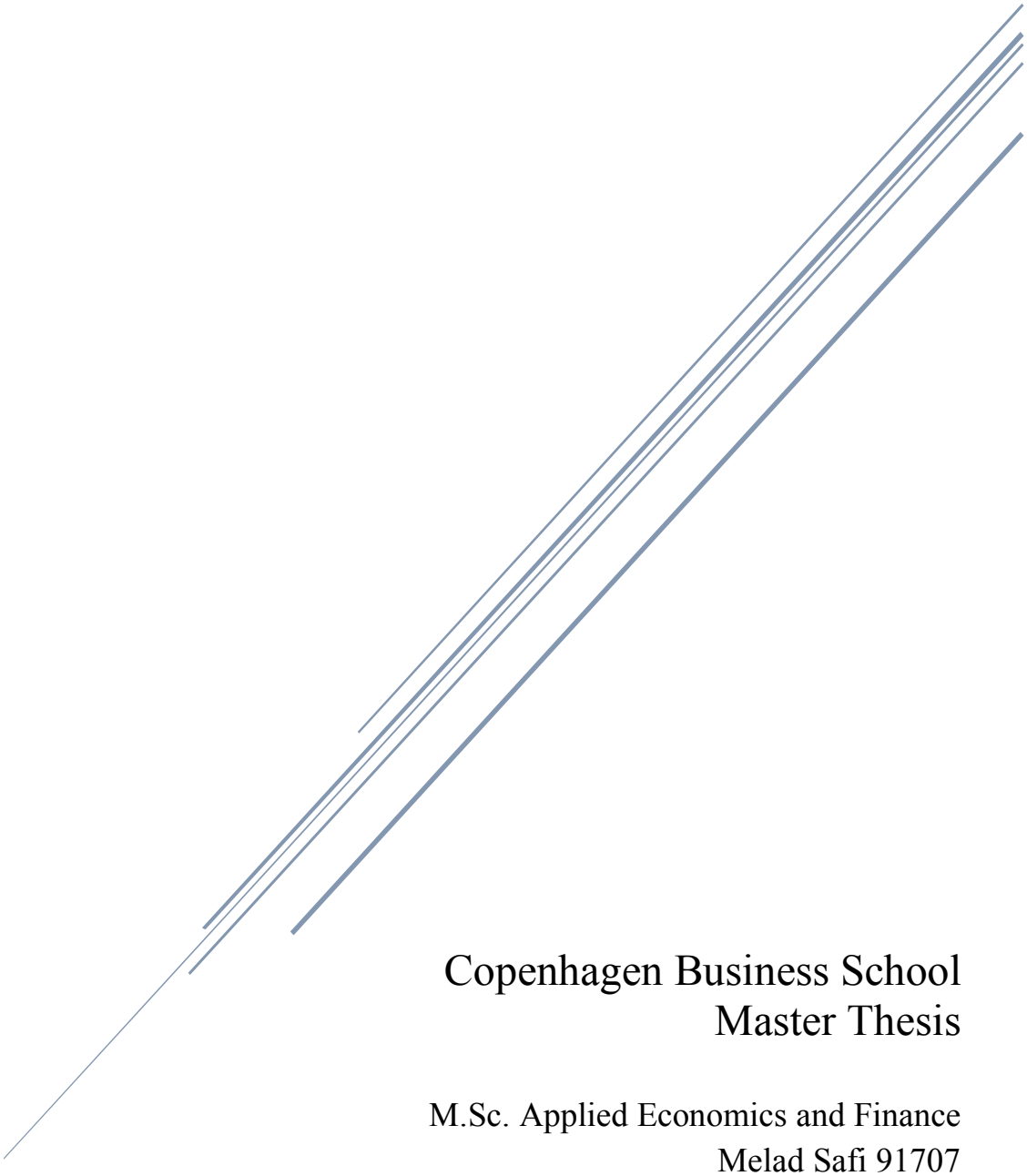
Private Equity Sponsorship and Long-Run Economic Value Creation in Portfolio Companies



Copenhagen Business School
Master Thesis

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Number of characters: 157.142
16th of September 2019

Abstract

This master thesis investigates the long-run economic value contribution of private equity sponsorship in continental Europe, through a comparative examination of the long-run abnormal performance of 1,054 initial public offerings from 2003 to 2015. The investigation is executed in multiple perspectives delivering granularity to the research methodology. In a novel addition, the influence of institutional environment on economic value contribution of private equity sponsorship is investigated.

Initially, an overview of the most prevalent theoretical frameworks is presented on private equity firms, initial public offerings, and the institutional paradigm of continental Europe. The lion's share of theoretical frameworks predicts private equity sponsorship is associated with superior economic value contribution relative to other sponsor identities. It is noteworthy that these predictions have been unsubstantiated by research in academia. However, a vast majority of such research has focused on the Anglo-Saxon world. Thus, the intention of this thesis is to explore the interaction of the industry's modus operandi and the institutional paradigm of continental Europe, which emphasises sustainable and long-term value-creation.

This thesis finds a sizeable long-run abnormal overperformance of private equity sponsored initial public offerings, independent of size and less subject to irrational investor behaviour. In addition, an indication of a gradual evolvement in the industry scope of the private equity industry towards technology-enabled industries is detected. Furthermore, evidence is discovered for the influence of the institutional environment on the modus operandi and long-run economic value creation emphasis of private equity sponsors. In sum, the discoveries of this thesis are in alignment with the prediction of prevalent theoretical frameworks and provide novel and interesting insights into the long-run economic value contribution of private equity sponsorship, while setting the scene for future research opportunities.

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1. Introduction

This master thesis, on the long-run economic value contribution of private equity firms in their portfolio companies, measured through the long-run abnormal performance of private equity sponsored (PE-sponsored) initial public offerings (IPO), is intended to contribute to the limited and narrow contemporary literature and academic discussion, on this topic, in continental Europe. This contribution is achieved by introducing an empirical study with a unique multinational perspective combined with an evaluation of the role of the institutional environment on private equity behaviour.

From the very beginning, the modus operandi of the private equity industry has been a source of controversy in the business world. Furthermore, the lack of sensitive data from the industry has complicated academic research, and to date, little is known about their performance and contribution to the economy. Critics of the private equity industry have highlighted its predatory behaviour, the ruthless focus on profit-maximisation, abnormal debt levels associated with leveraged buyouts and extensive restructuring of target companies as counterproductive for the long-run performance of portfolio companies and the economy. For instance, former Prime Minister of Denmark, Poul Nyrup Rasmussen stated, *"leveraged buyouts leave the company saddled with debt and interest payments, its workers are laid off, and its assets are sold, ... benefiting neither workers nor the real economy."* (Davis, Haltiwanger, Jarmin, Lerner, & Miranda, 2008).

Advocates, on the other hand, argue that private equity firms lead to superior performance and efficiency as they introduce effective corporate governance, industrial experience and disciplinary debt to portfolio companies. These beneficiary factors are considered the industry's 'claim to fame' and are associated with 'the Jensen hypothesis', which claims that PE-sponsored companies benefit from operational efficiencies, unattainable by non-PE-sponsored companies (M. Jensen, 1986; 1989). As such, PE-sponsored companies should exhibit superior performance relative to companies with a different sponsor identity. As such, the private equity industry has been endorsed as the 'champion of capitalism' by advocates.

Since the 1980s, the industry has grown rapidly in the United States of America (USA) and the United Kingdom (UK), two geographies dominated by Anglo-Saxon institutions associated with capital-centred financial markets and one-tiered corporate governance structures. On the other hand, the industry

has had difficulties in establishing itself in continental Europe, which is a geography dominated by institutions associated with bank-centred financial markets, two-tiered corporate governance structures and scepticism towards shareholders. Academia and private equity firms themselves claim that these differences have shaped the industry's modus operandi relative their Anglo-Saxon peers (Lerner, 2011; Lerner & Schoar, 2005). It is argued that continental European private equity firms are less predatory, and their emphasis is on long-term sustainable value contribution in portfolio companies.

The vast majority of academic research on private equity and the effects of PE-sponsorship on long-run economic value-creation, measured as IPO performance, has focused on the USA and the UK. Research in continental Europe has been constrained by inadequate data and activity, compromising the statistical validity and granularity. For example, the majority of studies, in continental Europe, on PE-sponsorship and IPO performance in the 1980s to late 1990s, the prime period of academic discussion on the topic, operated with sample sizes ranging from a few dozen to a maximum of around 200, with a mean around 100 (Jaskiewicz, González, Menéndez, & Schiereck, 2005). In general, however, academic studies have substantiated an overarching underperformance of IPOs relative to market performance. This underperformance is also applicable to PE-sponsored IPOs, despite less significance.

In essence, the empirical findings of this thesis will provide indicative evidence on the ability of private equity firms to create superior long-run economic value in portfolio companies, measured through a comparative examination of the long-run IPO performance of PE-sponsored companies relative to a proxy for market performance and non-PE-sponsored companies. The multinational approach will overcome the activity and data constraints, faced by previous studies in individual continental European constituencies. In addition, a novel perspective of including the influence of institutional environment will be integrated into the equation. In summary, this master thesis will contribute to a narrow and relatively unexplored subject of the economic value contribution of PE-sponsorship in academia. Expectantly, this study will provide valuable insights for ongoing research and investors while facilitating the debate on private equity firms and the industry's role in the economy.

1.1 Research Question

In an extension of the academic motivation of this thesis' empirical research, on the effects of PE-sponsorship on long-run economic value in continental Europe, this master thesis has defined the following overarching research question:

How does PE-sponsorship affect the long-run economic value of portfolio companies in continental Europe?

This master thesis considers, the above-mentioned research question to be an utterly relevant aspect of the discussion in academia on PE-sponsorship and the theory hereof. However, the empirical model, building on an extensive data set, will also be utilized to explore other relevant questions closely associated with the research question. These associated questions seek to provide further insights into the nature of PE-sponsorship and the long-run economic value consequences hereof. The following sub-research questions will therefore also be explored.

a) *Is there **pricing** differences between PE-sponsored and non-PE-sponsored IPOs?*

b) *What is the relationship between long-run abnormal IPO performance, dependent on sponsorship, and the **size** of the issuing company?*

c) *What is the relationship between long-run abnormal IPO performance, dependent on sponsorship, and the **industry** classification of the issuing company?*

d) *What is the relationship between long-run abnormal IPO performance, dependent on sponsorship, and the **institutional environment** of the issuing company?*

e) *How significant is the explanatory function of key **company fundamentals** on 6, 12 and 36 months long-run abnormal IPO performance, dependent on sponsorship?*

1.2 Statistical Models

To comprehensively explore the research and sub-research questions of this thesis, six statistical analyses will be executed. These analyses will be complementary, thereby incrementally increasing our understanding of the investigated academic realm. The academic rationale and interest for each sub-research question will be clarified in the following sections on theoretical frameworks and literature review. To provide the reader with an overview, a brief outline of all six statistical models is provided below. Each model will be explained in detail later, and the associated hypotheses for each will be presented in the analysis section.

Model 1: A comparative and multinational investigation of long-run abnormal IPO performance of PE-sponsored companies relative to market indices and non-PE-sponsored companies.

Model 2: A comparative investigation of pricing behaviour of PE-sponsored and non-PE-sponsored IPOs.

Model 3: A difference-in-difference analysis of the relationship between long-run abnormal IPO performance and issuer size, dependent on sponsorship.

Model 4: An exploration of long-run abnormal IPO performance, dependent on sponsorship, in industries considered as traditional private equity industries

Model 5: A difference-in-difference analysis of the relationship between long-run abnormal IPO performance and the institutional environment of the issuer, dependent on sponsorship.

Model 6: An investigation of the explanatory function of pre-IPO company fundamentals on long-run IPO performance, dependent on sponsorship.

1.3 Delimitation of Thesis

The subject of private equity, PE-sponsorship and IPO performance, which this thesis seeks to investigate, is an immense and complex arena in academia. Thus, it is crucially important to first and foremost clarify the scope of this thesis with the reader.

Firstly, the private equity industry encompasses two distinct fund types, namely buyout funds and venture capital funds. The former is considered the traditional and most dominant private equity method, where leveraged buyouts and majority ownerships are key aspects of the modus operandi. The buyout funds are focused on small, mid, and large cap companies depending on the fund's size. The latter is considered a newer aspect to private equity with a focus on start-ups and immature companies. Venture capital funds have a significantly different modus operandi in terms of, e.g., deal financing, ownership and corporate governance. For example, venture capital funds rarely acquire more than a third of the target company, in order to not disincentivise the entrepreneur, among several reasons. Despite the difference between the two fund types being eroded and that several funds operate within both fields, this thesis will exclude venture capital funds from the PE-sponsored sample (Cao & Lerner, 2009; Levis, 2011). Thus following a long tradition in academia of treating buyout funds and venture capital funds separately, given their vastly different modus operandi (Ritter, 1991). Consequently, venture capital sponsored IPOs will be relocated to the non-PE-sponsored sample. Accordingly, when referring to 'private equity', this thesis is solitarily referring to buyout funds.

Secondly, a number of methods exist for measuring performance and economic value. This thesis will utilise stock returns, in the fashion of several influential studies on the topic, as a proxy. (Bergström, Nilsson, & Wahlberg, 2006; Levis, 2011; Ritter, 1991). Stock returns are often used as proxy for economic value and performance as the required data is easily extractable compared to other possible proxies. Additionally, the stock price is the weighted and aggregated evaluation of all financial investors on the performance and upside potential of any given legal entity. However, this method has a number of shortcomings as well; for example, the aggregated evaluation need not be rational. The irrationality of investors is a subject explored by behavioural finance and inflicts noise on the proxy. Despite, the benefits of stock returns as proxy substantially outweighs its shortcomings and is therefore frequently applied to studies of this kind. In addition, in this thesis, long-run performance is defined as performance at least 6 months after the IPO.

Thirdly, as this thesis is focused on the value-creation abilities of private equity firms, this thesis has little interest in exploring the performance of, e.g. venture capital, public and family sponsored IPO performance. Therefore, all these other categories of sponsorship will be part of the non-PE-sponsored sample. As a consequence, the findings and inferences of this thesis will be constrained solitarily to PE-sponsored companies, as little is inferable about the non-PE-sponsored sample, given the sample's diversity.

Fourthly, the geographic focus of this thesis is limited to continental Europe, which excludes the UK and Ireland. The countries encompassed by the term 'continental Europe' differ widely, and therefore, further delimitation on the geographic dimension is required. When referring to 'continental Europe', this thesis will be referring exclusively to countries in Europe characterized by (1) bank-centred financial markets, (2) two-tiered corporate governance structures or similar structures which protects stakeholders, and (3) adequate contract enforcement. Thus, this thesis will be referring to the countries in the figure below, when the term 'continental Europe' is applied. This selection is aligned with the methodology of previous research in academia on adjacent topics (Groh, von Liechtenstein, & Lieser, 2010). However, as a consequence, the findings and inferences of this thesis will only be applicable to the sampled countries.

Country List
Austria
Belgium
Denmark
France
Finland
Germany
Italy
Luxembourg
Netherlands
Norway
Portugal
Spain
Sweden
Switzerland

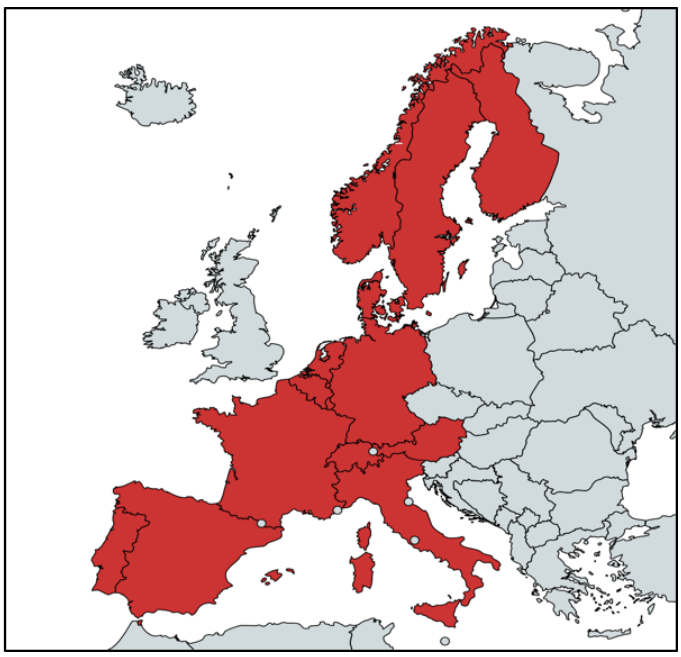


Figure 1: Continental European Countries

1.4 Outline of Thesis

The remainder of this master thesis is organised as follows: Section 2 provides an extensive overview of the most prevalent theoretical frameworks and their predictions regarding the main components of this thesis. Section 3 will review the contemporary literature on the topic of long-run IPO performance and pricing behaviour, while considering observed geographical and sponsor differences as well as similarities. Section 4 outlines the empirical methodology and underlying data for the following statistical analyses. In detail, section 4 will elaborate on the data collection process, variable definitions and statistical model for each analysis. The results of the statistical analyses will be presented in section 5, and the main findings will be discussed in section 6. In addition, section 6 facilitates a discussion on the implications of the findings, opportunities for future research as well as strengths and weaknesses of this thesis. Section 7 will round this thesis out by drawing conclusions on the thesis in its entirety

2. Theoretical Frameworks

This section outlines the relevant theoretical frameworks, found in the list below, which constitute the major academic contributions and predictions affecting this thesis on the economic value contribution of private equity sponsorship. The following section, section 3, will then explore the latest academic research on the empirical validity of the theoretical frameworks and associated inferences.

(1) Modus operandi of the private equity industry

(2) Initial Public Offerings

(3) Institutional paradigm of continental Europe

2.1 Modus Operandi of the Private Equity Industry

This subsection will provide insights on the main characteristic and theories of the private equity industry. Firstly, the main characteristics of private equity funds will be briefly highlighted, followed by an exploration of the leveraged buyout model (LBO) vigorously employed in the industry. Thereafter, the active ownership strategy of the industry will be elaborated, before the exit-strategies of private equity firms are explored.

2.1.1 Main Characteristics of Private Equity Funds

In simple terminology, private equity funds are investment vehicles enabling investors to co-invest into a dozen private companies, thereby diversifying their portfolio and reducing risk. However, this simple terminology does not do justice to the industry's tremendous influence and complex mechanisms. Instead, private equity should be understood as long-term partnership agreements between limited partners (LPs) and general partners (GPs) (Braun & Schmidt, 2014). In this partnership, LPs commit the majority of capital, while GPs primarily actively manage and invest the committed capital. These funds often have a lifetime of ten years, with the possibility of a three-year extension (Ang & Sorensen, 2012; Phalippou & Gottschalg, 2008). The figure below illustrates the relationship between LPs, GPs, and funds with portfolio companies.

