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Is there any difference in Private Equity pay?

*A panel study about the drivers of the bid premium in
Private Equity Public Takeovers*

Master Thesis, MSc Financial Economics

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Abstract

There is still limited research about the variables driving the value of Private Equity takeover transactions, even with its significant growth as an industry and ongoing public debate about whether Private Equity adds value to the economy. To examine this, some target takeover and Private Equity firm specific factors will be tested on the premium paid for takeovers, also controlling for some deal- and macro related factors. First, the premium significantly differs around the announcement date but is less compared to what is generally observed in the market. Second, Private Equity is not homogeneous for every subsector within the industry, as buy-and-build strategies significantly differ from other strategies. Furthermore, Private Equity firms seem to pay significantly less for profitable companies with a high market-to-book value, while on the other hand, these firms seem to pay significantly more to become the majority shareholder of a company, for buy-and-build and for companies of Scandinavian origin. The experience of a Private Equity firm seems to have no direct effect on the bid premium. All previous discussed outcomes seem to be constant over the last decade and will help provide a better understanding of why Private Equity firms pay certain prices for target takeovers.

Keywords:

Private Equity, Bid Premium, Event Study, Public Takeovers, Buyouts, Venture Capital, Strategies, Buy-and-Build, Expertise

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1. Introduction

Since Private Equity (PE) emerged in the 1980s, there is a long-standing public debate about the value enhancement of the sector.¹ This debate started with allegations and press comments made about the PE industry stripping the assets of their portfolio firms at the expense of employees and long-term performance and flipping them as IPO's or trade sales in the short run (Wright et al., 2007; Kosman, 2009). The debate expanded even further by some critics suggesting that the profits made by the PE funds are largely driven by favourable tax treatments of corporate debt. Inducing executives of major public companies to accept deals that go against the interest of shareholders, thereby destroying shareholder value (Lerner et al., 2011; Wright et al., 2007).

Because of this public debate, the Dutch government requested an empirical study about the influence of the PE sector on the companies in which investments are made. This and other international research shows however that the effect of PE on the performance of acquired companies is, broadly speaking, slightly positive. Meaning better growth perspectives, higher profits and a development in the number of employees. Also, the results show no systematic proof of PE negatively affecting employees and other stakeholders or about higher default rates involved in PE backed transactions, contradicting the statements made by critics (Ligterink et al., 2017).

Meanwhile, the PE sector has been growing significantly in the past decades, with European and US PE committed capital increasing from around 2 billion USD in 1980, to over 140 billion USD in 2000 and is still growing as an industry today (Gottschalg et al., 2004; Ligterink et al., 2017).

With this significant growth and ongoing debate, one can imagine the topic of value enhancement in PE takeovers becoming even more important. Though, despite the heightened interest of the public in the industry and the importance of this asset class to the economy, there is still limited research about the variables driving the value in PE takeovers, more specifically the bid premium.² To assess this topic, this study will explain the following research question:

“Which target company and Private Equity firm specific factors significantly influence the bid premiums in public Private Equity transactions?”

First, I will examine if the bid premium significantly differs around the announcement date for PE public takeovers and what is generally observed in the market. Second, I will examine if the PE industry is completely homogeneous, or if subgroups within the industry provide different results regarding the value enhancement process. Following the outcome of these steps, it would be valuable to know what kind of parameters are influencing this premium. Therefore, this paper will examine the target takeover variables, to see what PE firms are paying for. Furthermore, one would expect more

¹ By Private Equity, I mean lean decentralised organisations that engage in obtaining control over other companies (target takeovers) as an active shareholder, which will be elaborated on further in this study.

² The additional amount an acquirer has to offer above the pre-bid share price to succeed in a takeover offer.

professional and better organised PE firms to enforce better prices in target transactions compared to less experienced firms, but is this really the case? PE firm related factors will be included to account for this issue. Overall, this should provide a solid overview of the drivers of the bid premiums for public takeovers in the PE industry. In other words, what are PE firms paying for?

This study shows that the bid premium is significantly higher around the announcement date. Also, based on theoretical and empirical results, this paper shows the PE industry not to be completely homogeneous, as different strategies provide different results. Furthermore, PE firms pay significantly less for (expensive) profitable companies with a high market-to-book value. On the other hand, these firms pay significantly more to become the majority shareholder of a company, for buy-and-build and for companies of Scandinavian origin. The experience of a PE firm seems to have no direct effect on the bid premium and all previous discussed outcomes seem to be constant over the last decade.

Some control variables will be included to examine if other factors than the target takeover and PE firm specific variables are influencing the bid premiums. Every deal has different circumstances. Economic theory shows that these deal specific circumstances influence the bid premium of corporate takeovers, therefore potentially influencing PE public takeovers as well. Furthermore, one can imagine that macro-economic variables like a financial debt crisis or an M&A wave affect the price paid by firms for PE takeovers, hence these parameters will also be taken into consideration.³

Overall, the existing empirical evidence suffers from several shortcomings: (i) it only analyses the effect of different parameters in corporate M&A takeovers on the bid premium (ii) uses the bid premium as an independent variable, explaining for different issues within the PE industry (iii) ignores different strategies within the industry (iv) lacks further research about the influence of different PE-firms, (v) does not examine the influence of target company parameters on the bid premium in the PE sector and (vi) does not take periodic events into account, like the recent financial debt crisis and the most recent Merger and Acquisition (M&A) wave. To answer these shortcomings, the current study uses a unique dataset, combining three powerful and comprehensive databases –Zephyr, Orbis and DataStream – which are supplemented by a selection of handpicked data.

First, there is substantial economic research about the bid premium, though most of this research is based on corporate takeovers, not specifically on the PE sector. For instance, some papers provide a general overview of the takeover market, measuring the share price reaction on takeover announcements for different countries (Martynova & Renneboog, 2006; Hope et al., 2010). There is also extensive literature on the association between the bid premium and conflicts of interest within corporate acquisitions, like executive compensation, the influence of outside directors or other agency problems. These studies are focussed on M&A takeovers in general, but none specifically about the bid premium as a dependent variable for the PE industry (Jaggi & Dorata, 2006; Walkling & Long, 1984; Byrd & Hickman 1991).

³ This will be elaborated on further in this paper.

Other research done within the PE sector frequently uses the bid premium to explain different issues within the industry, like the influence on public-to-private acquisitions or on tax advantages. Therefore, only using the bid premium as an explanatory variable (Wright et al., 2007; Renneboog et al., 2007; Jenkinson & Stucke, 2011). These papers used the bid premium to account for the wealth effects of public-to-private transactions and found it not to be affected by the taxes paid by the company prior to the transaction.

Also, none of the studies so far examined the industry as heterogeneous, thereby examining different results for subsectors within the sector.

There are some studies examining the difference between PE firms like Meuleman et al. (2009) and Wright et al. (2007), who consider the PE firms' reputation or network centrality. These papers provide valuable insights about possible influences of these variables, but do not answer any questions regarding the value enhancement in PE deals, nor on the combination with any company, deal or strategy specific characteristics.

Moreover, none of the existing literature specifically examines the influence of target company characteristics on the bid premium, paid by PE bidders. Which is important to get a better understanding on the value drivers of the premiums paid in this sector. Recent research suggests that target company specific characteristics, such as some of the variables described in the literature review of this paper, could influence the bid premium both positively and negatively (e.g., Martynova & Renneboog, 2006; Renneboog et al., 2007). It is therefore important to test these variables on PE public transactions as well, since they potentially influence the premiums paid for takeovers in this sector.

Also, examined for the first time this study, the effect of the financial crisis and the most recently defined M&A wave will be tested on the bid premium in PE public takeovers.

Overall, these different factors will help provide a better overview of the PE landscape and will serve as a starting point for other studies to further examine the relatively unexplored territory of value enhancement in this sector. Furthermore, this study can be used for many other practices since it helps better understand the drivers of the bid premium in public PE transactions. For instance, it can help governmental institutes to establish regulations around the sector. Also, it can provide insights for all firms active in the investment industry (as well on the buy as on the sell side) to understand why certain prices are paid for companies.

2. Literature review

This chapter will discuss some of the empirical evidence reported in previous literature. First, it is important to better understand the PE sector. Therefore, a general overview of the industry is presented in section 2.1. Section 2.2 explains the principles of bid premiums whereas section 2.3 explains the parameters which are potentially driving these premiums in public PE takeovers. Section 2.4. defines the control variables used to control if anything other than the explanatory parameters are influencing

the bid premium. Finally, this chapter will be concluded with a summarizing overview of the results, displayed in a table 2 and table 3.

2.1. A general overview of the Private Equity landscape

To get a good understanding about the variables in the present study, it would be valuable to know more about PE sector. Therefore, this section will provide a general overview of the landscape, starting with the organisation of PE firms and PE funds, followed by the distinction between Private Equity (PE) Buyouts and Venture capital (VC). In the last section, some sub-sectors within the industry will be discussed.

2.1.1. Private Equity firms

Most PE firms are organised as a partnership or a limited liability company corporation. Examples of prominent PE firms in the US are: Blackstone, KKR and The Carlyle Group. In Europe, well known PE firms are: CVC Capital partners (UK), EQT (Sweden) and Apax Partners (UK).⁴ Jensen (1989) described PE firms as lean decentralised organisations with only a few investment professionals. For instance, in a survey among seven large PE buyout funds, Jensen found an average of 13 investment professionals. Most of these investment professionals had a background in investment banking. Nowadays, large PE firms note significantly larger numbers of investment professionals. For example, KKR had 139 investment professionals in 2007 and at least four other large PE firms appeared to have 100+ FTE's among their investors. This means that the PE landscape is changing, with more investment professionals and a wider variety of skills per professional compared to 20 years ago (Kaplan & Stromberg, 2009).

2.1.2. Private Equity funds

Capital for PE firms is raised using PE funds. These funds are typically "close-end funds", which means that investors cannot withdraw their funds until the fund is terminated. "Open-end funds", like mutual funds, work vice versa. Here, investors can withdraw their money at any preferred moment (Kaplan & Stromberg, 2009). Most of the time, these close-end PE funds are organised as limited partnerships, with the general partners managing the fund and the limited partners (LP's) providing the capital. The LP's typically include institutional investors, such as corporate and public pension funds, endowment funds, insurance companies as well as high net worth individuals (HNWI's). It is customary for the general partner to provide at least one percent of the total capital.

Funds normally have a fixed life span of around ten years, whereas the life span can be extended up to three additional years. Normally, a firm has up to 5 years to invest the committed fund capital into

⁴ According to the PEI (Private Equity International), a global B2B publisher focusing solely on private equity, private real estate, private debt and agricultural investing.

companies, and an additional five (to eight) years to return the capital to the investors. After the capital is committed by the LP's, they have only little influence about where to invest the money, as long as the basic covenant agreements of the fund are followed. These covenant agreements are set out at the start of a new investment fund. Examples of these covenants are: restrictions on the capital invested per company, types of securities a fund can invest in and debt on a fund level. The debt on a (target) company level is unrestricted and can be determined by the parties involved in the specific transaction (i.e. banks, M&A advisory, management).

The managing partners (i.e. the PE firm) are compensated in three different ways: (i) a management fee, (ii) performance fee or "carried interest" and (iii) sometimes by charged deal and monitoring fees of the companies in which they invest. The management fee is based on the Assets Under Management (AUM) of the fund and is typically 2-2.5% (ending after 10 years). The carried interest is almost always 20%, above the hurdle-rate as determined by the fund (Phalippou, 2009; Kaplan & Stromberg, 2009).⁵

There are many different types of PE funds. For instance, there are funds focussing solely on Real Estate, Growth Capital, Mezzanine financing, LBOs, Distressed PE, Fund of Funds or Co-Investments. Though, in general, the most important types of PE funds are the Buyout fund and the VC fund, which will be explained in further detail below.

2.1.3 Buyout funds

Buyout funds are generally used to purchase a controlling interest in established corporations or one of its product lines, often involving mature companies and large amount of debts (i.e. leveraged buyouts, further elaborated on in this chapter). According to Ljungqvist et al. (2007), 63% of the amounts raised for PE funds is accounted for by buyout funds, making it a significant sum of the entire industry.

In practice, PE buyout funds create value through two channels: (i) financial and governance engineering and (ii) operational engineering. Financial engineering can be derived from disciplining and tax benefits from higher debts and improvement of incentives from managerial ownership, the so called 'skin in the game'. Governance engineering derives from a better control of the board and management, which is especially important in public companies. Operational improvements relate to the suggestion that PE firms have strong operational focus and sometimes specialised knowledge of certain industries. Therefore, consulting the company with long term strategical improvement and implementation (Vinten, 2007). As these are commonly known practices within the PE buyout industry, it would be interesting to examine the effect on the takeover price of these financial and operational factors of the company. Hence, this will be considered in the present study.

⁵ Carried interest is an incentive fee for managers based on the returns earned by the fund. This incentive fee is paid only after reaching a certain rate of return set out by the fund, which will be 100% delegated to its investors. This rate of return is called the hurdle-rate.

This paper focuses mainly on public PE takeovers. Since publicly listed companies in general will be larger and more matured, most of the deals in the dataset consist of buyouts, and less of VC investments.

2.1.4. Venture Capital

Venture Capital or VC works in general according the same principles as PE investments, only with different investment criteria. The first problem arises in the different use of the term. Outside of the US, the term VC is mostly used to indicate a type of PE investments made by wealthy institutions or individuals both publicly and privately held. Within the US, the term is referred to as a composition of three terms – seed, start up and expansion capital – and excludes buyouts. In this paper I will use the US way of distinguishing VC and PE capital.

Seed investments are the first stage of investments for Venture Capitalists. These are funds typically used to fund initial product research and development and to assess the commercial potential of ideas. Start-up investments would be the next phase, targeting companies which have moved past the idea stage and are gearing up to produce, market and sell their products. In this stage, companies still need more cash than they generate themselves. Both phases are sometimes referred to as the early stage investments. Finally, if the company passes these early stage investments, it becomes a potential candidate for expansion stage investing. In the expansion stage, the company has an established product in the market place and needs additional capital for further growth of its manufacturing capacity, distribution or R&D.

In general, VC investments are identified as riskier compared to buyout investments, since there is less security on a positive outcome of early adopters compared to more matured firms. Also, most of the VC funds are betting on a potential IPO (Jeng & Wells, 2000).

To provide an indicative overview of the VC landscape, I use the investment criteria as indicated in Table 1. This table follows the same criteria widely used within the industry for tech companies. For instance, these are the same criteria as used by a US based global investment banking firm, having 70+ senior professionals in 10+ offices in different countries worldwide. Pre-seed, Seed, Series A, Series B and Series C can be identified as different phases within the VC industry, whereas series A shows the start-up investments and series B / C the expansion stage investing, where B stands for build, C for scale. All phases differ in: investment amount, valuation, type of investor, team, product-market-fit, tech development and monthly recurring revenue. Series C can already be identified as PE (larger) investments, but sometimes these companies still consider themselves to be VCs, making it hard to set a clear line between VC and PE investors.

Table 1: An indication of Venture Capital investment criteria

	Pre-Seed	Seed	Series A	Series B	Series C
Investment Amount (USD)	200 - 500k	500k - 2.5mn	3 - 12mn	10 - 25mn	20mn +
Valuation (USD)	1 - 3mn	2 - 6mn	10 - 40mn	30 - 100mn	80mn +
Investors	Family, friends & Angels	Angels, Micro VCs	VCs	VCs	VCs, PE, Venture debt
Team	Smart, committed with relevant expertise/skills	Founder / Market fit	Good director level hires	Senior leadership in most functions	Complete senior management team
Product / Market fit	Research indicates strong need for the product	Strong indications of Product/Market fit from early customers or pilot users	Clear PMF* and increasing evidence of PMF in large markets		
Tech	Strong tech founder with relevant experience	Proven ability to move fast. Start scalability and processes	Attract and manage great engineers. Continued high development velocity	Excellent tech leadership. Product does not break and meets SLA**. Product meets security, compliance and disaster recovery requirements of tech buyers	
MRR*** (USD)	-	0 - 50k	100 - 250k	350 - 800k	> 1mn

*PMF stands for Product / Market fit

**SLA stands for Service Level Agreement (a minimum level of service a carrier will deliver to you per agreement)

***MRR stands for Monthly Recurring Revenue

In conclusion this means that, in general, VC funds can be identified as funds investing in early stage adopters. Since this paper is using publicly listed takeover transactions, the data will consist of mainly PE buyouts. It would be less likely for early adopters to be listed on a stock exchange since this would be considered as the end game for most VC investors. Also, the size and age (VCs are mostly early adopters) of the target company will be used as a variable to control for this issue.

2.1.5. Private Equity strategies

The PE sector is an extremely heterogeneous asset class with many subsectors. The data used in this paper is retrieved from Zephyr, a comprehensive international deal information database from Bureau van Dijk (BvD). This database provides a special opportunity to examine not only the PE takeovers within the takeover industry, but also identifies different strategies in this sector, such as: *LBO*, *buy-and-build* and *patent sales*. The definitions of these PE strategies, as used in this paper, will be briefly discussed below.

