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The Effects of the Interplay between Private Equity Club Deals and Auction Theory in Leveraged Buyouts

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Abstract

The concerns of regulators about private equity club deals have led to a surge of research about the wealth effects of club deals for target shareholders. This thesis contributes to existing literature by linking club deals to auction theory by creating a comprehensive database of prominent private equity takeovers from 2010 to 2019. The novelty of this thesis lies in the collection and connection of hand-picked variables regarding type of deal and type of sale. The sample of 1354 takeovers, contains 34 club deals and 103 sole-sponsored deals of prominent private equity firms. I find small evidence for the existence of a club discount whereas significantly negative effects on target shareholder return when prominent private equity firms win an auction. Lastly, I substantiated that clubs pay a significant premium when they acquire firms in a one-on-one negotiation. These findings lead to the conclusions that one type of sale does not fit all and prominent private equity clubs are not necessarily bad for target shareholders.

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1. Introduction

Acquisitions in which multiple bidders come together to form a consortium for a single bid on a target are fairly common in private equity. These so-called 'Club Deals' have led to vivid discussions between legislators and private equity (PE) firms. In recent years, many of the large PE funds have been accused of collusive behaviour by forming clubs and lowering prices of corporate buyouts, in the period before the financial crisis (Alden, 2014).

Ever since there have been mixed findings on the question of whether private equity consortiums create or destroy target shareholder value. Officer, Ozbas and Sensoy (2010) find that private equity clubs consistently pay less for acquisitions when compared to sole-sponsored private equity deals. Boone and Mulherin (2011) find no evidence for collusive behaviour of private equity firms in their sample. Marquez and Singh (2013) show that the value creation of private equity deals depends on different factors, like market size, entry costs and auction type.

Starting point of this thesis were the articles of Officer et al. (2010) and Boone and Mulherin (2011) reflecting on differing effects of club-deals on target shareholder returns. Officer et al. (2010) argue that target shareholders receive significantly lower premiums in club-deals compared to sole-sponsored LBOs. Boone and Mulherin (2011) find no such evidence of collusive behaviour in their sample. Opposing to Officer et al. (2010), they have not only taken the largest private equity firms (PEI50) into their sample but also smaller firms.

Boone and Mulherin (2007) found almost half of all companies are sold via one-on-one negotiations. Conventional auction theory should suggest that an auction would lead to higher bids by the bidders because of the inherently competitive nature of that process. It would therefore lead to higher shareholder returns to the selling firm and dominate one-on-one negotiations (Bulow & Klemperer, 1996). Hence, the findings of Boone and Mulherin (2007) suggest a troublesome lack of competition in the takeover process.

When a firm is sold by means of an auction, the design has great influence on the incentives of participants to sole-bid, to cooperate or to collude. Conventional auction theory suggests that collective bidding harms the seller in auctions because it effectively reduces competition (Smith, 1983). Alternatively, competition hypothesis as an alternative argues that consortiums can enhance competition. In sealed bid auctions, a consortium can enable firms that would otherwise not have the financial resources to make a bid (Klemperer, 2002). First-price, second-price, English and Dutch auctions are the four main auction types. By setting an appropriate

reserve price in English auction (Graham & Marshall, 1987), or modifying a second-price auction (Che & Kim, 2009), researchers have found different ways of overcoming collusive behaviour in auctions.

This paper links auction theory with private equity club deals. The aim is to find out what impact the type of sale and private equity club involvement have. Hence the research question reflects this as follows:

What effect does the type of sale have - in private equity clubs deals - on target shareholder returns in the period of 2010 to 2019?

To examine this research question, a comprehensive dataset from various databases was constructed. The deals with prominent private equity involvement were carefully classified into club or sole-sponsored deal and auction or negotiation, using the SEC EDGAR database. Out of a total of 1354 deals completed in the US between 2010 and 2019, 137 were takeovers of prominent private equity firms. After extensive reading of the SEC merger filings, several hand-collected variables could be gathered: 34 takeovers could be classified as club deals, and 103 as sole-sponsored deals. At the time of writing, I am not aware of research examining the combination of club deals (e.g. Officer et al., 2010; Boone & Mulherin, 2011) and the type of sale (e.g. Boone & Mulherin, 2007). The hypotheses are tested by regression analysis and lead to several findings regarding the research question. The first three hypotheses are tested in the large sample of all takeovers in the US between 2010 and 2019. The other three hypotheses are tested in a subsample exclusively consisting of prominent private equity firms.