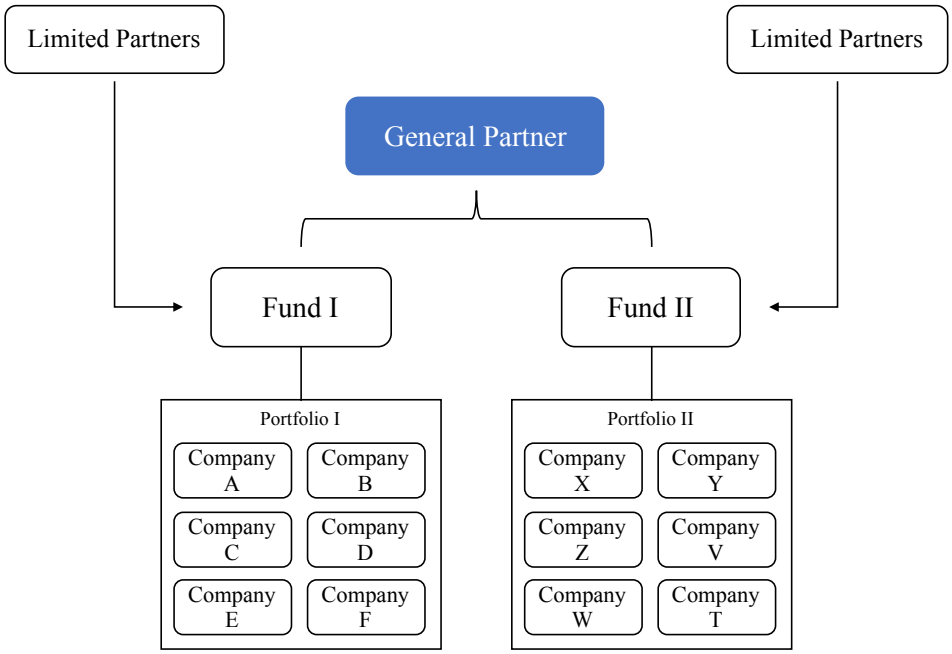


Figure 2: Structure of private equity partnerships

GPs are legal partners in the private equity firm and receive management fees, return on their share of committed capital and carried interest, which is a percentage of the fund's profit. The latter is only received if the returns from the fund exceeds specified hurdle rates. The LPs receive returns on their investment from the remaining profit after carried interest has been paid (Phalippou & Gottschalg, 2008). The minimum committed capital requirement for participating in funds is considerable; thus, LPs are primarily intuitional investors such as pension funds, hedge funds, and insurance companies. In some instances, high-net-worth individuals also participate in private equity funds (Sensoy, Wang, & Weisbach, 2014). The partnership agreement between LPs and GPs is one of the most illiquid in the world of finance. LPs will commit capital to the fund for at least 10 years, and are contractually obliged to provide capital, up to a pre-specified amount, whenever GPs make a capital call. The LPs, in return, require an illiquidity premium, denominated by superior return expectations relative to other asset classes (Ang & Sorensen, 2012).

As indicated at the beginning of this subsection, the benefits derived by LPs in such agreements are two-fold. Firstly, LPs achieve greater diversification in their investments, as their capital is invested in a dozen private companies. Secondly, they achieve the benefits of the GPs' in-depth experience, as private equity firms tend to be focused on specific industries, and active ownership which mitigates managerial agency (Cressy, Munari, & Malipiero, 2007; Cronqvist & Fahlenbrach, 2013).

2.1.2 The Leveraged Buyout Model

Having explored the structure and main dynamics of the private equity business, this subsection will turn towards the industry's frequently employed acquisition model.

The acquisition of portfolio companies requires tremendous level of capital thereby substantially increasing risk in the business model. The industry has developed the LBO model to overcome this hurdle and inflate returns. The LBO model employs, in relative terms, excessive debt in the acquisition of the target. In some instances, the financing of acquisitions can be leveraged 10x the equity in the transaction (Kaplan & Stromberg, 2009). The enormous debt level is collateralised with the assets of the target company, which explains private equity firms' preference for asset-intensive industries, such as industrial and consumer goods. Furthermore, the management or intended management of the targeted firm is required to provide capital for the buyout as well. This is done to ensure alignment of incentives and the effective mitigation of managerial agency, explained in detail in the upcoming subsection (Salter, 2008). Following the completion of the acquisition, a significant proportion of the acquired portfolio company's free cash flow (FCF) will be allocated to interest payments and debt servicing. Naturally, LBO activity is negatively correlated with interest rates (Cumming & MacIntosh, 2006).

Critics of the LBO model argue that the excessive debt level to substantially increases the probability and cost of distress (Hennessy & Whited, 2005). The argument continues by pointing out the allocation of substantial FCF to interest payments and debt servicing, impedes the portfolio company's ability to reinvest capital in R&D and organic growth (Fox & Marcus, 1992; Long & Ravenscraft, 1993). However, advocates of the industry argue that they are aware of these variables, and their investments are calculated decisions. For example, the target company is often profitable and growing, thereby producing a steady FCF, which ensures its capability of servicing the debt level. Additionally, private equity firms base their value-creation undertakings on improving the profitability level, measured as EBITDA, which is done by eliminating inefficient aspects of the business, in addition to, providing expertise and networks, achieving synergies with other portfolio companies and ensuring alignment of interests between management and owners.

In fact, an indirect hypothesised benefit of the LBO model is that the leverage level disciplines managers and aligns interests with the principals, this is known as the leverage effect (Cronqvist &

Fahlenbrach, 2013). This hypothesis is derived from the fact that the abnormal debt levels increases the probability of bankruptcy. Thus management will restrain from managerial inefficiency as they risk their jobs and reputation (Bolton & Scharfstein, 1996). The direct benefits derived from the LBO model, is as mentioned, the higher return on equity, which benefits both GPs and LPs (Hurdle, 1974).

2.1.3 Active Ownership

The most crucial element in the value-creation toolbox of private equity firms is the active ownership paradigm. Jensen (1986, 1989) argues, in what is known as the Jensen hypothesis, that active ownership and effective alignment of incentives mitigate the agent-principal problem, generates informed principals and operational efficiencies, which leads to superior economic value creation and performance.

Well-established theoretical frameworks on agent-principal relations argues that when ownership and control are separated in a world with rational and homo economicus individuals, managerial agency will arise. Managerial agency is harmful for principals, as the self-interested manager will extract company wealth for their own private benefit (Tirole, 2001). Furthermore, as ownership and control are separated, extensive information asymmetry appears, meaning that the principal will be unaware of the suboptimal managerial performance (Hart, 1995). Consequently, if managerial agency is not mitigated or checked, the company will experience suboptimal performance. Two methods of reducing managerial agency are through active monitoring and incentives. Companies with fragmented ownership will, according to the theoretical framework, be ill-informed and experience greater managerial agency and thus have inferior performance, despite the existence of a board of directors (Cronqvist & Fahlenbrach, 2013). Westphal and Zajac (2018) elaborates, in their behavioural approach to corporate governance, how board of directors becomes subject to managerial influence and fails to undertake its fiduciary duty of protecting the interest of principals, in companies with fragmented ownership.

On the contrary, private equity firms are extensively involved with the management in portfolio companies on several levels, especially in the immediate period after acquisition (Salter, 2008). The direct involvement evolves around helping the acquired company with their in-depth experience and knowledge (Lerner, Sorensen, & Strömberg, 2011). Thus, private equity firms are considered to be

well-informed principals, leading to controllable information asymmetry, despite the separation of control and ownership. Empirical studies have found a positive relationship between the amount of time GPs spend in portfolio companies and portfolio company performance (Beroutsos, Freeman, & Kehoe, 2007). Furthermore, private equity firms allocate extensive resources to directly monitor the management and gather information, as the benefits outweigh the costs due to concentrated ownership. In fact, an essential part of the private equity industry's modus operandi is to acquire enough ownership, such that the benefits of active ownership exceed the costs. Concentrated ownership also allows for freedom of operation in terms of implementing changes in the acquired company, thus the decision process become effective and instantaneous.

The benefits of concentrated and active ownership decrease the necessity for a board of directors. If such boards were not compulsory by law, most private equity firms would abolish them, as informed principals and board of directors are substitutes (Burkart, Miglietta, & Ostergaard, 2017). In alignment with this hypothesis, studies have found that board of directors in PE-sponsored companies have fewer directors than non-PE-sponsored companies (Beroutsos et al., 2007; Cronqvist & Fahlenbrach, 2013). The role of boards in PE-sponsored companies is also found to be different relative to non-PE-sponsored companies. According to Filatotchev, Toms and Wright (2006), the function of boards in PE-sponsored companies is more advisory and less monitoring, as the principal's focus is on value-creation instead of wealth-protection as in companies with fragmented ownership.

Another important aspect in the extenuation of managerial agency is the provision of incentives for management to perform efficiently and refrain from shirking. These incentive schemes take various forms, such as salary, cash bonus, stocks, and options (Coles, Daniel, & Naveen, 2006). Well-structured incentive schemes have the potential to significantly improve managerial performance and effort, while poorly-structured schemes might incentivise management to engage in managerial agency, manipulative behaviour, and short-termism. According to H. Cronqvist and R. Fahlenbrach (2013), strong principals are more proficient in designing effective incentive schemes, given their involvement level in the company. Weak principals will leave the design to the board of directors, which at times are subject to managerial influence and engage in board agency as well (Westphal & Zajac, 2018).

As mentioned in the subsection about the LBO model, an important incentive mechanism utilised by private equity firms, is to require the management, or intended management, as private equity firms sometimes replaces the existing management, to provide substantial capital for the acquisition (Cronqvist & Fahlenbrach, 2013; Salter, 2008). This capital commitment directly links a significant proportion of management's wealth to the wealth of principals, thus effectively aligning interests. Private equity firms are also known to increase cash compensation and bonuses for top management by an average of 25%, while incentive schemes are re-designed away from non-financial measures. Instead, heavy emphasis is placed on core profitability measures, relatively immune to manipulation, such as EBITDA and IRR (Schiehll & Bellavance, 2009). Bonuses become subject to performance-vesting instead of time-vesting; this incentivises management to increase effort instead of being conservative to unlock bonuses (Cronqvist & Fahlenbrach, 2013; Petersen & Plenborg, 2010). This beneficiary aspect of PE-sponsorship is known as the principal effect and is considered a key value creation benefit (Cronqvist & Fahlenbrach, 2013; Loos, 2007).

In sum, the theoretical frameworks outlined above regarding the direct and indirect benefits of active ownership and strong principals indicate that PE-sponsored companies have superior performance and economic value contribution. If the theoretical frameworks hold empirically, PE-sponsored IPOs should exhibit superior performance for some time relative to market indices. This is explained by market indices being composed of companies with fragmented ownership leading to managerial agency and passive principals. These factors, theoretically, translates to suboptimal performance of market indices. Additionally, PE-sponsored firms should demonstrate superior performance relative to non-PE-sponsored IPOs. The theories suggested that performance differences of PE-sponsored, non-PE-sponsored IPOs, and market indices, would erode over time, leading to a convergence. This convergence occurs due to the fragmentation of ownership concentration which leads to increased managerial agency, information asymmetries, and operational inefficiencies once a company becomes listed (M. Jensen, 1986; M. Jensen, 1989; Leslie & Oyer, 2008).

Acknowledging, that some sponsors, other than PE-sponsors, could be considered strong principals, such as families and governments. However, they rarely display similar attention to operational efficiencies and value-creation. For example, family sponsors have greater emphasis on wealth-protection and are, therefore, conservative in business decisions (Lins, Volpin, & Wagner, 2013).

Governments, on the other hand, might neither focus on wealth-creation or protection, but rather the provision of utilities and services to the general public (Shleifer, 1998).

2.1.4 Private Equity Exit Options

The common involvement period of private equity firms in portfolio companies is four to seven years (Phalippou & Gottschalg, 2008). After this period, the portfolio company would preferably have considerably improved organic growth rates and profitability. Thus, the time for divestment arrives, such that LPs and GPs are able to collect returns on the investment. A private equity firm has effectively three methods of divesting portfolio companies;

(1) Divestment to a strategic buyer

(2) Divestment to a financial buyer

(3) IPO of the portfolio company

Another partial exit strategy named the Leveraged Dividend Recapitalisation method is also a possibility, but is fairly uncommon compared to the three strategies outlined above. This method implies financing large dividend payments to owners by increasing the debt level of the company (Baker, Filbeck, & Kiymaz, 2015). Thus, this method is often utilised when the divestment of portfolio companies fails or is delayed (Lande, Rashida, Gibson, Dunn, & Crutcher, 2011).

A divestment to a strategic buyer, which most probably seeks to incorporate the portfolio company and unlock synergies within their existing business, would most likely foster tension and friction between the management of the portfolio company and the private equity firm. Management would probably attempt to fight such divestments as they will be dismissed, since strategic buyers will eradicate duplicated positions (Lande et al., 2011). As indicated earlier, management's options for fighting divestments, i.e., engaging in managerial agency are limited, unlike publicly listed companies, where management uses extensive corporate resource in fighting shareholders and potential takeovers (Edmans, 2014). Divestments to strategic buyers are often considered to be an extensively profitable option for SMEs. Thus, PE-sponsors are focused on this option from the point they acquire a portfolio company (Schmidt, Steffen, & Szabo, 2010).

Financial buyers, which includes other and often larger private equity firms, are often interested in companies which provide synergies for the rest of their current portfolio. Financial buyers are often interested in retaining the management of the acquired company. Thus divestments to financial buyers are not subject to friction and tension (Lande et al., 2011). Divestments to strategic and financial buyers, also labelled divestment to a third party, ensures a complete and immediate exit for the private equity firm. This has several benefits, for example, invested capital and profits are reimbursed immediately to the private equity firm and LPs, while GPs will be able to channel their valuable and scarce time to other portfolio companies and investment opportunities. Among the dangers of doing business with third party buyers is an element of moral hazard risk. Competitors of the offered portfolio companies may express interest in an acquisition to access sensitive and confidential information during the due-diligence process. By acquiring sensitive information, the competitor will be able to diminish any competitive advantages the offered company might possess. Thus, third party divestments are increasingly centred on business relationships, thereby introducing an aspect of reputational capital in the industry.

The third divestment option, which is the method subject to investigation in this thesis and elaborated in greater detail in the following section, is the IPO method. This method is, in contrast to third party divestments, gradual, lengthy, and costly (Levis, 2011). Depending on the size of the IPO, the PE-sponsor will traditionally have to find a number of underwriters, which are investment banks responsible for managing, structuring, and pricing the IPO (Berk & DeMarzo, 2013). The underwriters will recommend contractual agreements constraining the PE-sponsors ability to divest its position in the company for 90, 180, or 360 days. Such contractual agreements are known as lock-up agreements and are designed to avoid an over-supply of shares, which would create downward pressure on the stock price. The voluntary lock-up agreements strengthen an investor's confidence in the quality of the company and the upside potential. As the lock-up agreement expires, stock prices are known to react negatively by around 3%, due to lowered investor confidence and an increase in the supply of shares (Brav & Gompers, 2003). Despite the expiration of lock-up agreements, PE-sponsors find themselves unable to unload their shares to the stock market, as any unloading would create a heard effect and push stock prices down, thereby harming their returns (Lande et al., 2011). This phenomenon is known as the 'market overhang' effect and possesses a significant challenge to PE-sponsors looking for a complete exit.

IPOs are considered the most profitable exit option for large and profitable portfolio companies in industries with relatively high market-to-book ratio (Baker et al., 2015; Pagano, Panetta, & Zingales, 1998). A study found IPOs to have an IRR of 111%, while divestments to third party buyers had an IRR of 49% (Schmidt et al., 2010). Despite incurring difficulty for the PE-sponsor, the lock-up period also introduces an upside, as the stock prices can surge in the lock-up period, thus increasing the sponsor's returns. The potential upside of lock-up agreements could incentivise short-term behaviour in the private equity firm (Bergström et al., 2006). Conversely, the process of going public is lengthy and costly, thereby confining valuable and scarce resources which leads to the under-prioritisation of other portfolio companies. Additionally, the process is demanding on the company undergoing an IPO as legal and administrative work will shift focus away from the operational aspects. As consequence, only a fraction of private equity exits are through an IPO. A study in the USA over the period 1970 to 2007 found that only 13% of private equity exits were executed through this method (Leslie & Oyer, 2008).

In summary, the outlined frameworks indicate PE-sponsored IPOs to suffer from risk of over-supply of shares, which continuously provides a downward pressure on the stock price. This also negatively affects investor expectations about the company, as they are aware of the desire of the PE-sponsor to fully exit. Non-PE-sponsored IPOs do not suffer from over-supply risk and the 'market overhang' effect, at least not to the same level. Non-PE-sponsors rarely utilise IPOs as an exit strategy, but rather as a method of raising capital to stimulate continued growth. Thus, investors are comforted by the fact that the current owners also believe in the company's upside and are not just looking to exit and cash in. On the other hand, private equity firms only undertake IPOs with high-quality portfolio companies, while non-PE-sponsors are more likely to undergo IPOs with both high-quality and low-quality firms, as they seek to raise capital. These factors points in conflicting directions regarding the performance of PE-sponsored IPOs relative to market indices and non-PE-sponsored IPOs. In general, the variables indicate that PE-sponsored IPOs to underperform market indices, while the relation with non-PE-sponsored IPOs is ambiguous.

2.2 Initial Public Offering

This subsection will outline the main theories and frameworks, which are believed to be explanatory of the attributes of IPOs and associated performance. Initially, the phenomenon of underpricing is explored followed by the cyclicality of IPO activity. Furthermore, the main attributes of IPO performance will be outlined. These topics are known as the IPO puzzles, as they are considered discrepancies relative to what ought to be observed (Berk & DeMarzo, 2013).

2.2.1 Underpricing

IPOs are generally characterised by substantial underpricing, calculated as the difference between the offer price and the closing price of the first trading day. Several theoretical frameworks seek to explain this discrepancy as underpricing is Pareto inefficient for the offering firm's sponsor, since they sell shares at a discount, thereby achieving suboptimal profits and returns. The information asymmetry theory reasons that underpricing is a product of information heterogeneity between the key parties involved in the IPO, namely the issuing company, underwriters, and investors (Bergström et al., 2006; Bozzolan & Ipino, 2007). The underwriter, who is responsible for pricing the IPO, possesses inferior information about the issuing company's fair value. Therefore, to avoid overpricing and undersubscription of the IPO, the underwriter, will include a discount in the offer price to ensure sufficient interest from investors (Berk & DeMarzo, 2013). The underwriter will risk future business, if the underpricing becomes extreme or if it fails to attract sufficient subscribers to the listing, thus underpricing becomes a calculated trade-off.

Another perspective argues that investors are heterogonous and classifies investors as well-informed and less-informed investors. The reason for investor heterogeneity is explained by differences in resources available for the due-diligence of forthcoming listings. Well-informed investors are considered to be institutional investors, while less-informed investors are considered to be retail investors (Keloharju & Torstila, 2002). Underpricing, in this context, is considered a risk premium for the less-informed investors because of (1) their inability to classify low-quality and high-quality companies, and (2) their information disadvantage relative to well-informed investors. Thus, underpricing could be considered a calculated discount ensuring enough interest in, particularly the IPO of low-quality companies (Bergström et al., 2006). According to Kevin Rock (1986), well-informed investors are

able to identify high-quality and low-quality offerings, thus leaving the market at low-quality offerings. Less-informed investors will be the only category interested in low-quality firms, but a discount is required to attract enough less-informed investors. This perspective is strengthened by the positive relationship between underpricing and the expected ex-ante uncertainty of the listing (Beatty & Ritter, 1986).

A third perspective indicates that the sponsor of the issuing company may be interested in the positive psychological effects derived from underpricing the IPO. This notion is highly relevant for sponsors with recurring IPOs, such as private equity firms. Significant stock price appreciation on the first trading day will create success stories and label the issuer a high-quality company, thus strengthening the reputation of the sponsor (Bergström et al., 2006). Thereby increasing the investor interest and confidence in future IPOs sponsored by that particular sponsor, leading to a diminished need for underpricing, going forward (Habib & Ljungqvist, 2001).

In sum, the theoretical frameworks on underpricing build on information heterogeneity between key players. Therefore, offerings surrounded with relatively less information asymmetry should exhibit less underpricing. Bergström et al. (2006) argue that private equity firms are subject to more information disclosures and scrutiny when listing a portfolio company. Thus, private equity firms decrease the adverse selection problem, since information is more transparent and homogenously spread among investors. Additionally, PE-sponsored IPOs tend to be surrounded by more publicity, which indirectly increases publicly available information for the benefit of less-informed investors. Furthermore, theories infer IPO size to be positively correlated with information homogeneity and availability; therefore, larger IPOs should exhibit less underpricing (Beatty & Ritter, 1986; Brounen & Eichholtz, 2002).