Some of the variables in the dataset are handpicked. By manually searching for some deal specific variables, which will be elaborated on further in this study, I was able to identify an additional sub-strategy within the PE industry, namely the *state-owned* PE funds. These firms are fully subsidised

by the government and mostly exist in Asian oriented countries. All previous mentioned strategies will be tested for significance on the bid premium, to see if they can be added to the target specific and PE-firm specific variables of this study.

A Leveraged Buyout or *LBO* is identified when a significant amount of borrowed funds/debt is used to acquire the target. This financing method would be added to an acquisition, *IBO*, *MBO* or a *MBI* whenever the deal is described as a *LBO*, *LMBO* or a *LMBI*.⁶

Zephyr identifies specific deals as build up or *buy-and-build* when a PE company builds up the company it already owns, by acquiring other companies to amalgamate into the larger firm, thus increasing the total value of its investment through synergies between the acquired companies. Buy-and-build strategies are typically used to strategically grow a company by acquisition, domestically or cross-border.

When a transaction includes the acquisition of a company its patents, Zephyr identifies this deal sub-type as a patent sale.

The next chapter will further elaborate on these strategies and how they can potentially influence the bid premium in PE takeover transactions, but first some more comments about the bid premium will be made.

2.2. The bid premium

In literature, there is full consent about the target shareholders creating abnormal returns immediately after the announcement of a bid and proof that this could depend on different factors. For instance, Jarrel and Poulsen (1989), Servaes (1991), Kaplan and Weisbach (1992) and Mulherin and Boone (2000) report average abnormal returns in the US of 29% between 1963–86, 24% between 1972–87, 27% between 1971–82 and 21% between 1990–99, respectively. For the UK and Continental Europe, the outcome was comparable, namely 24% between 1955–85 (Franks and Harris, 1989), 19% between 1966-91 (Danbolt, 2004) and 13% between 1990–01 (Goergen & Renneboog, 2004).⁷ A more recent paper of Martynova and Renneboog (2006) reports a share price announcement effect of 9% for target firms compared to 0.5% for the bidding firms between 1993–01.

One should be cautious determining the premium value for takeover bids, since numerous studies point out a price run-up before the announcement because of rumours, information leakage or insider trading. The price run-up can be substantial and can sometimes even exceed the announcement effect itself. Previous studies, for instance, show a run-up between 13% and 22% two months prior to the public announcement of the bid (Goergen and Renneboog, 2004). Another study of Walking (1985) quantifies part of this problem, finding 40% of the tender offers announced in the media prior to the announcement date. This means that in addition to taking a percentage specification, it will be very

⁶ *IBO* stands for institutional buyout; *MBO* stands for management buy-out; *MBI* stands for management buy-in; *LMBO* stands for Leveraged Management buy-out; *LMBI* stands for Leveraged buy-in.

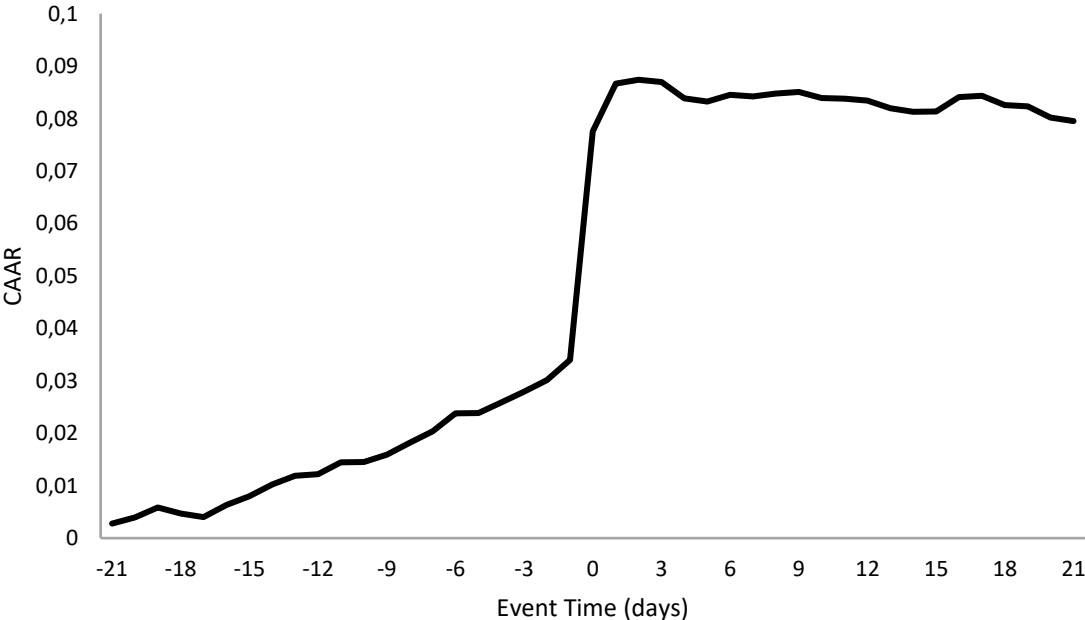
⁷ As also pointed out in the paper of Martynova and Renneboog (2006).

important to use an appropriate event date. The event date period is called ‘‘the anticipation window’’. Some papers opt 20 days before the announcement (Hope et al., 2010; Jarrell and Poulsen, 1989), others use more than one event window (Byrd & Hickman, 1991; Kaplan, 1989; Goergen & Renneboog, 2004; Renneboog et al., 2007). In this paper I will opt for four different event windows, namely a 40-day window of [-20,20], a 20-day event window [-10,10] a 11-day window of [-10,1] and a 2-day window of [-1,1] around the announcement date to see if they provide any different results. In addition to these event windows, the T=0 at the announcement date will be used to explain for the announcement day itself. These results are further elaborated in the methodology chapter (chapter 4).

The bid premium is calculated by using the cumulative average abnormal returns or the CAAR’s. This is measured as the sum of the average abnormal returns (AARs) in the event window. The CAARs show the price reaction of a specific deal to an announcement and will be briefly discussed in the methodology of this paper. In figure 1 below, one can see the unique assembled results of the announcement reaction of the CAARs of the complete dataset used for this study.

Figure 1: Target company CAARs around the takeover announcement⁸

This figure shows the market reaction to the announcement of a PE transaction for the target company as the CAARs 20 days before and after the event (day 0) for all companies (573 observations) in this study. The benchmark used is the MSCI-world index; the model parameters are estimated over 240 days starting 300 days prior to the acquisition announcement. Source: own proprietary dataset, retrieved from Zephyr, DataStream and Orbis.



⁸ The CAAR shows the price reaction of a specific deal to an announcement. This will be briefly discussed in the methodology of this paper (chapter 4).

In general, abnormal returns are defined as the difference between realised returns and benchmark returns (MacKinlay, 1997; Martynova & Renneboog, 2006). The realised returns will be the closing price of a stock. But, choosing proper benchmark returns will be less straightforward. The aim is to use a proper index for every benchmark based on economic models concerning investors' behaviour. There is no full consent in the financial literature about the most optimal index. As pointed out in a recent article of the Financial Times (Johnson, 2018), one should be critical about the data used in indices to derive the mean. For instance, to a large extent, modern indices are still constructed on a country-by-country basis. Investors in the US will most likely use the S&P 500 as a benchmark. In the past this made sense as most of the companies in the S&P 500 did most of their business in domestic markets. Nowadays, these components have changed. Take Apple, the largest component of the S&P 500 as an example, which sells more outside the US than within.

Also, the components of the benchmark itself have changed. For instance, as shown by Dimson et al. (2002), in 1900 over 60 percent of the value of US equities was in railway companies. While nowadays, much of this value is accounted for by technology, which came into existence relatively recently and has undergone significant changes in the past decade.

McKinsey (2006) analysed the ROIC⁹ histories of about 7000 publicly listed nonfinancial US companies between 1963 – 2004 and showed that companies have become more profitable over time. The study pointed out that the average US company returned its cost of capital throughout time. These differences can vary widely by industry. For instance, the software and services industry whose median ROIC from 1963 to 2004 was 18 percent, had a spread between the top and bottom quartile of companies which averaged 31 percent. This means is that on average valuations of capital intensive (and therefore less profitable) operations from the past will be compared with those of profitable companies today.

Formally, according to the efficient market hypothesis, all relevant information in determining security prices are fully and correctly reflected (Malkiel, 1989). In this research I will use the MSCI-world index as a benchmark. I will control for specific country-based governance regulations and their impact on the financial performance by checking the returns of the local market indices. There seems to be no significant difference in the mean between the MSCI-world index and local market indices for my specific sample, as also indicated in figure 7 of the appendix. Therefore, this study will use only the MSCI-world index as a benchmark.

2.3. Drivers of the bid-premium in Private Equity takeovers

This part will describe the different parameters examined in this research. These parameters are based on the results of existing empirical research. I will discuss some important drivers in this section potentially influencing the bid premium in PE takeovers namely: (2.3.1) the target company specific

⁹ ROIC is the return on invested capital.

parameters, (2.3.2.) the Private Equity firm specific parameters and finally (2.3.3) Private Equity strategies influencing the bid premium.

2.3.1. *Target company parameters*

Drivers of the bid premium in corporate takeovers are company specific. For example, *the maturity* of a company. There is consensus in the literature that companies who mature over time become less likely to default compared to new companies and are therefore less risky for bidders to acquire (Damodaran, 2016). This could imply that it would be more comfortable for bidding firms to take over companies that matured compared to relatively new companies. The executives and employees would be better aware of the market and the products have proven their value over time.

There is a difference between PE and VC transactions, as discussed in the first section of this chapter. The most common definition, also used in this paper, for VC is defined as funds investing in the early stage development of companies. That makes it highly likely that the difference between PE and VC investments is captured by the maturity parameter discussed above. Also, this paper uses takeovers done in the public sector. These transactions are consequently not considered to be early adopters. In addition, these are in general relatively large transactions. Therefore, the acquired data is considered to consist mainly out of PE buyout takeover transactions. Nevertheless, I will check for this issue to make sure the dataset is unbiased.

Another target company parameter which could influence the bid premium is the *beta* of a company.¹⁰ A higher beta indicates more systematic risk. Suggesting less riskier companies to be beneficial for any acquiring firms, a discount on the bid premiums for companies with a higher beta is expected. This is in line with the Capital Asset Pricing Model (CAPM), according to which expected asset prices depend on the systematic risk (Amihud & Medelson, 1989).

Gort and Hogarty (1970) argued that a larger *target value* relative to the size of the bidder would increase the risk of earnings dilution. This means that if the target would not perform as expected, the influence on the bidder would be more significant. In the case of PE takeovers, this will mean that the fund-manager would be exposed to more risk (less diversification of assets) when taking over a relatively sizeable target in proportion to its fund size. The paper also found larger target samples to receive lower bid premia. This is further confirmed by a research done by Frank and Harris (1988) in the UK, who also show larger target samples to receive lower bid premia, implicating target company size to negatively influence the bid premium. Therefore, this study will take the target company value into account to test its influence on the bid premium in PE takeovers.

Another important variable examined is the *pre-acquisition leverage* of a company, considering traditional investment methods, the LBO – model is one of the most used in the PE industry (Kaplan &

¹⁰ Beta is a measure of the volatility, or systematic risk, of a security or a portfolio in comparison to the market. Beta is used in the capital asset pricing model (CAPM), which calculates the expected return of an asset based on its beta and expected market returns. Beta is also known as the beta coefficient.

Stromberg, 2009). It would therefore be optimal for investing firms to be assured of a high debt-to-equity ratio, so it can regain higher equity returns in the long run by paying off the acquired company its debt. It would be easier to refinance a higher debt-to-equity ratio after the acquisition, if the company already enforced a higher rate previously to the transaction. For corporate M&A activities, this would suggest a smaller effect, but still positive. For instance, one of the reasons given for corporate takeovers is the co-insurance effect. This theory suggests that the likelihood of default decreases when two firms' assets and liabilities are combined through a merger or acquisition, since risky debt would be spread across the new firm and its operations. Therefore, acquiring corporate companies are expected to offer higher premiums for targets allowing combined amounts of debt in their capital structure (Walkling and Edmister, 1985). This effect is expected to be smaller for PE firms, but with the traditional usage of high debt-to-equity ratios for LBO's, higher premiums are expected.

Also, the cash available in a target company could be important. Several papers show that *excess free cash flow* is frequently used for managerial empire building and destroys value by overbidding (Jensen 1986, Servaes 1991, Lang et al. 1991). Additionally, the paper of Frésard and Salva (2010) shows that excessive cash valuation is mirrored by the expectation of investors on how the cash will be used, meaning inefficient allocation of corporate cash reserves. This paper suggests that bidders could have more to gain from target companies having a high liquidity because of the possibility to reduce agency cost. Hence, higher bid premiums are expected for target companies handling excess cash.

The *independence of the board* of a target firm plays an important role during takeover attempts. The results show tender offer premiums to be significantly higher when a target firm's board is independent. The logic behind this would be that independent boards are better in evaluating the source of the gains and therefore in evaluating their own company value, potentially extracting higher premiums (Cotter et al., 1996).

Another variable which shows to influence the bid premium is the *market-to-book ratio*. If the market price of a company is not adequately reflected, bargain acquisitions could be more likely. Therefore, higher bid premiums are expected on companies with lower market-to-book ratios (and vice versa), where assets are most presumably undervalued, and bidders can gain potential benefits from target agency problems (Walkling and Edmister, 1985). Also, a relatively low market-to-book value of target equity can indicate target management inefficiency. Replacing an inefficient target management could therefore engage benefits for a takeover (Robinson & Shane, 1990). Though potentially true, there is only weak causality between the market-to-book ratio and management inefficiency. Market-to-book ratio is mostly referred to in the literature as a proxy of growth opportunities, not of performance (Chen & Zhao, 2006). In this paper I will therefore not incorporate the measure as a proxy of underperformance, but as a reflection of the market price and potential future growth opportunities.

However, the *performance* of a company could be important when examining the bid premium. If a company is performing poorly, there is little incentive for the shareholders to hold on to the assets of the company. Therefore, shareholders are likely to accept a lower takeover premium because they are

looking for a potential exit route (and vice versa). A performance measure which is consequently used in previous papers is the ROA proxy,¹¹ which will also be used in this paper to test any relation between the bid premium in public PE takeovers (Khanna & Palepu, 2000; Wright et al., 2007).

2.3.2. *Private Equity firm parameters*

Apart from the target specific parameters, this research will also examine PE-specific parameters. This is based on previous economic literature which will be discussed below.

One would expect more experienced and reputable PE firms to enforce better prices, therefore this study compares experience for different PE firms. According to the study of Meuleman et al. (2009), the reputation for PE-firms can be captured by using the firm's *age*, *general experience* and its *experience as a lead investor*. The study examines the influence of reputation on syndication¹² and agency cost at the investor-investee level. Meuleman et al. find syndication to be less likely to occur when agency cost is highest. More importantly, they find strong evidence about the effect of reputation of the lead investing firm to soften any negative syndicate relationship. Additionally, Demiroglu & James (2010) report more reputable PE Groups to have lower borrowing costs, longer loan maturities, and to rely more on institutional loans.

Age is included because older PE firms should on average perform better than younger ones, as poorly performing organisations would be unable to raise new funding. Additionally, younger PE companies have a stronger incentive to prove themselves to establish their reputation and are therefore more willing to take risky investments projects with high potential outcomes (Lerner, 2000; Meuleman et al., 2009).

The general experience is measured by counting the number of investments done from the first observations of the dataset. This measure captures the ability of PE firms to structure deals and their ability to evaluate general aspects of the companies' business plan and management team which are not specific to the industry (Meuleman et al., 2009).

The number of times a PE investor took a majority control in a company is a good indicator of its reputation of being a lead investor. First, since the PE-firm takes majority control of a company, the firm ought to be more willing to actively participate in the target company, relying on its resources and capabilities to add value to the company. Secondly, the firm is willing to take more risk by taking larger portions of assets in the portfolio, which shows confidence in the investment decision made.

While Meuleman et al. (2009) do not elaborate any further about the reputation measures used in their research, some nuances are needed. In many cases, PE funds come and go because the clear majority are close-end funds with a life span of around ten to thirteen years (Kaplan & Stromberg, 2009), as discussed in the general overview of the PE landscape. When new funds arise, it does not necessarily

¹¹ ROA is the return on assets defined as earnings before interest and taxes deflated by total assets.

¹² Syndicates are a form of inter-firm alliance in which two or more PE firms invest in an investee firm and share a joint pay-off (Lerner, 1994).

mean the fund is eroded in experience. Most of the times these ‘new’ funds are managed by managers with the same experience as those of the more known funds and firms in the market. In addition, funds often have different names, while they are managed by the same firm. Therefore, I will make sure to reallocate the age and name of a PE fund back to the original firm, manually controlling for every data point in this study. Also, the nuance should be made in the transparency of the market. Though PE-firms could theoretically have experienced investment professionals, target companies are presumably attracted more easily by firms with more established names. Therefore, making it easier for more ‘known’ firms to attract better investment propositions in tight markets or when markets are floated with cash because of low interest rates, suggesting these firms to perform better in economically turmoiled time periods compared to the less known firms.

