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AGENCY COST OF DRY POWDER AND BUY-AND-BUILD STRATEGIES IN THE PRIVATE EQUITY INDUSTRY

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FOREWORD

This Master's Thesis on the agency cost of dry powder and buy-and-build strategies in the Private Equity industry is the culmination of our studies in Business Economics - Corporate Finance. During this period of four years, we had the privilege to get to know a lot of smart, talented and ambitious people for which we are very grateful. This experience has formed us into the people we are today.

Hundreds of hours of reading, writing, discussion and meetings have gone into this thesis- by far our most extensive project to date. The end result would not have been possible without Professor Doctor Mathieu Luypaert and Doctoral Researcher Gianni Spolverato, both excellent LPs in this project. We would like to express our gratitude for your extensive guidance, quick and comprehensive feedback and at last, to give us the opportunity to study a subject that continues to fascinate us both. Finally, thank you to our families for their continuous support throughout all these years.

We hope you enjoy reading this thesis as much as we enjoyed the work that led to it.

Marco Tinck

Viktor Verheyen

Ghent, June 2022

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LIST OF FREQUENTLY USED ABBREVIATIONS

Abbreviation	*Definition*
AFT	Accelerated Failure Time
AUM	Assets Under Management
GP	General Partner
IPO	Initial Public Offering
LBO	Leveraged Buyout
LP	Limited Partner
M&A	Mergers & Acquisitions
NPV	Net Present Value
PE	Private Equity
ROA	Return On Assets
SBO	Secondary Buyout
TA	Total Assets
TS	Trade Sale
UK	United Kingdom
VC	Venture Capital

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1. Introduction

Albeit a couple of disruptive years, the Private Equity (PE) industry remained relatively unscratched. The PE industry generated $1.1 trillion in global buyout deal value, which doubled 2020's total of $577 billion and crushed the old record of $804 billion in global buyout deal value in 2006. The number of $1 billion-plus deals surged, helping to increase average deal size by 57% (see Bain&Company, 2022). Assets Under Management[1] (AUM) held by buyout funds comprised 41% ($1.7 trillion) of global PE AUM in 2020 ($4.1 trillion) (see Bain&Company, 2021). PE investments and later-stage Venture Capital (VC) play a crucial role in enhancing performance, reviving and sustaining the growth and employment of their targeted companies (Gilligan & Wright, 2014). In times of this all-time high AUM, PE funds are bursting with uninvested, committed capital, referred to as *dry powder*. The industry's mountain of dry powder in 2021 has risen to $3.4 trillion globally, a new record, with approximately $1 trillion in buyout funds alone (see Bain&Company, 2022). This leads to increasing pressure on private equity firms to do more deals.

How the PE firm's active role as an investor (owner) drives performance changes in their portfolio firms (buyouts) has been conveniently explained by application of the agency theory perspective (Wilson, Amini, & Wright, 2022). PE firms have a 'dual identity' in a buyout transaction, both acting as an *agent* and *principal* in their relationships with investees, Limited Partners (LPs) and banks (Manigart & Wright, 2013; Meuleman, Wilson, Wright, & Neckebrouck, 2020; Pratt & Foreman, 2000; Wilson et al., 2022). With the help of agency theory, Arcot, Fluck, Gaspar, & Hege, (2015), Axelson, Jenkinson, Strömberg, & Weisbach, (2013) and Degeorge, Martin, & Phalippou (2016) show that when access to financing in forms of dry powder or debt is abundant, PE firms start to make less efficient investment decisions. The question arises if this phenomenon would also apply to investments made by their portfolio firms when looking at inorganic growth strategies. Concrete, this study intends to examine *if abundant PE dry powder facilitates add-on acquisitions by portfolio companies of PE funds.*

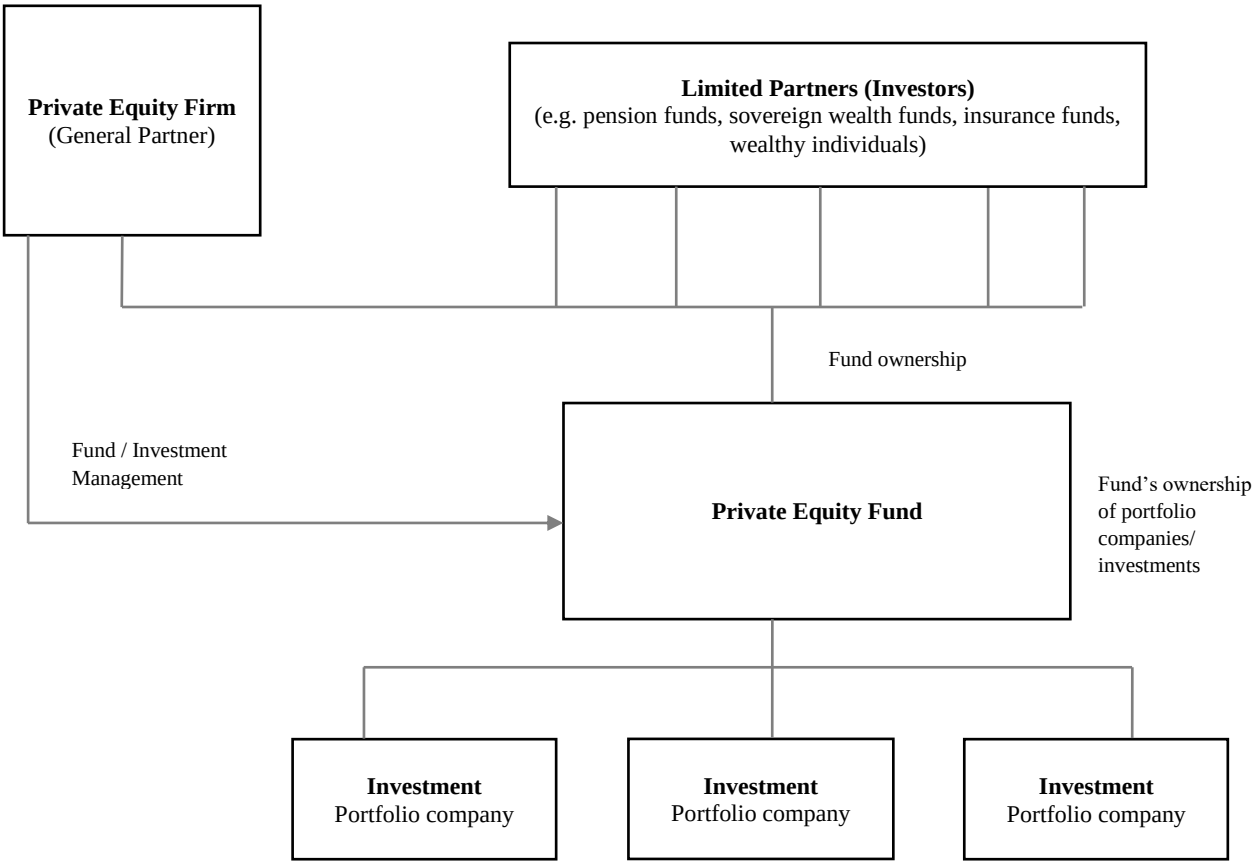
Ever since the seminal piece on PE of Jensen (1989), private equity and its various subjects received great interest from researchers and policymakers all over the world (Castellaneta & Gottschalg, 2016; Kaul, Nary, & Singh, 2018). Some studies shed light on the business model of PE firms such as Kaplan (1989) and Kaplan & Strömberg (2009). Hammer, Knauer, Pflücke, & Schwetzler, (2017) investigate inorganic growth strategies in PE buyouts and the evolution of the private equity business model, while Gompers, Kaplan, & Mukharlyamov (2016) survey PE investors about practices such as firm valuation and capital structure in order to get an insight on how PE firms operate. Other articles such as Harris, Jenkinson, & Kaplan (2014) examine the performance of private equity relative to public markets, whilst Guo, Hotchkiss, & Song (2011) focus on the question whether buyouts still create value. Bansraj, Smit, & Volosovych (2020), Cohn,

[1] AUM is the total market value of the investments that an entity manages on behalf of its clients

Hotchkiss, & Towery (2022), Giot, Hege, & Schwienbacher (2014) and Hotchkiss, Smith, & Strömberg (2021), all examine different aspects related to the investment strategy of PE firms.

PE firms are typically organised as a partnership or limited liability corporation. A PE firm raises capital through a private equity fund. Most of these funds are closed-ended funds, which means that once the predetermined amount of capital is raised, fundraising is closed. The investors in this fund have consequently committed themselves to provide a certain amount of money, which is used for making investments. Closed-ended funds are normally organized as limited partnerships, consisting of a General Partner (GP), who manages the fund and makes the investment decisions, and the Limited Partners (LPs) such as institutional investors and wealthy private individuals, who have contributed the money, but cannot influence investment decisions. The lifetime of a PE fund consists of a subscription period i.e., a fixed period to raise all the cash, the investment period i.e., the period in which the GP is allowed to call capital from LPs for investments, which is usually three to five years, assuming the fund has a ten-year life overall, and the harvesting period i.e., the period where the fund investments are exited. This is called the *drawdown and distribution model* (Phalippou, 2021). Usually, the GP of the PE fund also makes a personal investment in the fund, which is called the GP commitment. Fig. 1. graphically depicts the structure of a PE fund.

Fig. 1. Private equity fund structure.



The GP of a PE fund manages the fund thus needs to be compensated accordingly. Private Equity firms make money in several ways. First, the GP earns a *management fee*. The management fee is a periodic payment the manager receives from its LPs for managing the PE fund. Usually, the management fee is calculated as a percentage of capital committed during the investment period, and as a percentage of capital employed (costs of the active investments in the portfolio) after the investment period (Alemany & Andreoli, 2018). Metrick & Yasuda (2010) report that 84% of buyout funds switch the method of management fee computation from committed to invested capital between the investment and divestment period. Additionally, Metrick & Yasuda (2010) show that approximately two-thirds of the present value of GP commitments results from management fees. Second, the GP typically earns a particular percentage of the profit made on the investment, referred to as *carried interest*. Carried interest almost always equals 20%. However, the GP will only receive that carry when he or she is able to return the initial investments of the LPs plus a hurdle rate i.e., preferred return of the LPs. Finally, *deal and monitoring fees* are sometimes charged to the companies in which are invested (Kaplan & Strömberg, 2009). Consequently, the level of dry powder impacts the first two components of the GP compensation, resulting in the following *trade-off*: a high level of dry powder at the end of the investment period means that GPs forgo management fees after the switch, but still have the option to invest if better opportunities in the future arise, which positively influences the fees resulting from the carried interest. On the other side of the spectrum, GPs maximise their management fees in the harvesting period by spending their entire committed capital by the end of the investment period, but this might have a negative effect on the fees resulting from the carried interest if money is invested in inferior deals and the option to invest later has disappeared (Lambert, Scivoletto, & Tykvová, 2022).