Consequently, the main theoretical frameworks suggest that PE-sponsored IPOs are less underpriced relative to non-PE-sponsored IPOs. This inference is based on two overarching features (1) PE-sponsored IPOs are characterised by less information asymmetry, as more information is homogenously available (2) PE-sponsored IPOs are, on average, larger than non-PE-sponsored IPOs, as the latter includes a significant number of newly founded growth companies (Bergström et al., 2006).

2.2.2 Cyclicality of IPO Activity

The volume of IPOs is considered to be cyclical and subject to macroeconomic variables (van Pottelsberghe de la Potterie & Romain, 2004). Several frameworks suggest principals to proactively time IPOs to capture the so called 'windows of opportunity'. These windows of opportunity are characterised by high market valuations and exaggerated investor optimism (Bergström et al., 2006; Levis, 2011). The hot-issue market theory introduces the concept of hot-issue markets and cold-issue markets (Ibbotson & Jaffe, 1975). Hot-issue markets are defined by the average first month returns of new issues being abnormally high. Apart from returns being abnormally high, another important factor is that these periods are predictable for informed principals and underwriters. Thus, issuers, regardless of identity, are interested in timing their issuances, as the offer price can be inflated during hot-issue markets (Ibbotson & Jaffe, 1975). Consequently, issuance during hot-issue markets are characterised by overperformance in the short-term and underperformance in the long-run, as investor sentiment declines, and stock prices decrease towards fair value (Draho, 2004).

PE-sponsors are believed to be better able to time their issuances and, thereby, exploit the benefits of windows of opportunity and hot-issue markets (Bergström et al., 2006). The superior ability of timing is explained by the vast experience derived by the multiplicity of divestments accumulated by the private equity firm. This suggests that PE-sponsored IPOs exhibit greater short-term performance and long-term underperformance relative to non-PE-sponsored IPOs. If indeed, PE-sponsors time the IPOs of their portfolio companies, it would be an indicator of short-termism and short-term value creation by the private equity firms.

2.2.3 Performance of Initial Public Offerings

The weight of evidence on IPO performance indicates abnormal positive returns on the first trading day, followed by significant underperformance in the long-run. This observation is rationalized by the 'convergence of opinion' theory, which argues the observed anomaly to be a product of divergent opinion among investors on the fair value of the issuing company (Miller, 1977). The divergence in opinions are explained by extensive information asymmetries and investors being over optimistic (Ibbotson, Sindelar, & Ritter, 1994). As outlined in the subsection above, investor optimism is a product of encouraging macroeconomic variables, which also stimulates IPO activity. As more

information on the issued company becomes publicly available, the opinion of investors on the fair value will converge. This convergence is primarily directed downwards, as most IPOs are executed in periods with exaggerated investor optimism (Bergström et al., 2006).

Another framework, which seeks to explain the observed phenomenon, advances the argument of 'window dressing'. In this perspective, the issuing company undertakes short-term oriented activities to inflate key financial indicators, such that the company is perceived more attractive to investors (Pastusiak, Bolek, Malaczewski, Kacprzyk, & others, 2016). In particular, less-informed investors will over-value the issuing company, as they do not have the resources for proper and in-depth due-diligence. Window dressing is considered to be a more significant source of concern for investors when the sponsoring principal looks for an exit. Principals who utilise IPOs as a tool for raising capital will have a stake in the long-run performance of the company; thus the chance of artificially inflated financial performance indicators decreases (Ross, Hopkins, & others, 2011). Lock-up periods for PE-sponsored issues is believed to address the investors' concern regarding window dressing.

A third perspective reasons that irrational investor actions are explanatory of observed IPO performance anomalies. The argument revolves around herd behaviour and the mimicking of other investors, regardless of their own information (Bergström et al., 2006). This occurs because of an investor's conviction that other investors are better informed. Herd behaviour and mimicking leads to irrationality and abnormally high or low demand, depending on the actions of first moving investors. In oversubscribed IPOs, investors may demand shares in the aftermarket to such an extent that it leads to a rapid appreciation in the stock price. In time, some investors will divest their position for a number of reasons, which could be unrelated to the company itself. Irrational investors will ignore their own information on the company and will be convinced that the divesting entity is better informed. Therefore, they initiate a herd behaviour and mimicking, which over-supplies the market, leading to an abnormal depreciation in the stock price (Bergström et al., 2006).

In section 2.2.1, when the theoretical frameworks on underpricing were presented, it was found, for various reasons, that PE-sponsored IPOs were defined by less information asymmetry compared to non-PE-backed IPOs.. Building on this notion and the learnings from this section, the divergence of opinion on PE-sponsored IPOs will expectantly be less, suggesting a smaller downward price adjustment in time. In addition, since PE-sponsored IPOs allocate a greater fraction of shares to institutional

investors, they are likely to suffer less from irrational investor behaviour. This suggests a smaller upward price adjustment in the short-run and a smaller downward price adjustment in the long-run. However, the hot-issue hypothesis, which argued sophisticated principals, e.g. private equity firms, to more proactively time their listings, indicate that PE-sponsored IPOs suffer from larger downward price adjustment in time. Additionally, the impact of window dressing suggests that a PE-sponsored listing carries a greater incentive for optimising short-run performance at the expense of long-run performance. The accumulated effect of the above stated variables, seem to be ambiguous, as several reversing movements are predicted by the theoretical frameworks.

2.3 Institutional Paradigm of Continental Europe

The western hemisphere is dominated by two institutional models, namely the Anglo-Saxon and continental European. Each institutional system considerably define the underlying dynamics of the business spheres, where they are governing, with some locational variation (Krivogorsky, 2006). The Anglo-Saxon institutions, which builds on common law, is governing in, for example, the USA and the UK. The continental European institutions, built on civil law, governs in western Europe. This institutional model emphasizes the role of the state in the economy, the importance of the banking sector and debt financing, strategic relationships, and cooperation in the economy. In general, the two institutional models are believed to differ on six overarching factors;

(1) Structure of the Financial Market

(2) Corporate Governance and Investor Protection

(3) Taxation

(4) Economic Activity

(5) Human and Social Environment

(6) Entrepreneurial Culture

Groh et al. (2010), in a comprehensive study of Europe, found the two first mentioned factors to be particularly relevant for the modus operandi of the private equity industry. Therefore, the structure of

financial markets and corporate governance differences will be outlined in detail in the following section, as they are considered explanatory for the economic value contribution of the industry.

2.3.1 Bank-Centred Financial Markets

The financial markets of continental Europe remain dominated by bank financing, despite the increased influence of capital markets in recent times. Banks are considered to be more risk adverse, and their financing decision often resonate with strategic objectives, such as building relationships for future lending activities (Hellmann, Lindsey, & Puri, 2007). To mitigate risk, banks will often require seats on the board of directors in exchange for financing. This practice, most common in Germany and Austria, has allowed banks to become influential decision-makers in the corporate world along with workers and shareholders (Johnson, Daily, & Ellstrand, 1996). Despite, the level of private equity activity being negatively correlated with bank-centred financing, studies have found evidence for the positive impact of bank-centred financing on industries with extensive need for external financing (Cetorelli & Gambera, 2001). In extension, banks are considered to play an important role in facilitating credit access to companies in asset-intensive industries.

As LBOs are primarily focused on asset-intensive industries, it can be hypothesised that private equity firms have easier and cheaper access to credit in bank-centred financial markets relative to capital-centred financial markets. Arguably, the cheaper financing for LBOs enables the private equity firms to allocate a greater fraction of the FCF for reinvestment in the portfolio company, since debt servicing is cheaper. On the other hand, the creditor will probably gain influence through the board of directors, where they would argue for sustainable and long-term decisions, given their strategic rationale and long-term stake in the portfolio company. In aggregate, this could be an indication of superior, sustainable, and long-term economic value creation of private equity sponsorship in continental Europe, as powerful creditors influence the decisions of the private equity firm. In addition, as bank-centred financial markets are characterised by illiquid capital markets, the benefits derived from strong principals are expected to erode at a slower pace, compared to liquid capital markets. This factor could indicate that PE-sponsored IPOs in continental Europe outperform non-PE-sponsored IPOs and market indices for a greater period.

2.3.2 Corporate Governance and Investor Protection

The second aspect, relevant for private equity value-creation is corporate governance mechanisms and investor protection. Frameworks on corporate governance mechanisms in continental Europe strongly indicate a stakeholder protective agenda. This is evident in worker and creditor participation on the board of directors of privately-held companies (Johnson et al., 1996). As a consequence, when compared to the Anglo-Saxon world, the influence and operational freedom of shareholders is diminished. In extension of decreased influence, the involuntarily disproportionation of voting and cash flow rights increases the equity risk of shareholders, while decreasing shareholder protection (Djankov, La Porta, Lopez-de-Silanes, & Shleifer, 2003, 2008; Glaeser, Johnson, & Shleifer, 2001). Weak investor protection is believed to increase the cost of capital and be negatively correlated with private equity activity (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 2002; Lerner & Schoar, 2005).

In conclusion, several theoretical frameworks on corporate governance mechanisms and investor protection undisputedly indicate that continental European institutions negatively affect private equity activity. However, more interestingly, how do these factors affect the economic value-creation behaviour and modus operandi of private equity firms in continental Europe?

As mentioned earlier, the board of directors of companies in continental Europe is characterised by stakeholder representation. These stakeholders often have an extremely long-term interest in the well-being of the company. As indicated earlier, these stakeholders often carry significant influence on the board of directors, enabling them to effectively influence the ambitions of shareholders. Thus, shareholders are unable to engage in short-term and risky activities, as such plans will be challenged and resisted by other stakeholders. Therefore, shareholders will have to propose decisions, which is can be endorsed by stakeholders so as to avoid conflict on the board. These variables, all indicate that private equity firms and other principals in continental Europe are less capable of engaging the short-term shareholder value-maximisation activities, relative to the Anglo-Saxon world (Kim, Kitsabunnarat-Chatjuthamard, & Nofsinger, 2007). Therefore, expectedly, private equity firms in continental Europe are more careful of stakeholder interests, thus, more likely to engage in sustainable and long-term economic value-creation.

3 Literature Review

The previous section outlined the most influential theoretical frameworks on the various subjects relevant to this thesis. This section will explore the findings of empirical research into the IPO performance of PE-sponsored companies relative to market performance and non-PE-sponsored companies in order to investigate the derived predictions of the aforementioned theoretical frameworks. Firstly, the long-run performance of IPOs dependent on sponsorship will be explored, while secondly, the pricing behaviour of IPOs will be researched.

3.1 Long-Run Performance

The weight of international literature and empirical research on IPOs suggest a sizable underperformance in the long-run (Levis, 2011). The underperformance has been found to prevail irrespective of sponsor identity. However, studies have discovered that PE-sponsored IPOs underperform significantly less than IPOs with other sponsor identities. For example, Bergström, Nilsson and Wahlberg (2006) found evidence for such an outcome in their study on PE-sponsored IPOs in the United Kingdom and France. Likewise, Medin (2014) and Ritter (1991) found a similar result in their studies on Sweden and the USA, respectively. These observations and conclusion are supported by a long-lasting tradition of empirical studies providing evidence of IPO underperformance. Interestingly, the magnitude of underperformance has been higher in the Anglo-Saxon world relative to continental Europe, a pattern which might be explained by differences in institutions and investor behaviour.

However, a minority of studies have found that PE-sponsored IPOs significantly outperform the market and other groups of sponsors. For example, a study by Loughran, Ritter and Rydqvist (1994) found such a result in Sweden during the period of 1980-1990. Additionally, despite finding evidence for an overarching underperformance, Levis (2011) found certain industries where PE-sponsored IPOs outperformed the market and other IPO groups. The relevant industries would often be labelled classical private equity industries. The table in Appendix 1 summarises some of the most acknowledged studies on this topic in Europe.

3.2 Pricing Behaviour

In parallel with long-run performance, the weight of international literature and empirical research on pricing behaviour suggests substantial underpricing on the first trading day. Ibbotson's (1975) seminal article, which is one of the earliest and most cited papers, found evidence of significant underpricing, measured by the initial return on the first trading day in the USA. Proceeding empirical studies have found similar substantive underpricing in the rest of the world; it is noteworthy that most of the research has focused on the Anglo-Saxon world (Levis, 2011; Loughran & Ritter, 2004). In addition, the aforementioned studies and a number of others, have found evidence that PE-sponsored IPOs exhibit notably less underpricing relative to non-PE-sponsored IPOs across geographical constituencies and institutional environments (Bergström et al., 2006; Levis, 2011; Mogilevsky & Murgulov, 2012)

Interestingly, Bergström, Nilsson and Wahlberg (2006) in their study of IPOs in France and the UK, found significant differences in underpricing, dependent on geography and independent of sponsorship. Their empirical evidence suggests that IPOs in France, a country with considerable continental European institutions, exhibit substantially less underpricing than IPOs in the UK. The difference in underpricing between continental Europe and the Anglo-Saxon world has been substantiated by several other papers in recent times. Jenkinson, Morrison and Wilhelm (2006) provide evidence to show continental European IPOs are seldom priced outside the indicative pricing range, leading to modest underpricing on the first trading day. According to Ritter (2003), the modest underpricing in continental Europe relative to the Anglo-Saxon world is a product of less information asymmetry around continental European IPOs. In extension, another study found the corporate governance mechanisms of continental Europe to be explanatory and negatively correlated with underpricing of IPOs (Akyol, Cooper, Meoli, & Vismara, 2014). However, the modest underpricing in continental Europe is constrained to traditional industries. A study found technology companies to be aggressively underpriced in both institutional constituencies, with an insignificant difference (Aaij & Brounen, 2002).

4. Methodology and Data description

The subsequent section sets the methodological stage by describing the process of this thesis in its entirety. Subsection 4.1 elaborates on the data collection method, whereas 4.2 presents overarching trends in the data. In 4.3, the method of analysis is outlined while statistical models are outlined in 4.4. In subsection 4.5, a reflection upon some of the most important limitations of the chosen research design is provided. The research of this thesis has been designed with transparency in mind to facilitate replicative studies in the future.

4.1 Data Collection Method

This thesis conducts a comparative study of IPO performance in continental Europe with the ambition to investigate the economic value contribution of PE-sponsorship. If indeed, private equity firms in continental Europe are significantly different relative to their Anglo-Saxon peers in their value-creation focus, we shall observe that PE-sponsored IPOs in continental Europe exhibit similar or superior performance relative to market performance and non-PE-sponsored IPOs. Such an empirical result would suggest that location-specific factors decisively affect the modus operandi of private equity firms. However, if a statistically significant underperformance is observed, the empirical result will suggest that locational specific factors do not affect the modus operandi of private equity firms. Additionally, the benefits of the private equity industry to the economy and portfolio companies would be questionable.

4.1.1 Geography

This thesis leverages secondary data from IPOs in continental Europe to investigate the overarching research question and sub-questions. The chosen geography satisfies the requirement for sufficiently large sample sizes, as the individual states within the geography are characterised with limited IPO and private equity activity. In addition, the selected geography will provide an interesting perspective on the private equity industry while subject to a significantly different institutional environment compared to that of their Anglo-Saxon peers.

As indicated earlier, the geographic selection of this thesis is highly motivated by the contemporary scarcity of in-depth academic research into the subject. The lion's share of research has revolved around the USA and the UK, which are the two most prominent examples of the an Anglo-Saxon institutional environment. The private equity industry had its birth in the Anglo-Saxon world, which formed the industry's modus operandi. Despite, theoretically evident long-term benefits of private equity's business model, studies have failed to prove the persistence of these benefits in the long-run, which should, for instance, be observed through superior performance of portfolio companies after an IPO. The institutions of continental Europe are pointedly different relative to Anglo-Saxon institutions, and as suggested by researchers, facilitate long-run and sustainable value-creation. Thus, it is of great interest to investigate whether the implications of continental European institutions have affected the European private equity industry's modus operandi towards long-term and sustainable decisions. If correct, such a shift should be observable in the overperformance of PE-sponsored IPOs relative to market indices and other IPOs, all else equal.

4.1.2 Sample Design

The samples of this thesis include IPO observations in continental Europe from 01. January 2003 to 31. December 2015. This thirteen-year observation period is particularly interesting, as the chosen period witnessed the most severe financial crises since the Great Depression (French, Leyshon, & Thrift, 2009). This allows for the exploration of similarities and differences in listing behaviour dependent on market conditions between the two samples while observing the hot-issue market theory discussed earlier (Draho, 2004; Ibbotson & Jaffe, 1975). The timeframe of the sample was heavily influenced by the ambition design a contemporary study. The start date of the samples was selected to avoid the dot-com crash at the turn of the millennium and the immediate negative consequences for IPO activity. As of 2003, financial markets and IPO activity began to recover; thus, this thesis seeks to capture this recovery which lasted until the financial crises in 2008. The end date of the samples was chosen to end-2015 to ensure 36 months of return data for the calculation of long-run abnormal returns.

To avoid survivorship bias in the two samples, delisted and acquired companies will be included in this study. Note, a company will only be considered delisted or acquired, if the event occurs before the last relevant observation date for the individual company. The inclusion of delisted and acquired

companies is particularly important given the impact of the 2008 financial crisis mentioned above. Presumably, the samples will exhibit a spike in delisting a few years following the crisis. As acquisitions often increase in periods of expanding economic activity, it is expected that acquisition activity will spike in the period before the financial crisis.

The observations in this study have been sampled based on their domiciled location, which had to be within the continental Europe definition applied in this thesis. In current times with relatively extensive international capital market liberalisation, companies do not necessarily become listed in the location of their domicile. Thus, several observations in the samples are listed outside the boundaries of continental Europe. Initially, this should not be a cause of concern, as this study is predominantly focused on the influence of sponsorship on IPO performance. However, the fact that financial markets of Anglo-Saxon countries are widely different to those of continental Europe will not be ignored. For example, Anglo-Saxon financial markets are known to be more liquid , which for instance accelerates the erosion of benefits derived from strong historical principals. Thus, to mitigate the risk of this lurking variable, this thesis will control for listings in the Anglo-Saxon world.

The companies in the samples are characterised by widespread diversity, a natural consequence of sampling across several countries. The diversity is likewise relevant to company size, measured as implied market capitalisation on the listing date. Previous research suggests differences in performance dependent on size. To accommodate this discrepancy, each observation in the samples has been categorised as ‘large cap’ or ‘growth’. This classification allows for the measurement of long-run abnormal performance relative to a relevant market proxy, which reflects the size of the observation. Long-run abnormal performance of the large cap category will be measured relative to the Euronext 100 index, while long-run abnormal performance of the growth category will be measured relative to the Euronext Growth All Share Index. Euronext is the largest pan-European stock exchange (€3.4 trillion in capitalisation) with base in Amsterdam and exchanges in several European countries (Euronext, 2019). Hence, a significant proportion of observations in the samples have likewise been listed on one of Euronext’s stock exchanges; thereby, making Euronext the most suitable proxy for market performance in continental Europe.

4.1.3 Sample Construction

A common challenge facing studies on the private equity industry or related subjects is the inaccessibility of data, regardless of geography. However, given the lion share of private equity and IPO activity occurs in the Anglo-Saxon world, the lack of data is severe in continental Europe. This disparity is explained by the lack of focus and resources dedicated to cover continental Europe by data intelligence companies. To accommodate this obstruction a multi-layered approach to data gathering was operationalized, meaning, necessary data for this study has been collected via three databases, namely, Bloomberg, DataStream, and Thomson One. Bloomberg served as the main source, while DataStream and Thomson One served as auxiliary databases. The multi-layered approach required substantiate resource allocation to guarantee consistency in variables and observations. As anticipated, the databases differed in terminology and methodology while exhibiting observation shortcomings towards certain continental European countries. The codes used to extract the underlying data for this study are presented in the figure below.