Also, Kaplan & Schoar (2005) find larger and older firms to perform better than new firms. One could expect that professional PE firms have stronger bargaining power and are more experienced in evaluating the company’s value, therefore enhancing lower premiums in takeover attempts. In addition, managers of more sizeable funds earn higher fees, partially because they get compensated in AUM.¹³ Evidence shows managers with higher fees to deliver higher gross performance and highlight that agency costs are an inevitable consequence of the information frictions subject to agency relationships (Robinson and Sensoy 2013). Supporting the importance of fund size on investment returns.

In sum, the age of a PE firm, its general experience, experience as a lead investor and its entire firm size are good indicators of a firm’s reputation and experience. Therefore, for the present research, in line with earlier research (i.e., Meuleman et al., 2009), I will build one measure for a PE-firm’s reputation and experience. This measure will be named ‘expertise’. I will use only this measure, since I am solely interested if more professional and knowledgeable PE-firms are enforcing better prices compared to relative new and less experienced PE-firms.

2.3.3. Private Equity strategies influencing the bid premium

The type of PE takeover strategies can also influence the bid premium. In this paper, I observed four different strategies that can be implemented by a PE firm, namely: leveraged buyouts (LBOs), buy-and-build, patent sales and state-owned funds. These variables will be further elaborated on below.

LBO strategies can typically be seen to purchase established companies. The approach of a LBO strategy is to provide a management team with enough equity and then to pay the rest of the purchase price with borrowed money (hence the term leveraged). Bank debt can account for 50% of a LBO’s funding, junk and mezzanine debt for 20% and equity around 30%. The assets of the business are used as collateral for the loans, and the cash-flow of the company is used to pay off the debts. The companies acquired are usually divisions that are being sold by corporations so they can refocus on their core businesses, or businesses owned by families that wish to cash out. To earn an attractive return on their

¹³ Assets Under Management.

investment, LBO firms build value in the companies they acquire, to pay off the debt within the investment period. Typically, they do this by improving the acquired company's profitability, growing the acquired company's sales, purchasing related businesses and combining the pieces to make a bigger company, or some combination of these techniques (UBS, 2010). LBOs are typically thought to create value through high leverage, high performance pay, and active monitoring of the portfolio companies' management (Wang, 2012). LBO's are expected to add value to PE firms, because of their strategy of building value through the debt structure of a company. Therefore, this type of strategy is expected to have a positive effect on the bid premium.

Buy-and-build strategies are used to create synergies, where the sum of parts of two companies together will be worth more than the companies individually. For instance, because of economies of scale, which is shown to be an important factor in literature (Walkling & Edmister, 1985). Although the difficulty of measuring this in empirical research, some papers examining corporate M&A activities approach this by indicating deals as being conglomerate or non-conglomerate. For instance, Walkling & Edmister (1985) find higher premiums in non-conglomerate offers, indicating companies to pay more for takeovers concerning product- or market extensions. This could very well also be the case for PE takeovers, since some takeovers are meant to strategically grow a company already existing in the portfolio of the fund. In this case the investors merge add-ons to one entity to create potential synergies. One could expect an investor to pay more for these potential synergies and therefore higher premiums for buy-and-build target acquisitions are expected. Additionally, since the main purpose of buy-and-build strategies are synergies and economies of scale, most of the acquired companies get fully integrated in the already existing portfolio companies. This is important to consider when looking at the bid premiums of these companies. In general, supported by the dataset used in this research, not all PE companies acquire a 100% stake in newly acquired firms. This is different for a buy-and-build buyout strategy, especially when looking at public takeovers. When acquiring the full new amount of a company for strategic purposes, one can imagine the impact on the bid premium to be more significant compared to partial acquisitions.

The to pay a higher premium for strategic takeovers can also be made for the patent-sale of a company. PE firms can acquire companies to make sure they acquire a certain patent, which provides the exclusive rights for a certain product, process or design. One can imagine the strategic benefits of such a company, operating solely or adding it to an already existing company in the portfolio of the PE funds. Hence, a positive influence on the bid premium is expected.

I manually collected the sizes of different PE firms for every data point used in this research, which provided the opportunity to identify state-owned funds as well. It would be interesting to see if the prices these funds pay for target companies differ from other funds. It could, for instance, be that state-owned funds have slightly different preferences compared to the more commercial funds. The focus could, for instance, be less on profit and more on other the political interest of the state. This is in line with Batjargal & Liu (2004), who report that the state plays a significant role in VC firms in China.

Here, the state plays the role of shareholder, investor, auditor and fund manager of VC firms simultaneously. This situation strengthens the regulatory chaos and uncertain external environment for VC firms. Hence, a negative relation on the bid premium is expected.

Overall, these parameters are important for PE – parties to take into consideration when doing a takeover. Some of them can be positive or negative. Therefore, these factors should be considered to determine their suggestive influence on the bid premium. A summary of the independent variables used in the regression is given in Table 2 below. The PE strategies will first be tested for significance, to see if they add any value as an explanatory variable of the bid premium in PE public transactions.

Table 2: Summary of findings independent variables

This table briefly concludes all identified findings and hypothesized effects of the independent variables used in this research. Explaining for an increase in the independent variable, a positive hypothesized effect means a positive influence on the bid premium and vice versa.

Parameters	Author(s)	Hypothesised effect
Target company parameters		
Maturity	Damadoran (2016)	Positive
Beta	Amihud & Medelson (1989)	Negative
Target company value	Gort and Hogarty (1970)	Negative
	Frank and Harris (1988)	Negative
pre-acquisition leverage	Kaplan & Stromberg (2009)	Positive
	Walkling and Edmister (1985)	Positive
Excess free cash flow	Jensen (1986)	Positive
	Servaes (1991)	Positive
	Lang et al. (1991)	Positive
	Frésard and Salva (2010)	Positive
Board independence	Cotter et al. (1996)	Positive
Market-to-book	Walkling and Edmister (1985)	Negative
	Robinson & Shane (1990)	Negative
Performance (ROA)	Khanna & Palepu, 2000	Positive
	Wright et al., 2007	Positive
PE-firm parameters		
Age PE-firm	Meuleman et al. (2009)	Negative
	Lerner (2000)	Negative
	Kaplan & Schoar (2005)	Negative
General Experience	Meuleman et al. (2009)	Negative
Experience as a lead investor	Meuleman et al. (2009)	Negative
PE -firm size	Kaplan & Schoar (2005)	Negative
	Robinson and Sensoy (2013)	Negative
PE Strategies		
LBO	UBS (2010)	Positive
	Wang (2012)	Positive
Buy-and-build	Walkling & Edmister (1985)	Positive
Patent sale	Walkling & Edmister (1985)	Positive
State-owned	Batjargal & Liu (2004)	Negative

2.4. Control variables influencing the bid premium

This section will describe some of the control variables found in previous studies, to control if anything other than the target specific and PE firm specific parameters are influencing the bid premium. These factors show to be important for bidders in (mostly) corporate takeovers and could therefore influence the bid premium to some extent. I will discuss the deal related parameters in section 2.4.1. and the macro-economic parameters in 2.4.2., ending this section with the sixth and newly defined seventh takeover wave.

2.4.1. Deal related parameters

Previous literature shows the results to be largely dependent on different factors. Namely: (i) the type of the takeover bid, (ii) full or partial control, (iii) the means of payments, (iv) domestic or cross-border operations, (v) legal origins of the country, (vi) the type of industry, (vii) in which stage of the M&A wave the takeover took place and (viii) the pre-announcement holdings. These variables are further elaborated below:

- (i) Martynova and Renneboog (2006) showed that the type of bid premium affected the target shareholders in the short-run, with hostile takeovers triggering substantial larger takeover premiums. This is also confirmed by other research (Jarrell et al., 1988; Wright et al., 2007).
- (ii) Martynova and Renneboog also find a difference between the announcement intention of full or partial control, with returns being higher for firms intending to take majority control. This is also supported by Walkling and Edmister (1985), who find a 9 percentage points higher premium offered when the bidder seeks a majority control, compared to a minority control. At least four factors should explain this negative reaction between the shareholders control and bid premiums: (1) increased ownership provides a direct influence on the actions of the target management, (2) shared ownership could provide the bidder with additional firm information, (3) increased ownership in a target firm would reduce the amount of shares needed to obtain any desired level of control and (4) bidders with previous commitments in the firms could be concerned as more serious in their acquisition attempt. Therefore, arbitrators would be more willing to buy the shares in an open market. This last point will be further elaborated on in this paper.
- (iii) Fishman (1989) argues that bidders use cash when they are well informed of the high value of a target to pre-empt competition. This is also supported by Martynova and Renneboog (2006), who find strong evidence that the means of payment have a large impact on the share prices of the bidder and target, with all-cash offerings triggering significant higher abnormal returns upon announcement compared to all-equity offers. Rhodes-Kropf et al. (2005) show that acquirers with high firm-specific errors use stocks when buying targets with relatively lower errors. In general, they find cash acquirers to be less overvalued compared to stock

acquirers. All-cash offers would therefore beckon to higher bid-premiums. It should be noted that this difference is only of importance for corporate takeovers, since PE takeovers in general are financed with cash, both for equity and hybrid structures like mezzanine and senior loans.¹⁴ Therefore, this variable will be left out, since it does not concern the specific industry examined in this study. All other explained variables will be used in this study.

- (iv) Another result which shows to affect the bid premium is the difference between cross-border and domestic takeovers, with domestic takeovers triggering higher wealth effects for target shareholders. This is in line with the paper of Prowse (1998), showing these effects for the angel investment market.
- (v) Furthermore, the legal origin of different countries shows an impact on the bid premiums in takeovers, with firms of French, German and EU – accession legal origins earning the lowest abnormal returns, compared to the UK and Scandinavian targets. This is also supported by the paper of Lerner & Schoar (2005), indicating this type of legal enforcement to be substantial for PE investments, showing higher valuations and returns in high enforcement countries. The English law is the common law made by judges and subsequently incorporated into legislature. The common law countries protect both the shareholders and the creditors the most, French civil law countries the least and German civil law and Scandinavian civil law lay somewhere in the middle (Porta et al., 1998).¹⁵
- (vi) Also, the type of industry influences the premium for the bidding and targeted firms. The industry control variable is important for capturing factors as risk, growth and (especially) potential synergies (Hope et al., 2010).¹⁶
- (vii) Additionally, Martynova and Renneboog reported different results for takeovers occurring in a different stage of a takeover wave, for both the bidding and the target firms. In specific, takeovers occurring at a later stage of the takeover wave would trigger lower gains for the shareholders.
- (viii) As previously mentioned, the pre-deal acquirer shareholders' funds should be controlled for. According to Robinson and Shane (1990), the bidder's per-announcement holdings could influence the bargaining power of an acquirer. Increased bargaining power would decrease competition and would therefore inversely affect the bid premium on the target its assets. This is also supported by the research done by Walking and Edmister (1985). On the other hand, Frank and Harris (1988) find higher returns for completed acquisitions in which bidders

¹⁴ Mezzanine is a hybrid of debt and equity financing that gives a lender the rights to convert to an ownership or equity interest in a company in case of default, after senior lenders are paid.

¹⁵ Classification made based on the results of Porta et al., 1998.

¹⁶ I will define "companies in related industries" as firms having the same 2-digit SIC codes. The definition of a SIC code is a Standard Industry Classification. These codes are four-digit numerical codes assigned by the U.S. government to business establishments to identify the primary business of the establishment.

held target shares before the merger activities began. To control for these issues, the pre-announcement holdings will be included as a dummy variable.

2.4.2. *Macro-economic parameters*

Some of the control measures used in this paper are macro-economic. This study will first consider the different time frames of the PE transactions, mainly because studies have shown different time periods to impact the bid premia paid in corporate takeovers. Also, some other macro-economic events impact the bid premium in corporate takeovers and are therefore worth taking into consideration. The periodic events will be explained in more detail below.

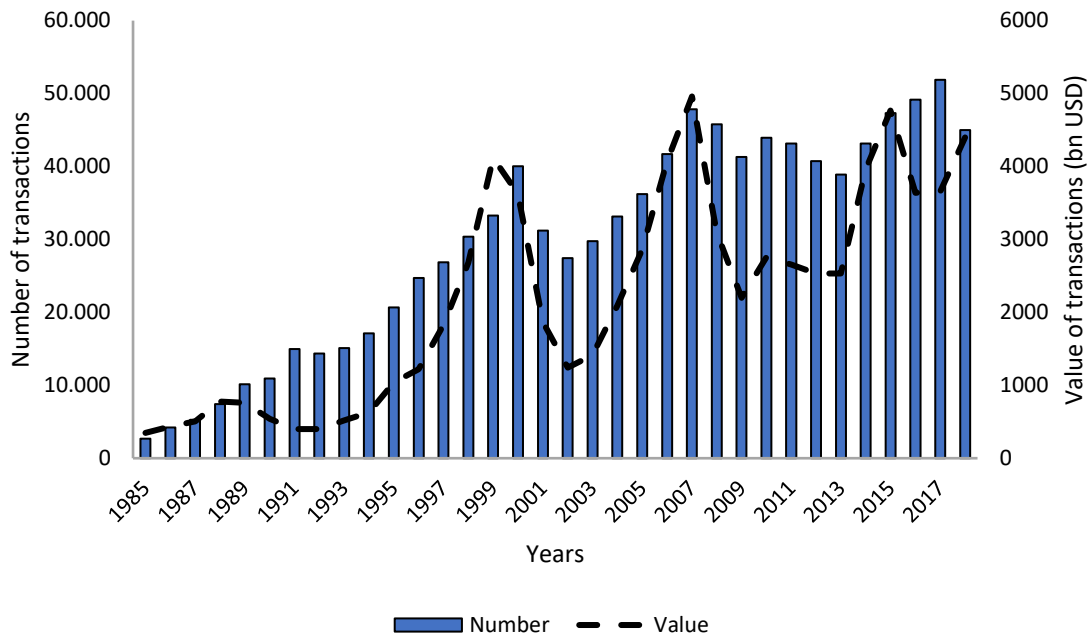
Numerous studies prove M&A activity to be cyclical by nature, with each wave having its own characteristics. As shown in Martynova and Renneboog (2006), M&A waves can influence the bid premiums while occurring in different phases of an M&A wave, because of the increased takeover volume taking place. Despite this valuable insight, the research did not account for any new takeover waves. Only the fifth takeover wave (1992 – 2002) is taken into consideration. According to Cretin et al. (2015), however, there is also a sixth takeover wave which took place between 2003 and 2009. The economic crisis with the fall of Lehman Brothers (2008) brought this wave to an end. After that period, from 2010 till 2012, M&A activity was modest and very chaotic, which is a characteristic of a waiting period between two waves. Though, data from 2013 shows strong evidence for an up-warded trend well underway. Cretin et al. (2015) build an index indicating the activity of M&A waves. This index shows that the industry is currently finding itself in the middle of a new cycle, with managers engaging in new growth projects for the future of their companies. In this paper, I will further elaborate on the impact of the newly defined seventh take-over wave on the takeover premiums in the PE sector.

According to the Institute for Mergers, Acquisitions and Alliances (IMAA)¹⁷, companies announced over 50'600 transactions in 2017 with a total value of more than 3.5 trillion USD (2.9 trillion EUR/ 2.5 trillion GBP). Compared to 2016, the numbers of deals grew only marginally by 2.9% while the value declined by 2.00%. Figure 2 below shows the number & value of M&A worldwide, with some clear peaks indicating some of the waves discussed in this section.

¹⁷ IMAA offers extensive and up-to-date information, data, research on M&A and Mergers & Acquisitions statistics for registered users.

Figure 2: Mergers and Acquisitions worldwide

This graph shows the number and value of the M&A transactions worldwide. Source: Institute for Mergers, Acquisitions and Alliances (IMAA).



In addition, a financial debt crisis influences the return of company values, provision of debt and stock market developments, over the last decade this was especially of importance for the American and European countries. In these periods stock markets were decreasing and eroding company values, resulting in lower bid premiums (Grammatikos & Vermeulen, 2011; Cretin et al., 2015).

There are also other macro-economic events which could potentially influence the bid premium. For instance, developing countries show to bid higher on average to acquire assets, compared to developed countries. One reason for this phenomenon is that takeovers in developing countries involve high-profiled acquisitions accompanied by nationalistic and political considerations, showing significant evidence for the influence of national pride on the premium paid for companies (Hope et al., 2010). Therefore, this paper will control for developed and developing countries to see if there is any influence on the quality purpose of the results. Other reasons for this, not described by Hope et al. (2010) could be the influence of the growth potential, illiquidity of stock and the diversification argument. Developing equity markets are increasingly seen as important sources for investment funds to diversify geographical risk. Additionally, there are more potential investments in growth opportunities to accelerate a funds potential need for riskier investments (Hearn et al., 2010).