Typically, PE buyers finance investments using a small portion of equity, which stems from the capital committed ex ante at the fund inception. Additionally, 50-70% of the deal value is, on average, financed by debt (Jenkinson, Kim, & Weisbach, 2021). Hence, this type of transaction is called a *leveraged buyout* (LBO). PE firms use a variety of mechanisms in order to create value for their LPs through LBO transactions. Traditionally, the PE business model has merely relied on governance improvements, financial engineering and buying low/selling high as levers of value creation (Berg & Gottschalg, 2005; Jenkinson, 2018; Kaplan & Strömberg, 2009). Private equity firms are experts in the restructuring of targets (Demiroglu & James, 2010), improve corporate governance (Acharya, Gottschalg, Hahn, & Kehoe, 2013), or can obtain debt at a lower cost than strategic buyers due to existing relationships with banks (Ivashina & Kovner, 2011). However, as argued by Braun, Jenkinson, & Stoff (2017), financing and valuation techniques have been commoditized, adding heavy competition and leading to soaring purchase prices causing the PE model to evolve with operational value creation at the forefront of the new PE business model (PwC, 2015). Increased competition and soaring purchase prices impact the potential of PE firms to generate excess returns (Axelson et al., 2013). Achleitner, Braun, Engel, Figge, & Tappeiner (2010) find that about two-thirds of value creation can be attributed to market and operational effects, while the leverage

effects account for the remaining third. Operational value creation sources have evolved as well. According to the survey used in Gompers et al. (2016), increasing revenue i.e., organic growth, is the most frequently mentioned source of value (in over 70% of deals) identified by PE investors, while reducing costs only accounts for 36%. Gompers et al. (2016) suggest the possibility of a shift in emphasis from the cost-cutting and agency reduction emphasized in Jensen (1989), as growth seems to be more important than reducing costs. Biesinger, Bircan, & Ljungqvist (2020) provide systematic evidence on the content of value creation plans[1] and whether they help improve investor returns or company operations by using confidential information of pre-deal investment memos, investment committee presentations and post-investment reports. They report that buyouts are typically focused on optimizing capital structure, changing the product or service mix, pursuing inorganic growth and replacing senior and middle management.

GPs are increasingly relying, as aforementioned, on *buy-and-build* strategies i.e., inorganic growth, to productively deploy the committed capital. Typically, it involves buying an initial portfolio company serving as a platform, building its scale and scope through bolt-on acquisitions[2] and organic growth with the eventual goal of integrating and exiting the combined entity (Bansraj et al., 2020). The platform acquisition allows the PE owner to create a foothold in a particular market and leverage to expand product offerings, the customer base or geographic outreach, Smit & Moraitis (2010) argue. Major levers for value creation are the integration of operations, cost efficiencies and increasing market share. Next to the as aforementioned value creation levers that exist, PE firms can exploit this operating synergy potential that exists between the platform and its bolt-on acquisitions (Hammer, Janssen, Schweizer, & Schwetzler, 2021). Occurrence of this buy-and-build strategy is more likely in industries with high levels of fragmentation, with no clear market leader and the availability of add-on targets with standalone value underperformance (Bansraj & Smit, 2017; Smit, 2001). Brown, Dittmar, & Servaes (2005) provide a potential explanation for the finding that buy-and-builds tend to occur in fragmented industries. PE firms can avoid antitrust concerns by investing in fragmented industries and, additionally, can rely on a plethora of potential targets. In that case, fragmented industries of substantial size are consolidated, similar to roll-up transactions, using buy-and-build as a vehicle (Brown et al., 2005). Borrell & Heger (2013) add to the buy-and-build literature by identifying the value-enhancing potential, indicating that increased efficiency of assets to generate sales mainly drives the improved performance after buy-and-builds. Concerning the add-on acquisitions done by platforms under PE ownership, evidence shows that PE funds prefer quantity over complexity (Hammer, Hinrichs, & Schwezier, 2016). Since PE firms envision synergistic value creation in buy-and-build strategies, PE firms are willing to pay a significant premium, similar to the premium paid by strategic buyers, when the platform serves for future add-on acquisitions (Hammer et al., 2021). While in 2003, 21% of all add-on deals represented at least the fourth acquisition by a single platform company, that proportion grew to roughly 30% in more recent years (see Bain&Company, 2019). Earlier it

[1] Existence noted in Kaplan and Strömberg (2009)
[2] Throughout this thesis, the terms ‘add-ons’, ‘follow-ons’ and ‘bolt-ons’ are used interchangeably when referring to inorganic growth strategies

was noted that private equity firms typically engage in a type of transaction called *leveraged buyout*. This is also the case when looking at inorganic growth strategies, the platform as well as the add-on acquisitions are usually financed with significant amounts of debt. Thus, buy-and-builds are also known as *leveraged build-ups* (Borell & Heger, 2013). Various studies report that inorganic growth strategies outperform standalone deals in terms of multiples and margins (Acharya et al., 2013), and returns (Nikoskelainen and Wright, 2007). Whether the buy-and-build strategy delivers on the premise of long-term growth lacks the systematic evidence in the literature (Bansraj et al., 2020). Critics argue that these transactions are used just to raise more capital, window dress track records or as justification to spend already committed capital (Morris & Phalippou, 2020). In this thesis, a buy-and-build strategy is defined as *a hybrid strategy that combines the deal structure of LBOs with the long-term synergy focus of serial acquisitions of strategic buyers* (Bansraj et al., 2020).

The success of a PE firm depends on its ability to realize a return on its investments by determining the most suitable exit avenue. Invested funds are in principle returned to the LPs and reputation is being built, based on how the GPs have lived up to the LP's return expectations. There are four possible exit routes (besides bankruptcy) (Phallippou, 2021). The most prevalent exit route is a *Trade Sale (*TS) i.e., the sale of company shares to industry investors. Industry investors are usually motivated by synergies and economies of scale, and thus willing to pay a premium. The second most common exit route is the *Secondary Buyout* (SBO) i.e., the sale of a company to a financial buyer, which is usually another PE firm. SBOs often come across as the preferred exit avenue for funds under pressure, as there are lower search costs (since PE-owned companies are publicly known) and lower adverse selection problems (portfolio firms of PE companies are a priori up for sale) involved (Arcot et al., 2015; Degeorge et al., 2016). A third exit avenue available to PE firms is the *dividend recapitalization*, allowing the shareholders to exit partially by having the company borrow money to pay a large dividend. The additional borrowing typically occurs early in the life of the investment, permitting returning an amount similar to what the investors had put in the deal. The fourth possible exit channel is the *Initial Public Offering* (IPO) i.e., registration and sale of the portfolio company's shares on a stock exchange. This exit route is also a partial sale as only some of the shares are sold due to the occurrence of lock-up periods.

This thesis is an attempt to bridge two strands of literature regarding PE, the first of which analyses the behaviour of PE- acquired companies, and the second which examines the agency issues of excess cash in PE firms. This is done by focusing on the following questions: (1) Are PE portfolio companies more likely to engage in add-on acquisitions if the fund still has high levels of excess dry powder? (2) Are portfolio companies more likely to engage in add-on acquisitions if the fund is at the end of its investment period and still has high levels of excess dry powder? (3a) Are add-on deals of portfolio companies executed with high levels of excess dry powder larger than other deals? (3b) Are add-on deals of portfolio companies with high levels of excess dry powder executed faster than other deals?

These questions are analysed using a comprehensive sample of 603 buyouts, spanning 19 years of buyout activity between 1997 and 2015 in the United Kingdom. 286 deals are observed with at least one and up to 29 consecutive add-on acquisitions and, in sum 680 add-on acquisitions during the sample period. Several fixed effects regression models and a parametric Accelerated Failure Time (AFT) model are estimated to analyse the hypotheses as set forth in this thesis. Findings in this study include the observation that PE firms with high levels of excess dry powder are more likely to engage in inorganic growth strategies when they are at the end of their investment period. When nearing their investment period, PE firms with lots of committed capital to spend will result to inorganic growth strategies to productively deploy that capital due to the lower search costs and reduced information asymmetry prevalent in inorganic growth strategies. Furthermore, targets in add-on deals executed with high levels of excess dry powder are found to be larger than in other deals, confirming the hypothesis that GPs prefer investing in larger deals to reduce the abundant dry powder. Lastly, the speed at which the first add-on acquisition is made, significantly accelerates when the respective PE firm has high levels of excess dry powder. However, due to mixed findings in this study, only partial support is found for this hypothesis.

Several contributions are made to the existing research. First, this thesis primarily adds to the literature on agency costs caused by the PE business model by focusing on the role of dry powder. The literature examining the direct effects of dry powder is scarce (Arcot et al., 2015; Degeorge et al., 2016; Lambert et al., 2022). A broader focus in this study is provided by studying inorganic growth strategies. General deal distortions for LBO deals are investigated. To the best of our knowledge, these agency costs have only been analysed at PE investment level i.e., buyout, but not yet how it impacts the decision-making of portfolio firms concerning bolt-on acquisitions. Using a unique dataset of 603 buyouts and 680 add-on acquisitions, the findings improve the understanding of the relationship between dry powder and the occurrence of buy-and-build strategies. Second, literature that describes the agency costs of cash in Mergers & Acquisitions (M&A) concentrates predominantly on the acquiring firm level, a consideration at the shareholder level has been lacking. This consideration is provided by this study. Finally, this thesis adds to existing literature regarding private equity firms participating in inorganic growth strategies.

The remainder of this thesis is structured as follows. Section 2 describes the literature around agency costs in private equity and of cash in mergers & acquisitions. The hypotheses are developed in Section 3. Section 4 describes the data and presents descriptive and summary statistics. Section 5 discusses empirical results. Section 6 concludes.