I find only small evidence for Officer et al.'s (2010) club discount suggestion. In the large sample, only one of the three return measures used is negative and significant. In the subsample, I find no evidence at all of a club discount in a sample consisting exclusively of prominent private equity firms. However, I find that prominent private equity firms (PEI50), in general, do pay significantly less. This could partly explain Officer et al.'s (2010) findings that prominent private equity clubs pay less than prominent private equity firms. Furthermore, I find that prominent private equity firms in auctions pay significantly less than other public and private companies. This effect is still evident – albeit significant only for one return measure – in the subsample of prominent private equity firms. These findings could strengthen the argument that auctions do not always dominate negotiations in terms of shareholder return. It would rather suggest that information asymmetry and the pooling of financial resources could

be important factors to be considered in the sale process (Akerlof, 1970, Boone & Mulherin, 2007). Lastly, bidding clubs engaging in one-on-one negotiations pay significantly more than other prominent private equity firms. This is contrary to the concerns of regulators that bidding clubs would enhance collusion.

This thesis is organized as follows: Section 2 contains a review of current literature to build up the conceptual framework followed by the construction of the hypotheses. In section 3, the sample formation and data extraction process are being described. Subsequently, in section 4, the return variables are constructed and the hypotheses are statistically specified, followed by descriptive statistics. In section 5, the regression results are being interpreted. This thesis will finish with section 6, containing the conclusion and discussion.

2. Literature Review and Conceptual Framework

The focus of this section will lie on current literature on the corporate takeover process. The section will first go into detail about existing literature on the corporate takeover process, private equity club deals, and auction theory. The second part will elaborate on the conceptual framework and the hypotheses development process.

2.1. Background on Corporate Takeover Processes

Even though private equity firms only exist for 75 years, the idea of purchasing distressed assets and leveraged buyouts are as old as capitalism (Gordon, 2012). Gordon (2012) exemplifies this with the British North American colonies that were founded by joint-stock companies, such as the Massachusetts Bay Company. He states that "some of those involved in that venture may have hoped to build a shining city on a hill, but others were hoping for profits. In 1901 J.P. Morgan & Co. handled what is arguably the world's first leveraged buyout, when they bought out the Carnegie Steel Corporation for $480 million" (Gordon, 2012). The first real PE companies are found to be the American Research and Development Corporation and J.H. Whitney & Co., founded in 1946 (Gordon, 2012).

Historically, private equity has been a cyclical business which can be clustered into three waves. The first wave was in the 1980s with a flourishing junk bond market. A prominent example of this wave is the spectacular takeover of RJR Nabisco, the food and tobacco giant, by Kohlberg, Kravis, Roberts & Company (KKR), in 1988, for record breaking $25bn. The second wave took place in the 1990s as a result of high GDP growth ending with the burst of the dot-com bubble in 2000. This wave was largely driven by the dot-com boom and growing venture capital activities (Cendrowski, 2012). After the dot-com bubble burst, the third wave took place, up until crash of the financial crisis in 2008/09 (Bain & Company, 2010). Cendrowiski (2012) found that "by the early part of 2007, the buyout industry was enjoying a renaissance never before seen by investors. Investments spiked to $80 billion and fund sizes, returns, and distributions were at or near record highs.". Bain & Company (2020) find a new wave emerging in recent years, with fundraises rising from $321bn in 2010 to a high of $930bn in 2017.

2.1.1. Private Equity Club Deals

Club deals consist of multiple private equity firms bidding jointly for a corporate takeover target. There are different findings to why private equity firms bid as a consortium. Many authors find evidence that they do so to pool resources, competencies, information and reduce their risk exposure (e.g. Brander, Amit & Antweiler, 2002; Kim & Palia, 2014; Marquez & Singh, 2013). Others find that private equity clubs pay systematically less, which can be seen as an indication for collusion (e.g. Lerner, 1994; Officer et al., 2010).

Brander et al. (2002) find that cooperating venture capital funds tend to create higher returns. They argue that pooled resources and information lead to higher return. Risk sharing and large project scales may be additional reasons for venture capitalists to cooperate. Robinson (2008) develops a framework for strategic alliances. He finds that firms have an objective to diversify their risk exposure and therefore form alliances, not in their core, but their secondary or tertiary line of business. These projects are often found to be riskier than the core business line. Kim and Palia (2014) test this in the private equity industry and find strong support for the risk-reduction hypothesis of Robinson (2008). The findings suggest that the differences in target shareholder return premiums between clubs and non-clubs originate from different target firm characteristics rather than collusive behaviour.

Officer et al. (2010) find different results in their sample of prominent private equity firms from 1984 to 2007. They find that target shareholders receive significantly lower premiums in club-deals compared to sole-sponsored LBOs. The effect was found to be significant to firm and deal characteristics (Officer et al., 2010). The results are concentrated before 2006 which indicate support for the accusations of collusive behaviour of private equity firms, by the US Justice Department (Alden, 2014).