In an addition to checking the political effects on the bid premium, one can add the year, country and industry effects. The fixed year and country effects are added because this paper does not assume that all differences across countries or within different years are driven by the independent variables.

Countries and different years in general should have some individual effects and are therefore taken into consideration.

To control for anything other than (i) the target company characteristics and (ii) the type of PE firm or some of the (iii) PE strategies are influencing the bid premium, the deal related parameters and macro-economic parameters will be taken into consideration. These variables are summarized below in table 3.

Table 3: Summary of findings control variables

This tables briefly concludes all identified findings and hypothesized effects of the control variables used in this research. Explaining for a positive hypothesized effect means a positive influence on the bid premium and vice versa.

Parameters	Author(s)	Hypothesised effect
Deal related parameters		
Hostile vs friendly	Martynova & Renneboog (2006)	Positive for hostile
Full vs partial control	Martynova & Renneboog (2006)	Positive for full control
	Walking and Edmister (1985)	Positive for full control
Cross border vs domestic	Martynova & Renneboog (2006)	Positive for domestic
	Prowse (1998)	Positive for domestic
Legal origin	Martynova & Renneboog (2006)	Highest for UK & Scandinavia
	Lerner & Schoar (2005)	Highest for UK & Scandinavia
Type of industry	Martynova & Renneboog (2006)	-
	Hope et al. (2010)	-
Pre-announcement holdings	Robinson and Shane (1990)	Negative
	Walking and Edmister (1985)	Negative
	Frank and Harris (1988)	Positive
Macro-economic events		
7th M&A wave	Martynova & Renneboog (2006)	Positive
	Cretin et al. (2015)	Positive
Financial debt crisis	Grammatikos & Vermeulen (2011)	Negative
	Cretin et al. (2015)	Negative
Developed vs developing	Hope et al. (2010)	Positive for developing
	Hearn et al. (2010)	Positive for developing
Year effects	Martynova & Renneboog (2006)	-
Country effects	Martynova & Renneboog (2006)	-

3. Hypothesis

Several hypotheses are proposed on the effect of target company specific variables and PE-firm specific variables on the bid premium in PE backed transactions, based on the existing empirical literature and economic theory described in the literature review.

3.1. Target company specific hypothesis

As previously elaborated upon, there are target specific parameters potentially influencing the bid premium paid by PE firms. These are expected to have an influence on the (bid) price PE-firms pay to acquire target companies. The first parameter considered is the maturity of a target company.

There is consensus in the literature that companies maturing over time become less likely to default compared to new companies in the market. Because of the proven value of the resources and capabilities of a target company, it would be less risky for bidders to acquire the company. Hence:

Hypothesis 1: The expected relationship between the maturity of a target company and the bid premium is positive.¹⁸

Another parameter described is the beta of a company. A higher beta indicates more systematic risk. Theory suggests less risky companies to be beneficial for acquiring firms, therefore a discount on the bid premium for a higher beta in a takeover is expected. Hence:

Hypothesis 2: The expected relationship between the beta of a target company and the bid premium is negative.

Also, the size of a target company plays a role. When a company determines a big proportion of the fund size, the manager's assets would be less diversified and would therefore be exposed to more risk. This will result in a lower bid premium, hence:

Hypothesis 3: The expected relationship between the size of a target company and the bid premium is negative.

Because of the combined effect of traditional LBO strategies and the co-insurance effect, higher premiums are expected for higher pre-acquired leverage ratios. Hence:

Hypothesis 4: The expected relationship between the pre-acquisition leverage of a target company and the bid premium is positive.

¹⁸ A positive influence, meaning a higher premium and vice versa.

Theory suggests that bidders could gain more from companies with high liquidity, because of the possibility to reduce agency cost. Hence:

Hypothesis 5: The expected relationship between the liquidity of a target company and the bid premium is positive.

A governmental parameter tested will be the independence of the target its board members. The logic behind this would be that independent boards should be better in evaluating the source of the gains and therefore better in evaluating their own company value. This would extract higher premiums, hence:

Hypothesis 6: The expected relationship between the independence of the board of a target company and the bid premium is positive.

If the market price of a company is not adequately reflected, bargain acquisitions could be more likely. Therefore, higher bid premiums are expected on companies with lower market-to-book ratios (and vice versa), where assets are most presumably undervalued. Additionally, a relatively low market-to-book ratio could potentially indicate target management inefficiency. Replacing an inefficient target management could engage benefits for the PE-firm after a takeover. Hence:

Hypothesis 7: The expected relationship between the market-to-book value of a target company and the bid premium is negative.

If a company is performing poorly, there is little incentive for the shareholders to hold on to the assets of the company. Therefore, shareholders could be likely to accept a lower takeover premium because they are looking for a potential exit route. Hence:

Hypothesis 8: The expected relationship between the performance of a target company and the bid premium and is negative.

3.2. Private Equity firm specific hypothesis

Also, there are some variables potentially influencing the bid premium for PE-firm specific factors. Previous research, for instance, showed that the *age*, *experience as a lead investor*, *fund size* and the *general experience* influence syndication and agency cost and can therefore influence the bid premium in a transaction. Intuitively, one can think about this as ‘‘the most professional firms bargaining the most optimal prices’’. As discussed, one could expect more professional PE firms to have stronger bargaining power and to have better knowledge in evaluating a company’s value. Also, reputable PE groups are expected to have lower borrowing costs, longer loan maturities, and rely more on institutional loans, therefore enhancing lower premiums in takeover attempts. Hence:

Hypothesis 9: The expected relationship between a PE firm's age, experience as a lead investor, fund size and general experience with the bid premium is negative.

3.3. Hypothesis about the strategic takeovers

As discussed, this paper will incorporate four takeover strategies, namely: LBO, the buy-and-build strategy, patent sale and state-owned funds. Buy-and-build, patent sale, and LBO are expected to create synergies, economies of scale and would provide investors with the possibility to gain more return on invested assets, therefore potentially adding extra value for the bidding company. Hence, all are expected to have a positive influence on the bid premium except for the state-owned funds, since these are considered more controversial and less efficient. First, I will test the significance of the strategies to see if I can add these to my OLS regression. If some are significant, I will control these for other factors potentially explaining the effect on the bid premium.

All hypotheses will be tested by doing an Event Study and econometrical OLS-regression, which will be further elaborated on in the methodology. The control variables will be added to see if these explain some effect on the bid premia in PE takeovers.

4. Methodology

The bid premium (PREM) paid by the PE firms will be determined by an event study using several target company specific factors and PE firm specific factors. This will help provide more insight on why PE firms pay certain premiums over a target company. The effect will be measured on the complete dataset, also considering strategic takeovers. First, it will be important to explain more about the event study methodology used in this paper. Second, the estimation of the abnormal returns (PREM) will be elaborated on and eventually the use of the econometrical OLS regression model will be further defined.

4.1. Event study methodology

Event studies frequently help economists to measure the effect of an economic event on the value of firms. Using financial market data, an event study measures the specific event on the value of a firm. This is useful because, given the rationality provided in the marketplace, effects of a certain event will be reflected immediately in the security prices. In this research, the event will be the announcement date of a PE takeover in the market.

After defining the event of interest, another task of conducting an event study is to identify the period over which the security prices of the firms involved in this event will be examined – the event window. This research will examine different event windows around the announcement date, capturing the price run-ups of the announcement as well.

After defining the event window, the specific data required is determined. This is briefly explained in the data section of this research.

To assess the impact of the event a measurement of abnormal returns is required. In general, abnormal returns are defined as the difference between realised returns (R) minus the normal returns $E(R|X)$ or benchmark returns. For firm (i) and event date (t) the abnormal return is calculated as follows:

$$AR_{i,t} = R_{i,t} - E(R_{i,t} | X_t) \quad (1)$$

In this study, to facilitate the examination of the impact of the bid announcement, the Event Study Tool will be used. The Event Study Tool is a built-in tool provided by the Erasmus University of Rotterdam. This tool enables to do an event study with DataStream data. It calculates the mean adjusted returns and the market model adjusted returns, the latter of which is used in this study. This is done by importing the specific ISIN codes and announcement dates of the PE takeover deals examined.

4.2. Abnormal return estimation

As discussed, to facilitate the examination of the impact of the bid announcement the Event Study Tool will be used. This section will provide more background on the principles used by this tool, as well as an explanation of the abnormal return calculations.

Two kinds of benchmarks will be used (in separate regressions) for the regressions, namely the MSCI-world index and all the local market specific indices, to make sure the results are robust.¹⁹

After the selection of my normal return- or benchmark model, the estimation window needs to be defined. The most common choice is the period prior to the event window, to prevent the event (including the price run up) from influencing the normal performance model parameters (MacKinlay, 1997). In this research, I will follow the same estimation period conducted by Martynova and Renneboog (2006), which is 300 to 60 days prior to the event (total period of 240 days).

With the parameter estimates for the normal performance model defined, the abnormal returns can be calculated, which will be explained in the next paragraph.

There are three common choices for modelling the normal returns – the *constant mean return model* where X_t is a constant, the *market model*, where X_t is the market return and the *Fama-French* three factor model. The constant mean model implies that the mean return of a security stays constant over time, whereas the market model assumes a stable linear relation between the market return and the security return. The Fama-French three factor model considers (i) market risk, (ii) outperformance of small versus big companies, and (iii) the outperformance of high book/market versus small book/market

¹⁹ The MSCI- world index is a value weighted global equity index that represents large and mid-cap equity performance across 23 developed market countries.

companies. Consistent with the previous studies, I will adopt the persistency assumption and estimate the market model.²⁰

The market model is a statistical model which relates the return of any given security to the return of the market portfolio. The linear specification of the model follows from the assumed joint normality of asset returns. For firm (i) and for any specific period (t) the market model calculates the normal returns as follows:

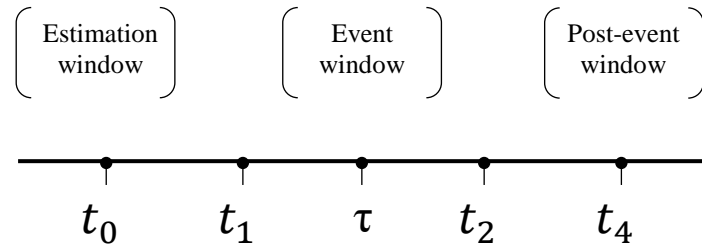
$$R_{i,t} = \alpha_i + \beta_i * R_{mt} + \varepsilon_{i,t} \quad (2)$$

$$E(\varepsilon_{i,t} = 0) \quad \text{Var}(\varepsilon_{i,t} = \sigma_\varepsilon^2)$$

Whereas R_{mt} stands for the actual market return on day t, α_i captures the differences in the risk-free rate across countries and the risk of a security with respect to the market portfolio will be captured in β_i .

After setting the market estimates, the abnormal returns can be measured and analysed. The abnormal return observations must be aggregated to draw conclusions about the results. First, it is important to define some notations. Returns will be indexed in an event time using τ , which denotes an event window (t_1, t_2) as showed in the figure 3 below:

Figure 3: The timeline for an event study



The estimation window will be (t_0, t_1) . The cumulative abnormal returns will be calculated as the sum of all including abnormal returns in the event window, meaning:

$$CAR_i(t_1, t_2) = \sum_{t_1}^{t_2} AR_{i,t} \quad (3)$$

²⁰ The constant mean return model is excluded because it assumes the impact of the market to be similar across securities. Furthermore, there is significant variation in the risk-free interest rates across countries, as shown in Martynova & Renneboog (2006).

The cumulative average abnormal returns (CAARs) for N securities over different event windows (from T_1 to day T_2) will be calculated as follows:

$$CAAR_{\tau} = \frac{1}{N} \sum_{i=1}^N CAR_{i,\tau} = \frac{1}{N} \sum_{i=1}^N \sum_{t=T_1}^{t=T_2} AR_{i,t} \quad (4)$$

To test the significance of the CAARs for the different event windows, I will do both a standard parametric test as a non-parametric rank statistic. The parametric statistics differ regarding their assumptions whether abnormal returns are constant across the different securities or increase with the variance. Both tests assume joint normality of the abnormal returns. The portfolio test statistic, which will be the parametric test, assumes that the ARs are larger for securities with higher variance. Hence, equal weights are given to the returns of individual securities. The statistic is distributed as Student's t and will be calculated as:

$$t_p = \frac{CAAR_{\tau}}{\sigma^{\wedge}(CAAR_{\tau})} \quad (5)$$

Where $\sigma^{\wedge}(CAAR_{\tau})$ is an estimator of the cross-sectional standard deviation of CAARs over the event window τ for the sample of N securities:

$$\sigma^{\wedge}(CAAR_{\tau}) = \sqrt{\frac{1}{N^2} \sum_{i=1}^N \sum_{t=T_1}^{t_2} \sigma_i^{\wedge 2}} \quad (6)$$

Where σ_i^{\wedge} is an estimator for the standard deviation of the ARs for target company I will compute over the *estimation window* (t_0, t_1) :

$$\sigma_i^{\wedge} = \sqrt{\frac{1}{L_i - 2} \sum_{t=t_0}^{t_1} (R_{i,t} - \alpha_i - \beta_i R_{m,t})^2} \quad (7)$$

Where L_i is the number of observations for security I in the estimation window (t_0, t_1) , which will be 240 in this research [-300, -60].

In parametric approaches it is assumed that the distribution of the random variable being sampled is known, with some exceptions. In practical problems however, the functional form is seldom known. It is therefore desirable to also perform some procedures that are free of this assumption

concerning the functional distribution. These are called non-parametric procedures, composed of the median instead of the mean. A very well-known and often used test is the Wilcoxon signed-rank test.

Suppose the sample of this research with X_1, X_2, \dots, X_n , with an observed value of x_1, x_2, \dots, x_n from a continuous and symmetric distribution function F_x , which will be the CARs with a median M_x . The null hypothesis concerning the value of the median is written as $H_0 : M_x = M_0$, where M_0 is the median of random variable X , which will be tested to differ significantly from zero. The Wilcoxon signed-rank statistic, where $r(|d_i|)$ is the rank statistic, is symbolically written as follows:

$$T^+ = \sum_{i=1}^N r(|d_i|) I(d_i > 0), \quad (8)$$

Where $d_i = X_i - M_0$, and I is the indicator function.

$I(\rho) = 1$ if ρ is true,

$I(\rho) = 0$ if ρ is false.

For a large sample size ($n > 15$), the test statistic is given by:

$$Z = \frac{T^+ - n(n+1)/4}{\sqrt{2n((n+1)(2n+1)/48)}}, \quad (9)$$

whose distribution, under the null hypothesis, is approximately standard normal (Taheri & Hesamian, 2013). The outcome of both the parametric and non-parametric tests performed on the dependent variables for different event windows are displayed in table 7 and will be discussed in the results chapter of this study.

4.3. Construction of variables

This study will use different variables to estimate a potential effect on the bid premium of PE takeovers. This section will explain the construction of some of these used variables.

As described in the data section, the expertise measure will be constructed out of the PE-firm size, age, experience as a lead investor and general experience. This will be done by performing a Principal Component analysis. Principal Component Analysis (PCA) is a multivariate technique that analyses a data table in which observations are described by several inter-correlated quantitative dependent variables. Its goal is to extract the important information from the table, to represent it as a set of new variables called principal components. The quality of the PCA can be evaluated in different ways. In this research I will conduct the quality steps in twofold. First, I will perform the traditional analysis by looking at the eigenvalues of the newly constructed components. After that, I will perform

a Kaiser-Meyer-Olkin (KMO) test, providing an index of the proportion of variance between the variables. The outcome can be found in table 12-15 of Appendix A, the regression results.

The traditional measures of the Eigenvalue are used only to keep the components with an eigenvalue larger than 1. As one can see in table 12, the eigenvalue of the newly created value is 2.022, which is >1. The other values are below the eigen value of 1, which indicates that 1 component can explain all variables (Abdi & Williams, 2010).

The KMO test provides an index (between 0 and 1) of the proportion of variance among the variables that might be common variance, i.e. that might be indicative of underlying or latent common factors. A higher KMO means a more statistically acceptable factor solution representing the relation between the parameters. As indicated in table 13 of the Appendix, the value is found to be 0.687, which is above the suggested 0.6 value (Shieh et al, 2010).

4.4. OLS – estimation

For my OLS estimation²¹, I will use the following econometrical regression model to assess the impact of the different company and firm specific drivers influencing the bid premium in PE takeovers:

$$\begin{aligned}
 PREM_{i,t} = & \alpha_i + \alpha_i * Control\ Variables + \beta_1 * COMP_{MATURITY} + \beta_2 * COMP_{BETA} + \beta_3 * \\
 & COMP_{SIZE} + \beta_4 * COMP_{LEVERAGE} + \beta_5 * COMP_{LIQUIDITY} + \beta_6 * COMP_{BOARDINDEPENDENCE} + \beta_7 * \\
 & COMP_{MARKET-TO-BOOK} + \beta_8 * COMP_{PERFORMANCE} + \beta_9 * STRATEGY_{BUY-AND-BUILD} + \beta_{10} * \\
 & PE_{FPC\ EXPERTISE} + \beta_{11} * Fixed\ Effects + \varepsilon
 \end{aligned}$$

I will use the independent variables as described in the data section and test if anything other than the explanatory variables are influencing the bid premium by using some control variables, presented in the executive summary of the literature review.