Variable	**Bloomberg**	**DataStream**	**Thomson One**
Company Name	SECURITY_NAME	COMPANY NAME FULL	I
Ticker	TICKER	TICKER	TIC
IPO	IPO	ISSUE TYPE	IPO
PE-sponsorship	PE_BACKED	PE BACKED IPO FLAG	PE_BACKED_IPO_FLAG
Country	CNTRY_OF_DOMICILE	NATION OF HEADQUARTERS	NAT
Industry	INDUSTRY_SECTOR	TRBC ECONOMIC SECTOR	TF_MACRO_DESC
Issue Date	EFFECTIVE_DATE	ISSUE DATE	FIRSTTRADEDATE
Market Status	MARKET_STATUS	TRANSACTION STATUS	TRANS_STATUS
Offer Price	EQY_INIT_PO_SH_PX	OFFER PRICE	OFFERPRICE
Employees Before Offer	-	NUMBER OF EMPLOYEES	EMPLOYEES
Revenue Before Offer	-	TOTAL REVENUES BEFORE OFFERING	REVENUESBEF
EBITDA Before Offer	-	EBITDA BEFORE OFFERING	EBITDABEF
Net Income Before Offer	-	NET INCOME BEFORE OFFERING	NIATBEF
Total Assets Before Offer	-	TOTAL ASSETS BEFORE OFFERING	ASSETS
Total Debt Before Offer	-	TOTAL DEBT BEFORE OFFERING	TOTD1
Market Capitalisation	-	-	TCAP1

Table 1: List of codes used to extract data

The first step was to identify a unique and comprehensive list of IPOs, with a ticker, located in continental Europe within the specified timeframe, followed by the identification of those with PE-sponsorship. As expected, the databases each had numerous IPO observations not captured by the other databases. Therefore, the process of building a comprehensive list, based on the three databases, had to be completed before further data gathering. When identifying PE-sponsored IPOs among the observations in the comprehensive sample, each database fortunately allowed for the extraction of 'flags' for PE-sponsored IPOs. However, since this study only explores the effect of buyout fund sponsorship, each flagged observation was cross-checked and had to be investigated manually via the Bloomberg Terminal to exclude venture capital sponsored IPOs and IPOs with limited private equity ownership. The latter exclusion was motivated by the fact that limited ownership corresponds to incentive constraints in terms of active ownership. With the PE-sponsored and non-PE-sponsored samples defined, the next step was to retrieve industry classification, issue date, and domicile country via the Bloomberg API to Excel. The applied industry classification from Bloomberg is a high-level classification along nine categories. This ensures adequate observations for relevant industries to achieve meaningful statistical results in Model 3.

With the basic variables extracted, the focus turned to financial measures. Firstly, offer prices were extracted from the three databases. Secondly, dividend and split adjusted closing prices were extracted for the issue date, 6 months, 12 months, and 36 months via the Bloomberg API for Excel for each observation in the two samples. The closing price on the issue date will be leverage to measure underpricing in Model 2, while the remaining timepoints will be leveraged for the long-run abnormal performance measurement. With the stock price data retrieved in absolute numbers, the succeeding step transformed the data into level of underpricing and Buy-and-Hold Returns (BHR) with the equations below.

$$Underpricing = \frac{P_{close} - P_{offer}}{P_{offer}}$$

$$BHR_t = \frac{P_t - P_0}{P_0}$$

P_0 is the offer price on the issue date, while P_t is the dividend and splits adjusted closing prices at 6, 12, and 36 months.

With the required data extracted for the main analysis of this study, attention turned towards collecting company fundamentals for the auxiliary analyses. In Model 6, an investigation of the explanatory power of pre-IPO company fundamentals for long-run abnormal performance of PE-sponsored and non-PE-sponsored IPOs is conducted. For these auxiliary analyses, data on revenue, EBITDA, net income, total assets, and total debt before the IPO day was gathered from DataStream and Thomson One. Unfortunately, fundamentals for all observations were not extractable. In general, the smaller the observation, the greater the likelihood of incomplete company fundamentals in the databases, which cultivates a bias towards the smallest companies. Despite the incompleteness, enough observations with adequate fundamentals data were retrieved for the required statistical models. Additionally, for the purpose of the analysis in Model 6, measures of leverage ratio and asset turnover were developed, based on the equation below.

$$Leverage\ Ratio = \frac{Net\ Debt}{EBITDA}$$

$$Asset\ Turnover = \frac{Revenue}{Total\ Assets}$$

Lastly, returning to the data inaccessibility obstacles mentioned at the beginning of this section, several observations in the samples had minimal or no financial data, as Bloomberg's API and the other databases returned "N/A". This could be for two reasons (1) locational bias in the databases meaning some geographies were not adequately covered (2) size bias as some IPOs are too small for the data intelligence agencies to cover adequately. In total the PE-sponsored raw sample consisted of 273 observations while the non-PE-backed sample consisted of 1,428 observations. The faulty observations, although numerous, were removed from the two samples. Observations with some missing financial performance data were looked up manually via a Bloomberg Terminal.

At the end of this process, the PE-sponsored sample was reduced to 231 observations while the non-PE-sponsored was reduced to 823 observations. Thus, the total number of observations in continental Europe, in the period of 2003 to 2015, in this study is 1054. This is a multi-fold improvement compared to previous studies in this geography and allows for granular analyses without significantly sacrificing statistical validity.

4.2 Comparative Statistics

Earlier, the concept of windows of opportunity was explored in relation to IPO behaviour contingent on external market conditions. In general, it was argued that IPO activity is highly cyclical and that sponsors prefer to go public when investors are overly optimistic (Levis, 2011). The table below, illustrates the number of PE-sponsored and non-PE-sponsored IPOs in the timeframe of this study.

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
PE-Sponsored IPOs	0	10	22	42	34	4	1	19	14	7	16	26	36	231
% of PE-Sponsored	0%	4%	10%	18%	15%	2%	0%	8%	6%	3%	7%	11%	16%	100%
Non-PE-Sponsored	13	49	84	158	166	52	24	51	34	14	25	67	86	823
% of Non-PE-Sponsored	2%	6%	10%	19%	20%	6%	3%	6%	4%	2%	3%	8%	10%	100%
Total	**13**	**59**	**106**	**200**	**200**	**56**	**25**	**70**	**48**	**21**	**41**	**93**	**122**	**1054**

Table 2: IPO activity by year and sponsorship in continental Europe

table 2 demonstrates that the IPO market rapidly expanded prior to the 2008 financial crisis after the dot-com bubble crisis. However, this pattern is not replicated after the 2008 financial contraction, as the recovery has been modest, probably due to the poor economic recovery in Europe. Both samples exhibit comparable IPO patterns in the pre-crisis period, which indicates that private equity firms also seek to capitalise on windows of opportunity. This observation is aligned with the work of Cao (2008, 2010) who found evidence suggesting that private equity firms spend less time in portfolio companies under favourable external market conditions. This pattern indicates that continental European private equity firms prioritise extracting the most value from portfolio companies instead of emphasising long-term and sustainable value-creation. The immediate post-crisis pattern differs between PE-sponsored and non-PE-sponsored IPOs, as PE-sponsored IPOs have maintained a relatively higher activity level in subtle market conditions. This could be explained by internal pressure to exit investments made in mid-2000s as funds needed to be closed. The pattern at the end of the observation period strongly resembles that of the pre-crisis, as 2014 and 2015 witnessed considerable improvements in macroeconomic trends.

In section 4.2.2, the problem of survivorship bias was discussed. Thus, an interesting perspective is observing the delist and acquisition activity within the 36 months observation period of this study.

The figures and table below illustrate the number of delisted and acquired companies before 36 months after the issue date.

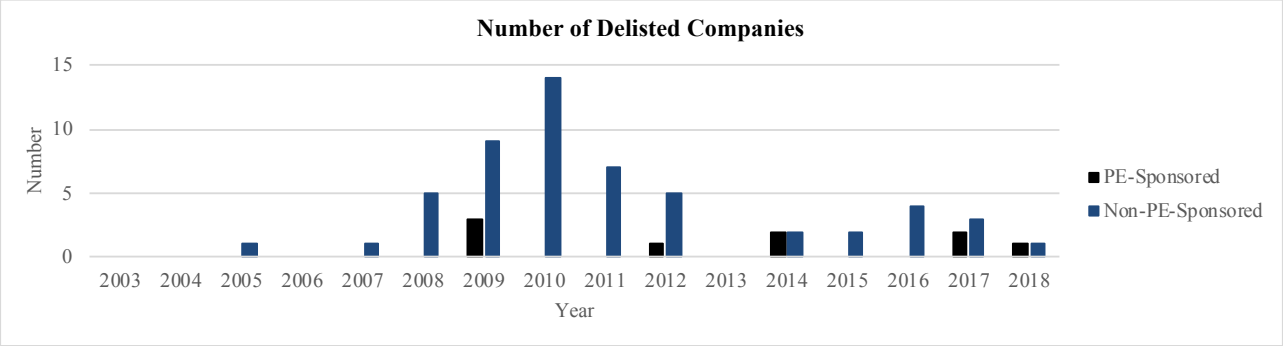


Figure 3: Number of delisted companies by year

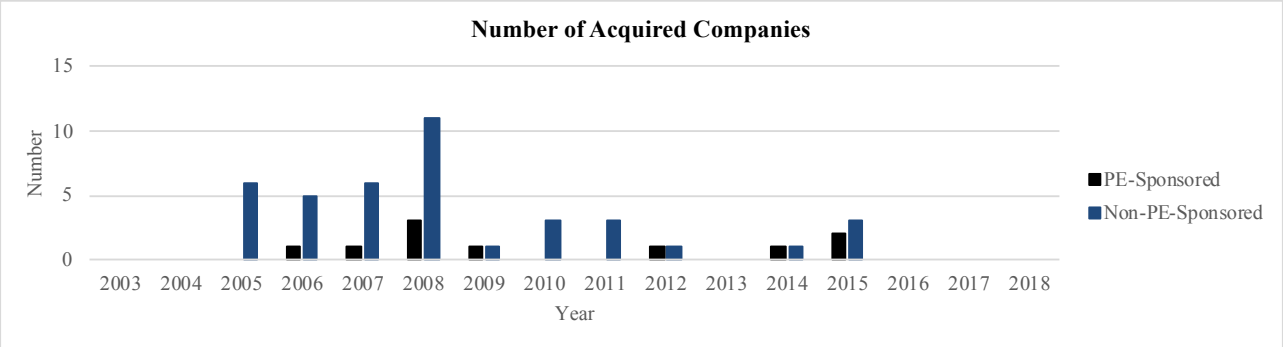


Figure 4: Number of acquired companies by year

Year	Total	% of Sample
PE-Sponsored		
Delisted	9	3,88%
Acquired	10	4,31%
Non-PE-Sponsored		
Delisted	54	6,55%
Acquired	40	4,85%
Total	**113**	

Table 3: Total delisted and acquired companies

As predicted in section 4.2.2, figure 3 demonstrates a considerable increase in delisted companies before the 36 months anniversary in the period after the 2008 financial crisis, while figure 4

demonstrates a substantial surge in acquisitions of observations, in the period before the crisis. The post-crisis period exhibits low activity with no clear pattern. Table 3 compares the number of delisted and acquired companies in the two samples. The figure indicates that a substantially greater proportion of companies in the non-PE-sponsored sample were delisted within 36 months after IPO, while the two samples exhibit comparable proportions of acquired companies. These observations are indicative of PE-sponsored companies exhibiting superior robustness towards negative external market conditions relative to non-PE-sponsored companies. The greater robustness could be derived from operational efficiencies associated with private equity ownership. This interpretation is a preliminary indication of PE-sponsored companies exhibiting superior IPO performance relative to non-PE-sponsored IPOs.

Another potential explanation for the robustness of PE-sponsored companies could be explained through the size differences in the two samples. The figure below illustrates the number of large cap and growth companies in each sample. The categorisation is constructed on market capitalisation implied by the offer price and shares offered on the issue date. Observations with a market capitalisation above €150 million were categorized as large cap, while observations below €150 million were categorized as growth. Additionally, for observations without market capitalisation, their categorization was determined manually by considering other fundamentals, such as issue size, assets, employees, and revenue.

	Total	**% of Sample**
PE-Sponsored		
Large Cap	160	69.26%
Growth	71	30.74%
Non-PE-Sponsored		
Large Cap	283	34.39%
Growth	540	65.61%
Total		

Table 4: Size distribution in samples

Table 4 demonstrates observation size differences in the two samples. The PE-sponsored sample consists of approx. 69% large cap companies, while the proportion of large cap in the non-PE-sample is approximately 34%. A study by Dunne and Hughes (1994) on company survival in the USA and the UK found smaller companies had higher death rates and greater sensitivity to external market fluctuations. Thus, a relatively higher level of delisted companies in the non-PE-sponsored sample could partially be explained by the higher proportion of growth companies.

In continuation of the comparative statistics, the country distribution of observations is presented in the table below.

Country	**PE-Sponsored**	**Non-PE-Sponsored**	**Total**
Austria	6	11	**17**
Belgium	11	58	**69**
Denmark	5	36	**41**
France	42	298	**341**
Finland	7	22	**29**
Germany	42	71	**113**
Italy	17	123	**140**
Luxembourg	10	16	**26**
Netherlands	20	35	**55**
Norway	11	84	**95**
Portugal	2	3	**5**
Spain	13	13	**26**
Sweden	28	37	**66**
Switzerland	17	16	**33**
Total	**231**	**823**	**1054**

Table 5: Number of observations by country and sample

Table 5 demonstrates that the two largest continental European economies, France and Germany witnessed the largest number of PE-sponsored IPOs in the relevant time interval. Additionally, the Netherlands and Sweden exhibit strong private equity activity in the observed period, driven by their hybrid economies which have integrated some aspects of Anglo-Saxon institutions. In the non-PE-sponsored sample, France and Italy are the main contributors to the sample. Unexpectedly, Germany accounts for only 71 non-PE-sponsored observations. As indicated earlier, the data sources revealed bias towards certain countries and sub-regions within continental Europe. When this discrepancy was looked into, it was discovered that a significant number of observations with minimal to no data originated from Germany. This discrepancy produces a bias in the analysis, as the influence of Germany will be underweighted. Regrettably, few realistic options exist to mitigate this discrepancy besides displaying awareness of this issue when concluding on statistical results. Furthermore, this data intelligence bias in the databases extends to the Iberian peninsula, where extremely few observations with adequate data were made for Portugal and Spain.

Despite the geographical biases encountered, the samples are satisfactory on a general level. Fortunately, there are other countries in the sample, for example, Austria and Luxembourg, whose institutions closely resemble those of Germany. This aspect assists in mitigating some of the discrepancy as the observations will be categorized into three categories, namely strong, moderate and mild, reflecting the intensity of continental European institutions. The process of ascribing countries to the three categories is primarily based on the degree of bank-centred financial markets and stakeholder protective corporate governance mechanisms, in alignment with the work of Groh et al. (2010). However, the work of Gerner-Beuerle, Paech and Schuster (2013) on corporate governance mechanisms in the European Union, and the work of Bijlsma and Zwart (2013) on the financial markets of Europe, USA and Japan, were also influential. The category of strong reflects the continental European countries with the most dominant banking-centred financial markets and extensive stakeholder protective corporate governance regulations, such as worker participation in boards and weak shareholder protective regulation. The figures below illustrates the categorisation of sampled countries along the three categories on a map of Europe, while the table illustrates, the distribution of observations for each category in the data set of this thesis. A list of countries in each category can be found in Appendix 2.

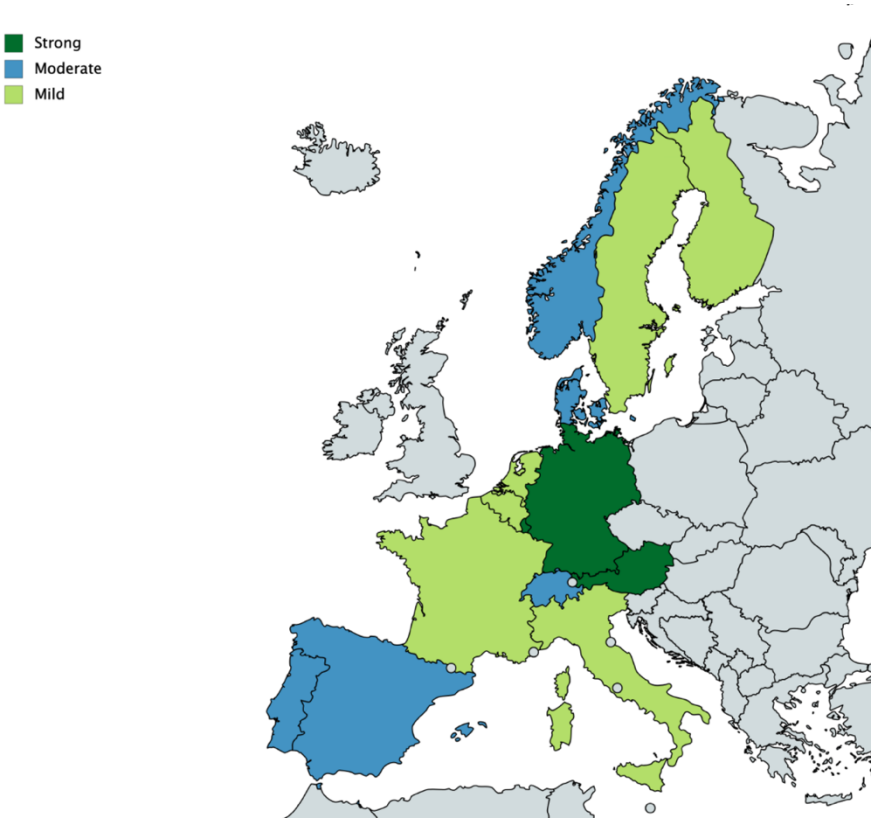


Figure 5: Sampled countries after intensity of continental European Institutions

	Strong	Moderate	Mild	Total
PE-Sponsored	58	48	125	231
% of Sample	25.1%	20.8%	54.1%	100.0%
Non-PE-Sponsored	98	152	573	823
% of Sample	11.9%	18.5%	69.6%	100.0%

Table 6: Observations distributed across institutional environments

The illustrations above indicate substantially more IPO activity in mild institutional environments, even after considering the bias towards Germany and the Iberian Peninsula in the non-PE-sponsored sample. This observation is supported by the general trends of IPO activity being negatively correlated with bank-centred financial markets and stakeholder protective corporate governance mechanisms.

As mentioned earlier, the sample sizes achieved by this study's multinational methodology will allow for robust industry-level statistical analyses for relevant industries, which has so far been difficult in continental Europe. The table below illustrates the industry-level distribution in the PE-sponsored and non-PE-sponsored samples.

Industry	**PE-Sponsored**	**Non-PE-Sponsored**	**Total**
Basic Materials	12	25	**37**
Communications	27	87	**114**
Consumer, Cyclical	44	112	**156**
Consumer, Non-cyclical	57	157	**216**
Energy	8	51	**59**
Financial	19	149	**168**
Industrial	45	131	**176**
Technology	19	101	**120**
Utilities	0	10	**10**
Total	**231**	**823**	**1054**

Table 7: Industry-level distribution of observations

Table 7 demonstrates the differences in industry patterns between the PE-sponsored and non-PE-sponsored samples. Jensen (1986, 1989) argues in the operational efficiency hypothesis, that among the benefits of private equity ownership, was the tremendous industrial experience of the principal transferred to the portfolio company through active ownership. This hypothesis is in accordance with the industry distribution observed, as the PE-sponsored sample exhibits a concentration on Consumer Goods and Industrial, industries known for being primary targets for private equity firms, partly given knowledge and experience synergies. The non-PE-sponsored sample, however, displays clearer diversity embedded by heterogenous sponsor identity. The Consumer Non-Cyclical industry, which includes healthcare and necessity products, is the most frequent industry across both samples. Consumer Cyclical and Industrial are likewise frequently observed industries in both samples. Additionally, Technology and Financial are two industries which appear more frequently in the non-PE-sponsored sample.