Boone and Mulherin (2011) are analysing these accusations in their study from 2003 to 2007. They are not only taking prominent, but also smaller private equity firms, into their sample. They do not find evidence of collusion in the takeover market and argue that policymakers should rather "focus on ensuring that the takeover market is an unimpeded and competitive process" (Boone & Mulherin, 2011). Similar conclusions are drawn by Fougner (2013) and Marquez and Singh (2013). Fougner (2013) uses the Herfindahl-Hirschman Index (HHI) to measure market concentration of the takeover market and finds the takeover market concentrated. He argues that club bidding increases competitiveness for large LBOs when small bidders would be too small to bid alone. Also, club bidding may bring new players in and

therefore increase market size. He calls for regulators to consider size of targets, funds and clubs when assessing private equity clubs. Marquez and Singh (2013) present a novel analysis in which they find that market and auction settings are of crucial importance when evaluating club deals. They show that "club formations can lead to higher acquisition prices when the number of bidders is exogenously fixed and large" (Marquez & Singh, 2013). However, clubs can also lead to an endogenous limit of competition if entry costs are high. Marquez and Singh (2013) reconcile the contradictory findings and exemplify that value creation of private equity club deals is very much a question of market and auction settings.

2.1.2. Auction theory

Auction theory for joint bidding - in the case of private equity - can be divided into two categories. Conventional auction theory, assuming joint bidding harms the seller in an auction, and competition hypothesis, assuming bidding-clubs can enhance competition.

Conventional auction theory is based on the intuition, that "whenever joint bidding occurs, potential rivals join together in a consortium that effectively precludes competition among its membership" (Smith, 1983). Graham and Marshall (1987) find that cooperative behaviour strictly dominates non-cooperative behaviour, so that, if there are no regulations, it is always beneficial for bidders to form a cartel. McAfee and McMillan (1992) differentiate between strong and weak cartels. Strong cartels are able to make transfer payments and exclude new entrants from an auction. In weak cartels, bidders cannot make side-payments. Side-payments are transfer payments, to for example refrain other potential bidders entering an auction. The only way of cooperating is by bidding similarly low and let one cartel member win the auction. There is evidence for this weak cartel behaviour in many government contract auctions (Klemperer, 2002; McAfee & McMillan, 1992).

Competition hypothesis relaxes the assumption that joint bidding inevitably reduces competition. Instead information pooling, auction design (Mares & Shor, 2012) and pooling of resources (Cho, Jewell & Vohra, 2002) are important factors to consider when evaluating the effects of joint bidding on competition. Competition hypothesis argues that joint bidding can also enhance competition by making the takeover market more accessible.

There are four widely used auction types: English, Dutch, first-price and second-price auction. English auction is an oral auction in which the auctioneer solicits a bid at a low price and gradually raises the price until only one bidder remains. Dutch auction is an oral auction in

which the auctioneer initially solicits a very high price and then gradually decrease until one bidder claims it for the current price. A first-price auction is a sealed-bid auction in which the bidder who submits the highest bid pays the amount he has bid. A second-price auction is a sealed-bid auction in which the highest bidder wins the auction but pays the second-highest bid for the good (Graham & Marshall, 1987). Che and Kim (2009) argue that second-price auctions are the most efficient type against collusion, even if a weak cartel exists (McAfee & McMillan, 1992). Due to information asymmetries within the bidding ring a cartel member cannot win a second-price auction if there is at least one rational bidder in the auction (Che & Kim, 2009). Klemperer (2002) argues that pure English auctions are especially vulnerable to collusion and hamper competition by deterring entry because of the winner's curse. The winner's curse implies that the winner of an English auction is the one who has overestimated the value of a good the most when the valuations of the bidders do not differ significantly. Competition is hampered because stronger firms are generally favoured by an ascending auction type and firms outside of a cartel can be punished and driven out of the auction by extremely aggressive bidding behaviour of the cartel (Klemperer, 2002). Klemperer (2002) proposes a new model of auction which is called the Anglo-Dutch auction. The Anglo-Dutch auction has a pre-set reserve price which needs to be overbid for the good to be sold. It will begin as an oral English auction with an ascending price until only two bidders remain. At this stage, the bidders have to submit sealed-bids with the highest bid winning the auction. This way Klemperer (2002) argues, the seller can overcome collusion by the sealed bid stage and encourage smaller firms to bid as well. It is important to note that there is not one auction type that fits all and that auctions can be tailored in a way that suits the market conditions best.