2. Theoretical background

2.1.Agency costs in private equity

A vast amount of prior research into private equity has theoretically been drawn on the theory of agency relationships. Arcot et al. (2015) use agency theory to report that funds under pressure engage more in SBOs, while Axelson, Strömberg, & Weisbach (2009) focus on the financial structure of PE funds and how this impacts investment choices and performance. Axelson et al. (2013) examine the determinants of leverage and pricing in buyouts by using GP-LP agency conflicts as one potential explanation. Wright, Hoskisson, & Busenitz (2001) identify in their article different types of buyouts with one particular type being an efficiency buyout, which introduces more concentrated ownership, enhanced incentive schemes and stricter monitoring, and thereby mitigating agency problems. Jensen & Meckling (1976) define the agency relationship as a contract under which one or more persons i.e., the *principal(s)*, engages another person i.e., the *agent*, to perform certain services on their behalf, which involves delegating some decision-making authority to the agent. However, there is good reason to believe the agent will not always act in the best interests of the principal when both parties are utility maximisers. The principal can limit this problem by introducing incentives for the agent and monitoring costs to align interests between the two parties.

PE has a 'dual identity' in a buyout transaction, acting both as a principal and an agent (Arcot et al., 2015; Pratt & Foreman, 2000). The PE firm acts as a *principal* in its governance relationship with the investee (Acharya et al., 2013; Kaplan & Schoar, 2005; Manigart & Wright, 2013). The PE firm acts in the name of its shareholders to incentivize and discipline through targets, share ownership and leverage respectively the buyouts' management team i.e., the agents (Wilson et al., 2022). Meuleman et al. (2020) extend by proposing a role as *agent* for PE firms to their LPs and the banks, who arrange debt financing for their acquisitions. Meuleman et al. (2020) focus on this matter in a setting in which portfolio firms enter financial distress, a situation in which principal-agent conflicts are likely to emerge. Transactions are sometimes financed using immoderate amounts of leverage, which might result in costly financial distress. Leverage leads to increasing insolvency risks of PE-backed buyouts transactions, imposing agency costs on lenders (Wilson & Wright, 2013).

As previously mentioned, PE firms traditionally raise capital through closed-ended funds organized as limited partnerships. The LP i.e., the principal, commits to provide the majority of the capital of the fund and delegates the GP i.e., the agent, to manage the fund and invest the committed capital on their behalf. As long as basic covenants of the fund are respected, the LP has little to no control over the decision-making authority of the GP (Kaplan & Strömberg, 2009). Common covenants are related to the size, company age, type and the operating industries of the investments the fund is allowed to undertake. The LP's capabilities in the event of GP misconduct are by consequence limited and principal-agent conflicts might still provoke suboptimal investment outcomes (Arcot et al., 2015). Axelson et al. (2009) show that this widely adopted limited partnership model is the financial structure that maximises the value of the fund. Despite the optimal

contracting, personal objectives of GPs to maximise fee collection might clash with LPs' objective of profit maximisation in some circumstances, such as the accumulation of uninvested committed capital. This accumulation of large amounts of unspent fund commitments has the possibility to incentivize the GP to invest in inferior deals in order to collect higher management fees if the fund is at the end of its investment period. Arcot et al. (2015) provide evidence that pressured GPs may reflect opportunistic behaviour instead of value-maximisation. Pressured GPs (based on how close the GP is to the end of their investment period, amount of dry powder, reputation, and fundraising frequency) aim at spending the fund's dry powder, thus receiving management fees, rather than maximising value creation for the LP. Reputation effects are expected to align the economic interests of GPs and LPs. Reputation and track record of the PE firms are critical to successfully raise follow-on funds from LPs (Chung, Sensoy, Stern, & Weisbach 2012; Kuckertz, Kollmann, Röhm, & Middelberg, 2015; Meuleman et al., 2020). The performance of current investments the fund has made and the cash returned to investors will be scrutinized when deciding whether or not to provide follow-on funds (Cumming & Walz, 2010). However, follow-on funds typically raise their capital before the investment period of their previous fund has ended, causing LPs to not know what their actual returns on their initial investment will be. Additionally, information asymmetries arise by GPs only sharing basic, obligatory information for the LP, affecting the LP's ability to accurately assess the GP's performance reports (Batt & Appelbaum, 2021). In case of a conflict of interest between the financial interests of the GP and their portfolio company or fund, the GP's decision-making is expected to be dominated by their own interest and commitment as principal in the PE firm, contrary to PE's agent identity in the relationship with the LP (Batt & Appelbaum, 2021).

2.2.Agency cost of cash in mergers & acquisitions

In contrast to preserving financial flexibility and hedging against risk, company's cash reserves also bring along agency costs (Stulz,1990). Concentrating on the implications of agency cost of cash in mergers & acquisitions, literature is predominantly built on the free cash flow hypothesis developed by Jensen (1986). Following the free cash hypothesis, managers i.e., the *agents*, possessing excessive resources are more likely to engage in low/ negative Net Present Value[1] (NPV) mergers instead of paying the cash out to the shareholders i.e., the *principals*. These managers are often referred to as "empire building" managers, maximising their own personal utility from power, prestige, and compensation by growing the firm beyond its optimal size (Jensen & Meckling, 1976). Previous studies have extensively focused on the impact on performance, method of payment and sources of financing in mergers & acquisitions (Harford, 1999; Martynova & Renneboog, 2008; Renneboog & Vansteenkiste, 2019; Yang, Guaruglia, & Guo, 2017). Harford (1999) provides evidence that the likelihood of attempting diversifying acquisitions increases for cash-rich firms. Stock returns show the destruction of seven cents in value for every excess dollar of cash held by the acquiror. Extending the study conducted by Harford (1999), Oler (2008) reports that cash-rich

[1] The present value of the cash flows at the required rate of return of a project compared to the initial investment (Gallo, 2014)

acquirors perform worse in the long-term, with performance measured using accounting data and stock returns. Schlingemann (2004) finds that free cash flow negatively impacts acquiror announcement returns, using a sample of all-cash deals. A fairly recent study conducted by Gao & Mohamed (2018) provides contradictory evidence on the claim that cash-rich acquirors undertake bad acquisitions. They report that cash-richer acquirors chiefly make better acquisitions, a phenomenon particularly pronounced when the acquiror is financially constrained. Focusing on the opportunity cost of holding cash, acquirors with excess cash have a lower opportunity cost of cash retention and consequently are less selective in picking target firms, resulting in an increased likelihood of value-destroying transactions (Yang et al., 2017). Martynova & Renneboog (2008) disentangle the sources of financing from the method of payment i.e., cash, equity and mixed offers. The distinction is made between deals financed with internal funds, debt issues, equity issues or combinations of both. Consistent with the empire building hypothesis developed by Jensen & Meckling (1976), cash-rich firms are more likely to engage in deals financed with internal funds i.e., excess cash reserves, and underperform compared to debt-financed deals. A possible means of resolving the agency problem is by aligning management compensation and shareholder interest (Shleifer & Vishny, 1989). Equity-based compensation linked to firm performance is one feasible way of achieving this.

3. Hypothesis development

This thesis aims at integrating both strands of theoretical literature by examining the extent to which the agency costs of cash are transferable to the relation between the GP and its platform companies i.e., agency costs of cash at the shareholder level of the platform company. As previously mentioned in section one, PE funds are increasingly relying on buy-and-build strategies to productively deploy their committed capital. PE firms have several value creation levers at their disposal when making investments such as de-leveraging or operational and governance improvements (Gompers et al., 2016). Additionally, when pursuing a buy-and build strategy, there is an operating synergy potential the PE firm can exploit between the platform company and its add-on acquisitions (Hammer et al., 2021). Cost efficiencies and improved market power occur when integrating the operations of the platform and its bolt-on acquisitions, leading to the fact that PE firms can bank on operating synergies akin to synergies observable in horizontal M&As (Smit, 2001). A platform company provides a foothold in a new sector for the PE firm, and a significant portion of the value creation of a buy-and-build strategy is tied to follow-on investment opportunities, according to Smit (2001).

The compensation structure of PE funds can create adverse incentives for the GP to invest in suboptimal deals if the respective fund has a lot of undrawn capital or dry powder when it is nearing the end of its investment period (Arcot et al., 2015; Axelson et al., 2009). PE firms forgo management fees if this respective dry powder is not spend by making investments. Additionally, financial sponsors try to raise capital for a new fund every three to five years. Raising this new fund is harder when the GP still has a lot of dry powder in the existing fund (Degeorge et al., 2016). Prospective LPs analyse next to past

performance, the investment track record of the PE firm's recent funds. Having a lot of uncommitted capital puts pressure on the respective fund to invest in order to boost their track record, otherwise this might put future fundraising rounds in jeopardy and with that, the GP's expected income (Arcot et al., 2015). The lifetime income of private equity GPs is indirectly affected by the impact of the latest fund performance on their abilities to raise capital for subsequent funds (Chung et al., 2012). Funds with limited reputation might possibly have stronger incentive distortions to invest their dry powder in suboptimal deals (Arcot et al., 2015). Given these findings, it is likely to expect PE firms with excess dry powder to catch on to the growing popularity of inorganic growth strategies to spend their cash. PE firms can resolve to portfolio companies to pursue a buy-and-build strategy, given they already have a foothold in the industry via this platform company. Add-on deals in the portfolio company's industry can be characterized by lower information symmetry as the PE firm already built a certain familiarity with the industry at the moment of participating in the platform company. Moreover, buy-and-build strategies can be distinguished by lower search costs, as inorganic growth strategies are more prevalent in fragmented industries in which both platforms and follow-ons are present (Bansraj & Smit, 2017). Given the lower search costs and reduced information asymmetry (as the PE firm would a priori be familiar with the acquiror and industry), supplemented with the substantial amount of dry powder and the increasing pressure to invest this uncommitted capital, the following hypothesis is formulated:

Hypothesis 1: *Portfolio companies of PE firms are more likely to engage in Add-on acquisitions if the PE firm has more excess dry powder*

Section 1 mentioned that PE fund managers receive management fees as compensation for their provided services. When the calculation of the management fee transitions from committed capital in the investment period to net invested capital in the harvesting period, managers face a trade-off between giving up management fees or overinvesting their committed capital. Evidence suggests that PE firms later in their investment period are more inclined to show opportunistic behaviour, overinvesting committed capital for self-serving purposes (Arcot et al., 2015). Consequently, one could expect PE firms to increasingly search for opportunities to invest their excess resources at the end of the investment period. Next to SBOs, additional add-on acquisitions to platform companies could be such opportunities:

Hypothesis 2: *Portfolio companies of PE firms are more likely to engage in Add-on acquisitions if the PE firm has more excess dry powder and is at the end of its investment period*

Relying on the framework of Axelson et al. (2009), it is expected that a high level of dry powder may lead to investment distortions due to the GP tendency to overinvest. When pursuing a buy-and-build strategy, the amount of value creation is predominantly tied to the follow-on investment opportunities that are presented (Smit, 2001). Having still a lot of uninvested, committed capital available, the GPs want to reduce the dry powder, and thus prefer investing in larger deals. Braun et al. (2017) show a negative relationship between the size of a deal and its performance. From the above discussion, the following hypothesis is derived:

Hypothesis 3a: *Add-on deals of portfolio companies executed with high levels of excess dry powder are larger than other deals*

PE portfolio companies make one or more successive add-on acquisitions in buy-and-build strategies. Platform companies that only carry out one single acquisition could potentially be the result of a suddenly appearing investment opportunity, rather than being the results of examinable determinants (Hammer et al., 2017). Heterogeneity in the accessibility to the market for add-on acquisitions can be explained by differences in experience and reputation of the portfolio company's PE sponsor (Hammer et al., 2017). As mentioned in hypothesis 1, buy-and-build strategies can be characterized by lower search costs and reduced information asymmetry. Thus, one could hypothesise that GPs, under pressure of excess dry powder, would rely on increasing the speed with which add-on acquisitions are done to spend their money. Hammer et al. (2017) argue that the speed with which add-on acquisitions are executed is related to overall add-on activity. While on the one hand increasing the speed of engaging in add-on acquisitions is beneficial for GP to spend excess cash, Renneboog & Vansteenkiste (2019) review the literature on serial acquirors (e.g., Aktas, de Bodt , & Roll, 2011; Billet & Qian, 2008; Jaffe, Pedersen, & Voetmann, 2013) and find consensus that performance of serially or frequently acquiring companies is on average declining from deal to deal. The following hypothesis aims to investigate the above-described agency conflict:

Hypothesis 3b: *Portfolio companies of PE firms with high levels of excess dry powder engage faster in add-on acquisitions after the entry*

4. Data

4.1.Sample construction

The sample of 603 buyouts has been constructed by selecting all buyouts completed in the United Kingdom (UK) between 1 January 1997 and 31 December 2015 using Bureau van Dijk's database 'Zephyr'. Only deals involving the acquisition of a majority stake are included in the sample.

All buyouts are subsequently checked for exit transactions and ownership status as of 31 December 2021. The current status of the PE-backed portfolio company is verified using Zephyr, Orbis, Nexis Uni and websites of the respective PE firms. All buyouts for which the exit channel and/or exit date is known are kept in sample, in addition to the unexited buyouts for which the PE ownership as of 31 December 2021

can be verified. This sampling method leads to a sample of 603 buyouts in the UK ranging from 1 January 1997 to 31 December 2015. The exit and holding period is known for 486 buyouts whereas the remaining 117 buyouts have been in PE portfolio as of 31 December 2021.

To complete the sample, all exited and unexited buyouts are matched with their respective add-on acquisitions under PE ownership using the 'Zephyr' database. Add-on acquisitions, completed up until 31 December 2021, are included in the sample if the transaction is completed in the period between entry and exit of the respective PE firm. The final sample consists of 286 buyouts with inorganic growth strategies, i.e., including at least one add-on acquisition, and a total of 680 add-on acquisitions. The question arises whether the UK markets are representative of other PE markets. In their paper discussing whether PE contributes to financial fragility during economic crises, Bernstein, Lerner, and Mezzanotti (2020) find that during a 14-year period spanning from 2000 to 2013, Europe as a whole, Germany, France and the United States show remarkably similar patterns in terms four reported variables related to Private Equity investment, although the UK represents a disproportionate share of European activity. Furthermore, private companies in the UK are required to file financial information, providing it to be a good context for analysis (Valkama, Maula, Nikoskelainen, & Wright, 2013).

4.2.Descriptive statistics

Table 1 Panel A depicts the distribution of buyout deals and add-on acquisitions across industries[1]. The sample is well distributed over all industries, which is in line with previous literature (Bernstein, Lerner, Sorensen, & Strömberg, 2017). Most buyouts occur in "Manufacturing" (26.9%). This is also the case when looking at deals without add-on acquisitions (34.1%). Most deals with inorganic growth strategies (22.7%) and add-on acquisitions (25.9%) themselves occur in "Business Services". Deals with add-on acquisitions ("Deals with add-on") cluster more than buyouts ("All deals") for "Business Services", "Transportation & Public Utilities", "Engineering & Related Services" and "Health Services". For "Manufacturing", "Retail Trade", "Wholesale Trade" and "Social Services", they cluster less.

Table 1 Panel B summarises the distribution of buyouts by exit channel. The sample consists of 478 exited buyouts (79.3%) as of 31 December 2021. The remaining buyouts in the sample are either not exited (19.4%), or the exit route is not available (1.3%). The largest part of buyouts with known exit was exited by means of a secondary buyout (SBO) (43.2%). Trade sale (TS), i.e., sale to a strategic buyer, and liquidation account respectively for 36.8% and 8.4% of the sample. Comparing the distribution by exit channel over the sample, secondary buyouts and trade sales account for the largest part of buyout exits for deals with add-on acquisitions, as well for deals without add-on acquisitions. Wright, Renneboog, Simons, & Scholes (2006) study leveraged buyouts in the UK and find a comparable distribution by exit channel.

[1] The Standard Industrial Classification (SIC) system is used in this thesis to classify industry areas. The category "Services" is broken down into its several components such as "Personal Services", "Business Services", "Legal Services" and more, resulting in a more balanced distribution across industry classification codes. For others, the first two digits of the four-digit classification code is used

Table 1 Sample distribution.

Panel A: Buyout distribution by industry

	All deals		Deals with add-on		Deals w/o add-on		Add-on acquisitions	
Industry	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*
Manufacturing	162	26.9	54	18.9	108	34.1	79	11.6
Business Services	108	17.9	65	22.7	43	13.6	176	25.9
Retail Trade	65	10.8	25	8.7	40	12.6	52	7.6
Transportation & Public Utilities	58	9.6	32	11.2	26	8.2	74	10.9
Engineering & Related Services	45	7.5	27	9.4	18	5.7	39	5.7
Health Services	31	5.1	22	7.7	9	2.8	68	10.0
Wholesale Trade	28	4.6	12	4.2	16	5.0	32	4.7
Social Services	17	2.8	8	2.8	9	2.8	43	6.3
Educational Services	17	2.8	7	2.4	10	3.2	12	1.8
Amusement & Recreation Services	14	2.3	7	2.4	7	2.2	9	1.3
Motion Pictures	10	1.7	3	1.0	7	2.2	14	2.1
Miscellaneous Services	10	1.7	5	1.7	5	1.6	5	0.7
Construction	9	1.5	1	0.3	8	2.5	5	0.7
Automotive Repair & Services	7	1.2	3	1	4	1.3	7	1.0
Hotels & other Lodging Places	7	1.2	3	1.0	4	1.3	5	0.7
Personal Services	4	0.7	3	1.0	1	0.3	14	2.1
Miscellaneous Repair Services	3	0.5	1	0.3	2	0.6	5	0.7
Legal Services	3	0.5	3	1.0	0	0.0	3	0.4
Agriculture, Forestry, Fishing	3	0.5	3	1	0	0.0	8	1.2
Mining	2	0.3	2	0.7	0	0.0	7	1.0
Finance, Insurance, Real Estate	0	0.0	0	0.0	0	0.0	14	2.1
Everything Else	0	0.0	0	0.0	0	0.0	2	0.3
Total	603	100	286	100	317	100	680	100

Panel B: Buyout distribution by exit channel

	All deals		Deals with add-on		Deals w/o add-on	
Exit channel	*N*	*%*	*N*	*%*	*N*	*%*
Secondary Buyout	210	43.2	107	51.0	103	37.3
Trade Sale	179	36.8	63	30.0	116	42.0
Liquidation	41	8.4	10	4.8	31	11.2
Initial Public Offering	31	6.4	16	7.6	15	5.4
Debt-to-equity Swap	13	2.8	7	3.3	6	2.2
Not Available	8	1.6	3	1.4	5	1.8
Other	4	0.8	4	1.9	0	0.0
Total	486	100	210	100	276	100

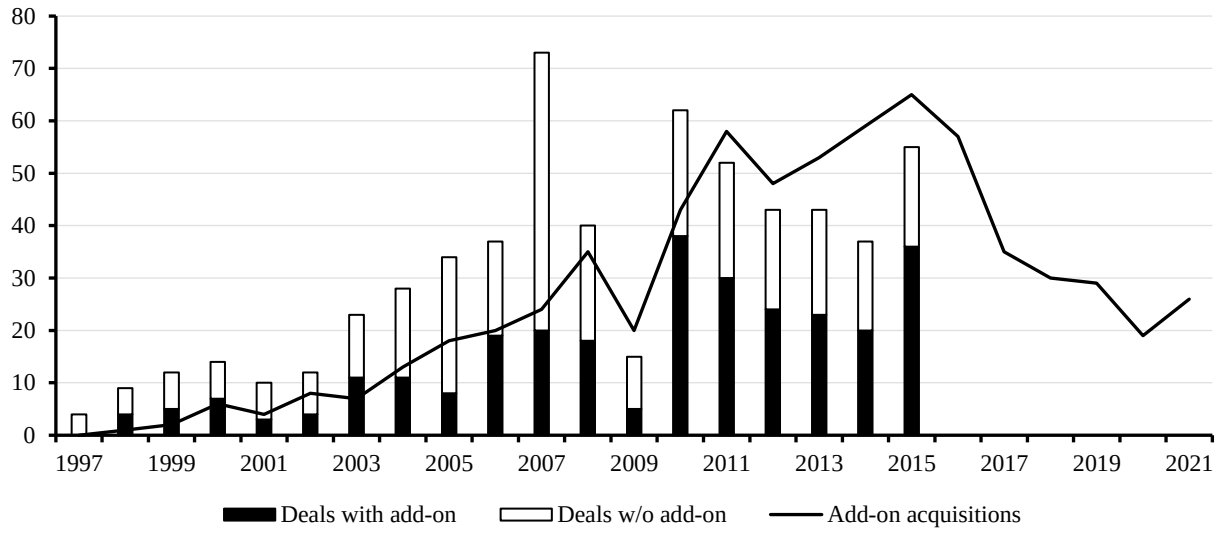


Fig. 2. Sample distribution by year. Buyouts are included from 1 January 1997 to 31 December 2015. Add-on acquisitions were completed between 1 January 1997 and 31 December 2021. X-axis represents the year, the y-axis the number of deals.