4.3 Method of Analysis

The following subsection will elaborate on the statistical considerations and methodology for each statistical model in this thesis. In general, Microsoft Excel has been utilised for data processing, while statistical models have been developed in R, an open-source statistical programming software.

Model 1, which relates to the performance of PE-sponsored IPOs relative to market performance and non-PE-sponsored IPOs, will utilise skewness-adjusted t-statistics with bootstrapped p-values to test equally-weighted mean Buy-and-Hold Abnormal Returns (BHAR). This consideration follows the suggestions of Lyon, Barber and Tsai (1999) and Jelic, Saadouni and Wright (2005), when working with non-normal distributions, exhibited by abnormal stock returns. The distributions of BHARs for 6, 12 and 36 months were tested with the Shapiro-Wilk test for normality (Shapiro & Wilk, 1965), while the mean BHAR for each sample was computed as;

$$BHAR = \frac{1}{N}\sum_{i=1}^{N}[(\prod_{t=1}^{T}(1 + r_{it})) - (\prod_{t=1}^{T}(1 + r_{bt}))]$$

r_{it} and r_{bt} denote the raw returns on IPO *i* and benchmark index *b* at time *t*. The mean BHAR of each paired sample will be tested for significant differences twice. Firstly, without any manipulation to the samples, and secondly, controlling for IPO listings outside of continental Europe. The mean BHAR of each sample will be winsorized at a [0.05 , 0.95] level prior to the skewness-adjusted t-tests with bootstrapped p-values. The winsorization is intended to constrain the influence of extreme values, by moving values above and below the specified percentiles to the percentile level. This reduces the sensitivity of the test statistics to outliers or extreme observations (Kokic & Bell, 1994). Additionally, all statistical models throughout this thesis will be operationalized at a 0.95 confidence interval. A value-weighted approach was considered, but inconsistency in size data compromised the preciseness of such a method.

Model 2, which relates to the pricing behaviour of PE-sponsored and non-PE-sponsored IPOs, is largely identical to the methodology above. The modification is strictly limited to the underlying sample, as this model will perform statistical tests on 1 day mean BHAR, in the exploration of pricing differences between PE-sponsored and non-PE-sponsored IPOs.

Model 3, concerning mean BHAR differences subject to size across 6, 12 and 36 months BHAR for the two samples, will utilise the skewness-adjusted t-statistic with bootstrapped p-values, winsorization, and confidence interval methodology identical to previous models. Model 3 differentiates the samples into large cap and growth, with the differentiator being predominantly €150 million market cap at IPO. The mean BHAR is thus calculated for each size dependent on category and tested with the appropriate t-statistics. Additionally, this analysis will test intra-sample size-dependent performance differences in a difference-in-difference analysis.

Model 4, concerning mean BHAR differences subject to industry classification across 6, 12 and 36 months BHAR for the two samples, will likewise utilise an identical statistical methodology. Despite nine industry classifications in this master thesis, skewness-adjusted t-statistics with bootstrapped p-values will only be conducted on three industry classifications, namely Consumer Cyclical, Consumer Non-Cyclical, and Industrial. This is for two reasons, firstly, the three industries mentioned are traditional private equity industries, and secondly, only these industries fulfil the generally accepted minimum observations for a parametric test of at least 30 observations. In instances with non-normal distributed data, Lehmann and D'Abrera (1975) argued the necessity for adding an observation premium. The mean BHAR is computed for each relevant industry classification and tested for significance.

Model 5, concerning mean BHAR differences subject to institutional environment at 6, 12 and 36 months for the two samples, will similarly utilise identical statistical methodology. The observations in each sample are classified as belonging to either a strong, moderate or mild continental European institutional environment. The mean BHAR of each institutional environment will be tested for significant differences between the two samples. In addition, an intra-sample test of mean BHAR of each institutional environment will be executed to investigate performance differences between strong, moderate, and mild environments. This difference-in-difference approach in this exercise will expose the results to institutional environment risk, which may be difficult to capture. The relevant analysis will elaborate on this aspect.

Model 6, which investigates the explanatory function of company fundamentals prior to the IPO on the 6, 12 and 36 months BHAR, will utilise multivariate linear regression for this purpose. As several

of the independent variables exhibit non-normal distributions, the natural logarithm of such variables will be utilised. Additionally, to avoid imperfect multicollinearity, which impacts variances, standard errors and the t-statistics, highly correlated fundamentals will be excluded from the multivariate regression. Lastly, to mitigate the consequences of heteroskedasticity, the Breusch-Pagan test will be utilised to identify heteroskedastic variables and heteroskedastic-robust standard errors will be computed, if relevant.

4.4 Descriptive Statistics

The subsequent table in this subsection presents descriptive statistics for all variables utilised throughout the various analysis of this thesis. This will provide the reader with an overview of all the variables and their corresponding observations.

						Percentiles		
	N	Mean	Std. dev.	Min	Max	10th	50th	90th
PE-sponsored	231							
Non-PE-sponsored	823							
Domicile Nation	1054							
Industry	1054							
Offer Price	1054							
PE-sponsored	231	16.63	16.45	1.00	163.94	4.35	12.25	32.16
Non-PE-sponsored	823	45.45	378.23	0.05	9875	2.68	10.60	49.24
BHAR 1 Day, %	1054							
PE-sponsored	231	0.07	0.41	-0.72	4.61	-0.07	0.02	0.18
Non-PE-sponsored	823	0.07	0.30	-1.01	4.07	-0.07	0.03	0.24
BHAR 6 Months, %	1054							
PE-sponsored	231	0.10	0.48	-0.77	3.48	-0.31	0.03	0.45
Non-PE-sponsored	823	0.09	0.48	-0.96	5.23	-0.34	0.02	0.53
BHAR 12 Months, %	1047							
PE-sponsored	231	0.31	0.63	-0.89	3.03	-0.40	0.25	1.01
Non-PE-sponsored	816	0.19	0.80	-1.31	5.24	-0.75	0.10	1.05
BHAR 36 Months, %	1033							
PE-sponsored	231	0.22	0.86	-1.44	4.63	-0.52	-0.00	1.31
Non-PE-sponsored	802	0.13	1.05	-1.63	7.67	-0.78	-0.09	1.22
Log(Revenue)	599	4.08	2.52	-2.62	11.00	1.09	4.03	7.25
Log(Issue Size)	599	3.87	2.02	-6.73	9.15	1.50	3.98	6.33
Log(Leverage Ratio)	599	2.42	2.27	-5.40	11.07	-0.19	2.28	5.29
Asset Turnover	599	3.16	18.52	0.00	25.13	0.08	0.83	2.33
Log(Debt)	599	3.50	2.73	-2.61	12.09	-0.12	3.82	6.74

Table 8: Descriptive statistics

4.5 Limitations of Methodology

No scientific research is free from methodological shortcomings, and this subsection has the ambition to provide the reader with sufficient insights into the limitations of this thesis. The methodological design of this thesis mitigates the most obscuring impediments. However, some limitations persist and need to be considered when drawing inferences from statistical results. These limitations are summarised in the list below;

(1) A mere fraction of PE-sponsored companies exit through an IPO

(2) Excluded observations

(3) Size bias in observation and data intelligence

(4) IPO performance of PE-sponsored might not be entirely explained by operational efficiencies

(5) International private equity firms polluting continental European observations

Firstly, private equity firms have several exit options for their portfolio companies. As suggested by theory and empirical data, private equity firms prefer exits through the private market, i.e. to financial or industrial actors. Referring back to Leslie and Oyer's (2008) research on the private equity industry in the USA, which found only 13% of private equity exits were via IPO. Based on theoretical intuition, nothing suggests that continental European private equity firms exploit the IPO exit option more actively; on the contrary, intuition indicates the opposite. The bank-centred institutional tradition of continental Europe has led to less efficient capital markets, which further increases the costs associated with going public. Thus, presumably less than 13% of private equity exits in continental Europe occur via IPO. This has considerable implications for this study. Firstly, only a fraction of PE-sponsored exits is observed. Secondly, according to empirical evidence, the observed fraction has certain characteristics which significantly differentiate it from the majority of private equity portfolio companies. As mentioned, Pagano, Panetta and Zingales (1998) found IPOs to be positively correlated with portfolio company size, market-to-book ratio, organic growth, and profitability. These observations indicate that the PE-sponsored sample of this study captures the largest, most valued and best performing PE-sponsored companies, which creates a performance bias. The implication and

limitation of this feature is that the analytical results and inferences, on the effects of PE-sponsorship on economic value-creation, in this study are only valid for a fraction of the private equity industry. The findings of this thesis will not carry meaningful inferences for the industry as a whole, but only for IPO-relevant companies in the industry.

Secondly, as elaborated in the subsection on sample construction, a significant number of observations were excluded from the samples. In fact, 42 observations were excluded from the PE-sponsored sample due to incomplete financial and company fundamentals data. The excluded observations from the PE-sponsored sample were diverse in nature; thus, the exclusion will not have a material impact on related findings. The final PE-sponsored sample consists of 231 observations, which is sufficient for our statistical requirements. However, the non-PE-sponsored sample faced 605 exclusions due to incomplete financial and company fundamentals data. In general, these exclusions were also diverse in nature along several factors, except location. It was found that a significant portion of observations from Germany were completely without any associated data. Despite manual efforts to mitigate this discrepancy in the data, the inconsistency was not successfully mitigated due to resource and time constraints. As consequence, Germany and its strong institutional environment is underrepresented in the non-PE-sponsored sample, which is a stern limitation to this study, as Germany is the largest economy among the sampled countries and a heavy-weight in bank-centred and stakeholder protective corporate governance institutions. When inferring and concluding on the results in this thesis, one has to be thoughtful of this limitation.

Thirdly, an important aspect of this study is the investigation of potentially explanatory pre-IPO company fundamentals for 6, 12, and 36 months BHAR in the two samples. When extracting company fundamentals, e.g. revenue, EBITDA, net income etc. for the observations from the databases a disappointing pattern appeared. Data availability in the databases was positively correlated with company size. The consequence of this relationship is that data on fundamentals got scarcer as the size of observations decreased; this is illustrated by the descriptive data table in section 4.4. Thus, analyses including fundamental data will operate with relatively smaller samples and have a positive bias towards larger companies. The limitation arising from this imperfectness in data strictly impacts analytical Model 6 of this study. The impact is disproportional, as the non-PE-sponsored sample has a greater proportion of smaller observations compared to the PE-sponsored sample, as shown in table

2 in section 4.2. Thus, when inferring on the statistical results of Model 6, this limitation shall be considered.

Fourthly, the main hypotheses of this thesis builds on theoretical and empirical institutions indicating that PE-sponsored companies have superior performance due to operational efficiencies implemented by a strong principal. This hypothesis is only measurable through IPOs and stock price development as proxy, as the information on performance in the industry is kept secret. However, measuring the objective through IPOs and stock price developments as proxy might not be the best methodology, as it exposes the study to several other uncontrollable factors. Despite various financial theories claiming stock market efficiency, investor psychology exhibits numerous irrational behavioural patterns. These irrational behaviour patterns might favour the PE-sponsored sample, and thus, the observed superior performance of the PE-sponsored sample relative to market performance and the non-PE-sponsored sample, might not entirely be derived from operational efficiencies but also investor psychology. The theoretical framework section briefly touched upon this topic, for example, Bergström, Nilsson and Wahlberg (2006) argued that institutional investors hold a larger fraction of PE-sponsored IPOs, and some could be reluctant to divest after observing poor performance, to not harm their relationship with the private equity firm behind the IPO. Additionally, they argued smaller firms would have a large fraction of retail investors who exhibit more herd behaviour and irrationality. Remember that the non-PE-sponsored sample of this study had a significantly higher proportion of growth companies. The impact of irrational investor behaviour will be most significant in the immediate periods after listing, as information asymmetry and over-optimism will gradually diminish over time (Bergström et al., 2006). Investor psychology and the implications thereof, have led to an entirely new discipline called Behavioural Finance (Shleifer, 2000), and is close to impossible to mitigate in such studies. However, including the potential impact of investor psychology and other lurking variables in interpretations of statistical results is of utmost importance.

In an increasingly international world with liberalised capital markets, it is problematic to assume that all PE-sponsored IPOs in continental Europe have been backed by private equity firms located in continental Europe and entirely subject to the explicit and tacit institutions of the geography. It is not unthinkable that Anglo-Saxon based private equity firms are making investments in continental Europe, despite Groh, Liechtenstein and Lieser's (2010) argument of private equities preferring proximity to portfolio companies. Goldman Sachs' private equity fund's acquisition of DONG Energy

A/S is an example of such cross-institutional activity. The solution to this problem is not the exclusion of PE-sponsored IPOs with a sponsor foreign to continental Europe. Presumably, these foreign private equity firms adjust the modus operandi to the governing laws of their host location. The level of adjustment, however, depends on the explicitness of the continental European institutions at their host location. For example, the foreign private equity firm would be forced to implement a two-tier board if the host location was Germany, while the implantation of such a structure would be optional if the host location was France (Krivogorsky, 2006). Arguably, the analysis Model 5, which investigates the effect of the degree of bank-centred financial markets and stakeholder protective corporate governance mechanisms, indirectly mitigates the implications of this limitation as the level of adjustment required from foreign private equity firms is captured in the variables.

5. Analysis

This section seeks to investigate and provide empirical evidence through hypothesis driven statistical models, which will allow this thesis to infer and conclude upon the stated research question and related sub-questions. The R code for the entire analysis is documented in the associated attachment. Noteworthy, despite showing a 10% significance level, only statistical results with a significance level of 5% or greater will be considered, when accepting or rejecting hypotheses. This is done to minimise the probability of 'false positive' (type I error) and 'false negative' (type II error) hypothesis conclusions.

5.1 Model 1: Long-Run Abnormal Performance

Model 1 investigates the BHAR of PE-sponsored IPOs relative to market performance and non-PE-sponsored IPOs in continental Europe. If a significant positive difference is found, all else equal, it could be indicative evidence for the operational efficiencies hypothesis of Jensen (1986, 1989). On the contrary, if no such observation is made, the entire industry's 'claim to fame' and modus operandi will be questionable. As such, the objective of this analysis is outlined by the hypotheses below.

H_0: *No differences in long-run BHAR of PE-sponsored observations relative to market performance and non-PE-sponsored observations in continental Europe.*

H_{1a}: *A significant difference in long-run BHAR of PE-sponsored observations relative to market performance in continental Europe.*

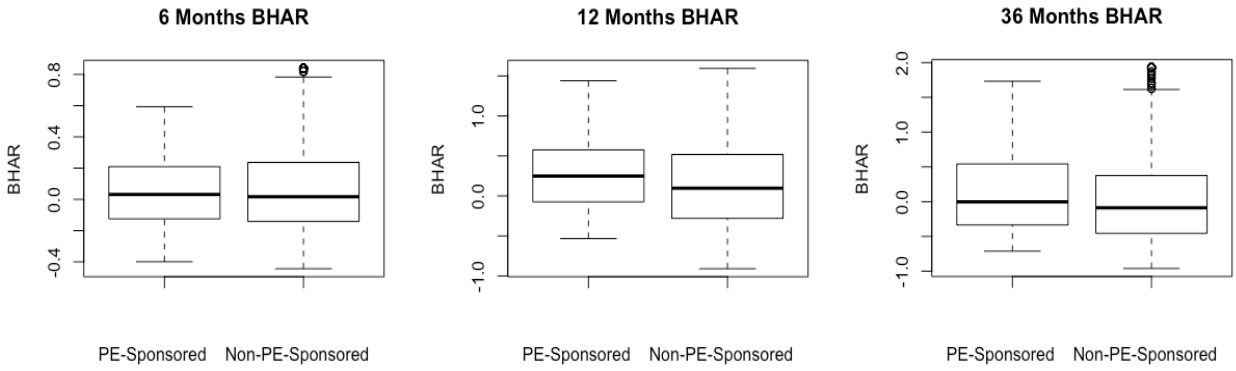
H_{1b}: *In addition to* $H_{1a,}$ *a significant difference in long-run BHAR of PE-sponsored observations relative non-PE-sponsored observations in continental Europe.*

Section 4.3, on the analysis method, introduced the skewness-adjusted t-statistics with bootstrapped p-values as the primary statistical methodology of this thesis. This statistical method is utilised as the Shapiro-Wilk test found the mean BHAR for all periods to be non-normally distributed as indicated by the table below. Additionally, the following boxplots illustrate the post-winsorized mean BHAR

for 6, 12 and 36 months, which is utilized in the skewness-adjusted t-statistics with bootstrapped p-values.

Shapiro-Wilk Test	W	P-value	Distribution
PE-Sponsored			
6 months BHAR	0.67561	< 2.2e-16	Non-Normal
12 months BHAR	0.91093	1.62E-10	Non-Normal
36 months BHAR	0.84758	2.50E-14	Non-Normal
Non-PE-Sponsored			
6 months BHAR	0.78793	< 2.2e-16	Non-Normal
12 months BHAR	0.90618	< 2.2e-16	Non-Normal
36 months BHAR	0.7673	< 2.2e-16	Non-Normal

Table 9: Shapiro-Wilk test results



The winsorized boxplots illustrate less extreme BHAR observations relative to the original boxplots found in Appendix 3; thus, improving the inferability of succeeding statistical findings, albeit a few remaining extreme observations persist.

The results of the skewness-adjusted t-statistics with bootstrapped p-values on mean BHAR are summarised in below. The table also includes 1 day mean BHAR, which will be relevant in Model 2.

*** 1% ** 5% * 10%		PE-Sponsored	Non-PE-Sponsored	Difference
1 day BHAR	μ	4.1%***	5.4%	-1.3%*
	N	231	823	
6 months BHAR	μ	5.1%***	6.6%	-1.6%
	N	231	823	
12 months BHAR	μ	28.3%***	15.1%	13.2%***
	N	231	816	
36 months BHAR	μ	17.2%***	6.6%	10.6%***
	N	231	802	

Table 10: Skewness-adjusted t-statistics results

Interestingly, table 10 indicates that PE-sponsored IPOs significantly outperform the market at 6, 12 and 36 months, as the mean BHAR is significantly different from zero. These observations are in steep contrast to previous studies from, particularly, the Anglo-Saxon world. Additionally, the 'Difference' column of table 10 illustrates that PE-sponsored IPOs significantly outperform non-PE-Sponsored IPOs at 12 and 36 months. Intriguingly, PE-sponsored IPOs underperform non-PE-sponsored IPOs at 6 months; however, this result is statistically insignificant. These observations are supportive of earlier studies, which found sponsored IPOs to overperform non-PE-sponsored IPOs. In summary, the table above indicates that PE-sponsored IPOs have substantial long-term operational efficiencies and benefits, derived from private equity principals, not available to already listed companies and non-PE-sponsored IPOs.

As indicated earlier, some continental European companies are listed outside the sphere of continental European institutions. In particular, due to proximity and size, several companies are listed in the UK, and some even in the USA. These locations are characterised by liquid capital markets, fragmented ownership and Anglo-Saxon institutions, indicating erosion acceleration of benefits derived from strong principals. Thus, the samples are cleansed from listings outside of continental Europe, leading to the following results in the table 11.