Aktas et al. (2009) find that in many deals there is only one bidder which suggests a troubling lack of competition. Yet, indirect competition, the potential threat of another party entering the negotiation propels bidders towards more competitive actions. Though auction theory suggests one-on-one negotiations to be disadvantageous, auction costs - the costs of setting up and if the one-on-one negotiation fails - explain why targets voluntarily accept limited competition among bidders (Aktas et al., 2009).

Akerlof's (1970) study of the 'market for lemons' could be seen as one explanation why many takeovers are one-on-one negotiations: "The basic assumption of Akerlof's model is that consumers and producers have asymmetrical information about the quality of the good traded. Producers know precisely what they produce; after all, they are the product specialists. Consumers, however, find it difficult to determine the quality of many products at the time they

buy them" (Sinn, 2003). The market for lemons was originally modelled as an adverse selection problem. Akerlof's (1970) main example refers to cars. The owner can either continue to drive it themselves or sell to someone else (Sinn, 2003). Because the owner knows more about their cars than the potential buyers do, only bad cars - the lemons – are offered for sale (Sinn, 2003). Akerlof (1970) assumed that cars of a certain age - that are bought and sold - are of lower average quality than the exact same cars driving on the streets, because used cars bought and sold are a negative selection (Sinn, 2003).

Boone and Mulherin (2008) define a negotiation as a "takeover in which the selling firm focuses on a single buyer." In an earlier study, Boone and Mulherin (2007) compare the wealth effects for auctions and negotiations. They distinguish between agency cost hypothesis and information costs hypothesis. They argue that if agency costs are the driving force between auctions and negotiations, then wealth effects of auctions should be significantly larger than the ones for negotiations (Boone & Mulherin, 2007). They argue that if the information cost hypothesis was true, wealth effects of auctions and negotiations should be comparable. They find no evidence for rent-seeking of the target's management at the expense of shareholders, but rather argue in favour of the information cost hypothesis. In a later study, Boone and Mulherin (2009) argue that one size does not fit all in this sales process. Large established companies would often sell through one-on-one negotiations with single bidders judged to have the best fit with the target (Boone & Mulherin, 2009). Though, "smaller companies that are more difficult to value often find it in their interest to conduct an auction among a number of bidders to find the firm willing to offer the highest price" (Boone & Mulherin, 2009).

2.2. Conceptual Framework and Hypotheses

In this subsection, the concepts relevant for answering the research question will be clarified and defined. The focus will be laid on the following concepts: (1) the target shareholder return, (2) private equity club deals, and (3) private equity firms in auctions. Based on the relevant literature of these concepts, testable hypotheses will be formulated.

2.2.1. Return to target shareholders

Return to target shareholders will be measured based on the 4-week acquisition premium and the buy-and-hold abnormal returns (BHARs) of the runup, mark-up and premium phase.

The first measure to determine the target shareholder return is the 4-week acquisitions premium. This is calculated by the percentage difference between the price offered per share and the share price 4 weeks prior to the announcement of the deal. Eckbo (2009) states two key advantages over abnormal returns: (1) direct output of the bidding behaviour of the acquirer and (2) bid premiums being less effected by rumours because the short-term runup is included in the premium.

The second measure to determine the return to target shareholders is buy-and-hold abnormal return. BHARs are calculated for the following intervals for each target, based on the trading days relative to the deal announcement date (day=0). The runup phase is defined as day -42 to day -1. The mark-up phase ranges from day 0 to day +126 or the delisting date, whichever occurs first. The premium interval represents day -42 to day +126 or the delisting date, whichever occurs first. These intervals follow Officer et al. (2010). The BHARs are calculated by subtracting the compound returns of the CRSP value-weighted market index (including dividend distributions) from the compound returns of the target shares over the given time periods (Officer et al., 2010).

To obtain insightful results, regressions will be run on both methods to measure return to target shareholders.

2.2.2. Private equity club deals

Increasing presence of private equity consortiums has led to growing interest in their investment behaviour. There have been mixed findings of the premiums paid to target shareholders. Officer et al. (2010) find prominent private equity clubs to pay significantly lower premiums than sole-sponsored deals and non-private equity mergers and acquisitions from 1994 to 2007. However, Boone and Mulherin (2011) do not find such an effect when analysing prominent as well as smaller private equity consortiums from 2003 to 2007.

Hence, the first two hypotheses will examine whether prominent private equity consortiums do pay less than sole-sponsored private equity deals and non-private equity mergers and acquisitions. Similarly to Officer et al. (2010), sole-sponsored and consortium corporate takeovers won by prominent private equity firms will be analysed. Deviating from Officer et al. (2010), hypotheses 1 to 3 will analyse shareholder returns of prominent private equity clubs to sole-sponsored private equity deals and non-private equity mergers and acquisitions. Concerns by regulators and the press about club deals are generally focusing on prominent

private equity firms because they would be more likely to have the market power to influence and reduce prices (Officer et al., 2010). Prominent private equity firms are defined as the largest 50 private equity firms based on the capital they have raised in the previous five years. This list is published every year by the Private Equity International (PEI) magazine (Le, 2020).