²¹ In statistics, ordinary least squares (OLS) is a type of linear least squares method for estimating the unknown parameters in a linear regression model.

5. Data sources and descriptive statics

This section will describe the data sources and descriptive statics used in this research. First, I will describe the sample selection and data sources. Second, I will describe the independent variables which consist of the target company specific factors and PE-firm specific factors. Finally, I will describe the control variables used in this research which consist of some deal-specific and macro-specific factors.

5.1. Sample selection and data

A sample of 573 observations of PE takeover data between 2008 and 2018 – during the financial crisis and the seventh takeover wave – was obtained from Zephyr, a comprehensive international deal information database from Bureau van Dijk (BvD). In addition to Zephyr, I also used Orbis and Thomson Reuters DataStream to extract company specific and financial data. Orbis contains information about public and private companies worldwide, while Thomson Reuters contains financial data about companies. Apart from providing the financial data – in my case the stock prices for the specific deals – DataStream also provides the opportunity to crosscheck and supplement the company specific data retrieved from Orbis. After combining the data retrieved from these three databases, I manually searched for the size and the age of 337 different PE firms. I also reallocated all individual funds to their main PE-firm, not to create any bias.

One of the major constraints in research on PE is gaining access to the often highly confidential and sensitive data concerning deal structuring. Therefore, this study focuses mainly on public takeovers. Because of the unique combination of three comprehensive databases, together with manually selected data, sufficient data should be provided to answer the research question.

First, all specific deal information was extracted from Zephyr. After checking for any missing values, the dataset was merged with the Orbis database. This merge was possible by using the specific BvD ID numbers.²² After extracting the company specific information and linking it to the deal specific information from Zephyr, the dataset was checked and imported in the Thomson Reuters DataStream database by using the specific ISIN numbers.²³ All valuable data points were crosschecked with announcement dates and all missing values deleted.

Because of the special regulatory environment and accounting issues related to financial institutions, this paper only focuses on non-financial targets, not to create any bias. This means that certain investments were excluded, such as investments in banks; saving banks; unit trusts; mutual funds and pension funds, using the SIC codes of every target company. The paper of Walkling and Edmister (1985) shows that premiums in successful offers are 13 percentage points higher than those in

²² The BVD ID numbers are special identification numbers of Bureau van Dijk, identifying each security individually.

²³ An International Securities Identification Number (ISIN) uniquely identifies a security. The ISIN code is a 12-character alphanumeric code that serves for uniform identification of a security through normalization of the assigned National Number, where one exists, at trading and settlement.

unsuccessful attempts. Therefore, the dataset will only consist of completed deals, to keep the results unbiased.

To facilitate the examination of the impact of the bid announcement the Event Study Tool will be used. The Event Study Tool is a built-in tool provided by the Erasmus University of Rotterdam and enables to do an Event Study with DataStream data. It calculates the mean adjusted returns and the market model adjusted returns, the latter of which is used in this study. This is possible by importing the specific ISIN codes and announcement dates of the PE takeover deals examined.

Furthermore, bids made by the same bidder are excluded if these bids occur within less than 300 days since the previous announcement of the bid. The reason for this is to avoid any bias in the estimation period of 240 days, ending 60 days before the announcement. Also, it is very important to exclude exits from my sample of PE-firms, since the main purpose of this research is on PE-takeovers. PE-firm exits can cause different dynamics around the bid premium and would perhaps be a valuable insight for further research to examine. My final sample consists of 573 public PE takeovers involving 337 different PE- firms in 50 different countries.

5.2. Independent variables

The summary statistics on the measures used in this research are displayed in table 4. I use several variables to test the influence on the bid premium in PE takeovers. Studies of high quality data show high percentages of gross errors in each tail of asymmetric data, sometimes much higher (Hampel et al., 2011). Therefore, all continuous variables will be controlled for outliers and winsorized. Winsorizing or winsorization is the transformation of statistics by limiting extreme values in the statistical data to reduce the effect of possibly spurious outliers, named after biostatistician Charles P. Winsor. In this study, asymmetric trimming strategies will be performed following the paper of Kesselman et al. (2008).

The explanatory variables can be divided into 3 main categories: (i) target company specific measures, (ii) PE-firm specific measures and (iii) strategic takeovers. The control variables can be further divided into: (i) deal specific measures and (ii) macro-economic measures. These measures will be explained in detail below.

5.2.1. Target company specific factors

To account for the company specific characteristics, the following target company specific effects will be examined: *maturity*, *beta*, *target company size*, *pre-acquisition leverage*, *liquidity*, *market-to-book ratio*, *independence of the board* and *the performance* of the company.

First, the maturity of the company will be measured in years from the date of incorporation until 2018. The function itself does not seem to be normally distributed, I will therefore use the natural logarithm of the maturity of a company. Performing an analysis on the outliers, this variable can best be winsorized 1% on each tail.

The beta is a measure of market risk that shows the relationship between the volatility of the stock and the volatility of the market. This coefficient is based on between 23 and 35 consecutive month end price percent changes and their relativity to a local market index. Only monthly data after the fresh start date is used for companies that have emerged from bankruptcy. The beta will be linked to the specific announcement date to keep the results unbiased. The variable seems to be normally distributed, further analysis shows its outliers to be most concentrated in the upper tail. This variable will therefore be winsorized for 1% and 96% up the tails.

The size of the company will be measured by the specific transaction value of the announced bid. To normalise the variable, the natural logarithm will be taken. This variable does not need to be further winsorized since it shows now extreme outliers.

The pre-acquisition leverage is conducted as an accounting ratio, to show which debt-to-equity level was handled in the company at that specific point in time. For this, the gearing ratio is used. The gearing ratio is a measure of financial leverage that demonstrates the degree to which a firm's operations are funded by equity capital versus creditor financing. The gearing ratio is conducted as the (long-term debt + short-term debt + bank overdrafts) / shareholders equity. The logarithm of this variable will be taken to check its influence on the bid premium.

The liquidity of a target company will be measured by the current ratio. The variable will be the log of the current assets / current liabilities, winsorized for 5% at each tail. This will provide an estimate of the assets companies have at hand to undertake certain actions.

Another measure is the independence of the board of a company. This variable is constructed as a dummy variable, where if the decision maker (DM) of a company is also a shareholder, the value would be one. The value would be zero if the DM of a company do not own any shares. In this study, approximately 36% of the sample contains current managers as shareholders in the firm, as shown in table 6 of this paper.

The market-to-book value is extracted as a value from DataStream and crosschecked with Orbis. The logarithm of this value will be taken. This value is constructed by dividing the book value of firm with the market value of the firm and is winsorized for 1% and 94% at each tail.

For the performance, this paper will look at the ROA, retrieved from Orbis and crosschecked with the DataStream database. The ROA is calculated using as the net income divided by the total assets. Winsorized for 8% and 98% at each tail.

5.2.2. *Private Equity firm specific measures*

To account for the PE firm specific characteristics *age*, *experience as a lead investor*, *general experience* and the *PE-firm size* will be used.

Age will be measured in years from the date of incorporation of the PE-firm (not the fund) until 2018. Experience as a lead investor will be used counting all different majority deals done by the firm over the years of the dataset (2008-2018). General experience will be measured as all different deals in

general done by a PE-firm, over the life span of the dataset. I will conduct a multivariate analysis to study if the data involved has a substantial number of correlated variables. Additionally, I will consider the fund size AUM of a PE firm to examine its influence on the bid premium. Together, these variables will be used to construct one new factor, also based on economic literature, namely ‘expertise’ (Meuleman et al., 2009).

All continuous statistics are summarized in the descriptive statics table 4 for independent variables of this paper. The correlation matrix can be found in table 9 of Appendix A. As shown in table 9, the variables age, PE-firm size, general experience and experience as a lead investor seem to be positively correlated with each other, which is in line with the analysis of these variables elaborated on in the methodology.

Table 4: Summary statistics on continuous variables

Descriptive statistics on the continuous variables of all (573) deals used in the sample for 337 different PE-firms in 50 different countries.

		Mean	S.D.	Min	Max
Company maturity	Measured in years	34	28	4	144
Beta	Volatility of stocks	0,8	0,6	-0,9	2,4
Target company value	Target value (EUR million)	400,2	1.939,3	0,1	30.434,1
Pre-acquisition leverage	Gearing ratio (%)	98,5	129,5	0,0	960,8
Excess free cash flow	Current ratio (%)	2,1	1,6	0,1	6,7
Market-to-book	Market-to-book ratio (%)	2,2	1,7	0,0	6,6
Performance	Return on Assets (%)	0,6	10,5	-21,4	23,0
General Experience	# deals in dataset	3,4	3,2	1,0	13,0
Experience as a lead investor	# majority deals in dataset	0,9	1,4	0,0	6,0
Age PE-firm	Measured in years	26	18	4	90
PE -firm size	PE-firm value (EUR billion)	19,4	45,6	0,1	351,3

This table summarizes all descriptive statistics on the continuous variables used in this study. Source: Zephyr, DataStream, Orbis and own research.

Most of the deals of this dataset seem to be coming from Europe. While most deals come from Europe, the largest portion of AUM for the PE firms and largest portion of target value comes from the US. On average US target deals and PE-firms seem to be bigger in size, compared to for instance European and Asian takeover deals. On the other hand, Europe shows to have more older firms on average. The statistics by continent can be found in table 5 below.

Table 5: Summary statistics by continent

This graph shows some general statistics per continent of the data used in this research.

	Europe	Americas	Asia	Africa	Australia	All firms
# deals	225	176	139	4	29	573
PE-firms						
AUM (bn EUR)	3.209	6.064	3.213	13	634	13.133
Average AUM (bn EUR)	14	23	23	3	22	19
Average age	28	25	26	34	23	26
Companies						
Target value (bn EUR)	37	173	12	0.077	6	229
Average target value (mn EUR)	166	985	87	19	211	400
Average age company	41	27	33	21	29	34

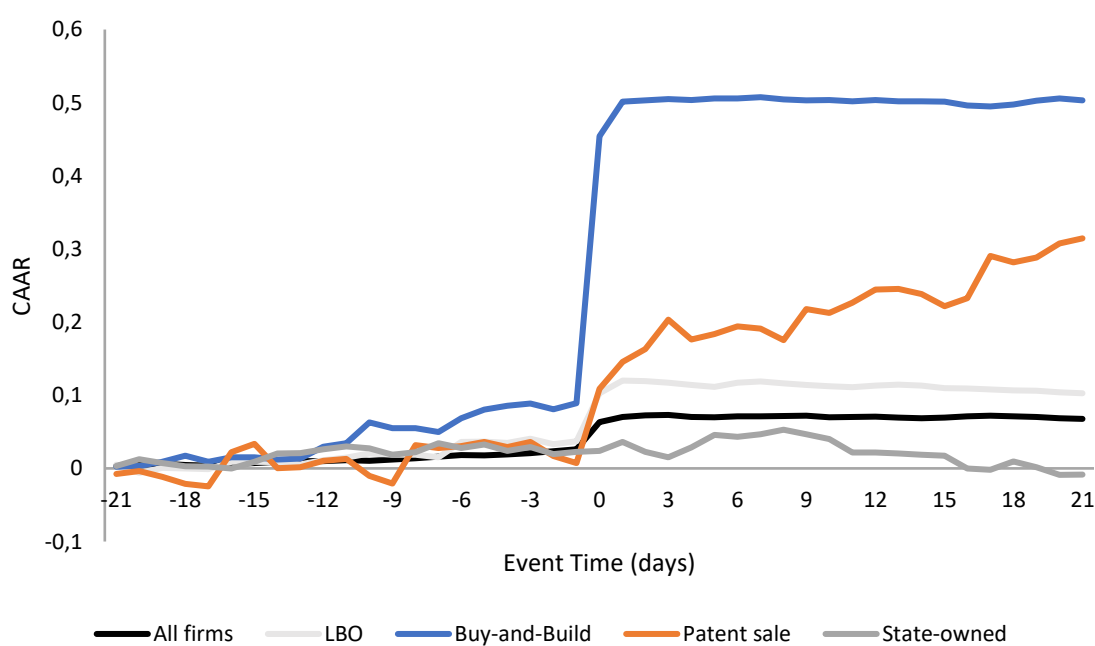
This table geographically summarizes some descriptive statistics used in this study. Source: Zephyr, DataStream, Orbis and own research.

5.2.3. Strategic takeover measures

In this paper, I will also look at certain subsamples of the complete dataset, by using dummy variables. As one can see in figure 4, the company CAARs differ strongly amongst the different strategies.

Figure 4: Target company CAARs by PE firm strategy

This figure shows the market reaction to the announcement of different PE strategies for the target company as the CAARs 20 days before and after the event (day 0). The benchmark used is the MSCI-world index; the model parameters are estimated over 240 days starting 300 days prior to the acquisition announcement. Source: own proprietary dataset, retrieved from Zephyr, DataStream and Orbis.



First, the strategies buy-and-build, and patent sale seem to have higher CAARs around the announcement date compared to the entire dataset and all other strategies. This seems to be in line with the economic literature previously described, suggesting PE-firms to pay extra for synergies, economies of scale and a unique set of resources and capabilities. Furthermore, the state-owned funds seem to provide lower CAARs compared to the complete dataset, as also in line with the hypothesis made. These assumptions will be further tested in this research to see if one or more strategies are affecting the bid premium in PE public takeovers.

5.3. Control variables

I will use some control variables to control if anything other than the explanatory variables are influencing the bid premium. These control variables are divided into two subsamples, namely the deal-specific and macro-specific variables. All variables are either fixed effects or dummy variables and are based on economic and empirical evidence of previous research.

5.3.1. Deal-specific variables

The deal-specific variables used in this research are: *hostile vs friendly*, *cross border vs domestic*, *legal origin*, *type of industry* and *pre-announcement holdings*.

Hostile vs friendly captures hostile or rivalry takeovers in the dataset, whereas the dummy variables equal one if there is a hostile takeover and zero if it is a friendly takeover. Cross-border identifies whether the deal is done in the domestic country of the PE firm or in another country, the value will be one if the takeover is cross-border. The legal origin is divided in five main categories, namely: English, French, German, Scandinavian and other, whereas other origin is omitted in the regressions due to multicollinearity. Another deal related parameter will be the type of industry fixed effects. Following the Central Limit Theorem, I will be using the 2-digit SIC codes instead of the 3-digit SIC codes due to the size of my population, keeping my regression smooth and normalised (Isreal, 1992). Finally, the pre-announcement deal holdings will be indicated, with a value one if the acquiring PE-firm was already holding shares in the target company.

5.3.2. Macro-economic variables

Some of the macro economic variables discussed are: the 7th *M&A wave*, *financial debt crisis*, *developed vs developing countries*, *fixed year* and *fixed country* effects. The 7th M&A wave will be measured by a fixed period between 2013 and 2018, as indicated by Cretin et al. (2015). This will be similar for the financial debt crisis, following the period between 2008 and 2011 (Beirne & Fratzscher, 2013). Developed vs developing will be measured using a dummy which equals one if the deal finds itself in a developed country. These categories are based on the United Nations publication "Standard

Country or Area Codes for Statistical Use".²⁴ Finally, the fixed year and the fixed country parameters will be added to the regression, to see if it captures any specific country or year effect. The macro-economic variables will be carefully tested for multicollinearity, due to high likelihood of correlation between the fixed factors.

Table 6: Summary statistics on dummy variables

Descriptive statistics on the dummy variables of all (573) deals used in the sample, for 337 different PE firms in 50 different countries.

		All deals (573)	%	Mean	S.D.
Board independence	1 = DM is also a shareholder	210	37%	0.366	0.482
Full vs partial control	1 = Majority control	174	30%	0.304	0.460
Buy-and-Build	1 = Buy-and-Build	12	2%	0.021	0.143
Hostile vs friendly	1 = Hostile (rivalry) takeover	17	3%	0.030	0.170
Cross border vs domestic	1 = cross-border	274	48%	0.478	0.500
English origin	1 = English origin	227	40%	0.483	0.500
French origin	1 = French origin	125	22%	0.218	0.413
German origin	1 = German origin	69	12%	0.120	0.326
Scandinavian origin	1 = Scandinavian origin	36	6%	0.063	0.243
Developed vs developing	1 = Developed	431	75%	0.752	0.432
Pre-announcement holdings	1 = Pre-announcement holdings	179	31%	0.312	0.464
7th M&A wave	1 = 7th-M&A wave	241	42%	0.421	0.494
Financial debt crisis	1 = financial-debt crisis	279	49%	0.487	0.500

This table summarizes all descriptive statistics on the dummy variables used in this study. Source: Zephyr, DataStream, Orbis and own research.