*** 1% ** 5% * 10%		PE-Sponsored	Non-PE-Sponsored	Difference
1 day BHAR	μ	3.9%***	5.6%	-1.7%**
	N	214	776	
6 months BHAR	μ	4.9%***	7.3%	-2.4%
	N	214	776	
12 months BHAR	μ	27.7%***	15.3%	12.4%***
	N	214	769	
36 months BHAR	μ	18.4%***	5.1%	13.3%***
	N	214	756	

Table 11: Skewness-adjusted t-statistics results excluding listings outside continental Europe

The adjustment made merely produces small adjustments in mean BHAR, while the overall statistical inferences remain persistent. Thereby, based on the statistical inferences of Model 1, we reject the null hypotheses and accept the two alternative hypotheses;

H_{1a}: *A significant difference in long-run BHAR of PE-sponsored observations relative to market performance in continental Europe.*

H_{1b}: *In addition to* $H_{1a,}$ *a significant difference in long-run BHAR of PE-sponsored observations relative non-PE-sponsored observations in continental Europe.*

5.2 Model 2: Pricing Behaviour

Model 2 investigates the pricing behaviour of PE-Sponsored and non-PE-sponsored IPOs in continental Europe, by analysing the difference between the offer price and first day trading performance less the market performance on the listing date. As elaborated earlier, empirical studies have found substantial evidence for significant underpricing of companies going public. Additionally, the evidence suggests that PE-sponsored companies are generally less underpriced relative to non-PE-sponsored companies. Theoretical frameworks suggested these observations to be a product of information asymmetries and irrational investor behaviour. If a significant result suggesting PE-sponsored IPOs are less underpriced than their non-PE-sponsored peers in continental Europe is found, it would be supportive evidence of frameworks suggesting PE-sponsored IPOs have greater information

homogeneity and/or a greater fraction of rational investors. As such, the objective of this analysis is outlined in the hypotheses below.

H_0: *No difference in the pricing behaviour of PE-sponsored and non-PE-sponsored* observations

H_1: *A significant difference in the pricing behaviour of PE-sponsored and non-PE-sponsored* observations

In similarity with the previous analysis, the results of the Shapiro-Wilk test for distribution of 1 day mean BHAR for the two samples is presented in the table below.

Shapiro-Wilk Test	W	P-value	Distribution
PE-Sponsored			
1 day BHAR	0.29369	< 2.2e-16	Non-Normal
Non-PE-Sponsored			
1 day BHAR	0.5139	< 2.2e-16	Non-Normal

Table 12: Shapiro-Wilk test results for 1 day BHAR

As expected, the extremely small p-values in table 12 imply non-normal distributions in the 1 day mean BHAR. Therefore, the skewness-adjusted t-statistics with bootstrapped p-values will be utilised to test the null hypothesis. However, firstly, the winsorized 1 day mean BHAR is presented in the boxplot below, to ensure the data's insensitivity to outliers. The comparative non-winsorized boxplot is presented in Appendix 4.

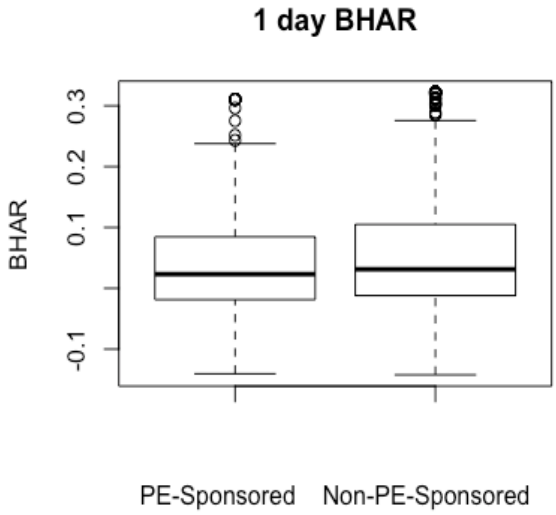


Figure 6: Boxplot for 1 day BHAR

The boxplot above indicates the remaining of some extreme values in both samples, which could be considered outlier at a [0.05, 0.95] level winsorization. However, given the nature of this study looking at abnormal returns, these extreme values will be included in the analysis to achieve a representative picture of pricing behaviour.

As illustrated by table 10 and 11, this study finds both PE-sponsored and non-PE-sponsored IPOs to exhibit underpricing, evident in the positive mean of 1 day mean BHAR, indicating stock price appreciation on the first trading day. The average stock price appreciation of non-PE-sponsored IPOs is 5.6%, which is higher than that of PE-sponsored IPOs; the difference being 1.7% is statistically significant. The underpricing is statistically significant when compared to the market, suggesting the price appreciation to be abnormal. Thus, the findings of this study regarding underpricing behaviour are evidently aligned with previous research and support theoretical frameworks suggesting PE-sponsored IPOs are characterised by less information asymmetry and less irrational investor behaviour. The discussion sections will discuss these findings and the underlying explanation in detail . In an extension of the findings above, the conclusion of this analysis rejects the null hypothesis and accepts the alternative hypothesis;

H_1: *A significant difference in the pricing behaviour of PE-sponsored and non-PE-sponsored observations*

5.3 Model 3: BHAR and Issuer Size

Model 3 deep-dive into the components of mean BHAR by exploring differences dependent on the size of the observation. As explored earlier, substantial size related differences are present in the two samples; thus, this analysis seeks to mitigate some of the effects of this discrepancy. Additionally, this analysis will test intra-sample performance differences, e.g. exploring the mean BHAR differences of large cap and growth PE-sponsored observations. This difference-in-difference analysis will yield substantial insights into size-dependent performance horizontally, i.e. PE-sponsored relative to non-PE-sponsored, and vertically, i.e. large cap relative to growth IPOs. The vertical aspect of this analysis exposes the statistical methodology to lurking size-specific risk, which might be difficult to quantify in a multinational empirical study. The discussion section will, therefore, consider this aspect when inferring on the results of this analysis.

Theoretical frameworks suggested larger IPOs perform better than smaller IPOs, as larger companies, for example, enjoyed superior resilience towards external macro-economic variables. These theoretical frameworks were supported by empirical studies which found evidence that performance and size were positively correlated. Therefore, if the following analysis find superior mean BHAR of large cap observations, it would function as supportive evidence of the previously mentioned frameworks. However, if the opposite is found, new approaches for theorizing the size-performance relationship in continental Europe should be discussed and searched for. Thus, the objectives of this analysis are defined by the two sets of hypotheses below.

H_{0a}: *No difference in long-run BHAR of PE-sponsored and non-PE-sponsored observations dependent on issuer size*

H_{1a}: *A significant difference in long-run BHAR of PE-sponsored and non-PE-sponsored observations dependent on issuer size*

H_{0b}: *No difference in long-run BHAR of PE-sponsored large cap and growth observations*

H_{1b}: *A significant difference in long-run BHAR of PE-sponsored large cap and growth observations*

The analysis of Model 3 follows the same statistical methodology of skewness-adjusted t-statistics with bootstrapped p-values and winsorization, as the foregoing analyses. The table below summaries the statistical results of the difference-in-difference analysis for the relationship between size and BHAR.

*** 1% ** 5% * 10%		PE-Sponsored			Non-PE-Sponsored		
		BHAR 6 months	BHAR 12 months	BHAR 36 months	BHAR 6 months	BHAR 12 months	BHAR 36 months
Large Cap	μ	6.2%**	29.9%**	18.8%	10.5%	20.6%	13.2%
	N	160	160	160	283	282	277
Growth	μ	2.3%	28.8%**	18.6%	4.6%	12.5%	3.3%
	N	71	71	71	540	534	525
Difference		3.9%*	1.1%	0.2%	5.85%***	8.1%**	9.9%**

Table 13: Long-Run Performance dependent on IPO company size

The horizontal axis of table 13 illustrates that large cap PE-sponsored observations underperform large cap non-PE-sponsored IPOs at 6 months and outperform at 12 months. Interestingly, this out-performance is eroded at 36 months performance. Additionally, growth PE-sponsored observations solitarily outperform their non-PE-sponsored peers at 12 months mean BHAR. These observations are partly in conflict with the conclusions made in table 10 and 11 but could be explained statistically by the smaller sample sizes of this analysis. As sample sizes decrease, especially in non-normal distributions, the variance increases thereby increasing the threshold for a mean BHAR difference to be statistically significant.

The vertical axis illustrates large cap PE-sponsored observations to vaguely outperform growth observations at 6 months BHAR, at a 10% significance levels. At all other observation timeframes the vertical difference in mean BHAR are neglectable and statistically insignificant. This observation is in steep contrast to the non-PE-sponsored sample, where large cap IPOs outperform growth companies at 6, 12, and 36 months. The product of this analysis evidently indicates that non-PE-sponsored IPOs exhibit positive correlation between size and long-run abnormal performance, while PE-sponsored IPOs exhibit a largely neutral relationship between size and long-run performance. This could be an indication of the distinctive ability of private equity principals to facilitate sustainable and long-

run economic value-creation independent of the size of portfolio companies. This interesting observation will be further explored in the discussion section. In sum, the results of this analysis conclude with the rejection of $\mathbf{H_{0a}}$ and $\mathbf{H_{1b}}$, while accepting the following;

H_{1a}: *A significant difference in long-run BHAR of PE-sponsored and non-PE-sponsored observations dependent on issuer size*

H_{0b}: *No difference in long-run BHAR of PE-sponsored large cap and growth observations*

5.4 Model 4: BHAR and Industry Classification

Model 4 explores the BHAR of PE-sponsored and non-PE-sponsored observations at industry level. In particular, the focus is directed towards traditional private equity industries, where the Jensen hypothesis indicate the possibility for most value-creation, as private equity firms are able to transfer their immense industrial knowledge, experience, and networks to their portfolio company (M. Jensen, 1986; 1989). However, prior to turning attention towards traditional industries, an overview of mean BHAR of all industries in the two samples is provided in the table below.

		PE-Sponsored			Non-PE-Sponsored		
Industry		BHAR 6 months	BHAR 12 months	BHAR 36 months	BHAR 6 months	BHAR 12 months	BHAR 36 months
Basic Materials	μ	6.0%	36.6%	7.8%	15.9%	32.0%	9.2%
	N	12	12	12	25	25	25
Communications	μ	-1.2%	28.4%	17.5%	4.6%	28.8%	-0.4%
	N	27	27	27	87	86	83
Consumer, Cyclical	μ	-1.6%	15.8%	12.0%	1.7%	15.2%	-0.8%
	N	44	44	44	112	109	107
Consumer, Non-cyclical	μ	12.4%	25.9%	4.3%	2.9%	2.5%	-0.7%
	N	57	57	57	157	155	151
Energy	μ	25.2%	-13.0%	-20.2%	14.9%	2.2%	12.3%
	N	8	8	8	51	51	48
Financial	μ	10.8%	39.8%	31.9%	2.1%	15.0%	9.8%
	N	19	19	19	149	149	148
Industrial	μ	4.6%	40.2%	26.9%	13.2%	19.5%	16.0%
	N	45	45	45	131	131	130
Technology	μ	3.2%	27.0%	53.1%	10.6%	16.8%	20.3%
	N	19	19	19	101	101	101
Utilities	μ	-	-	-	6.9%	20.6%	-22.5%
	N	0	0	0	10	9	9

Table 14: Industry-based Long-Run Performance

Returning to the primary goal of Model 4, if a mean BHAR difference in favour of PE-sponsored observations is observed in this analysis, it would be supportive of the experience and knowledge argument presented above. In contrast, if no such observation is made, it might be an indication that superior PE-sponsored BHAR, which was found in Model 1, originates from non-traditional private equity industries. As such, the objective of this analysis is testing the following hypotheses.

H_{0a}: *No difference in long-run BHAR of PE-sponsored and non-PE-sponsored observations in traditional private equity industries*

H_{1a}: *A significant difference in long-run BHAR of PE-sponsored and non-PE-sponsored observations in* ***Consumer, Cyclical***

H_{1b}: *A significant difference in long-run BHAR of PE-sponsored and non-PE-sponsored observations in* ***Consumer, Non-Cyclical***

H_{1c}: *A significant difference in long-run BHAR of PE-sponsored and non-PE-sponsored observations in* ***Industrial***

The analysis of Model 4 follows the same statistical methodology of skewness-adjusted t-statistics with bootstrapped p-values and winsorization, as the foregoing analyses. The table below outlines the results of the statistical model for the three relevant industries.

*** 1% ** 5% * 10%		PE-Sponsored			Non-PE-Sponsored		
Industry		BHAR 6 months	BHAR 12 months	BHAR 36 months	BHAR 6 months	BHAR 12 months	BHAR 36 months
Consumer, Cyclical	μ	-1.6%	15.8%	12.0%	1.7%	15.2%	-0.8%
	N	44	44	44	112	109	107
Consumer, Non-cyclical	μ	12.4%***	25.9%***	4.3%	2.9%	2.5%	-0.7%
	N	57	57	57	157	155	151
Industrial	μ	4.6%	40.2%*	26.9%	13.2%	19.5%	16.0%
	N	45	45	45	131	131	130

Table 15: Long-run performance for traditional private equity industries

Table 15 demonstrates that none of the three traditional private equity industries significantly outperform non-PE-sponsored observations at 36 months. The PE-sponsored Consumer Cyclical industry does not significantly outperform its non-PE-sponsored peers at any periods, while the PE-sponsored Industrial category vaguely outperforms at 12 months. The PE-sponsored Consumer Non-Cyclical industry, however, significantly outperforms the non-PE-sponsored sample at 6 and 12 months. These observations are particularly interesting, as they indicate a considerable portion of the superior BHAR of PE-sponsored observations could be explained by companies originating from non-traditional private equity industries. This observation, implicitly hints, that the outperformance of PE-sponsored IPOs is to a larger extent explained by the strong principal effect and less so by the experience effect. Arguably, it should be noted, as in Model 3, that the decreased sample sizes in relation to the statistical method could be an influencing factor. For example, the difference between the 36 months BHAR in the Consumer Cyclical industry was 12.8% points in favour of PE-sponsored IPOs. However, the statistical method did not find this significant due to the relatively small sample size.

However, nonetheless, the findings of this analysis were unexpected as traditional private equity industries, which according to theoretical frameworks should benefit substantially from the experience and knowledge of the private equity principal, failed to consistently outperform their peers in the non-PE-sponsored sample. As consequence, for Consumer Cyclical and Industrial the null hypothesis is accepted;

H_0: *No difference in long-run BHAR of PE-sponsored and non-PE-sponsored observations in traditional private equity industries*

Since Consumer, Non-Cyclical exhibited a significantly different long-run BHAR, the null hypothesis is rejected for this industry, and the following hypothesis is accepted.

H_{1b}: *A significant difference in long-run BHAR of PE-sponsored and non-PE-sponsored observations in* ***Consumer, Non-Cyclical***

5.5 Model 5: BHAR and Institutional Environment

Model 5 investigates the long-run performance of PE-sponsored and non-PE-sponsored observations dependent on the intensity of continental European institutions. As outlined, continental European institutions are subject to locational variations; thus, the sampled countries have been divided into three categories descriptive of their institutional environment. In addition to the horizontal cross-sample investigation, a vertical intra-sample investigation will be performed to explore the performance differences between PE-sponsored observations in strong, moderate, and mild institutional environments. Consequently, this difference-in-difference analysis is particularly insightful, as inferences on the optimal institutional environment for the value-creation of private equity firms can be deduced. As such, the objective of this analysis is to test the following sets of hypotheses.

H_{0a}: *No difference in long-run BHAR of PE-sponsored and non-PE-sponsored observations when considering the institutional environment*

H_{1a}: *A significant difference in long-run BHAR of PE-sponsored and non-PE-sponsored observations when considering the institutional environment*

H_{0b}: *No difference in long-run BHAR of PE-sponsored strong, moderate and mild observations*

H_{1b}: *A significant difference in long-run BHAR of PE-sponsored strong, moderate and mild observations*

The analysis of Model 5 follows the same statistical methodology of skewness-adjusted t-statistics with bootstrapped p-values and winsorization, as the foregoing analyses. The table below summarises the statistical results of the difference-in-difference analysis for the relationship between the intensity of continental European institutions and BHAR.

*** 1% ** 5% * 10%		PE-Sponsored			Non-PE-Sponsored		
Intensity of Continental Institutions		BHAR 6 months	BHAR 12 months	BHAR 36 months	BHAR 6 months	BHAR 12 months	BHAR 36 months
Strong	μ	-0.1%	28.7%***	28.1%***	2.4%	10.3%	-2.2%
	N	58	58	58	98	98	98
Moderate	μ	6.7%	13.4%***	0.9%	7.1%	-44.1%	18.3%
	N	48	48	48	152	151	145
Mild	μ	8.5%	33.3%	19.4%***	7.3%	31.5%	5.2%
	N	125	125	125	573	567	559
Difference: Strong - Moderate		-6.8%*	15.3%**	27.2%***	-4.7%	54.4%***	-20.5%*
Difference: Strong - Mild		-8.6%**	-4.6%	8.7%	-4.9%	-21.2%***	-7.4%
Difference: Moderate - Mild		-1.8%	-19.9%*	-18.5%	-0.2%	-75.6%***	13.1%**

Table 16:Long-run IPO performance dependent on sponsorship and institutional environment

The horizontal part of the difference-in-difference analysis of table 16 demonstrates PE-sponsored observations to significantly outperform non-PE-sponsored observations at 12 and 36 months in geographies with strong continental European institutions. In moderate and mild institutional environments, PE-sponsored IPOs solitarily outperform non-PE-sponsored IPOs at 12 months and 36 months respectively. Interestingly, the observations deducted from table 16 indicate that PE-sponsored observations in strong institutional environments exhibit the greatest consistency in overperformance relative to the non-PE-sponsored sample over time. This could be indicatory of greater long-term economic value-creation by private equity firms in their portfolio companies when stakeholder protective regulations are robust and/or bank-centred financing is dominant.

The vertical aspect of the difference-in-difference analysis of table 16 illustrates that PE-sponsored observations in strong institutional environments underperform observations in moderate institutional environments at 6 months while overperforming significantly at 12 and 36 months. The pattern is fragmented, when observing differences between strong and mild institutional environments in the PE-sponsored sample, as observations in strong institutional environments underperform IPOs in

mild institutional environments at 6 months, while all other periods are insignificant. When comparing moderate and mild institutional environments a vague underperformance of the former is observed at 12 months. The insight from the vertical analysis, indicate that the most noticeable and consistent long-run performance difference is to be found between strong and moderate institutional environments. Interestingly, the consistent 6 months BHAR underperformance of observations in strong institutional environments could be indicatory of conservative investors unwilling to immediately invest in listings, as information is scarce on the listed company.

In summary, the analysis above found considerable differences in the mean BHAR of observations in both the horizontal and vertical analysis. Thereby, the null hypothesis for both sets is rejected while the following hypotheses is accepted.

H_{1a}: *A significant difference in long-run BHAR of PE-sponsored and non-PE-sponsored observations when considering the institutional environment*

H_{1b}: *A significant difference in long-run BHAR of PE-sponsored strong, moderate and mild observations*

5.6 Model 6: BHAR and Company Fundamentals

This analysis seeks to explore whether mean BHAR return is explained by company fundamentals prior to listing. Accordingly, the observations extracted from this analysis will yield valuable insight into which fundamentals, if any, investors consider crucial for the future potential and well-being of the company Additionally, this analysis will indicate whether such considerations of company fundamentals by investors is dependent on sponsorship. Expectedly, the explanatory function of company fundamentals immediately before a listing is expected to diminish over time. If a different pattern should be observed, it could be an indicator of irrational investor behaviour. As such, the objective of this analysis is outlined in the two sets of hypotheses below;

H_{0a}: *Pre-IPO company fundamentals have no explanatory function for long-run BHAR of PE-sponsored observations*

H_{1a}: *Pre-IPO company fundamentals have significant explanatory function for long-run BHAR of PE-sponsored observations*

H_{0b}: *Pre-IPO company fundamentals have no explanatory function for long-run BHAR of non-PE-sponsored observations*

H_{1b}: *Pre-IPO company fundamentals have significant explanatory function for long-run BHAR of non-PE-sponsored observations*

The statistical method for this analysis will be multivariate linear regressions with heteroskedastic-robust standard errors when appropriate. The formula for the model is presented below and developed based on logical reasoning and iterations.

$$BHAR_t = \alpha + \beta_1 \,\mathrm{Ln(Revenue)} + \beta_2 \,\mathrm{Ln(IssueSize)} + \beta_3 \,\mathrm{Ln(LeverageRatio)} + \beta_4 \,\mathrm{Asset\ Turnover} + \beta_5 \,\mathrm{Ln(Debt)} + \varepsilon_i$$

The decision to apply heteroskedastic-robust standard errors is based on Breusch-Pagan tests for heteroskedasticity, which found one regression model subject to heteroskedastic standard errors. The output of the Breusch-Pagan test for each regression model is presented in Appendix 5, note that p-

values below 0.05 indicate heteroskedasticity. Additionally, to avoid imperfect multicollinearity, highly correlated company fundamentals have been omitted from the multivariate regression model. Correlation tables on company fundamentals for both the PE-sponsored and non-PE-sponsored sample are presented in Appendix 6. The R software, used for the multivariate linear regressions, will automatically identify cases of perfect multicollinearity.