The first two hypotheses will be as follows:

Hypothesis 1: Takeover premiums in corporate takeovers won by prominent private equity firms, are – on average – lower than non-private equity mergers and acquisitions.

Hypothesis 2: Takeover premiums in corporate takeovers won by prominent private equity clubs, are – on average – lower than sole-sponsored deals and non-private equity mergers and acquisitions.

2.2.3. Private equity firms in auctions

Conventional auction theory implies that joint bidding in an auction is precluding competition amongst bidders. Hence they negatively influence the return to target shareholders (Smith, 1983). Competition hypothesis relaxes this and suggests that joint bidding can enhance competition in an auction (Cho, Jewell & Vohra, 2002; Mares & Shor, 2012). Officer et al. (2010) find prominent private equity clubs to pay significantly lower premiums than sole-sponsored private equity deals, while Boone and Mulherin (2011) do not find such an effect for prominent as well as smaller private equity clubs. Additionally, they do not find a detrimental effect on target shareholders of joint bidding in auctions (Boone & Mulherin, 2011).

In an auction, winner's curse implies that the winning bidder bids a price, that is higher than the Nash equilibrium of the market, to win the auction (Holt & Sherman, 2014). According to the theory of the winner's curse, target shareholders should expect higher premiums from auctions than from negotiations. Bulow and Klemperer (1996) find that – by the seller - a simple auction with N+1 bidders should always be preferred to a one-on-one negotiation with N bidders. In theory, the competitive dynamics of the bidding process would always lead to a more optimal outcome than a negotiation (Bulow & Klemperer, 1996). Contrary to this, Akerlof (1970) argues in his theory of lemons that the uncertainty of quality in the marketplace will reduce prices of all goods in the market. Boone and Mulherin (2007) find comparable wealth effects of auctions and negotiations in the takeover market. The uncertainty of quality

may be pronounced in auctions as the timeframe for bidding rounds is more formalized when compared to one-on-one negotiations. This could lead to more superficial due diligence because of time-pressure and would lead to higher uncertainty. This leads to the assumption that firms that are sold on a public marketplace via an auction are not always dominating negotiations and yielding higher shareholder returns.

To test which theory reflects the takeover market, with prominent private equity involvement, the following hypothesis will be tested:

Hypothesis 3: Takeover premiums in corporate takeovers won by prominent private equity firms in an auction are – on average – lower than other corporate takeovers.

The counterfactual group consists of all one-on-one negotiations and auctions not won by prominent private equity firms. The business model of private equity firms includes acquiring firms via means of negotiations or auctions. They could be seen as the most professional buyers in the takeover market. This would make them more hesitant to acquire companies in auctions if quality is less certain. Out of all private equity firms, prominent private equity firms have proven to be the most successful firms in assessing risk and therefore serve well as a comparison group.

2.2.4. Prominent private equity firms

Following the theory previously mentioned (section 2.2.2.), the assumptions will be tested on a sample exclusively consisting of prominent private equity buyers. The time period will be the same as previously mentioned. The sample consists of 137 takeovers, out of which 34 are classified as club deals and 104 as sole-sponsored deals. This can lead to a comprehensive understanding of the effects of joint bidding and different sale processes.

The 4th hypothesis is stated as follows:

Hypothesis 4: Takeover premiums are lower for club deals than for sole-sponsored private equity deals.

Akerlof (1970) presents the second-hand car market as an example of his lemons hypothesis. The car may be a good car or a lemon (bad car). Uncertainty of quality resulting from information asymmetry between seller and buyer leads to lower prices. This uncertainty could be larger in auctions than in one-on-one negotiations, because of time-pressure resulting

from a more formalized sale process in auctions. To test whether this can be found with auctions and negotiations in the takeover market, the fifth hypothesis is:

Hypothesis 5: Auctions obtain lower takeover premiums, when prominent private equity firms win than negotiations.

The last hypothesis tests whether evidence can be found of the theory that bidding clubs can add value in one-on-one negotiations. By in-depth due diligence, clubs can reduce their risk and could hence acquire larger firms, by pooling information and resources (Cho et al., 2002; Mares & Shor, 2012). Negotiations could reduce the information asymmetry of seller and buyer and leave room for thorough due diligence.

This leads to the last hypothesis:

Hypothesis 6: Private equity club takeovers in one-on-one negotiations lead to higher acquisition premiums than other prominent private equity takeovers.