Fig. 2. provides an overview of the sample in terms of deals executed by year. Buyouts (603) completed between 1 January 1997 and 31 December 2015, and their respective add-on acquisitions (680) until 31 December 2021 were included. An increasing number of deals have been included towards the end of the collection period (1997-2021). Explanations for this increase are the rising popularity of buy-and-build strategies (23.5% buyouts with add-on acquisitions in 2005 to 65.5% of buyouts with add-ons acquisitions in 2015) as well as increased data availability. Notable is the decrease in number of buyouts during the financial crisis (40 in 2008 to 15 in 2009). Nevertheless, despite the simultaneous severe drop in add-on acquisitions (35 in 2008 to 20 in 2009), the relative decrease in add-on acquisitions (42.9%) is less pronounced than the relative decrease in buyouts (62.5%). This dataset is consistent with the finding that economic, regulatory, and technological shocks drive industry merger waves (Harford, 2005). It is believed that the distribution of the sample provides a representative view of the UK buyout landscape. Zephyr is gaining popularity among M&A (e.g., Erel, Jang, & Weisbach, 2015) and PE researchers (e.g., Hammer et al., 2021; Rigamonti, Cefis, Meoli, & Vismara, 2016; Tykvová & Borell, 2012; Wang, 2012), indicating the reliability of data derived from Zephyr.

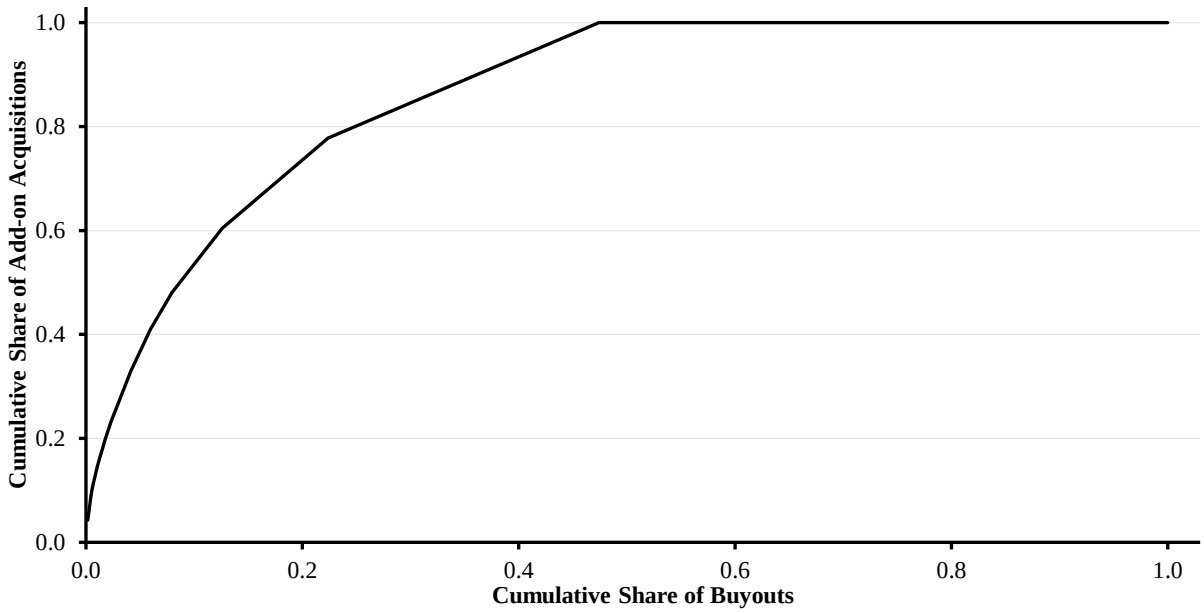


Fig. 3. Add-on acquisition concentration curve. The figure indicates the cumulative share of add-on acquisitions on the y-axis (in%) and the cumulative share of buyouts (ranked from highest to lowest number of add-on acquisitions) on the x-axis (in %).

In Fig. 3. a concentration curve summarises the distribution of add-on acquisitions over the sample of buyouts. The x-axis describes the cumulative share of buyouts (ranked from highest to lowest number of completed add-on acquisitions during the PE holding period) and the y-axis indicates the cumulative share of add-on acquisitions. The illustration suggests an unequal distribution of add-on acquisitions over the number of buyouts. In our sample 47.4% of all buyouts completed at least one add-on acquisition. Concentration in add-on acquisitions is indicated by the observation that 24.9% of all buyouts account for 80% of the number of add-on acquisitions. A similar sample distribution was found by Hammer et al. (2017), where 43% of the total PE firms in the sample were involved in the add-on market.

Table 1 Panel C describes the distribution of add-on acquisitions in terms of industry. Consistent with the distribution of buyouts by industry, “Business Services” (25.9%) and “Manufacturing” (11.6%) are the most frequently occurring industries in the add-on acquisition sample. Cross-border deals (178), i.e., when the platform company and add-on acquisition are located in a different country, account for 26.1% of the overall add-on acquisitions. Diversifying add-on acquisitions (228), i.e., when the platform company and add-on target operate in unrelated industries, account for 33.5% of the total add-on acquisition sample. The finding that most add-on acquisitions are within the same industry is not unexpected. Consolidation in the local market is mentioned in the PE industry and existing theoretical literature as the primary motivation for a buy-and-build strategy (e.g., see Bain & Company, 2018; Smit, 2001). The consolidation potentially could result in a more secured market position or economies of scale, which horizontal mergers have shown in general (Bhattacharyya & Nain, 2011).

Table 1 Sample distribution.

Panel C: Add-on acquisition distribution by industry

	All add-on acquisitions		Cross-border add-on acquisitions		Diversifying add-on acquisitions	
Industry	*N*	*%*	*N*	*%*	*N*	*%*
Business Services	176	25.9	51	28.7	42	18.4
Manufacturing	79	11.6	40	22.5	41	18.0
Transportation & Public Utilities	74	10.9	23	12.9	20	8.8
Health Services	68	10.0	10	5.6	14	6.1
Retail Trade	52	7.6	7	3.9	18	7.9
Social Services	43	6.3	0	0.0	12	5.3
Engineering & Related Services	39	5.7	14	7.9	17	7.5
Wholesale & Trade	32	4.7	13	7.3	16	7.0
Personal Services	14	2.1	0	0.0	1	0.4
Finance, Insurance, Real Estate	14	2.1	1	0.6	12	5.3
Motion Pictures	14	2.1	4	2.2	0	0.0
Miscellaneous Services	12	1.8	6	3.4	11	4.8
Educational Services	12	1.8	0	0.0	2	0.9
Amusement & Recreation Services	9	1.3	3	1.7	0	0.0
Agriculture, Forestry, Fishing	8	1.2	0	0.0	3	1.3
Automotive Repair & Services	7	1.0	1	0.6	2	0.9
Mining	7	1.0	2	1.1	5	2.2
Construction	5	0.7	1	0.6	4	1.8
Miscellaneous Repair Services	5	0.7	0	0.0	5	2.2
Hotels & other Lodging Places	5	0.7	0	0.0	1	0.4
Legal Services	3	0.4	1	0.6	0	0.0
Everything Else	2	0.3	1	0.6	2	0.9
Total	680	100	178	100	228	100

Table 2 provides the descriptive statistics for the financial data of the platforms and add-on acquisitions 1 year before the add-on took place. In panel A, which describes the firm level characteristics of the platform and add-on acquisitions, it can be seen that the add-on acquisitions are relatively underreported when taking into account that the dataset includes 603 buyouts and 680 add-on acquisitions. The limited availability of financial data related to add-on acquisitions might be due to a survivorship bias in the data itself or due to a bias in the reporting standards of PE firms. Bansraj et al. (2020) find that reported information about buy-and-build strategies is purposely reduced to prevent competition when looking for possible new targets. The existence of a survivorship bias might originate from the fact that only financial data for larger firms in the dataset is known. As expected, platforms tend to be larger on average than add-on acquisitions in terms of firm size, number of employees and loans as well as changing items such as operating profit or loss, cash and cash equivalents, interest paid and cash flow generated. Table 2 Panel B compares portfolio firm characteristics between deals with inorganic growth strategies and deals without further add-on

acquisitions. On average, in terms of size, portfolio firms engaging in inorganic growth strategies have higher cash holdings, generate more cash flow and have higher net income than their counterparts in the year preceding the PE buyout transaction. However, both groups of portfolio companies do not significantly differ when comparing the profitability (ROA) and cash holdings relative to their total assets.

Table 3 depicts the descriptive statistics for the PE fund characteristics. To uncover the impact of excess dry powder on characteristics of buy-and-build strategies, first, a measure for excess dry powder had to be established. A PE fund's excess dry powder is measured, following the methodology of Degeorge et al. (2016), by fitting the fraction of committed capital spent as a quadratic function of fund age in the sample of PE funds. The excess dry powder is the difference between the cash left to be spend by the PE fund at the time of investment inception and the "fitted" amount of cash left to be spend for a PE fund at that age. The regressions are estimated on the full (1997 to 2015) sample data.

$$E(dry\ powder_{it}) = constant + \hat{\beta}_1 fund\ age_{it} + \hat{\beta}_2 fund\ age^2{}_{it}$$

$$Excess\ dry\ powder_{it} = dry\ powder_{it} - E(dry\ powder_{it})$$

Where 'i' refers to a PE fund, 't' denotes the quarter preceding the buyout of the platform. Applying the above-described approach of Degeorge et al. (2016) to calculate Estimated Dry Powder and Excess Cash[1], results in an average of 1% Excess Cash of the total fund size in the quarter preceding the initial buyout of the platform company for the PE firms in the sample. The average buyout investment is made 2.33 years after the closing date of the PE fund, an observation which is consistent with the findings of earlier studies and market practice. Ljungqvist & Richardson (2003) report that 50% of funds have 70% of their committed capital invested in the first three years. Of the total 283 buyouts, 124 buyouts (43.8%) are made after 2.5 years after the PE fund's inception. Private equity fund characteristics have been gathered with the use of PitchBook as data source. For each of the 603 buyouts in the sample, the PE fund behind the deal has been checked. Next, the amount of dry powder the fund possessed one quarter before the respective buyout has been collected. A significant drop in observations (N= 283) can be noted when looking at table 3. This sample reduction has two possible reasons. First, GPs of PE firms have the opportunity to report dry powder to Pitchbook, but are, for obvious reasons, not required to report the amount of dry powder. If GPs forgo to report the dry powder for their funds, data is not available for the respective PE fund. Second, not every PE firm is organized as a limited partnership, other organisational forms do also exist. An example is the so-called evergreen fund structure, i.e., an investment vehicle that has no stated lifetime[2]. The investment proceeds in evergreen funds are being reinvested for continued capital growth (Phalippou, 2021). Therefore, dry powder data for such types of PE firms is not available.