The multivariate regression output for each model is presented in the table below with R^2 and adjusted-R^2 values.

*** 1% ** 5% * 10%	**PE-Sponsored**			**Non-PE-Sponsored**		
	BHAR 6 months	BHAR 12 months	BHAR 36 months	BHAR 6 months	BHAR 12 months	BHAR 36 months
Intercept	0.080 (0.534)	0.655** (2.525)	0.397 (1.149)	0.113* (1.951)	0.186* (1.865)	0.135 (0.922)
Log(Revenue)	0.031 (1.100)	0.147*** (2.994)	-0.008 (-0.123)	-0.004 (-0.356)	0.009 (0.419)	-0.001 (-0.023)
Log(Issue Size)	-0.014 (-0.357)	-1.151** (-2.297)	0.073 (0.829)	0.007 (0.529)	0.001 (0.012)	0.058* (1.706)
Log(Leverage Ratio)	0.008 (0.272)	0.003 (0.052)	-0.094 (-1.397)	-0.018 (-1.353)	-0.014 (-0.575)	-0.021 (-0.656)
Asset Turnover	-0.008 (-0.246)	-0.138** (-2.462)	-0.071 (-0.944)	0.001 (1.482)	0.002 (0.735)	-0.000 (-0.190)
Log(Debt)	-0.027 (-1.201)	-0.043 (-1.116)	-0.056 (-1.099)	-0.006 (-0.639)	-0.013 (-0.727)	-0.034 (-1.538)
R-squared	0.016	0.091	0.027	0.010	0.014	0.010
Adjusted R-squared	-0.021	0.056	-0.010	-0.001	0.003	-0.001

t statistics in parentheses

Table 17: Multivariate regression table

Unexpectedly, table 17 demonstrates a non-diminishing relationship between the explanatory function of company fundamentals and mean BHAR in time. Company fundamentals have no significant

explanatory function for neither samples at 6 months BHAR. For 12 months BHAR, the natural logarithm of revenue, leverage ratio, and asset turnover are significant explanatory variables in the PE-sponsored sample. This observation is not mirrored in the non-PE-sponsored sample, where all the independent variables remain insignificant, while only the intercept is vaguely significant. For 36 months BHAR, none of the explanatory variables remain significant for the PE-sponsored sample. In the corresponding regression for the non-PE-sponsored sample, the natural logarithm of issue size is significant at a 10% level. In general, the R^2 and adjusted-R^2 values in the regression models are extremely small, thereby suggesting that the linear model is poor for explaining the dependent variable. The regression was executed with non-linear methods too, without obtaining better results.

In summary, the explanatory function of pre-IPO company fundamentals was weaker than anticipated. The spike of significance at 12 months BHAR for PE-sponsored observations and the insignificance of company fundamentals at 6 months are possibly explained by investor behaviour, which the discussion section will elaborate on. For the PE-sponsored sample the null-hypothesis is rejected and the alternative hypothesis is accepted;

H_{1a}: *Pre-IPO company fundamental have significant explanatory function for long-run BHAR of PE-sponsored observations*

For the non-PE-sponsored sample the null-hypothesis is accepted, as the explanatory function of company fundamentals was insignificant;

H_{0b}: *Pre-IPO company fundamental have no explanatory function for long-run BHAR of non-PE-sponsored observations*

6. Discussion

This section will discuss and infer upon the main findings from the statistical analyses of this thesis. A holistic approach is utilised by combining the results of all models while considering them in relation to relevant theoretical frameworks and empirical research. It should be noted that only observations with a significance level of 5% or greater, will be considered statistically significant in this section as well. This thesis has delivered some unexpected and vigorous results, which enables this thesis to provide new perspectives on the topic of long-run economic value-creation of PE-sponsorship, deducted from IPO performance. The implications of these findings also be discussed, in addition to the strengths and weaknesses of this thesis. However, before addressing the findings in different perspectives, the key findings are summarised below to provide the reader with an overview.

I. The performance of PE-sponsored observations is significantly superior compared to the market at 6, 12, and 36 months, irrelevant of listing location.

II. The performance of PE-sponsored observations is significantly superior compared to non-PE-sponsored IPOs at 12 and 36 months, irrelevant of listing location. The performance at 6 months was statistically insignificant.

III. Observations in both samples are significantly underpriced; however, PE-sponsored IPOs are significantly less underpriced.

IV. Large PE-sponsored observations significantly underperform non-PE-sponsored IPOs at 6 months, while outperforming at 12 months. Growth PE-sponsored observations outperform non-PE-sponsored IPOs at 12 months.

V. The performance of large and growth PE-sponsored IPOs are more or less similar, while large non-PE-sponsored IPOs consistently outperform growth non-PE-sponsored IPOs.

VI. Consumer Non-Cyclical PE-sponsored IPOs exhibit superior performance relative to non-PE-sponsored IPOs, while other traditional private equity industries fall short.

VII. PE-sponsored observations from strong continental institutional environments consistently outperform non-PE-sponsored observations from similar environments. PE-sponsored observations in moderate and mild institutional environments exhibit sporadic overperformance.

VIII. PE-sponsored observations in strong continental institutional environments underperform PE-sponsored observations in moderate and mild environments at 6 months, while outperforming moderate at 12 and 36 months.

IX. Revenue, issue size and asset turnover have substantial explanatory function for PE-sponsored IPOs at 12 months, while all company fundamentals are insignificant at 6 and 36 months. Company fundamentals has no explanatory function for non-PE-sponsored IPOs.

The observance of superior BHAR of PE-sponsored IPOs, illustrated by points I and II, suggest compelling evidence for the 'Jensen hypothesis' and the argument of operational efficiencies (Jensen, 1986; 1989). However, the possibility that the abnormal returns are a product of greater risk associated with PE-sponsored IPOs needs to be discussed. Section 4 explored a number of characteristic differences between the two samples. It was found that PE-sponsored IPOs are delisted less often, are larger on average and more concentrated in certain industries relative to non-PE-sponsored IPOs. The two first mentioned factors indicate less risk relative to market indices and non-PE-sponsored IPOs, while the latter factor indicates less diversification and hence greater risk. In aggregate, considering the aforementioned variables and the greater information availability, PE-sponsored companies should be perceived as less risky by investors. Thus, from the perspective of risk, PE-sponsored companies have greater abnormal returns and less associated risk relative to non-PE-sponsored companies.

Another potential external explanation for the superior abnormal return, relative to market indices, could be the utilisation of a poor proxy for market performance. The majority of empirical studies on this topic have utilised the S&P 500, considered the gold standard, as proxy for market performance. Unfortunately, no such standard is available in continental Europe, thereby exposing studies for poor market performance proxies. As argued earlier, Euronext is the best available example of a pan-European market performance indicator, but it might be insufficient. Figure 8 below, compares the indexed performance of Euronext with S&P 500. Interestingly, the performance of the two indices is similar in the pre-crisis period, while S&P 500 exhibits considerably superior performance in the

post-crisis period. This follows the general macroeconomic trends in the two geographies. Thus Euronext seems to be an adequate proxy for the market performance in continental Europe. Consequently, the better performance is most likely attributed to the operational efficiencies implemented by the PE-sponsor prior to the IPO. To relate this to the research question of this thesis, it can be argued with relative confidence that PE-sponsors affect the long-run economic value of their portfolio companies positively, at least for the fraction exited through public listings.

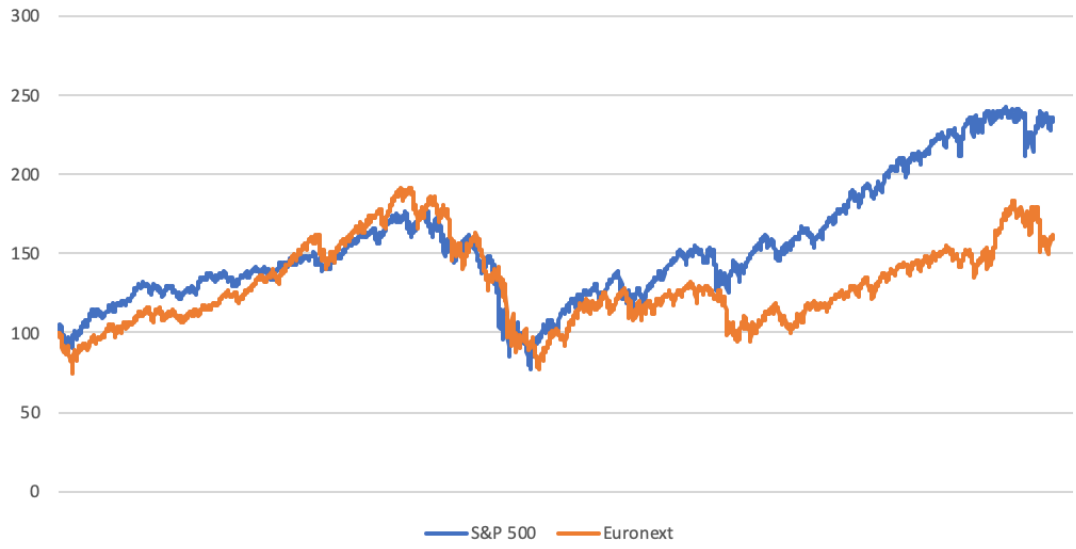


Figure 7: Indexed performance of Euronext 100 and S&P 500

This inference, however, suggests that the benefits of operational efficiencies outweigh the substantial downward pressure on the stock price, created by the private equity firm's desire to exit the portfolio company. In addition, the hypothesis of Ross et al. (2011) suggesting that exiting principals engage in window dressing, leading to inflated short-run returns and underperformance in the long-run is insignificant in the context of continental Europe. Furthermore, the notion of private equity firms having superior abilities to capture windows of opportunities in the hot-market issue hypothesis, as presented by Bergström et al. (2006), is questioned in the context of this thesis. In contrast, the decline in abnormal returns at 36 months, relative to 12 months, could be partially explained by the hot-issue market hypothesis introduced by Ibbotson and Jaffe (1975), which predicts initial appreciation followed by a depreciation in stock returns. The decline in abnormal returns could also be explained by the erosion of strong-principal benefits and the increase of managerial and board agency over time. Unfortunately, both samples exhibit similar behaviour at 12 and 36 months, and more

detailed observation periods would be needed to investigate the importance of this aspect. Table 2, illustrating IPO activity by year, highlighted the persistence of PE-sponsored IPOs in the post-crisis period, despite poor macroeconomic performance. This observation emphasises time constraints facing private equity firms, pushing them to engage in IPO despite subtle return expectations.

The observed underpricing behaviour of both samples could be indicative of discounts provided to investors to compensate them for the attributed risk, derived from information asymmetry between underwriters, the company, and investors. As several theoretical frameworks and empirical research have suggested, this thesis found evidence of PE-sponsored IPOs to be less underpriced than non-PE-sponsored. These observations support the notion of greater information homogeneity around PE-sponsored listings, as suggested by Bergström et al. (2006). The greater information homogeneity could be derived from two sources. Firstly, PE-sponsored IPOs are on average larger; hence, more information is published on the company by third party sources, as suggested by, for example, Beatty and Ritter (1986). Secondly, private equity firms are better at communicating information to the market since they engage in such activities on a recurring basis.

Another explanation for the observed underpricing differences could be derived from heterogenous investors, as suggested by Keloharju and Torstila (2002). As explored earlier, shares in PE-sponsored IPOs are often allocated to resourceful institutional investors, while shares in non-PE-sponsored IPOs are more frequently allocated to retail investors, since these IPOs are, on average, smaller. In brief, well-informed investors are less over-optimistic, thereby, less inclined to over-valuate a listing. Retail investors, on the other hand, are more likely to be overoptimistic and irrational; thereby, they are inclined to over-valuate listings in the short-run. As such, heterogonous investors and share allocation are compelling explanation for the modest underpricing of PE-sponsored IPOs.

The observations made in Model 3, on long-run performance and the implication of company size had several intriguing attributes. For example, what is the explanation for large PE-sponsored underperformance relative to non-PE-sponsored peers at 6 months? Initially, since both sub-samples consist of large companies, it can be assumed that the fractional difference of well-informed investors is less; thus, investor over-optimism and difference in information asymmetry cannot be the sole explanatory variable. The hot-issue market hypothesis proposes a persuasive complimentary explanation. Non-PE-sponsored IPOs, as observed, had a greater likelihood of being issued during hot-issue

markets, which inflated initial returns at the expense of subsequent returns. As 6 months can be considered at the periphery of initial returns, this hypothesis explains the unexplained fraction of the underperformance. Large PE-sponsored IPOs outperformed their non-PE-sponsored peers at 12 months, and the performance difference was insignificant at 36 months. The former is in alignment with the operational efficiency argument discussed earlier, while the latter is indicative evidence for the erosion of the operational efficiencies in time, as the fragmentation of ownership is positively correlated with time since listing. This process is also applicable to the case of growth PE-sponsored IPOs. Interestingly, no significant difference was observed between the performance of large and growth PE-sponsored IPOs, while large non-PE-sponsored IPOs consistently outperformed growth non-PE-sponsored IPOs. This observation is indicatory of the ability of continental European private equity companies to consistently achieve operational efficiencies independent of the portfolio company's size. Something not valid to companies not sponsored by private equity firms.

Model 4 on industry level performance, surprisingly found PE-sponsored observations to outperform in just one out of three of the industries that are traditionally considered private equity industries. This observation is problematic for the operational efficiency argument, as an important portion of the value-creation in the argument arises from the transfer of industrial experience and expertise to the portfolio company. How can this observation be rationalised with the operational efficiency argument? Firstly, as traditional industries fail to outperform, the overarching outperformance observed must be a product of non-traditional industries, ignoring statistical factors for a moment. Thus, for some reason, other than the transfer of knowledge and expertise according to traditional frameworks on operational efficiencies, PE-sponsored IPOs in non-traditional industries have managed to outperform non-PE-sponsored peers. To solve this puzzle, the term 'traditional private equity industries' has to be revisited in the context of time. Truly, during the golden age, the private equity industry was almost exclusively limited to industries such as Industrial and Consumer Goods. This reality has changed since the late 1990s, as private equity firms increasingly expanded their investment focus to the exotic industries of that time such as communications and technology. Thus, some private equity firms have considerable experience and expertise within these industries today, as such, it can be argued that the operational efficiency argument remains intact.

Secondly, however, the revision of the term 'traditional private equity industries' does not answer for the absence of superior performance in Industrials and Consumer Cyclicals. A likely plausible

explanation resonates around the increased competition, facilitated by internationalisation and digitalisation in traditional industries. The increased competition negatively affects the expectations of investors, thereby decreasing returns. Remember, a negative attribute of utilising stock return as proxy for performance is that stock prices are not solely a product of an entity's contemporary performance but also include investors' future expectations. As such, investors might overlook the contemporary superior operational aspects of PE-sponsored IPOs within these industries, as they believe the fierce competition to be a more predominant factor for future performance. Another explanation could be that investors have pre-defined preferences/bias towards certain industries, this is an example of investor irrationality and evident in the dot-com bubble.

Model 5 on BHAR dependent on institutional environment, unveiled PE-sponsored IPOs in strong continental European environments to outperform their non-PE-sponsored peers at 12 and 36 months. This observation was the most consistent of all three institutional categorisations. It shall be considered that strong is underweighted in the analysis, suggesting a fairer weight distribution might have led to an even superior BHAR for PE-sponsored observations. On the vertical aspect, in general, PE-sponsored observations in 'strong' exhibited the strongest performance, while their peers in 'moderate' exhibited the weakest performance. Interestingly, PE-sponsored IPOs in 'strong' exhibited an initial underperformance relative to moderate and mild at 6 months. While the operational efficiency argument explains the horizontal outperformance, it does not explain the vertical performance difference.

To rationalise the intra-environment differences, geographic corporate governance, and financial market differences have to be considered. A part of the possible explanation for superior performance in 'strong' might be deduced from substantial stakeholder participation in the ensuring sustainable economic value-creation in the pre-listing period. The capital markets of 'strong' are considerably less liquid, and the weaker investor protection has led to less fragmentation of ownership (Edmans, 2014). For example, a study found 34% of listed European companies to have two or more large shareholders, defined as at least 5% ownership (Laeven & Levine, 2007). Concentrated ownership has two implications; firstly, managerial agency is less of an issue and, secondly, the share of well-informed investors is higher. Thus, investors in strong are less likely to initially over-value an IPO and subsequently less likely to divest their position. This explains why PE-sponsored IPOs in strong underperform the other categories at 6 months while outperforming at 12 and 36 months, in general.

However, according to this hypothesis, PE-sponsored IPOs in mild should exhibit the worst long-run performance, which is not the case. This clearly indicates that the relationship is non-linear and the influence of lurking variables, not captured by the model of this thesis. One such variable could be differences in specific country-risk, or in the context of this thesis geography specific risk. For example, the countries categorised as moderate have substantially greater diversity compared to the other categories, which are more clustered geographically. This unlocks the opportunity for future research to design a more well-tuned categorisation and include additional institutional dependent variables to capture such risk factors.

Model 6 on the explanatory function of pre-IPO company fundamentals on BHAR, interestingly found counter-intuitive evidence, as the explanatory function of company fundamentals was completely insignificant at 6 months for both samples. Intuitively, one should expect that the performance of companies should be correlated with at least some company fundamentals at 6 months since they are good indicators of contemporary performance. Nonetheless, the observation indicates that investors greatly value expectations on future performance relative to actual performance at 6 months. This could be linked to initial investor over-optimism, explored throughout this thesis. In addition, Model 6 found the natural logarithm of revenue and issue size as well as asset turnover to have significant explanatory function for long-run performance at 12 months for PE-sponsored IPOs. This might be an indication that the influence of expectations settles over time and that tangible performance indicators regain importance in the valuation of companies. As expected, pre-listing company fundamentals have insignificant explanatory function at 36 months, simply rationalised by the fact that 36 months old performance indicators are outdated. Nonetheless, the R^2 and adjusted R^2 are tremendously small, indicating an extremely poor fit of the multivariate regression model. This factor has to be considered when inferring on Model 6. Additionally, the underlying data for this analysis exhibited considerable size-bias; thus, these observations might be less relevant for small IPOs.

However, why is the natural logarithm of revenue and issue size as well as asset turnover correlated with the market valuation of the company at 12 months? Revenue is a variable often associated with the size of an entity and has a positive coefficient. This could be indicatory of that revenue captures the superior performance of large cap companies relative to growth companies. Size is often an indicator of financial robustness, which investors seemingly value. Issue size has a negative coefficient, which indicates that the capital markets negatively value large issue sizes. A possible explanation for

this is that issue size is positively correlated with the fragmentation of ownership, which has profound negative consequences for the operational efficiency of a company. Asset turnover also has a negative coefficient, which can be explained by the fact that the measure is negatively correlated with asset intensity. Asset intensity is considered a measure of financial robustness in terms of collateral by shareholders and creditors. Thus, companies with high asset turnover are often considered riskier, which is something risk adverse investors dislike.

6.1 Implications

This subsection will address the main implications of the findings for investors, private equity firms and legislative constituencies.