The counterfactual group consists of all auctions and one-on-one negotiations not won by prominent private equity clubs. This hypothesis could deliver insights if prominent private equity firms behave differently when forming a bidding club and engaging in a one-on-one negotiation.

3. Data

This section will cover the sample selection process and key sample characteristics. It starts with the data extraction from Securities Data Corporation (SDC) database. Subsequently, the data gathering and classification process of the SEC merger filings will be circumstantially explained. The data has been hand-collected and hence it is of paramount importance that this process is thoroughly elaborated upon. Additionally, the construction of the variables of interest will be exemplified.

3.1. Sample formation

The sample is obtained from the Securities Data Corporation (SDC) database via Thompson ONE. It includes all completed deals in the period 2010 to 2019, of U.S. targets in which the acquirer purchased 100% of the shares, are included. Based on the previously mentioned literature, the minimum deal value is $100 million (e.g. Officer et al., 2009). The announcement date of the takeover must be between the 1st of January 2010 and the 31st of December 2019. The deal must be completed by 1st of June 2020. It excludes transactions labelled as minority stake purchases, undisclosed value M&A, privatizations, self-tenders, acquisitions of remaining interest, recapitalizations, spin-offs, repurchases, and exchange offers. This has led to a total of 8496 deals. Other variables obtained from the SDC database are: the names of the target and the acquirer, the 4-week acquisition premium, the target 6-digit CUSIP, the target primary SIC, the acquirer name, the acquirer 6-digit CUSIP, the acquirer primary SIC, the enterprise value at announcement, the share price paid by the acquirer for target shares, the deal value and the deal synopsis. To verify that all the targets are public firms at the announcement date, the dataset is merged with the merged CRSP-Compustat database, based on the 6-digit CUSIP code. Additionally, the following financial information from the merged CRSP-Compustat databased are included: total assets, total common equity, total long-term debt, total intangible assets, total current liabilities and total operating income before depreciation. The financial information is derived from the annual report of the previous year. This leads to a total of 1354 merged deals.

The remaining deals are screened for deals with prominent private equity involvement. Prominent private equity is defined as the largest 50 private equity firms, based on the capital raised in the previous five years. This list is published every year by the Private Equity International (PEI) magazine. For this sample, the 2020 PEI Top 50 are chosen (detailed list in Appendix 2). If a prominent private equity firm is the acquirer or is mentioned as an acquisition

party in the Deal Synopsis, this deal is marked for matching with the SEC EDGAR database. This leads to 137 acquisitions of prominent private equity firms in the sample. Only deals with a filing in the SEC EDGAR databased are being included. In the SEC EDGAR filings for mergers, the SEC Form DEFM14A and/or Form S-4 and for tender offers the Schedule 14D-9 filings are investigated. During this process, no deals are eliminated from the sample.

3.2. Data extraction procedure for SEC merger filings

In this subsection, the hand-picked data extraction procedure for the SEC merger filings will be explained. Firstly, the categorization of the deals into club deal or sole-sponsored deal will be covered, followed by the categorization into auction or negotiation. Finally, the summary statistics will be presented.

3.2.1. Categorization club- or sole-sponsored deal

The SEC merger filings contain a Background of the Merger Section in which the whole deal from first contact to deal execution is described. The rich text of the filings enable the number of players contacted, the identification of the initiating player, the number of confidentiality agreements signed, the type of sale, the buyer's names and the agreement and announcement date. Despite the extensive information available, it requires very careful and thorough reading of each of the merger filings, as not all of them are written with the same structure. Important information is frequently omitted.

All deals with prominent private equity involvement are categorized into two categories. The deal can either be sole-sponsored or a club/consortium deal. To categorize this, the takeovers with prominent PE involvement have first been filtered out by manually searching through the acquirer's name and the deal synopsis section of the SDC data. If a prominent PE firm has acted as an acquirer, the deal has been marked and subsequently investigated in the SEC EDGAR database. After careful reading of each deal's Background of the merger section in the SEC EDGAR database, the deal was categorized based on the stated number of acquiring parties. If there was one prominent private equity party and at least one other party – prominent on not prominent – involved, the deal was classified as a club deal. If only one party is stated as the acquiring party, the deal is classified as sole-sponsored. This procedure has led to a sample of 137 deals with prominent PE involvement. 34 of those were categorized as club deals and 104 as sole-sponsored.