[1] Throughout this thesis, the terms 'excess cash' and 'excess dry powder' are used interchangeably
[2] A fund with no stated lifetime does not imply it is open-ended. Open-ended funds are funds whose number of shares they can provide is not limited. Evergreen funds are closed ended funds with no ending date (Phalippou, 2021)

Table 2 Descriptive statistics for financial data.

Table 2 displays descriptive statistics for the financial data for the platforms and add-on acquisitions 1 year before the add-on acquisition. Panel A provides the firm characteristics and operating performance measures. Firm is measured by taking the natural logarithm of total assets. Operating Profit/ Loss, Cash, Long Term Debt, Loans, Interest Paid and Cash flow are measured in thousands (USD). Diff.Mean denotes the p-values that resulted from the t-tests for equality of means between the platforms and add-ons.

Panel A: Firm level characteristics

	Platform					Add-on					
	N	*Mean*	*S.D*	*Min*	*Max*	*N*	*Mean*	*S.D*	*Min*	*Max*	*Diff.Mean*
Total Assets	501	173,396.28	74,949.92	119.6	3349,147	369	13,164.06	36,049.48	0	341,58	0.00***
Firm Size	501	17.92	1.64	11.69	21.93	369	14.54	2.67	0	19.65	0.00***
Operating Profit/ Loss	468	10,516.38	30,907.55	-110,100.69	186,000.98	167	416.70	6,945.64	-64,213.95	18,446	0.00***
Cash	445	12,037.06	30,858.34	0	456,530.75	343	1,895.50	5,887.35	0	71,770.29	0.00***
Long Term Debt	387	43,691.17	129,293.77	0	2011,935.74	271	4,908.66	26,029.46	0	305,872.67	0.00***
Loans	483	41,365.82	100,125.70	0	886,697.98	351	2,842.49	16,795.10	0	270,313.98	0.00***
Interest Paid	412	5,538.25	15,973.74	0	288,791.01	135	1,275.02	5,217.72	0	52,680.39	0.00***
Employees	414	794.54	1,372.35	1	10,898	139	226.45	429.25	0	3,406	0.00***
Cash flow	420	16,291.30	33,836.33	-65,455.26	279,566.24	157	1,447.42	6,778.24	-62,377.25	18,514	0.00***
ROA (Net Income)	468	0.05	0.36	-5.98	1.89	167	0.14	1.28	-2.97	16.03	0.36

Panel B: Buyout level characteristics

	Deals with add-on					Deals w/o add-on					
	N	*Mean*	*S.D*	*Min*	*Max*	*N*	*Mean*	*S.D*	*Min*	*Max*	*Diff.Mean*
Total Assets	241	167,473.25	38,0987.18	0	3,154,513.92	252	110,007.15	474,101.85	0	6,637,385.22	0.14
Firm Size	241	17.55	2.09	1.10	21.87	252	16.63	3.33	0.69	22.62	0.00***
Total Debt	241	78,975.61	201,225.71	0	1857,986.18	252	53,962.34	255,748.43	0	3524,849.67	0.23
Cash	218	14,137.50	37,767.60	1.56	334,201.41	216	7,937.85	18,388.01	0	206,389.55	0.03**
Cash flow	209	13,949.72	35,091.36	-88,249.84	280,034.72	209	5,238.64	15,815.77	-63,315.52	140,823.50	0.00***
Net Income	220	6,016.64	25,840.99	-88,440.02	169,084.27	219	1,262.63	13,168.47	-66,772.75	46,941.17	0.02**
ROA (Net Income)	220	0.08	0.32	-0.73	4.11	219	1.18	16.46	-1.04	243.65	0.32
Total Debt/ TA	241	0.37	0.37	0	2.42	252	0.32	0.51	0	5.14	0.15
Cash/ TA	241	0.11	0.14	0	0.79	252	0.14	0.19	0	1.00	0.03

Notes: Buyout level financial characteristics are measured in the year before the buyout. Firm size is the natural logarithm of Total Assets (TA). Total Debt is calculated as the sum of Long Term Debt and Loans. ROA is the ratio of Net income to Total Assets. Total Debt/ TA is the ratio of Total Debt to Total Assets. Cash/ TA is the ratio of Cash to Total Assets. Diff.Mean denotes the p-values resulting from the t-tests for equality of means between deals with add-on and deals w/o add-on. Significance at 10%, 5% and 1% are indicated respectively *,**,***.

Table 3 Descriptive statistics for PE fund characteristics.

Table 3 displays descriptive statistics for the PE fund characteristics. Dry Powder, Estimated Dry Powder and Excess Cash are calculated in the quarter preceding the PE buyout and measured in percentages (%). Excess Dry Powder is the difference between the fund's Dry Powder and the Estimated Dry Powder at the time of investment inception. Fund Age is calculated as the difference between the closing date of the PE fund and the completion date of the investment, measured in years.

	All deals				
	N	*Mean*	*S.D*	*Min*	*Max*
Dry Powder	283	0.58	0.29	0.00	1.00
Estimated Dry Powder	283	0.58	0.26	0.00	1.17
Excess Cash	283	0.01	0.19	-0.78	1.00
Fund Age	283	2.33	1.94	-2.21	8.00

5. Empirical results

5.1.Excess dry powder and likelihood of inorganic growth strategies

This paper tries to uncover the impact of excess dry powder on characteristics of buy-and-build strategies. Consequently, the key independent variable in this study is the excess dry powder held by the PE firm in the year preceding the buyout of the platform company. The measurements of excess dry powder are obtained by following the approach of Degeorge et al. (2016).

Table 4 summarises the impact of the selected determinants on the likelihood of engaging in inorganic growth strategies. The results are obtained by running logistic regressions, comparable to regressions in the literature that predict the likelihood of acquisitions (Arcot et al., 2015; Hammer et al., 2017; Harford, 1999), on the dependent variable *Inorganic growth strategies*. The variable equals one if the platform company engaged in at least one add-on acquisition during the PE holding period and zero otherwise. In specification (1) and specification (2), empirical evidence is sought for hypothesis 1. The regression models in specification (3) and specification (4) add interaction effects and both aim at providing empirical evidence for hypothesis 2.

Specification (1) examines the impact of PE fund characteristics on the likelihood of inorganic growth strategies. The effect of excess dry powder in the quarter before the buyout is measured by the independent variable *Excess Cash*. The regression model controls for year, industry, and PE sponsor fixed effects. The regression includes 163 observations, but no statistically significant results were found in this model specification. In model specification (2) variables are added to include the effect of the platform characteristics. All variables on level of the platform are measured in the year preceding the buyout. However, the coefficients of these variables were not found to be statistically significant. No significant evidence can be found for hypothesis 1, that PE firms with higher levels of excess cash are more likely to engage in inorganic growth strategies.

Table 4 Excess dry powder and likelihood of inorganic growth strategies.

Determinants of inorganic growth strategies probability

	Dependent variable: Inorganic growth strategies yes/no			
	(1)	(2)	(3)	(4)
Excess Cash	1.169	11.920	3.800	-17.560
	(2.22)	(16.03)	(3.08)	(17.83)
Fund Age	0.091	-0.093	0.152	3.210
	(0.21)	(0.35)	(0.33)	(1.65)
Firm Size		3.079		3.564
		(2.28)		(1.90)
Cash Flow / Total Assets		-0.789		-50.040*
		(9.90)		(21.11)
ROA (Net Income)		0.009		0.731*
		(0.16)		(0.31)
Debt / Total Assets		-8.340		-5.669
		(11.39)		(7.80)
Late Buyout			-0.317	-13.610
			(1.40)	(7.79)
Excess Cash * Late Buyout			-4.797	50.430**
			(4.00)	(16.56)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
PE firm FE	Yes	Yes	Yes	Yes
N	163	123	163	123
R^2	0.385	0.879	0.389	0.877
Pseudo R^2	0.334	0.723	0.342	0.742

Table 4 depicts the estimations from the logistic regressions. The dependent variable is the binary variable that equals one if the platform company engaged in at least one add-on acquisition during the holding period and zero otherwise. Further descriptions of the independent variables can be found in Appendix 1.1. The correlation matrix can be found in Appendix 1.2. All specifications control for year, industry and PE firm fixed effects. Standard errors are clustered by industry and are presented in parentheses. Statistical significance is represented at the 10% (*), 5% (**), and 1% (***) levels.

In specification (3), the model investigating PE fund characteristics on the likelihood of inorganic growth strategies is extended by adding the independent variable *Late Buyout* and the consequential interaction term *Excess Cash * Late Buyout*. Buyout deals are coded as late if the investment is made when the fund is older than 2.5 years (Degeorge et al., 2016). Adding these new variables increases the Pseudo R^2 from 0.334 in specification (1) to 0.342 in specification (3). However, the impact of the independent variables is not found to be statistically significant. Specification (4) further extends the regression model by incorporating platform characteristics. The coefficient for the independent variable *Excess Cash* appears to be negative, but insignificantly. The variable of *Cash Flow / Total Assets* significantly impacts the likelihood of inorganic growth strategies at the level of the platform company at the 10% significance level, meaning that platforms

with higher cash flow on total assets are less likely to engage in inorganic growth strategies. Additionally, *ROA* is statistically positively related at the 10% significance level to the likelihood of inorganic growth strategies with a coefficient of 0.731, which suggests that more profitable platforms are more likely to make add-on acquisitions. Finally, statistical support is found for the interaction term between *Excess Cash and Late Buyout*. The coefficient of the interaction term turns out to be positive. The idea behind the interaction term is that PE funds with high levels of excess cash late in their investment period are under pressure to deploy their funds, as empirically confirmed by Arcot et al. (2015). Empirical evidence is found to confirm hypothesis 2, that PE firms with high levels of excess cash are more likely to engage in inorganic growth strategies when they are at the end of their investment period.

5.2.Excess dry powder and target company size of add-on acquisitions

In order to investigate whether the executed add-on deals of portfolio companies are related to larger target companies if the PE fund holds higher levels of excess dry powder, fixed effects regression models are applied to explore the effects of PE fund characteristics and platform company characteristics. Deal characteristics may be affected by a variety of factors. Moreover, as deal characteristics depend on market conditions, they vary over time. In their paper, Robinson and Sensoy (2016) find that uncommitted capital is endogenous to market conditions. Lambert et al. (2022) mention the importance of integrating controls that have been reported to be related to investment decisions or determine the scope of deal opportunities such as the PE funds' track record (Gompers, 1996) and experience on GP investment decision (Ljungqvist, Richardson, & Wolfenzon, 2020). Whether a PE firm is in a fundraising phase may also affect GP behaviour (Chung et al., 2012). The regression models are run for the natural logarithm of total assets of the target company in the year preceding the add-on acquisition as dependent variable, the level of *Excess Cash* at the PE fund level one quarter before the buyout is executed as independent variable, and several control variables.