Firstly, the evidence found in this thesis suggests that PE-sponsored IPOs, on average, deliver a significantly superior long-run abnormal return relative to market indices and non-PE-sponsored IPOs in continental Europe. The risk-return differences of PE-sponsored IPOs seem to be the largest of all asset categories in this thesis. Therefore, the rational investor with a long-term horizon in capital markets, should identify and request shares in PE-sponsored companies during the listing process. However, if the rational investor has a short-horizon and is risk-seeking, they should invest in non-PE-sponsored IPOs, as they have the greatest underpricing followed by a period of investor irrationality and high-volatility, as suggested by theoretical frameworks. Taking a more granular approach, investors in PE-sponsored IPOs could preferably consider investing in non-traditional private equity industries, as we found a considerable portion of the outperformance was derived from these. However, which exact non-traditional industries remain to be explored by future research. The rational investor should focus his or her investments on large PE-sponsored companies, despite delivering a comparable return to smaller PE-sponsored companies, the risk-return margin is greater. Lastly, the rational investor with a long-term horizon should request shares in PE-sponsored IPOs in geographies with strong continental European institutions, while avoiding geographies with moderate continental European institutions.

The findings of this thesis are encouraging news for the continental European private equity industry, at least in strong and mild institutional environments. The findings suggest that the private equity industry has been able to adapt its modus operandi into assigning greater emphasises on long-term

and sustainable economic value-creation, at least in the case of portfolio companies suitable for an IPO. Whether this adaption is willingly, unwillingly, or a combination of the two, is a question for future research to investigate. Nonetheless, the evidence provides much needed support from academia to the private equity industry, which has been heavily criticised for its methods, especially in continental Europe. The rigid evidence for superior operational efficiencies in PE-sponsored companies, found in this thesis, is the argument the industry often lacked in their quest for legitimizing its existence and 'claim to fame'. However, one should remember, the findings of this thesis are based on a fraction of private equity activity, and this fraction is unique in its characteristics and has few similarities to the vast majority of private equity activity. Therefore, the encouraging evidence of this thesis is not the definitive evidence on the role of the private equity industry in the economy, as the findings are constrained in inferability outside the fraction.

Interestingly, it was found that PE-Sponsored IPO performance delivered the greatest abnormal returns in legislative constituencies with strong or mild continental European institutions. These legislative constituencies are in the sample considered to be the extremes of the spectrum. This observation suggests, ignoring the geography-specific risk for a moment, that certain legislative combinations or policies on bank-centred financial markets, stakeholder protective corporate governance mechanisms and weak investor protection can lead to sustainable long-run economic value-creation by private equity firms. Likewise, other combinations might disincentivise or hinder private equity firms in focusing on long-term sustainable value, as in the Anglo-Saxon world. It is difficult with the analyses of this thesis, to suggest which set of policies would encourage sustainable long-term value-creation. However, legislators should be reminded that their policies, individually and in aggregate, have widespread consequences for how the private equity industry adjusts its modus operandi, willingly or unwillingly. The legislative aspect leaves an intriguing aspect for future studies to explore the impact of policy decisions, individually and in aggregate, on the private equity industry in continental Europe.

6.2 Strengths and Weaknesses

This section will outline the main strengths and weaknesses of this thesis to inform the reader about the qualities and potential pitfalls of the findings. Firstly, the main strengths will be explained and, afterwards, the main weaknesses will be explored.

A primary strength of this thesis is derived from its multinational perspective on PE-sponsored IPOs in continental Europe. Never before has continental Europe been considered a uniform constituency in such empirical studies, despite increasing integration, alignment, and interconnectedness between the individual countries. In extension, recent decades have witnessed the integration of financial markets, an internal market, and a homogenisation of legislation. Therefore, a natural extension in academia on private equity research is to initially consider continental Europe as a single constituency, as sizeable cross-border private equity activity is present in continental Europe (Alhorr, Moore, & Payne, 2008; Meuleman & Wright, 2011). Considering continental Europe as a single entity has significantly decreased a number of lurking variables arising from cross-border private equity and IPO activity. Thus, the multinational approach has, in addition to providing an interesting geographical focus, helped achieve more vigorous findings. The multinational approach has also allowed for a granular analyses, scrutinising the influence of industries, size, and institutional environments. This has allowed for a nuanced and in-depth discussion on long-run abnormal PE-sponsored IPO performance, which leaves the reader with multi-perspective insights into the topic.

The multi-perspective approach is another considerable strength of this thesis. The lion's share of international empirical studies on this topic have studied long-run abnormal performance and underpricing from a single perspective, while few have tried to investigate their findings in several perspectives. The inclusion of the institutional environment as a factor in the context of long-run abnormal performance is a unique new perspective, with an extraordinary explanatory function. The initial results of including financial market structure and corporate governance mechanisms yielded some intriguing conclusions, which unlocks a tremendous opportunity for future research to in-depth explore the influence of other institutional variables on long-run abnormal performance and the behaviour of private equity firms. Nevertheless, this new perspective provides academia with a novel approach for evaluating the economic value-creation methods of private equity firms. Understandably, empirical studies constrained to, for example, the UK will most likely add value from an institutional approach. However, the approach could, with considerable academic output, be applied to the USA, where differences in state-level taxation, corporate governance, and financial markets are present.

Lastly, the robust statistical methodology and transparency applied throughout this thesis is regarded as a strength. Rarely have studies in continental European countries had large enough sample sizes to

conduct in-depth and granular analyses on the performance of PE-sponsored IPOs before. With a sample size of 1054 IPOs, including 231 PE-sponsored, across three geographical categorisations, this study has by far one of the largest sample sizes of all empirical studies on IPO performance and the influence of sponsorship in continental Europe. The importance and deducted strength of an adequate sample size is exponentially highlighted, especially when considering the nature of financial data, which is subject to great behavioural influence. The underlying data of this thesis exhibited considerable skewness forcing the adoption of non-common t-statistics models, such as the skewness adjusted t-statistics with bootstrapped p-values applied in this thesis. As discussed in the analysis section, such models require larger sample sizes to obtain statistically significant and meaningful results. For the multivariate regressions, weight was placed on avoiding imperfect multicollinearity, heteroskedasticity, and error normality. Throughout the statistical modelling, emphasis has been on transparency, to ensure the possibility of replicative studies. In sum, the statistical methodology has been selected with careful consideration to deliver resilient empirical results for inference.

A considerable weakness of this thesis is related to the constrained scope of inferences due to the nature of the underlying data. As clarified throughout the thesis, and as delimited in the delimitation section, only a fraction of all private equity exits occur through IPOs. As consequence, the observed evidence for long-run abnormal performance of PE-sponsored companies, explained by the operational efficiency argument, is constrained to this divestment method. Thus, this thesis cannot deduct meaningful inferences on the continental European private equity industry as a whole. Neither can it be argued, based on the presented evidence, that the existence of proprietary operational efficiencies is present throughout the vast majority of the industry.

Another weakness to be mindful of, is the persistent size and location related biases in the data set, despite efforts to eliminate them. Europe, in general, is a geography with relatively low private equity activity, which means that data intelligence companies do not prioritise in-depth coverage of this area. As consequence, the Iberian Peninsula is considerably ill-represented across the samples. More worryingly, Germany, the main economic hub of continental Europe, is also ill-represented in the non-PE-sponsored sample. Additionally, a bias towards smaller IPOs is present in the data set, as data intelligence companies neglect their coverage in favour of larger IPOs. Thus, when utilising the findings of this thesis, the reader shall be mindful of these pitfalls, despite vigorous attempts to mitigate them in the statistical models.

7. Conclusion

How does PE-sponsorship affect the long-run economic value of portfolio companies in continental Europe?

The above research question has been the main motivator of this master thesis. It has been the influential guideline, and operator of every analytical model developed, executed, and reviewed in respect of the established theories on PE-sponsorship, IPO performance, and institutional paradigms. In this section, conclusive remarks on the research question and the product of this thesis will be provided.

In conclusion, this thesis determines that PE-sponsorship is associated with superior long-run economic value contribution in portfolio companies, relative to other sponsor identities. The empirical models produced rigid results in favour of the abnormal long-run IPO performance when the listed company was PE-sponsored. Deductively, this observation is supportive of the operational efficiencies argument of the Jensen hypothesis. This result, predicted by several theoretical frameworks, is in sharp contrast to the lion's share of research in academia, which has frequently focused on Anglo-Saxon constituencies. PE-sponsored observations were also found to be less underpriced on the first trading day. This indicates PE-sponsored observations to be associated with less information asymmetry and high-quality companies.

In addition, the empirical models of this thesis found evidence for the ability of homogenous economic value-creation by private equity firms, as the size-dependent difference in long-run abnormal performance was statistically insignificant. In contrast, the size-dependent long-run abnormal performance of non-PE-sponsored observations exhibit significant variations. This observation further strengthens the validity of the operational efficiencies argument and the adjusted modus operandi of private equity firms in continental Europe. Furthermore, it was discovered that the industry scope of the private equity industry in continental Europe had expanded steadily to include technology-enabled industries. Moreover, it is abstracted that the private equity industry has an exceptional ability to create long-run value in these new industries, as the abnormal performance of traditional industries were relatively vague. Finally, it was discovered that the institutional environment is a sizeable determinant of the long-run value-creation and modus operandi of the private equity industry. Most interestingly, private equity firms from institutional constituencies with the strongest stakeholder

protective legislations and bank-centred financial markets exhibited the most consistent abnormal long-run performance, while constituencies with hybrid institutions experienced the weakest abnormal long-run value-creation. This is indicatory of that certain policies are able to stimulate sustainable long-run value-creation while others incentivises short-run shareholder value-maximisation, within the continental European institutional framework.

Lastly, in an effort to understand the methods investors utilise to value new listings dependent on sponsorship, a number of multivariate regressions were operationalised. These models found the 6 months valuation of new listings to be driven by investor optimism independent of sponsorship, while 12 months valuation of PE-sponsored listings converged towards certain tangible company fundamentals. Interestingly, the 12 months valuation of non-PE-sponsored companies did not, indicating a significantly higher level of associated investor irrationality. This observation is likewise confirmative of several established theoretical frameworks.

In sum, this master thesis researched a relatively unexplored aspect of the economic value contribution of private equity principals, while introducing new perspectives to the discussion in academia and society. In an extension of the methodology, the product of this thesis has been insightful, novel, and thought provoking. The thesis has been clear on the methodological limitations of the research design while providing suggestions on improvements and perspectives for future research. The findings of this thesis have positive implications for the legitimacy of the heavily criticised private equity industry and its 'claim to fame'. Moreover, financial investors and legislators can, with benefit, derive insights from the conclusions of this master thesis on the economic value contribution of private equity sponsorship.

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Appendix

Appendix 1: IPO Performance Studies in Europe

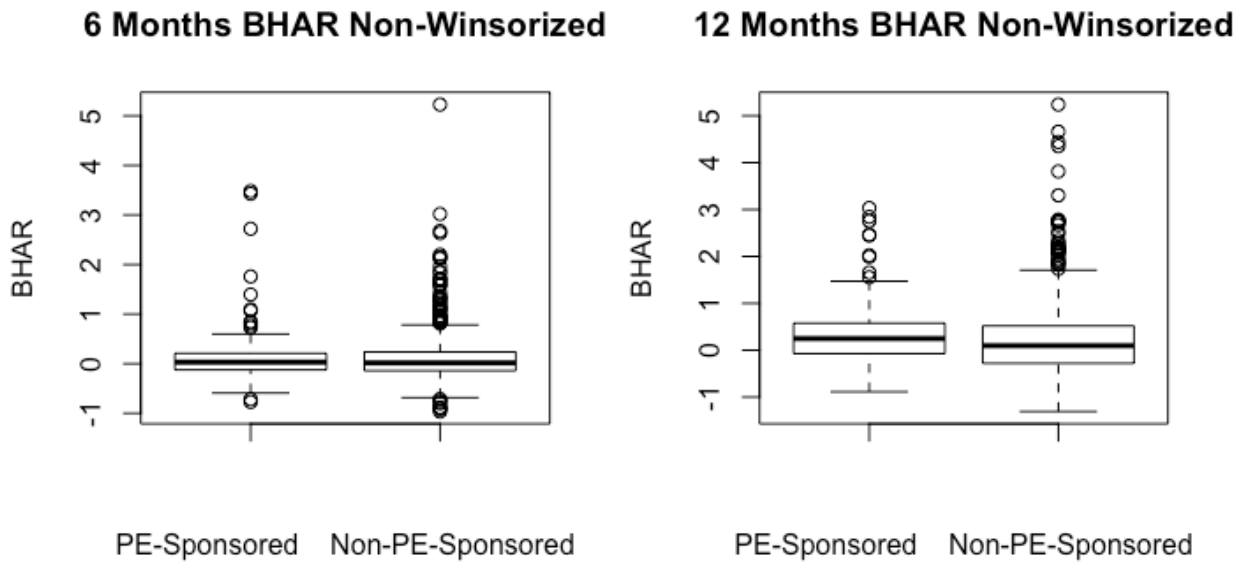
Country	Author	Sample Period	Sample Size	Months	Abnormal Returns
Austria	Aussenegg (1997)	1984-1996	51	60	-74.0%
Denmark	Jakobsen & Sorensen (2001)	1984-1992	76	60	-30.4%
Finland	Keloharju (1993)	1984-1989	79	36	-21.1%
France	Leleux & Muzyka (1997)	1987-1991	56	36	-30.3%
France	Derrien & Womack (2003)	1992-1998	264	24	-6.3%
Germany	Schlag & Wodrich (2000)	1884-1914	163	60	-7.8%
Germany	Schmit et al. (1988)	1984-1985	32	12	-10.2%
Germany	Uhlir (1989)	1977-1986	70	15	-11.9%
Germany	Wittleder (1989)	1961-1987	67	12	-4.0%
Germany	Ehrhardt (1997)	1960-1990	160	36	-5.2%
Germany	Hannson & Ljungqvist (1992)	1978-1991	162	20	-1.9%
Germany	Ljungqvist (1997)	1970-1993	145	36	-12.1%
Italy	Giudici & Paleari (1999)	1985-1995	84	36	-2.6%
Portugal	Almeida& Duque (2000)	1992-1998	21	12	-13.8%
Spain	Alvarez & González (2005)	1987-1997	37	36	-27.8%
Sweden	Loughran, Ritter & Rydqvist (1994)	1980-1990	162	36	1.2%
Switzerland	Kunz & Aggarwal (1994)	1983-1989	34	36	-6.1%
Switzerland	Drobetz & Kammermann (2002)	1983-2000	120	14	-6.8%
UK	Levis (1993)	1980-1988	712	36	-8.1%
UK	Leleux & Muzyka (1997)	1987-1991	220	36	-19.2%
UK	Espenlaub, Gregory & Tonks (2000)	1985-1992	558	60	-21.3%
UK	Brown (1999)	1990-1995	232	36	-20.1%
UK	Kurshed, Mudambi & Goergen (1999)	1991-1995	240	36	-17.8%

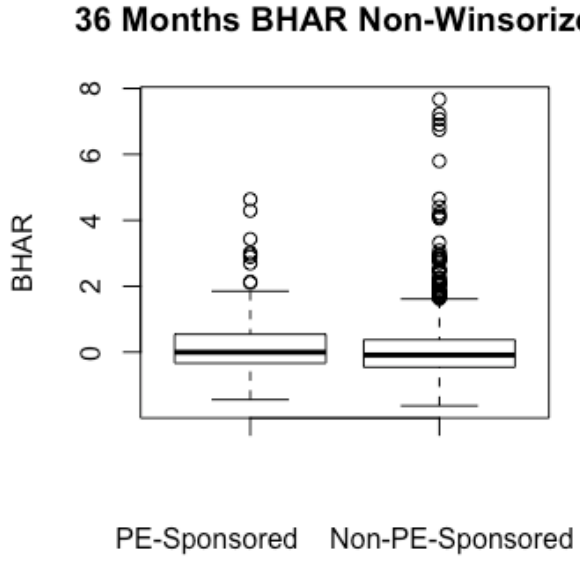
Source: (Jaskiewicz et al., 2005)

Appendix 2: Countries by Institutional Environment

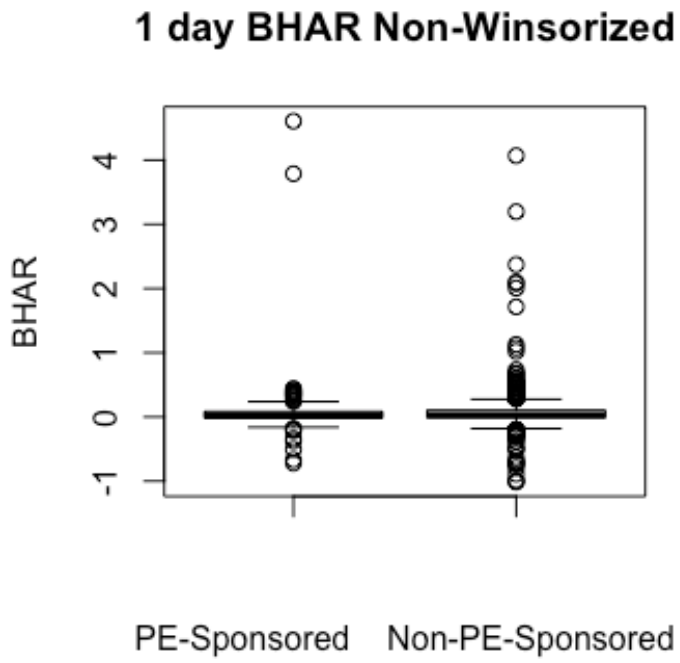
strong	moderate	mild
Austria	Denmark	Belgium
Luxembourg	Norway	France
Germany	Portugal	Finland
	Spain	Italy
	Switzerland	Netherlands
		Sweden

Appendix 3: Non-Winsorized Boxplots for 6, 12, 36 Months BHAR





Appendix 4: Non-Winsorized Boxplot for 1 day BHAR



Appendix 5: Breusch-Pagan Test

Breusch-Pagan	BP	P-value	Scedasticity
PE-Sponsored			
6 months BHAR	3.0305	0.6953	Homo
12 months BHAR	5.9136	0.3147	Homo
36 months BHAR	9.8743	0.0789	Homo
Non-PE-Sponsored			
6 months BHAR	7.4091	0.1919	Homo
12 months BHAR	12.462	0.0289	Hetero
36 months BHAR	3.4486	0.6312	Homo

Breusch-Pagan test for heteroskedasticity

Appendix 6: Correlation Tables

PE-Sponsored Sample	Log(Revenue)	EBITDA	Net Income	Log(MktCap)	Log(IssueSize)	Log(LevRatio)	Asset Turnover	Log(Assets)	Log(Debt)
Log(Revenue)	1								
EBITDA	0.501	1							
Net Income	0.280	0.619	1						
Log(MktCap)	0.669	0.589	0.334	1					
Log(IssueSize)	0.678	0.410	0.179	**0.896**	1				
Log(LevRatio)	-0.493	-0.314	-0.134	-0.011	-0.103	1			
Asset Turnover	0.255	-0.099	-0.001	-0.148	-0.087	-0.161	1		
Log(Assets)	**0.876**	0.597	0.308	**0.815**	**0.792**	-0.439	-0.079	1	
Log(Debt)	**0.761**	0.512	0.223	**0.708**	0.685	-0.394	-0.029	**0.840**	1

Non-PE-Sponsored Sample	Log(Revenue)	EBITDA	Net Income	Log(MktCap)	Log(IssueSize)	Log(LevRatio)	Asset Turnover	Log(Assets)	Log(Debt)
Log(Revenue)	1								
EBITDA	0.258	1							
Net Income	0.354	0.172	1						
Log(MktCap)	0.186	0.178	-0.039	1					
Log(IssueSize)	0.165	0.135	-0.076	**0.872**	1				
Log(LevRatio)	-0.558	-0.144	-0.375	0.487	0.435	1			
Asset Turnover	0.137	-0.013	-0.041	0.139	0.135	0.091	1		
Log(Assets)	**0.755**	0.257	0.367	0.139	0.109	-0.609	-0.170	1	
Log(Debt)	0.520	0.208	0.258	0.234	0.217	-0.341	-0.122	**0.716**	1