3.2.2. Categorization auction or negotiation

The categorization of acquisitions into a type of sale has required far more extensive and careful reading. Important information in the Background of the Merger section of the SEC merger filings were oftentimes omitted with no clear classification if an acquisition was an auction or a negotiation. Frequently, several parties were contacted in the sales process but no further interactions took place. A deal was classified as an auction if more than one party was indicated – in the Background of the merger section – as having signed a confidentiality agreement. If that was not the case, the deal was classified as a negotiation. The selection follows Boone and Mulherin (2008). After careful readings, this has led to 78 deals being classified as auctions and 59 classified as one-on-one negotiations. This is consistent with previous findings of Aktas et al. (2010), Boone and Mulherin (2007), and Boone and Mulherin (2008) who find roughly half of the takeovers in their samples to be one-on-one negotiations and the other half to be auctions.

3.2.3. Summary statistics

In Table 1, the total deal value of the sample per year is presented. Clustered in: all deals, club deals, sole-sponsored deals, private bidder deals and public bidder deals. In the sampling period - 2010 to 2019 – a total of 1354 deals with a total deal value of $4549bn could be identified. Out of those, 34 deals were classified as prominent private equity club deals, 103 as sole-sponsored prominent private equity deals, 331 as other private bidder deals, and 885 as other public bidder deals. In Table 1, it can be observed that there is a relatively even distribution of deals over the sampling period. The total deal value is the largest in 2015 for all categories, except for sole-sponsored private equity deals. It can be seen that the number and total deal value of sole-sponsored private equity deals is rising throughout the sampling period, suggesting growing popularity of this type of deal. Though it is worth noting that the average deal value for club deals – a total of $14bn in 34 takeovers - is significantly higher than for sole sponsored deals – a total of $17bn in 103 takeovers.

Table 1

Sample distribution of deals over the period of 2010 to 2019. Table 1 shows the time-series distribution of the sample of acquisitions of publicly traded firms, retrieved of Securities Data Company. Transactions are clustered by years based on their announcement dates. The prominent private equity deals are identified by searching names of prominent PE firms in the deal synopses provided by Securities Data Company and subsequently confirming the results by analysing the Background of the Merger Section of the SEC merger filings. Prominent PE firms are defined as the 50 largest PE firms in the world as indicated by the Private Equity International (PEI) magazine (Appendix 2). If the synopsis from SDC and the SEC merger filings contains the name of only one prominent PE firm, then the acquisition is classified as a sole-sponsored deal. If the deal synopsis from SDC and the Background of the merger section of the SEC merger filings contain the name of at least one prominent PE firm and at least one other firm - prominent or not – can be identified as the acquirer, then the takeover is classified as a club deal. All other takeovers in the sample are classified by whether the acquirer is privately held or publicly traded, as indicated by SDC. The total deal value is the yearly sum of deal value reported by SDC (in $m) (Officer et al., 2010).

Year	All deals		Deals by prominent private equity				Other deals			
			Club Deals		Sole PE deals		Private bidder		Public bidder	
	No. of deals	Total deal value	No. of deals	Total deal value	No. of deals	Total deal value	No. of deals	Total deal value	No. of deals	Total deal value
2010	144	225768,8	2	8487,5	5	5823,5	48	47524,5	89	163933,3
2011	136	318293,8	6	14540,6	9	9103,3	66	77760,1	55	216889,8
2012	118	153002,3	2	1677,1	9	4540,2	30	22902,6	77	123882,4
2013	122	187934,0	1	6710,1	8	8279,4	32	30046,0	81	142898,4
2014	132	534569,6	4	12566,6	5	7276,2	21	62434,2	102	452292,7
2015	162	818832,6	6	33327,6	10	18918,7	26	105520,9	120	661065,5
2016	165	668567,9	4	9378,3	19	33779,6	28	28306,1	114	597104,0
2017	135	458052,8	4	9792,5	13	20777,3	29	40182,4	89	387300,6
2018	133	550960,5	1	2544,5	12	40565,9	29	69063,9	91	438786,2
2019	107	633780,1	4	38157,4	13	21869,7	22	43455,3	67	529617,5
Total	1354	4549762	34	137182,2	103	170933,7	331	527195,9	885	3713770

Table 2 ranks the completed acquisitions by prominent private equity firms. For the sample period of 2010 to 2019, it can be found that 32 of the PEI50 (of 2020) have completed a deal in the United States. The deals are clustered in: all deals, sole sponsored PE deals and club deals. Thoma Bravo – 15th in the PEI50 – has completed the most deals in the sample period. Out of the 16 deals, 14 were sole sponsored and 2 were club deals. Apollo Global Management – 15th in the PEI50 - ranks second in the total number of acquisitions. Out of the 15 deals, 12 were sole sponsored and 3 are club deals. Vista Equity Partners – 10th in the PEI50 – ranks third with 13 deals, out of which all were sole sponsored. The PE firm with the most club deals is BDT Capital Partners – ranked 39th in the PEI50 – with four club deals in the sample period.