Specification (1) examines the impact of PE fund characteristics on the natural logarithm of total assets of the add-on target company. The size of the add-on target is measured in the year before the add-on acquisition. No coefficients in this model specification are found to be significant. In specification (2), the regression model is extended by incorporating financial characteristics of the platform company. The regression coefficient for the *Excess Cash* variable appears to be positively related to the dependent variable at the 5% significance level. This specification confirms hypothesis 3a, that add-on deals executed by platform companies of PE firms with high levels of excess cash are larger than other deals. The independent variable *Cash / Total Assets* of the platform company is negatively and significantly at the 5% significance level impacting the size of the target company in an add-on acquisition. Specification (3) further extends the regression model by including deal characteristics. The independent variable *Cross-border* is a binary indicator that equals one if the platform company and target company are located in the same country and

zero otherwise. The *Diversifying* binary variable equals one if the first 2 digits of the Standard Industrial Classification (SIC) code of the platform company and target company match. Industry, year and PE firm fixed effects are controlled for. As consistent with specification (2), the coefficient for *Excess Cash* is positive and statistically significant at the 5% significance level, which is in support of hypothesis 3a. Additionally, platform companies seem to make larger add-on acquisitions if the acquisitions are *Diversifying* (coefficient 2.716).

Table 5 Excess dry powder and target company size of add-on acquisitions.
Determinants of size of add-on acquisitions

	Dependent variable: LN (Total Assets Add-on Target)		
	(1)	(2)	(3)
Excess Cash	1.580	14.860**	13.950**
	(2.87)	(4.59)	(3.95)
Fund Age	0.288	0.133	-0.234
	(0.31)	(0.32)	(0.34)
Firm Size		0.2154	0.0682
		(0.45)	(0.55)
Cash Flow / Total Assets		4.132	-0.500
		(4.63)	(4.86)
ROA (Net Income)		-0.028	-0.022
		(0.04)	(0.03)
Cash / Total Assets		-6.810**	-2.577
		(2.46)	(3.33)
Debt / Total Assets		-4.022	-5.099
		(2.73)	(2.86)
Cross-border			-0.420
			(1.05)
Diversifying			2.716**
			(0.96)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
PE firm FE	Yes	Yes	Yes
N	224	170	170
R^2	0.483	0.691	0.711
Within R^2	0.012	0.172	0.226

Table 5 summarizes the estimations of the fixed effects regression model. The dependent variable is measured as the natural logarithm of the total assets of the target company in the year before the add-on acquisition. The descriptions of the independent variables can be found in Appendix 1.1. Standard errors are clustered by industry of the platform company and are presented in parentheses. Statistical significance is represented at the 10% (*), 5% (**), and 1% (***) levels.

5.3.Excess dry powder and add-on acquisition speed

To assess if the occurrence of excess dry powder has an impact on the add-on acquisition speed, a survival-analysis framework is relied upon. Static regressions are not suitable to examine this type of questions as differences in add-on acquisition timing are not taken into account. Schumway (2001) claims that logit analyses fail to control for each firm's period at risk as it puts equal weight to bolt-ons made just before or

right after exit. Analysis of differences in add-on acquisition speeds yields a peculiar problem solved by duration models. The sample of 603 buyouts consists of 286 deals with add-acquisitions, where the time to add-on is observable i.e., uncensored observations, and 317 deals without add-on acquisitions, where the timing of the add-on is unobservable i.e., censored observations. Tobit or conventional OLS regressions would only yield estimates for the sub-sample of uncensored observations, leading to the fact that this could lead to a skewed distribution of add-on acquisition times and may thus provide conflicting coefficient estimates (Hammer et al., 2017).

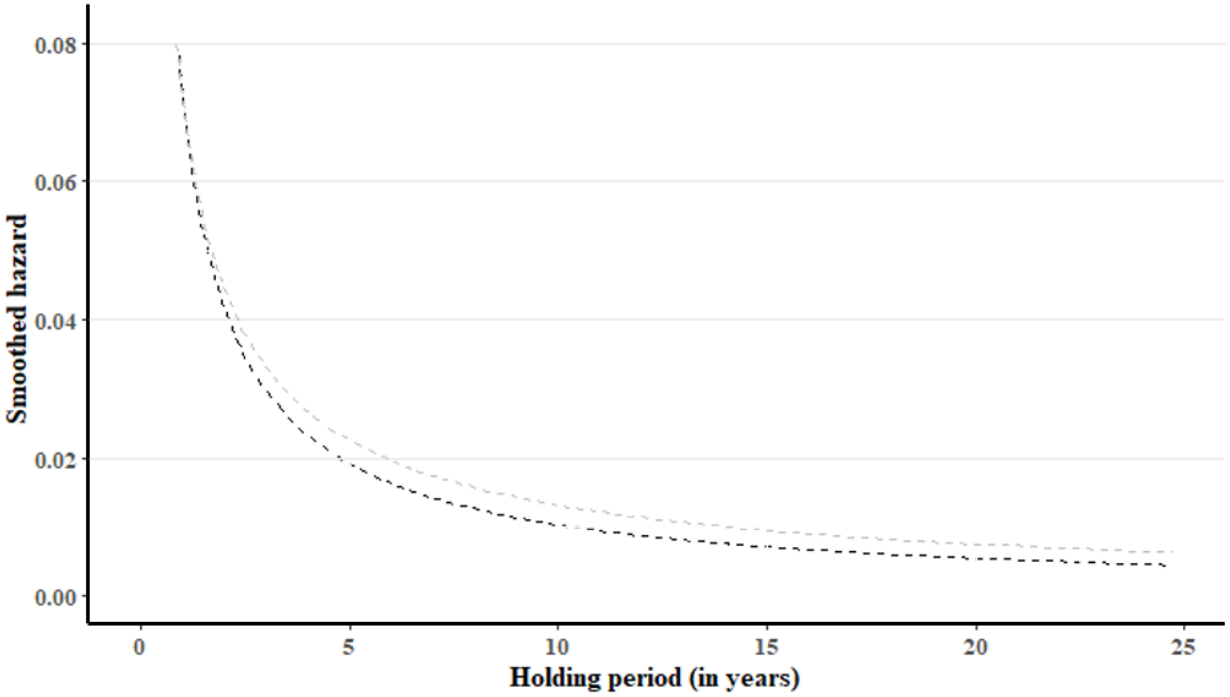


Fig. 4. Estimated hazard rates for add-on acquisitions. This figure indicates the hazard function of add-on acquisitions on the y-axis and indicates the holding period on the x-axis (in years). The smoothed hazard rates for an add-on acquisition for deals with a single, or multiple add-on acquisitions are respectively shown by the dashed grey and black lines. The hazard rate is the instantaneous probability of an add-on acquisition given that no add-on has been made at this specific point of time and is calculated using a Gaussian kernel function.

Fig. 4. denotes the smoothed hazard rates for an add-on acquisition estimated over the holding period. The hazard rate is interpreted as the instantaneous probability of an add-on acquisition, conditional on not having made acquisitions up to this point in time, and includes censored observations to construct a "risk-pool" for add-on acquisition at each instant of time (Hammer et al., 2017). It can be observed that the hazard rates peak approximately 1 year after entry and decrease exponentially as time passes. The decrease in hazard rate is suggested to be more severe for deals with multiple add-on acquisitions (dashed black line), meaning that the instantaneous probability that an add-on acquisition is made later in the holding period is higher for deals with a single add-on acquisition (dashed grey line).

A survival analysis method is used, as it is able to correct for the information provided by the deals without add-on acquisitions ("censored observations"), resolving the problem described before (Giot & Schwienbacher, 2007; Hammer et al., 2017). Following Espenlaub, Khurshed, & Mohamed (2015), Giot et al. (2014) and Hammer et al. (2017), a parametric accelerated failure time (AFT) model is utilised. A gamma density distribution[1] is selected for the duration model for its flexibility regarding the dynamics of the duration (Giot et al., 2014). Similar to Hammer et al. (2017), the dependent variable is the *natural logarithm of the time to the first add-on acquisition*. The independent variable is *Excess Cash*, measured in the quarter preceding the buyout. Control variables include *Fund Age* and various platform characteristics such as *Firm Size* (measured as the natural logarithm of total assets), *Cash and cash equivalents to Total Assets*, *Total Debt to Total Assets*, *ROA*, *Cash Flow to Total Assets*.

Multivariate analyses of the add-on acquisition timing in a survival-analysis framework are presented in table 6. Specification (1) presents the estimates for all deals. Specifications (2) and (3) exclude, respectively deals with single and multiple add-ons, allowing to test for sensitivity of covariate effects to the number of add-on acquisitions of the inorganic growth strategy. Specification (4) examines the relationship between the selected independent variables and the timing difference between the first and second consecutive add-on acquisition executed by the platform company.

According to Hammer et al. (2017), the advantage of using the accelerated failure time model (AFT) is its straightforward interpretation. The covariate impact can be interpreted as accelerating (negative coefficient) or decelerating (positive coefficient) the time to add-on acquisition. When taking all deals into consideration or specification (1), a significant (at 5%) acceleration of the first add-on acquisition can be detected. Specifications (2) and (3) bring forth insights into the sensitivity of bolt-on timing to the overall number of add-ons of the inorganic growth strategy. It can be observed that the effect of Excess Cash on add-on acquisition speed is amplified when comparing specification (2) (significant at 5%) with, although insignificant, specification (3). A possible explanation for the insignificance in specification (3) might be the limited availability of data observations (N = 162). The relationship between Excess Cash and the timing of add-on acquisitions is further investigated by specification (4). The specification examines whether portfolio companies owned by PE firms with high levels of Excess Cash increase the pace with which consequent add-on acquisitions are made. The dependent variable used in specification (4) measures the difference between the date of completion of the first add-on acquisition and the date of completion of the second add-on acquisition. This specification does not yield a statistically significant relationship between the level of

[1] It should be noted that other distributions such as exponential, Gompertz, lognormal, Gamma and Weibull are also considered. The Akaike Information Criterion (AIC) rendered similar values for several functional forms. Based on the fact that other studies (Giot et al., 2014; Hammer et al., 2017) reported that similar data clearly favoured a generalized gamma distribution, this functional form is chosen to proceed with further analysis

Excess Cash and the acquisition speed, but yields comparable significant results for the controls Firm Size and Cash to Total Assets as specification (1). In all, the findings demonstrate the existence of a relationship between acquisition speed and the level of excess dry powder. However, due to the mixed findings in specifications (2) and (3), only partial support is provided for hypothesis 3B.