6. Empirical results and analysis

In this section, I focus on the OLS analysis of the target company specific and PE firm specific factors on the CARs for public takeovers in the PE sector. These results are shown in table 8 of this paper. First, I will analyse the bid premium by event window, in general and for different strategies. Second, I will describe some overall implications of the OLS results. Furthermore, the control variables used in the regression will be described, since these are variables shown to be of influence in previous economic literature. Finally, I will describe which target-specific and PE-specific variables are influencing the price PE-firms are paying for target takeovers.

²⁴ <https://unstats.un.org/unsd/methodology/m49/>

6.1. Analysis of the bid premium

This section will briefly analyse the outcomes of the different event windows for the bid premium, the bid premium in general and the outcomes for the different strategies used in this study.

6.1.1. Analysis by event window

As elaborated on in the literature review, previous studies have frequently showed the presence of abnormal returns with takeover announcements. The question is therefore not particularly whether there is a bid premium, but more which event window would fit the specific industry best for the study conducted in this paper. As one can see in table 7 below, the t -statistic and z -statistic of the parametric and non-parametric test are performed for the different event windows. The best fitting event windows for my data seem to be $[-20,1]$ and $[-10,1]$. For this research I will initially focus on $[-10,1]$, based on previous economic literature. I will check the other event windows as well, to see if they provide similar results.

Additionally, the CAARs are found to be relatively low compared to the CAARs discussed in the literature review for corporate takeovers, for which even price run-ups exist between 13% and 22%. A potential explanation for this could be the main purpose of the takeovers. For corporates, in general, the main purposes of takeovers are strategic. For instance, to expand the product horizon, enter a new market or strengthen the market position. PE-firms buy companies, in general, to earn money, leaving the Buy-and-Build and patent sales as an exception. With an investment horizon between 5-7 years. This could mean that overall PE-firms are less willing to pay a premium compared to corporations active in takeovers.

Table 7: CAARs by event window

This table reports the average values of CAARs for the target takeover firms for 5 different event windows. $T=0$ stands for the day of the bid announcement. Abnormal returns are computed as the difference between realised and market model benchmark returns. For each firm I used the daily benchmark returns using the MSCI-world index returns and the market model parameters are estimated over 240 days starting 300 days prior to the acquisition announcement and ending 60 days prior to the announcement. One parametric test (t -statistic) and one non-parametric (z -statistic) test are used to assess the significance of the CAARs. '% Positive' is a percentage of takeover announcements with a positive CAR in my sample. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Event Window	$[-20,20]$	$[-20,1]$	$[-10,10]$	$[-10,1]$	$[-1,-1]$	$[T=0]$
CAAR (%)	7,9%	8,7%	6,9%	7,2%	5,6%	4,4%
Simple t stat.	6.00***	8.27***	7.17***	8.24***	7.69***	6.62***
Gen. Sign. Test	6.26***	8.26***	6.83***	8.08***	7.83***	7.09***
% Positive	59%	62%	61%	62%	60%	58%
Observations	573	573	573	573	573	573

6.1.2. *Analysis of the different strategies*

As shown in the test statistics of table 11 in Appendix A, the only strategy that significantly influences the bid premium is the buy-and-build strategy. This is a robust outcome, also considering Figure 4, which shows the CAARs of the different strategies around the announcement date to differ quite significantly. Therefore, I will include the buy-and-build measure in my econometrical OLS regression, performed further on in this research.

6.2. **General implications for the OLS regression results**

The performed regressions show a normal distribution and are tested for robustness, as they show no form of heteroskedasticity, multicollinearity or autocorrelation. Also, the residual-fitted plot seems to be robust. As well as the individual values, as they seem to follow a linear relation. Only when adding the fixed industry-, year- and country effects, multicollinearity is to be found between the macro-economic control variables. Therefore, the macro-economic effects showing multicollinearity will be dropped for the last regression. This concerns the following effects: origin, developed vs developing, 7th M&A wave and the financial debt crisis. Additionally, the results show not to be different when using other event windows for the dependent variables, as briefly described in the literature review. Further information about the robustness test can be found in Appendix B of this paper. All variables added one-by-one seem to better explain the variance of the bid premium, as the R-squared rises over the regressions displayed in table 8.

The intercept (or constant) is often interpreted as the mean of the response value when all predictors are zero. Mathematically that is correct, however a zero setting for all predictors in a model is often an impossible and nonsensical combination. Meaning a linear fit might makes sense (or at least be an adequate approximation) for the space the predictors reside in, but that does not mean the fit makes sense. In general, the significance of the constant in a regression model should be ignored, except for very rare cases. The key reason why the constant should be used in a regression model is because it guarantees that the residuals have a mean of zero, which is one of the conditions of a regression analysis (Keith, 2014). Meaning no further analysis of the constant is required for an OLS estimation.

6.3. **Deal specific and macro-economic fixed effects on the bid premium**

As shown in the results of the first regression of table 8, most deal-specific and macro-economic control variables do not directly influence the bid premium. Because this study finds itself in a new area of focus, this phenomenon can very likely be the case specifically for the PE-industry. Still, there are two variables strongly showing their significance on the bid premium, one of which is full vs partial control. The robust coefficient is showing that when a firm is seeking full control over a company instead of partial control, it would pay 0.135 additionally as a premium. The constant of this regression is 0.042 and the CAAR or average CAR for the event window [-10,1] is about 0.0722, meaning for full control over a company, a PE firm is willing to pay about 3 times more premium on average, compared to partial

control. Considering regression 12 of table 8, the influence seems to be partially explained by different variables but is still very significant at a 1% level. It therefore seems that PE-firms are likely to pay more to get full control over a company,

This is in line with earlier statements made by Martynova & Renneboog (2006) and Walkling & Edmister (1985), showing higher premiums for full control. Four main factors potentially explaining this effect are: (1) direct influence on the actions of the target management, (2) shared ownership could provide the bidder with additional firm information, (3) increased ownership in a target firm would reduce the amount of shares needed to obtain any desired level of control and (4) bidders with previous commitments in the firms could be concerned as more serious in their acquisition attempt. Though, as one can see in the regression results, this last effect does not seem to be of utmost importance for PE-firms.

Another variable which shows to be significant at a 10% level is the Scandinavian origin. It seems that to take over Scandinavian companies PE firms pay higher premiums compared to companies in other countries, namely 0.073 CAR more, which is approximately the same as the CAAR of the entire dataset. This is in line with Martynova & Renneboog (2006) and Lerner & Schoar (2005), who showed that both the UK (slightly) and Scandinavian countries (more strongly) pay higher premiums compared to French and German oriented countries. The differences in the laws and their enforcement could explain part of this variation. Rossi and Volpin (2004) show that the legal environment and takeover regulation are important determinants of the takeover gains. They report takeover premiums to be higher in countries with higher shareholder protection and in countries where the mandatory bid requirement is enforced by law, potentially explaining the higher premiums in UK and Scandinavian based countries.

The bid premium explains something about the preferences of an industry, as most events should be adequately priced in the market. When looking at the periodic events, the PE-industry and its preferences seems to behave very steadily over time. With no significant deviations of the bid premium in the newly defined 7th M&A wave and the most recent financial debt crisis. This indicates that over the last decade, PE-firms preferences for target firms were roughly the same. Additionally, no country-, year- and industry- fixed effects significantly influenced the bid premium, though they did seem to explain the differences of variance in the regression slightly better, as the R-squares become higher after adding these effects. For this regression, the macro-economic effects: origin, developed vs developing, 7th M&A wave and the financial debt crisis are dropped due to multicollinearity with the fixed variables previously included.

6.4. Target company independent variables

Adding the target company variables one by one provides some surprising results, showing significant implications for the market-to-book ratio, the performance measure and the buy-and-build strategic measure.

Starting with hypothesis 1-6 of this paper, table 8 shows the variables: maturity, beta, target company value, pre-acquisition leverage, excess free cash flow and board independence not to be of influence on the bid premium in public PE transactions, therefore no evidence is found for the hypotheses made on these factors. It seems that these variables only influence the bid premium in corporate takeovers but are of less relevance for the PE industry. As the regressions show no significant explanatory power and do not prove to have a strong tendency towards explaining the variance of the bid premiums in PE public takeovers, no effort will be taken to further analyse their individual results.

Considering hypothesis 7, the market-to-book variable seems to follow a negative relationship with the CAR, showing an estimate of -0.15 at a 5% significance level. Meaning an increase of the Market-to-book ratio by 1, will result in a decrease of the target CAR by -0.15 with a constant of 0.381 (regression 11). The ratio market-to-book is computed by dividing the book value of the firm with the market value of the firm. Making a change of the ratio by 1 very impactful on a company and therefore less likely to happen at once. This result supports hypothesis 7 of this paper, agreeing with the papers of Walkling & Edmister (1985) and Robison & Shane (1990). Whereas Walkling & Edmister argues that if the market price of a company is not adequately reflected, bargain acquisitions could be more likely. Therefore, higher bid premiums are expected on companies with lower market-to-book ratios (and vice versa), where assets are most presumably undervalued, and bidders can gain potential benefits from target agency problems. Additionally, the paper of Robison & Shane suggests a relatively low market-to-book ratio to potentially indicate target management inefficiency. Replacing an inefficient target management could therefore engage benefits for a takeover.

Another variable showing a strong significant effect on the bid premium is the ROA of a company, whereas a higher ROA seems to have a negative effect on the CARs of a company with a coefficient of -0.002 at a robust significance level of 1%. Meaning a 1% increase of the ROA would result in an effect of -0.002 on the CAR of a company, therefore supporting hypothesis 8 of this paper. This outcome is very interesting, as it shows that PE-firms are less willing to pay higher premiums for more profitable companies. Perhaps it could be the case that PE-firms have less to gain from more profitable companies, since there are less factors within the company that can be optimised. As also shown in the paper of Robinson & Shane (1990) about management inefficiency. According to the efficient market hypothesis, a lot of the potential upswing should already be priced in the company its share price. Meaning less premium is willing to be paid by a PE firm, referring at the already realised and priced in features of the company.

Finally, the buy-and-build strategy significantly influences the bid premium of PE-takeovers. Whereas a company being indicated as a buy-and-build target provides a positive influence on the CAR of 0.327 at a 1% significance level. This is in line with the hypothesis made about PE-firms paying extra for consolidation strategies, made in section 3.3. of this paper. This effect could also be expected considering figure 4 of this research, where buy-and-build seem to have higher CAARs compared to the

other strategies. Adding the buy-and-build effect also significantly increases the R-squared of the regressions, making the values better explaining the variance of the CARs examined in this research.

For the target specific variables overall, it shows that PE-firms are willing to pay significant less for expensive firms in the market. Meaning, firms that are performing well and have a high market-to-book value. These firms would be less attractive to realise potential upswing in the set-out investment period for PE-firms. On the other hand, the firms are willing to pay significant more for consolidating takeovers, showing the importance of certain strategies for realising the returns objectives of the PE-firm.

6.5. Private Equity firm specific independent variables

As briefly discussed in the methodology the measure 'expertise' of the PE-firms measures was created from of four variables, namely: PE-firm age, PE-firm size, experience as a lead investor and general experience. The variable is created to measure if more professional and experienced firms are enforcing better prices, compared to less reputable firms. Following hypothesis 9 of this paper, this study shows expertise to have a small positive influence on the bid premium, which cannot be considered significant enough. Therefore, no prove is found for the expected negative relationship between expertise and the bid premium. Meaning less sizeable and experienced firms to enforce the same prices as the more known PE-firms. This a very interesting outcome, as it indicates the allocation of money not to be dependent on the background of a PE-firm. Of course, it should be mentioned that the price a PE-firm pays for a company does not directly explains anything about the competence of the PE firm, which would be measured by for instance the Internal Rate of Return (IRR) of the investment over the entire investment period. Though, unfortunately, one of the major constraints in research on PE is gaining access to the often highly confidential and sensitive data concerning deal structuring. IRR is not always provided by PE-firms, which makes it difficult to estimate as a value.

Table 8: Regression results

This table reports coefficient estimates of 12 robust regressions for Private Equity deals with the CARs as the main dependent variable. The sample consist of 571 public deals of 337 different Private Equity firms from 50 different countries. All these companies have sufficient data between the chosen panel (2008-2018). Robust standard errors reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	{1}	{2}	{3}	{4}	{5}	{6}	{7}	{8}	{9}	{10}	{11}	{12}
Regression	Estimate t-value	Estimate t-value	Estimate t-value	Estimate t-value	Estimate t-value	Estimate t-value	Estimate t-value	Estimate t-value	Estimate t-value	Estimate t-value	Estimate t-value	Estimate t-value
Target Company variables												
Maturity		.001 0.09	0.001 0.09	0.002 0.13	0.002 0.16	0.002 0.17	0.002 0.16	0.002 0.16	0.007 0.52	0.006 0.1	0.006 0.49	.004 0.28
Beta			-0.000 -0.03	-0.000 -0.01	0.000 0.00	-0.000 -0.01	-0.000 -0.02	-0.000 -0.03	-0.005 -0.35	-0.002 -0.16	-0.003 -0.22	-.013 -0.87
Target company value				-0.002 -0.41	-0.002 -0.35	-0.002 -0.37	-0.002 -0.41	-0.000 -0.06	0.003 0.61	0.002 0.50	0.002 0.40	-.000 -0.05
Pre-acquisition leverage					-0.001 -0.23	-0.001 -0.09	-0.001 -0.18	-0.002 -0.32	-0.003 -0.42	0.001 0.17	0.001 0.15	.013 1.47
Excess free cash flow						0.007 0.22	0.007 0.25	0.005 0.18	0.006 0.22	0.014 0.48	0.010 0.48	.029 0.80
Board independence							-0.020 -1.06	-0.019 -1.03	-0.016 -0.86	-0.013 -0.73	-0.013 -0.73	-.012 -0.47
Market-to-book								-0.126* -1.88*	-0.118* -1.77*	-0.142** -2.18**	-0.145** -2.22**	-.0195** -2.43**
Performance (ROA)									-0.002*** -2.39**	-0.002*** -2.58***	-0.002*** -2.65***	-.0003*** -2.58***
Buy-and-build										0.328*** 5.54***	0.327*** 5.51***	0.330*** 5.29***
PE-Firm variables												
Expertise											.008 0.93	.009 0.87
Control variables												
Hostile vs friendly	-0.065 -1.28	-0.065 -1.28	-0.066 -1.28	-0.065 -1.27	-0.065 -1.27	-0.065 -1.25	-0.064 -1.24	-0.067 -1.30	-0.063 -1.23	-0.038 -0.76	-0.036 -0.71	-.031 -0.59
Full vs partial control	0.135*** 6.98***	0.135*** 6.97***	0.135*** 6.86***	0.139*** 6.29***	0.139*** 6.26***	0.139*** 6.24***	0.135*** 5.92***	0.131*** 5.75***	0.126*** 5.52***	0.106*** 4.71***	0.107*** 4.76***	.122*** 4.67***
Cross border vs domestic	-0.008 -0.48	-0.009 -0.49	-0.009 -0.49	-0.008 -0.46	-0.008 -0.45	-0.008 -0.46	-0.008 -0.43	-0.008 -0.45	-0.007 -0.40	-0.004 -0.25	-0.008 -0.45	-.003 -0.14
English Origin	0.008 0.27	0.007 0.26	0.008 0.26	0.007 0.25	0.007 0.24	0.007 0.23	0.008 0.28	0.007 0.23	0.006 0.20	-0.003 -0.09	-0.005 -0.16	- -
French Origin	-0.045 -1.46	-0.046 -1.44	-0.046 -1.44	-0.046 -1.44	-0.045 -1.42	-0.045 -1.42	-0.046 -1.45	-0.050 -1.57	-0.052 -1.62	-0.054* -1.74*	-0.056* -1.80	- -
German Origin	-0.023 -0.65	-0.023 -0.65	-0.023 -0.65	-0.024 -0.67	-0.024 -0.67	-0.025 -0.69	-0.025 -0.71	-0.028 -0.79	-0.029 -0.83	-0.024 -0.69	-0.025 -0.72	- -
Scandinavian Origin	0.073* 1.70*	0.072* 1.68*	0.072* 1.68*	0.072* 1.66*	0.071* 1.66*	0.072* 1.66*	0.068 1.56	0.071* 1.63*	0.072* 1.67*	0.073* 1.73*	0.073* 1.75*	- -
Developed vs developing	0.021 1.02	0.021 1.02	0.021 1.02	0.022 1.05	0.022 1.06	0.022 1.04	0.020 0.97	0.015 0.70	0.005 0.22	-0.001 -0.05	-0.001 -0.04	- -
Pre-announcement holdings	-0.001 -0.06	-0.001 -0.06	-0.001 -0.06	-0.004 -0.20	-0.003 -0.17	-0.004 -0.18	-0.003 -0.14	-0.001 -0.07	-0.001 -0.03	0.003 0.17	0.002 0.12	0.004 0.20
7th M&A wave	-0.028 -0.961	-0.027 -0.90	-0.027 -0.90	-0.028 -0.90	-0.027 -0.89	-0.027 -0.89	-0.026 -0.84	-0.018 -0.58	-0.021 -0.67	-0.023 -0.77	-0.021 -0.71	- -
Financial debt crisis	-0.008 -0.28	-0.008 -0.28	-0.009 -0.28	-0.010 -0.32	-0.009 -0.31	-0.010 -0.32	-0.009 -0.31	-0.005 -0.16	-0.000 -0.00	0.001 0.03	0.002 0.05	- -
Constant	0.042 1.03	0.038 0.68	0.039 0.67	0.042 0.73	0.045 0.76	0.033 0.44	0.044 0.56	0.361* 1.95*	0.328* 1.77*	0.368** 2.04**	0.381** 2.10**	0.756** 2.53**
Fixed effects												
Year effects	No	No	No	No	No	No	No	No	No	No	No	Yes
Country effects	No	No	No	No	No	No	No	No	No	No	No	Yes
Industry fixed effects	No	No	No	No	No	No	No	No	No	No	No	Yes
R^2	0.118 0.118	0.118 0.118	0.118 0.118	0.119 0.119	0.119 0.119	0.119 0.119	0.121 0.121	0.126 0.126	0.135 0.135	0.182 0.182	0.182 0.182	0.347 0.347
Number of observations	573 573	573 573	573 573	573 573	573 573	573 573	573 573	573 573	573 573	573 573	573 573	573 573

7. Conclusions, limitations and suggestions for further research

This research is conducted in the relatively new field of PE-takeovers, explaining some unexplored territories in this area. With its tremendous growth as an industry and ongoing debate about whether PE adds value to the economy, it would be important to better understand the important value drivers for these takeovers. Therefore, this study examines the target and PE firm specific variables of the bid premium in public PE-takeovers, by using its own proprietary dataset.

7.1. Conclusions

First, this paper shows the bid premium to be significantly higher around the announcement date for PE-takeovers but finds it to be lower compared to what is generally observed in the market for corporate takeovers. Also, it shows PE not to be homogeneous for every subsector within the industry, as buy-and-build strategies significantly differ from other strategies. Finally, this research has conducted an OLS estimation to examine the drivers of the bid premium for PE public takeovers.

The target company specific variables show some interesting results. As it seems that well performing companies that are properly reflected in the market, and therefore relatively expensive, earn less premiums on takeovers within the PE industry. Because of a high market-to-book-ratio, bargain acquisitions of these companies would be less likely. Also, most of their potential is already priced in the stocks (efficient market hypothesis) making these companies less attractive for PE firms to buy and realise a potential upswing over the set-out investment period. On the other hand, PE firms are willing to pay significantly more for deals that are consolidating takeovers (buy-and-build), showing the importance of strategic purchases within the industry. If synergies are expected, PE-firms are willing to pay for it.

Based on economic literature and multivariate analysis, a new variable is constructed named 'expertise', to see whether more experienced and professional PE firms are enforcing better prices. This study shows expertise not to be a significant predictor, which means that overall all acquiring PE firms are paying roughly the same prices. It must be noted that the purchase price does not necessarily explain too much about the returns on the assets over the investment period, therefore new variables must be examined.

When examining the control variables, full vs partial control seems to be of significant influence for takeovers in the PE-industry. The results show PE-firms to be willing to pay significantly more, around three times the average market premium, to acquire full control over a company. This is in line with previous statements made about (1) increased ownership providing a direct influence on the actions of the target management, (2) shared ownership providing the bidder with additional firm information and (3) increased ownership in a target firm would reduce the number of shares needed to obtain any desired level of control. For the final point (4), this study shows PE-firms previous commitments in a target firm not to have any influence on the bid premium.

Also, PE firms seem to be willing to pay significantly more for target takeovers of Scandinavian origin compared to UK, German, French and other origins. This could indicate that the legal environment and takeover regulation are important drivers of potential takeover gains in the industry.

The bid premium explains something about the preferences of an industry, as most events should be adequately priced in the market. Studying the periodic events, the PE-industry its preferences seem to behave steadily over time. With no significant deviations of the bid premium in the newly defined 7th M&A wave and the most recent financial debt crisis. Meaning over the last decade, PE-firms preferences for target companies were roughly the same. Additionally, no country, year and industry fixed effects were found to be of influence on the bid premium.

So, what are PE firms paying for? Overall it seems PE firms pay additional premiums for assets where strategic synergies are expected to be found, as shown by the buy-and-build strategy parameter. Additionally, PE-firms are very keen on acquiring full control over a company, to make sure they can have enough influence and are provided with enough information. Also, if the takeover is taking place in Scandinavia, there is a high chance that firms would be willing to pay more compared to other countries. On the other hand, PE-firms seem to dislike expensive profitable firms which have a high market value. A potential explanation for this could be that less upswing is expected to be realised with these kind of companies, making them less attractive investment propositions compared to less profitable firms with a low market-to-book-ratio. These preferences seem to be steady over the last decade and not to be influenced by any fixed effects.

7.2. Limitations

There are some limitations to this research. First, there are limitations to the size of the dataset concerning the different strategies used, which limits the possibility of interpreting results, as the data becomes more sensitive to outliers. This makes it more difficult to prove significant (normalised) results. Additionally, a large part of the AUM of the PE firms and the target value is US focussed, while most of the deals come from Europe, which can be seen in table 5 of this paper. This makes it difficult to generalise the results for the entire PE industry, as the outcomes are slightly biased towards US country deals. Finally, the PE-firm specific measures only the expertise of firms, while it would also be very interesting to take the PE-firm performance as an explanatory measure.

7.3. Suggestions for further research

As this study explores the new world of PE takeovers, there is still much that can be done. For instance, it could be very interesting to examine the set-up as described in this research for PE firm exits instead of acquisitions. Do acquiring firms face the same preferences for PE exits? Are there different factors that can be controlled for? Could there be new factors potentially affecting the entire acquiring process of PE-firms? Also, it would be very interesting if throughout time, more proprietary data of PE-firms would be accessible. As for instance the IRR of acquiring firms, indicating the performance of

invested assets. Additionally, one can try to include data about other strategies potentially influencing the data, providing more insights about why different strategies are used within the industry and if they are useful. Overall, further research to better understand the PE-industry seems called for.

References

- Abdi, H., Williams, L. J., 2010. Principal component analysis. *Wiley interdisciplinary reviews: computational statistics* 2(4), 433-459.
- Amihud, Y., & Mendelson, H., 1989. The effects of beta, bid-ask spread, residual risk, and size on stock returns. *The Journal of Finance* 44(2), 479-486.
- Ayers, B. C., Lefanowicz, C. E., & Robinson, J. R., 2000. The effects of goodwill tax deductions on the market for corporate acquisitions. *Journal of the American Taxation Association* 22(s-1), 34-50.
- Batjargal, B., & Liu, M., 2004. Entrepreneurs' access to private equity in China: The role of social capital. *Organization Science* 15(2), 159-172.
- Beirne, J., & Fratzscher, M., 2013. The pricing of sovereign risk and contagion during the European sovereign debt crisis. *Journal of International Money and Finance* 34, 60-82.
- Boot, A. W. A., Ligterink, J. E., & Martin, J. K., 2017. Private Equity in the Netherlands: Value Creation, Redistribution and Excesses: Private equity in Nederland: een stakeholder-perspectief. University of Amsterdam, Faculty of Economics and Business.
- Bruylant, E., & De Maeseneire, W., 2011. The risk effects of acquiring distressed firms (No. 11/742). Ghent University, Faculty of Economics and Business Administration.
- Byrd, J. W., Hickman, K. A., 1992. Do outside director's monitor managers? Evidence from tender offer bids. *Journal of financial economics* 32(2), 195-221.
- Chen, L., & Zhao, X., 2006. On the relation between the market-to-book ratio, growth opportunity, and leverage ratio. *Finance Research Letters* 3(4), 253-266.
- Cotter, J. F., Shivdasani, A., & Zenner, M., 1997. Do independent directors enhance target shareholder wealth during tender offers? *Journal of financial economics* 43(2), 195-218.
- Damodaran, A., 2016. *Damodaran on valuation: security analysis for investment and corporate finance* (Vol. 324). John Wiley & Sons, New Jersey.
- Danbolt, J., 2004. Target company cross-border effects in acquisitions into the UK. *European Financial Management* 10, 83-108.
- Demiroglu, C., James, C. M., 2010. The role of private equity group reputation in LBO financing. *Journal of Financial Economics* 96(2), 306-330.
- Dieudonne, S., Cretin, F., and Bouacha, S., 2014. M&A activity: Where are we in the cycle? Available at SSRN: <http://ssrn.com/abstract=2504412> or <http://dx.doi.org/10.2139/ssrn.2504412>
- Dimson, E., Marsh, P., & Staunton, M., 2002. *Triumph of the Optimists: 101 Years of Global Investment Returns*. Princeton University Press.
- Finance, C., 2006. *McKinsey on Finance. Perspectives on Corporate Finance and Strategy*, 18, 1-24.
- Fishman, M. J., 1989. Preemptive bidding and the role of the medium of exchange in acquisitions. *Journal of Finance*, 41-57.
- Franks, J. and Harris, R., 1989. Shareholder wealth effects of corporate takeovers: the U.K. experience 1955-1985. *Journal of Financial Economics* 23, 225-249.
- Frésard, L., & Salva, C., 2010. The value of excess cash and corporate governance: Evidence from US cross-listings. *Journal of Financial Economics* 98(2), 359-384.

- Goergen, M., & Renneboog, L., 2004. Shareholder wealth effects of European domestic and cross-border takeover bids. *European Financial Management* 10(1), 9-45.
- Gottchalg, O., Phalippou, L., & Zollo, M., 2003. Performance of Private Equity Funds: Another Puzzle? Working paper 2003/93/SM/ACGRD 3, INSEAD.
- Gort, M., and T. F. Hogarty., 1970. New evidence on mergers. *Journal of Law and Economics*, 167-184.
- Grammatikos, T., Vermeulen, R., 2012. Transmission of the financial and sovereign debt crises to the EMU: Stock prices, CDS spreads and exchange rates. *Journal of International Money and Finance* 31(3), 517-533.
- Hampel, F. R., Ronchetti, E. M., Rousseeuw, P. J., & Stahel, W. A., 2011. Robust statistics: the approach based on influence functions (Vol. 196). John Wiley & Sons.
- Hearn, B., Piesse, J., & Strange, R., 2010. Market liquidity and stock size premia in emerging financial markets: The implications for foreign investment. *International Business Review* 19(5), 489-501.
- Hope, O. K., Thomas, W., & Vyas, D., 2011. The cost of pride: Why do firms from developing countries bid higher? *Journal of International Business Studies* 42(1), 128-151.
- Israel, G.D., 1992. Determining sample size, PEOD6, Agricultural Education and Communication Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville.
- Jaggi, B., Dorata, N. T., 2006. Association between bid premium for corporate acquisitions and executive compensation. *Journal of Accounting, Auditing & Finance* 21(4), 373-397.
- Jain, S., 2011. Private Equity Strategies. UBS Alternative Investments.
- Jarrell, G. Poulsen, A., 1989. The Returns to Acquiring Firms in Tender Offers: Evidence from Three Decades. *Financial Management* 18, 12-19.
- Jarrell, G., Brickley, J. and Netter, M., 1988. The market for corporate control: the evidence since 1980', *Journal of Economic Perspectives* 2, pp. 49-68.
- Jeng, L. A., & Wells, P. C., 2000. The determinants of venture capital funding: evidence across countries. *Journal of corporate Finance* 6(3), 241-289.
- Jenkinson, T., Stucke, R., 2011. Who benefits from the leverage in LBOs? Unpublished working paper. University of Oxford
- Jensen, M., 1986. Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *American Economic Review* 76, 323-329.
- Jensen, M., 1989. The Eclipse of the Public Corporation, *Harvard Business Review* September-October.
- Jensen, M., Kaplan, S., Ferenbach, C., Feldberg, M., Moon, J., Hoesterey, B., Davis, C., Jones, A., 2006. Morgan Stanley Roundtable on Private Equity and its Import for Public Companies. *Journal of Applied Corporate Finance* 18(3), 8-37.
- Johnson, M., 2018. Modern finance must kick its addiction to indices. Retrieved from: <https://www-ft-com.eur.idm.oclc.org/content/b81c7540-1bd4-11e8-aaca-4574d7dabfb6>
- Kaplan, S.N., 1989a. The effects of management buyouts on operating performance and value. *Journal of Financial Economics* 24, 217-254.

- Kaplan, S. Weisbach, M., 1992. The Success of Acquisitions: Evidence from Divestitures. *Journal of Finance* 47, 107-138.
- Kaplan, S.N., Schoar, A., 2005. Private equity performance: returns, persistence, and capital flows. *Journal of Finance* 60, 1791–1823.
- Kaplan, S. N., Stromberg, P., 2009. Leveraged buyouts and private equity. *Journal of Economic Perspectives* 23(1), 121-46.
- Keith, T. Z., 2014). Multiple regression and beyond: An introduction to multiple regression and structural equation modeling. Routledge.
- Keselman, H. J., Wilcox, R. R., Algina, J., Othman, A. R., & Fradette, K., 2008. A comparative study of robust tests for spread: asymmetric trimming strategies. *British Journal of Mathematical and Statistical Psychology* 61(2), 235-253.
- Khanna, T., Palepu, K., 2000. Is group affiliation profitable in emerging markets? An analysis of diversified Indian business groups. *The Journal of Finance* 55(2), 867-891.
- Kosman, Josh, 2009, *The Buyout of America: How Private Equity Will Cause the Next Great CreditCrisis* (Penguin, New York).
- Kraay, A., & Ventura, J., 2007. *The dot-com bubble, the Bush deficits, and the US current account. G7 Current Account Imbalances: Sustainability and Adjustment*. University of Chicago Press, 457-496.
- Lang, L., Stulz, R. and Walkling, R., 1991. A Test of the Free Cash Flow Hypothesis: The Case of Bidder Returns. *Journal of Financial Economics* 29, 315-335.
- Lerner, J., 1994. The Syndication of Venture Capital Investments. *Financial Management* 23(3), 16-27.
- Lerner, J., 2000, ‘Money Chasing Deals? The Impact of Fund Inflows on Private Equity Valuations’, *Journal of Financial Economics* 55(2), 281–325.
- Lerner, J., & Schoar, A., 2005. Does legal enforcement affect financial transactions? The contractual channel in private equity. *The Quarterly Journal of Economics* 120(1), 223-246.
- Lerner, J., Sorensen, M., & Strömberg, P., 2011. Private equity and long-run investment: The case of innovation. *The Journal of Finance* 66(2), 445-477.
- Ljungqvist, A., Richardson, M. P., & Wolfenzon, D., 2017. The investment behaviour of buyout funds: Theory and evidence.
- Ljungqvist, A., Wilhelm, W. J., 2003. IPO pricing in the dot-com bubble. *The Journal of Finance* 58(2), 723-752.
- MacKinlay, A. C., 1997. Event studies in economics and finance. *Journal of economic literature* 35(1), 13-39.
- Malkiel, B. G., 1989. *Efficient market hypothesis*. Palgrave Macmillan, London. 127-134.
- Martynova, M., & Renneboog, L., 2006. Mergers and acquisitions in Europe. *Advances in corporate finance and asset pricing*, 13-75.
- Meuleman, M., Wright, M., Manigart, S., & Lockett, A., 2009. Private equity syndication: Agency costs, reputation and collaboration. *Journal of Business Finance & Accounting* 36(5-6), 616-644.
- Mulherin, J.H., and Boone, A.L., 2000. Comparing Acquisitions and Divestitures. *Journal of Corporate Finance* 6, 117-139.