Table 6 Excess dry powder and add-on acquisition speed.

	Dependent variable for AFT regression: LN (time to first add-on acquisition)			Dependent variable for AFT regression: LN (time between first and second add-on acquisition)
	All deals	Single add-on & no add-on	Multiple add-ons & no add-on	Multiple add-ons & no add-on
	(1)	(2)	(3)	(4)
Excess Cash	-1.254**	-2.290**	-0.678	-1.550
	(0.59)	(0.90)	(0.96)	(1.10)
Fund Age	-0.072*	-0.045	-0.105	-0.061
	(0.05)	(0.10)	(0.07)	(0.10)
Firm Size	-0.262***	-0.128	-0.526***	-0.070***
	(0.08)	(0.14)	(0.13)	(0.18)
Cash/ Total Assets	1.002*	0.975	2.306*	2.830*
	(0.81)	(1.28)	(1.28)	(1.70)
Debt/ Total Assets	0.306	-0.074	0.231	1.03
	(0.37)	(0.72)	(0.59)	(0.79)
ROA (Net Income)	-0.009	0.001	-0.047	-0.035
	(0.02)	(0.02)	(0.03)	(0.04)
Cash Flow/ Total Assets	-0.048	0.641	1.082	0.450
	(1.65)	(3.06)	(2.66)	(3.90)
Industry FE	No	No	No	No
Entry Year FE	No	No	No	No
Number of censored deals	97	97	97	97
Number of deals with add-on	125	59	66	66
N	222	156	163	163

Table 6 presents the estimations from the duration model. Coefficients in accelerated failure-time metric from a parametric survival model with generalized gamma distribution are presented in specifications (1)-(3), similar to Hammer et al. (2017). The dependent variable in specification (1)-(3) is the natural logarithm of the time to first add-on acquisition. The dependent variable in specification (4) is the natural logarithm of the time between the first and second add-on acquisition of the platform. The Excess Cash is measured one quarter before the buyout of the platform is executed. Firm size is measured as the natural logarithm of total assets. All deals without add-on acquisition are treated as censored. Standard errors are presented in parentheses. Statistical significance is represented at the 10% (*), 5% (**), and 1% (***) levels.

6. Concluding remarks

This study aimed to examine whether abundant PE dry powder facilitates inorganic growth strategies by portfolio companies of PE funds, focusing on the following questions: (1) Are PE portfolio companies more likely to engage in add-on acquisitions if the fund still has high levels of excess dry powder? (2) Are portfolio companies more likely to engage in add-on acquisitions if the fund is at the end of its investment period and still has high levels of excess dry powder? (3a) Are add-on deals of portfolio companies executed with high levels of excess dry powder larger than other deals? (3b) Are add-on deals of portfolio companies with high levels of excess dry powder executed faster than other deals?

A unique comprehensive data set of 603 UK buyouts and 680 add-on acquisitions is used to investigate these questions. Empirical results show that excess dry powder positively influences the likelihood of add-on acquisition when the private equity firm is nearing the end of its investment period. Moreover, these add-on acquisitions tend to be larger, confirming that GPs tend to invest in larger deals to quickly deploy their unspent committed capital. Finally, results show that the time to the first add-on acquisition of the platform significantly increases when the private equity fund has high levels of excess dry powder.

While the main focus of this study was to see if portfolio companies of PE funds with more excess dry powder are more likely to engage in inorganic growth strategies, there is still a lot of empirical research to do in this field. First, Hypothesis 3a briefly shed light on one type of deal characteristic that could be related to excess dry powder, but extension to other variables is likely to be possible. One could expect that deals with high levels of dry powder are less leveraged, have higher entry multiples and lower syndication rates as all these variables could be related to the pressure of the PE firm to invest. Second, next to deal characteristics, the performance of add-on deals driven by PE dry powder could also be an interesting research topic. Extending the work of Arcot et al. (2015) and Degeorge et al. (2016), it is likely that deals (funds) with high levels of excess dry powder exhibit weaker performance than other deals (funds).

Some limitations in this study have to be accounted for and will be elucidated below. The sample consists of 603 buyouts, spanning 19 years of buyout activity between 1997 and 2015 in the United Kingdom. The dataset is consistent with the finding that economic, regulatory, and technological shocks drive industry merger waves (Harford, 2005), thereby reducing the selection bias. There is the possibility of a geographical limitation as the sample solely consists of buyouts that took place in the United Kingdom. However, as aforementioned, Bernstein et al. (2020) showed that the UK PE market is representative of other PE markets. It is believed that this sample provides a representative view of the global buyout market. However, there could still be bias for the years 1997-1999 and 2015 as they were not included in the study of Bernstein et al. (2020). The limited availability of financial data of the follow-ons might be due to a bias in PE firm reporting

as well as survivorship bias in the data itself. Cumming & Walz (2010) report the existence of significant systematic biases in the reporting of fund performance to institutional investors. A study by Bansraj. (2020) has already shown that reported information about buy-and-build strategies is purposely reduced to prevent competition when looking for possible new targets. The existence of a survivorship bias might stem from two possible reasons. The first being that only financial data for larger firms in the dataset is known, the second being that PE firms might give less information on underperforming portfolio firms as PE firms have an incentive to predominantly disclose success stories, displaying better than average performance to e.g., potential investors.

For all 603 UK buyouts, the exit channel, exit date and the private equity firm behind the deal have been manually checked using sources such as Orbis, Nexis Uni and websites of the respective PE firms. The reliability of the information gathered from these sources has extensively been checked to ensure accuracy of the data. However, the possibility still remains that data errors related to the exit channel, exit data and the PE firm behind the deal have occurred.

The sample of all UK buyouts has been significantly reduced to 283 UK buyouts, considering the data availability of PE fund characteristics. Lambert et al. (2022) suggest including variables to control for the impact of the PE sponsor's track record and experience on the GP decisions as funds with little reputational capital have a higher incentive to gamble (Gompers, 1996; Ljungqvist, Richardson and Wolfenzon, 2020). Moreover, GPs who have a high reputation, presumably exhibit higher skills (e.g., Kaplan & Schoar, 2005), and are thus better in spotting interesting investment opportunities. In addition to controlling for whether the PE fund is in a fundraising phase (Barber & Yasuda, 2017; Brown et al., 2019; Chung et al., 2012). GPs are more likely to have a considerable pool of potential investors if they already possess experience in the fundraising process and are thus able to organize it more professionally (Arcot et al., 2015). GPs are more likely to rely on past performance when they have less experience in the fundraising process and thereby have an incentive to window dress their current performance (Arcot et al., 2015). These variables were not included in the analysis due to the lack of data availability on PE fund characteristics but would have positively influenced the reliability of the empirical results.

Undeniably, a lot of research questions still remain within this field and this study hopefully can be considered as a foundation for future research in the field of Private Equity.

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APPENDIX 1.1 VARIABLE DESCRIPTION

Variable	Description
Cash Flow / Total Assets	Variable measured as the ratio of cash flow and total assets of the platform company in the year before the buyout / add-on acquisition.
Cross-border	Binary variable equals one if the platform company and target company in add-on acquisition are located in the same country and zero otherwise.
Debt / Total Assets	Variable measured as the ratio of debt to total assets of the platform company in the year before the buyout / add-on acquisition. Debt is calculated as the sum of long-term debt and loans on the portfolio company's balance sheet.
Diversifying	Binary variable equals one if the first 2 digits of the Standard Industrial Classification (SIC) code of the platform company and target company match and zero otherwise.
Excess Cash	The fraction of committed capital spent is fitted as quadratic function of fund age. Excess cash denotes the difference between committed capital left to spend by the PE fund at the time of investment inception and the "fitted" amount of cash left to be spend for a fund of that age, measured as percentage of total committed capital. (Degeorge et al., 2016).
Firm Size	Firm size is measured as the natural logarithm of the platform company's total assets in the year before the buyout / add-on acquisition.

Fund Age	Variable measured as difference in time between the closing date of the PE fund and completion date of buyout / add-on acquisition, measured in years.
Industry	Variable registers industry in which company operates. The Standard Industrial Classification (SIC) system is used to classify industry areas.
Inorganic Growth Strategies	Binary variable equal to one if portfolio engaged in at least one add-on acquisition during the PE holding period. Add-on acquisitions are included if the portfolio company acquired at least 100% of the shares or a majority stake in the acquired company.
Late Buyout	Binary variable equal to one if the buyout is made when the fund is older than 2.5 years and zero otherwise (Degeorge et al., 2016).
LN (Time between first and second Add-on Acquisition)	Variable measured as the natural logarithm of the time between the completion date of the first add-on acquisition and the completion date of the second add-on acquisition by the platform, measured in years.
LN (Time to Add-on Acquisition)	Variable measured as the natural logarithm of the time between the completion date of the buyout of the platform company and the completion date of the first add-on acquisition by the platform company, measured in years.
LN (Total Assets Add-on Target)	Variable measured as the natural logarithm of total assets of add-on acquisition target company in the year before the add-on acquisition.

ROA (Net Income)	Variable measured as the ratio of net income after taxation on total assets of the platform company in the year before the buyout / add-on acquisition.

APPENDIX 1.2. CORRELATION MATRIX VARIABLES TABLE 4

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) LN (Total Assets Add-on Target)	1									
(2) Excess Cash	.034	1								
(3) Fund Age	-.006	.220**	1							
(4) Firm Size	.227**	.220**	-.093	1						
(5) Cash Flow / Total Assets	-.033	-.060	.222**	.326**	1					
(6) ROA (Net Income)	.007	-.044	.231**	-.243**	.774**	1				
(7) Cash / Total Assets	-.185*	-.026	-.088	-.302**	.358**	.231**	1			
(8) Debt / Total Assets	.059	-.011	-.064	.089	-.440**	-.384**	-.297**	1		
(9) Cross-border	.076	-.039	-.047	.018	-.066	-.085	.207**	.162*	1	
(10) Diversifying	.051	-.069	-.168*	.056	.032	-.049	.003	-.034	.162*	1

Note. Observations with data available for all listed variables are included in the correlation matrix (N = 170). Statistical significance is represented at the 10% (*), 5% (**) and 1% (***) level