- Walkling, R. A., Long, M. S., 1984. Agency theory, managerial welfare, and takeover bid resistance. *The Rand Journal of Economics*, 54-68.
- O'Brien, R. M., 2007. A caution regarding rules of thumb for variance inflation factors. *Quality & quantity* 41(5), 673-690.
- Phalippou, L., 2009. Beware of venturing into private equity. *Journal of Economic Perspectives* 23(1), 147-66.
- Porta, R. L., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W., 1998. Law and finance. *Journal of political economy* 106(6), 1113-1155.
- Postma, T. J. B. M., van Ees, H., & Sterken, E., 2001. Board composition and firm performance in the Netherlands. University of Groningen.
- Renneboog, L., Simons, T., & Wright, M., 2007. Why do public firms go private in the UK? The impact of private equity investors, incentive realignment and undervaluation. *Journal of Corporate Finance* 13(4), 591-628.
- Rhodes-Kropf, M., Robinson, D. T., & Viswanathan, S., 2005. Valuation waves and merger activity: The empirical evidence. *Journal of Financial Economics* 77(3), 561-603.
- Robinson, J. R., & Shane, P. B., 1990. Acquisition accounting method and bid premia for target firms. *Accounting Review*, 25-48.
- Rossi, S. and Volpin, P., 2004. Cross-Country Determinants of Mergers and Acquisitions. *Journal of Financial Economics* 74, 277-304.
- Servaes, H., 1991. Tobin's Q and the Gains from Takeovers. *Journal of Finance* 46, 409-419.
- Servaes, H. Zenner, M., 1994. Taxes and the returns to foreign acquisitions in the United States. *Financial Management* 23, 42-56.
- Shieh, J. I., Wu, H. H., & Huang, K. K., 2010. A dematel method in identifying key success factors of hospital service quality. *Knowledge-Based Systems* 23(3), 277-282.
- Taheri, S. M., & Hesamian, G., 2013. A generalization of the Wilcoxon signed-rank test and its applications. *Statistical Papers* 54(2), 457-470.
- Vinten, F., 2007. The performance of private equity buyout fund owned firms.
- Walkling, R. A., 1985. Predicting tender offer success: A logistic analysis. *Journal of financial and Quantitative Analysis* 20(4), 461-478.
- Wang, Y., 2012. Secondary buyouts: Why buy and at what price? *Journal of Corporate Finance* 18(5), 1306-1325.
- Wright, M., Burrows, A., Ball, R., & Scholer, L., 2007. Private Equity and Buy-outs: Jobs, Leverage, Longevity, and Sell-offs. Center for Management Buyout Research, Nottingham.
- Wright, M., Weir, C., & Burrows, A., 2007. Irrevocable commitments, going private and private equity. *European Financial Management* 13(4), 757-775.

Appendix A: Regression results

Table 9: Correlation table of the independent variables

Correlation table on the explanatory variables of all (573) deals used in the sample.

	Company maturity	Beta	Target company value	Pre-acquisition leverage	Excess free cash flow	Market-to-book	Performance (ROA)	General Experience	Lead Experience	Age PE-firm	PE - firm size
Company maturity	1.00										
Beta	0.02	1.00									
Target company value	0.08	0.04	1.00								
pre-acquisition leverage	0.08	0.10	0.17	1.00							
Excess free cash flow	-0.13	0.01	-0.05	-0.31	1.00						
Market-to-book	-0.03	0.02	0.10	0.04	-0.00	1.00					
Performance (ROA)	0.13	-0.12	0.03	-0.06	-0.06	0.10	1.00				
General Experience	0.08	0.03	-0.03	0.05	-0.03	0.07	0.16	1.00			
Lead Experience	-0.04	-0.08	0.12	0.03	-0.05	0.03	0.12	0.53	1.00		
Age PE-firm	0.07	-0.06	-0.07	-0.00	-0.03	-0.05	0.07	0.17	0.06	1.00	
PE -firm size	0.06	0.06	0.07	0.03	0.01	0.09	0.09	0.40	0.24	0.31	1.00

Table 10: Correlation table of the control variables

Correlation table on the explanatory variables of all (573) deals used in the sample.

	Board independence	BuyandBuild	Hostile vs friendly	Cross border vs domestic	English Origin	French Origin	German Origin	Scandinavian Origin	Developed vs developing	Pre-announcement holdings	7th M&A wave	Financial debt crisis
Board independence	1.00											
BuyandBuild	-0.06	1.00										
Hostile vs friendly	-0.03	-0.03	1.00									
Cross border vs domestic	0.03	-0.09	0.04	1.00								
English Origin	0.14	0.10	0.12	-0.21	1.00							
French Origin	-0.07	-0.05	-0.09	0.08	-0.51	1.00						
German Origin	-0.05	-0.05	-0.03	0.05	-0.36	-0.20	1.00					
Scandinavian Origin	-0.15	0.01	-0.00	-0.02	-0.25	-0.14	-0.10	1.00				
Developed vs developing	-0.12	0.08	0.08	-0.17	0.05	0.05	-0.05	0.15	1.00			
Pre-announcement holdings	0.06	-0.07	0.08	0.00	0.04	0.03	0.03	-0.08	0.09	1.00		
7th M&A wave	0.05	0.07	0.08	-0.10	0.07	-0.06	0.05	-0.09	0.02	-0.06	1.00	
Financial debt crisis	-0.03	-0.07	-0.11	0.07	-0.08	0.08	-0.06	0.08	-0.02	0.07	-0.83	1.00

Table 11: Testing different strategies

This table reports the *t*-statistics for 5 different strategies, regressed on the Cumulative Abnormal Returns. Abnormal returns are computed as the difference between realised and market model benchmark returns. For each firm I used the daily benchmark returns using the MSCI-world index returns and the market model parameters are estimated over 240 days starting 300 days prior to the acquisition announcement and ending 60 days prior to the announcement. The *t*-statistic is used to assess the significance of the Strategies. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Event Window	Buy-and Build	Patent sale	LBO	State-owned
Simple <i>t</i> stat.	6.85***	0.80	1.10	-1.08
Observations	573	573	573	573

Table 12: Principal components/correlation

This table reports the eigenvalues for the different component used in the multivariate analysis.

Rotation: (unrotated = principal)		Number of obs.	573	
		Number of comp.	4	
		Trace	4	
		Rho=	1.000	
Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	2.022	1.089	0.5056	0.5056
Comp2	0.339	0.384	0.2335	0.7391
Comp3	0.550	0.056	0.1375	0.8766
Comp4	0.494	.	0.1234	100

Table 13: Kaiser-Meyer-Olkin measure of sampling adequacy

Which shows to be well fitting above 0.6 (Shieh et al, 2010).

Variable	kmo
General Experience	0.6793
Lead Experience	0.6965
Age PE firm	0.6910
PE firm size	0.6865
Overall	0.6869

Table 14: Principal components (eigenvectors)

This shows the influence of every variable on the eigenvalues of the components.

Variable	Comp1	Comp2	Comp3	Comp4	Unexplained
General Experience	0.5697	-0.1090	-0.2968	-0.7586	0
Lead Experience	0.5059	-0.4409	0.7239	0.1600	0
Age PE firm	0.3142	0.8909	0.3274	-0.0202	0
PE firm size	0.5664	0.0092	-0.5297	0.6313	0

Table 15: Rotation: orthogonal varimax (Kaiser off)

This table reports the rotated values for the different component used in the multivariate analysis.

Rotation: orthogonal varimax (Kaiser off)		Number of obs.	573	
		Number of comp.	4	
		Trace	4	
		Rho =	1.000	
Component	Variance	Difference	Proportion	Cumulative
Comp1	1.000	.0000122797	0.2500	0.2500
Comp2	0.999	4,23E-01	0.2500	0.5000
Comp3	0.999	3,12E-02	0.2500	0.7500
Comp4	0.999	.	0.2500	1.000

Appendix B: Robustness

Table 16: Tests on multicollinearity

VIF calculates the centered or uncentered variance inflation factors (VIFs) for the independent variables specified in a linear regression model. If the VIFs are above the rule of thumb (4), the factor can be considered facing multicollinearity problems (O'Brien, 2007).

	VIF	1/VIF
7th M&A Wave	3.38	0.295998
Financial debt crisis	3.35	0.298542
English Origin	3.00	0.333877
French Origin	2.53	0.395815
German Origin	1.95	0.513555
Target company value	1.85	0.539573
Full vs partial control	1.65	0.606552
Scandinavian Origin	1.59	0.627054
Pre-acquisition leverage	1.54	0.647394
Excess free cash flow	1.41	0.711175
Performance (ROA)	1.24	0.805011
Developed vs developing	1.23	0.809991
Pre-announcement holdings	1.22	0.819607
Cross border vs domestic	1.20	0.836287
Company maturity	1.18	0.845333
Board independence	1.16	0.865733
Competence	1.13	0.888798
Beta	1.12	0.896613
Hostile vs friendly	1.11	0.897987
Buy-and-build	1.11	0.904480
Market-to-book	1.11	0.904910
Mean VIF	1.67	

Table 17: Test on heteroskedasticity

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity.

Ho: Constant variance

Variables: fitted values of CAR [-10,1]

chi2(1) = 308.89

Prob > chi2 = 0.0000

Figure 5: Histogram of the residuals

This Histogram shows the residuals of the regression results to follow a normal distribution.

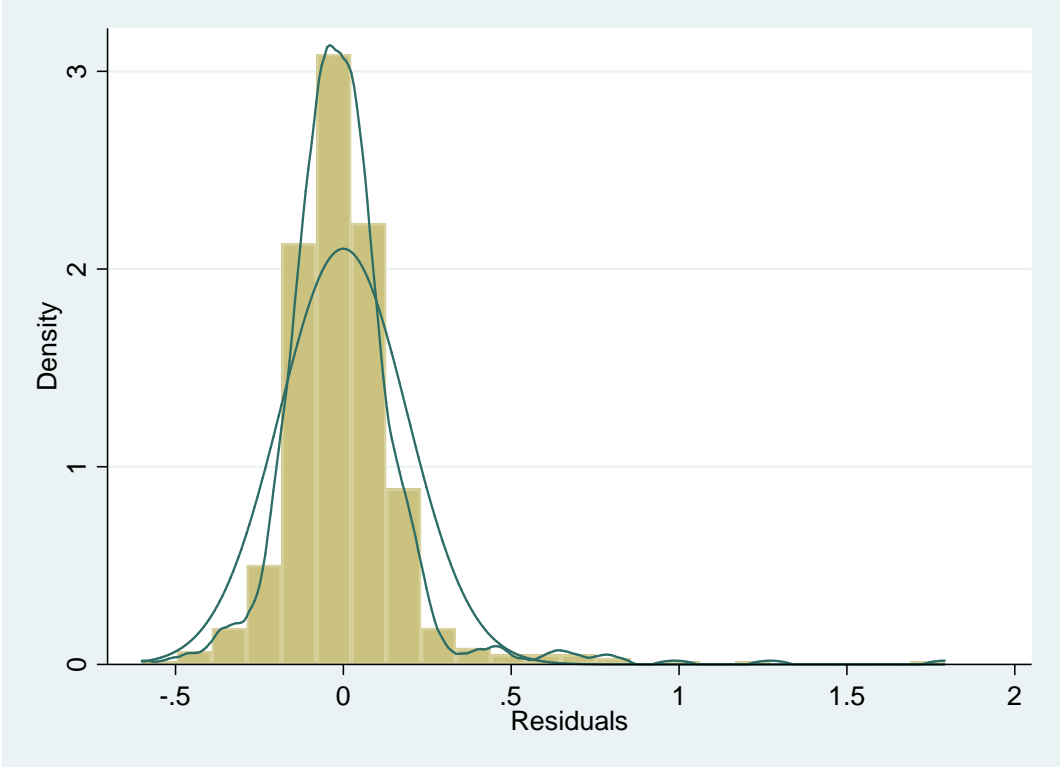


Figure 6: Residual-versus-fitted plot

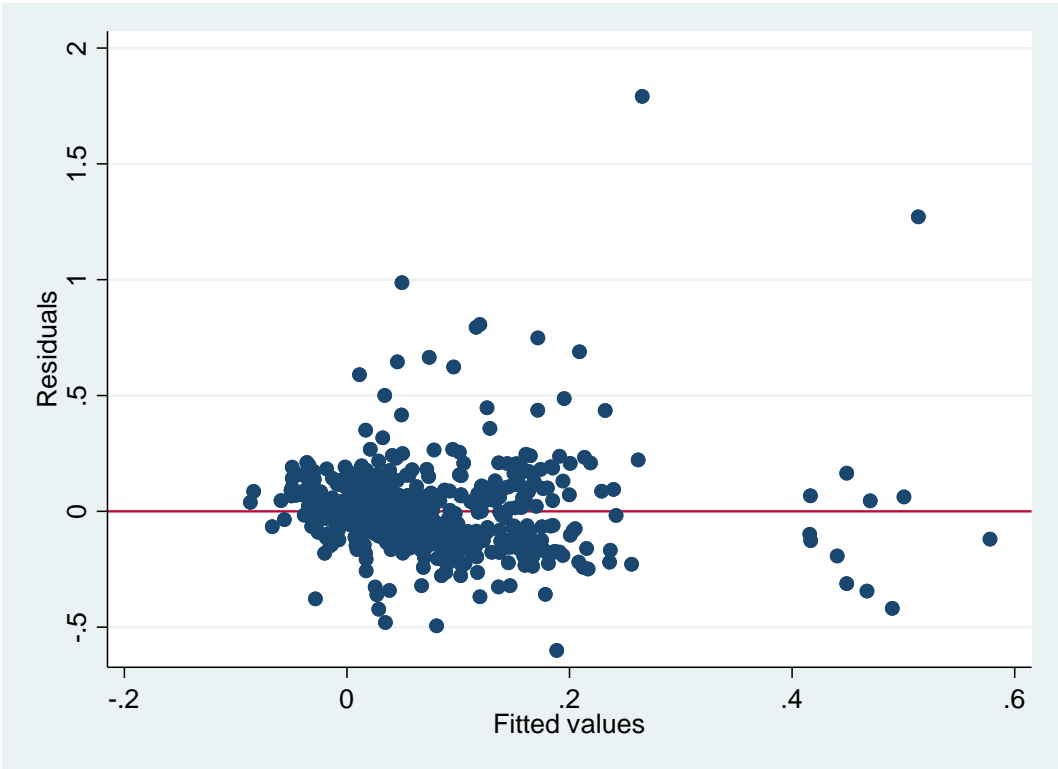
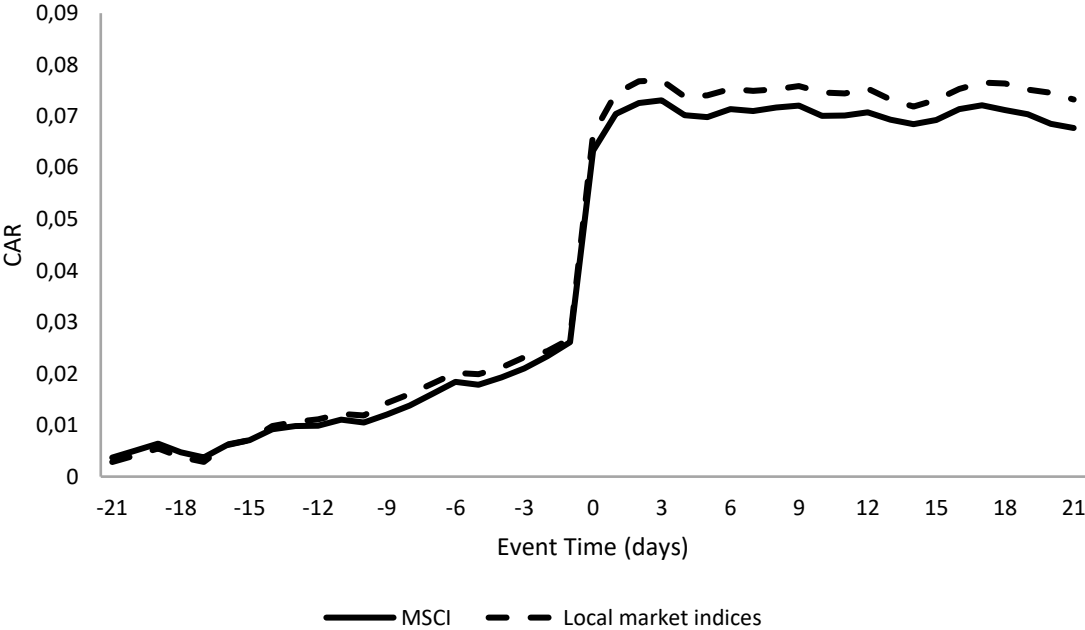


Figure 7: Comparing company CAARs around the takeover announcement for different indices

This figure shows the market reaction to the announcement of a PE transaction for the target company as the CAARs 20 days before and after the event (day 0) for all companies (573 observations) in this study. There are two benchmarks used, namely the MSCI-world index and the local market indices of each of the 50 countries included in the dataset. The model parameters are estimated over 240 days starting 300 days prior to the acquisition announcement. Source: own proprietary dataset.



There is consensus in literature about the use of announcement dates of takeovers instead of using the completion dates (Jarrell and Poulsen, 1989; Byrd & Hickman, 1991; Kaplan, 1989; Goergen & Renneboog, 2004; Martynova and Renneboog, 2006; Renneboog et al., 2007; Hope et al., 2010). The difference in CAARs can be reviewed in figure 8 of this paper. As one can already see in the graph, the PE-takeover completion dates shows no significant increase of the CAARs around the completion date and are significantly different from the outcome of the CAARs using the announcement dates, therefore following all previous literature about the bid premium.

Figure 8: Comparing company CAARs between the takeover announcement and completion date

This figure shows the market reaction of a PE transaction for the target company as the CAARs 20 days before and after the event (day 0) for all companies (573 observations) in this study for both the target takeover announcement and takeover completion date. The benchmark used for both time frames is the MSCI-world index; the model parameters are estimated over 240 days starting 300 days prior to the acquisition announcement. Source: own proprietary dataset.