Table 2

Completed deals per prominent private equity firm. This table shows the total number of acquisitions per firm, sole-sponsored and club deals. Every prominent private equity firm's PEI50 ranking has been included. The firms are ranked on the total number of deals. For example, Kohlberg, Kravis 6 Roberts & Co. (KKR) is has completed 7 takeovers in the sample, out of which 5 are sole-sponsored deals and 2 are club deals. KKR ranks 7th in this ranking and 3rd according to the PEI50.

Rank	PEI50	Name of private equity firm	All deals	Sole PE deals	Club deals
1	15	Thoma Bravo	16	14	2
2	14	Apollo Global Management	15	12	3
3	10	Vista Equity Partners	13	13	
4	1	Blackstone LP	9	7	2
5	20	Brookfield Asset Management	9	8	1
6	4	TPG Capital	8	5	3
7	3	KKR & Co	7	5	2
8	8	EQT	6	5	1
9	28	Hellman & Friedman	5	3	2
10	11	Leonard Green & Partners	5	2	3
11	19	Permira Advisers	5	3	2
12	2	The Carlyle Group	5	2	3
13	39	BDT Capital Partners	4		4
14	48	HIG Capital	4	4	
15	5	Warburg Pincus	4	3	1
16	35	BC Partners	3	1	2
17	7	CVC Capital Partners	3	1	2
18	23	Platinum Equity	3	3	
19	33	Silver Lake	3	1	2
20	40	American Securities	2	1	1
21	42	Apax Partners	2	1	1
22	29	Ares Capital Management	2	1	1
23	46	Clayton, Dubilier & Rice	2	2	
24	38	Genstar Capital	2	2	
25	16	Insight Partners	2	1	1
26	9	Advent International	1	1	
27	13	Bain Capital	1		1
28	22	Fransisco Partners	1	1	
29	41	L Catteron	1	1	
30	50	PAG	1		1
31	49	Riverstone Holdings	1	1	
32	31	Stone Point Capital	1		1

3.3. Variables of interest

This section will cover the choice and construction of the following main variables of interest: the return to shareholders, the type of deal and the type of sale.

3.3.1. Return to shareholders

To measure the return to shareholders, the 4-week takeover premium - and the runup, mark-up and premium BHARs - are being used.

The first measure to determine the return to target shareholders is the 4-week acquisitions premium. This is calculated by the percentage difference between the offer price per share and the share price 4 weeks prior to the announcement of the deal. Eckbo (2009) states two key advantages over abnormal returns: (1) the direct output of the bidding behaviour of the acquirer and (2) the bid premiums being less effected by rumours because the short-term runup is included in the premium. These key advantages make the 4-week acquisition premium an insightful addition to the BHARs used by Officer et al. (2010).

The second measure to determine the return to target shareholders are the buy-and-hold abnormal returns. BHARs are calculated for the runup mark-up and premium phase. According to Officer et al. (2010), BHARs are a good measure of the wealth effects to target shareholders.

3.3.2. Type of deal

To determine the type of deal, the takeovers with prominent PE involvement had to be carefully categorized into club or sole-sponsored deal, by reading the SEC merger files. The dummy variable Club is equal to one if the takeover was performed by a club and equal to zero if it was a sole-sponsored deal.

3.3.3.Type of sale

To determine the type of sale, the takeovers with prominent PE involvement had to be classified into auction or negotiation, by reading the SEC merger files. This step required utmost precision in the analysis of the whole Background of the Merger section of the SEC merger filings. The dummy variable Auction is equal to one if the target was sold in an auction and equal to zero if the target was sold in a negotiation.

4. Methodology

In this section the construction of the variables will be depicted, followed by the descriptive statistics. Then, the hypotheses will be statistically specified and potential outcomes exemplified. This section will conclude by explaining the approach of the analysis, followed by robustness checks.

4.1. Construction of the variables for shareholder return

The 4-week takeover premium was retrieved from the SDC database via Thompson ONE. The motivation to use the 4-week acquisition premium is similar to Aktas et al.'s (2010). Stock prices tend to react to future merger announcements around a month in advance of the official announcement. For one of the deals with prominent PE involvement, there was no takeover premium available and hence it was calculated manually by dividing the offer price by the target share price four weeks prior to the announcement. This results in the following formula:

$$Takeover\ Premium_i = \left(\frac{Offer\ Price\ per\ Target\ Share_i}{Target\ Share\ Price\ 4\ Weeks\ prior\ to\ Announcement_i} - 1\right) * 100\%, \quad (1)$$

where *i* denotes completed takeover *i.*

For similar reasons as the 4-week premium, the buy-and-hold abnormal returns have been calculated. BHARs are calculated over the following intervals for each target based on the trading days relative to the deal announcement date (day = 0). The runup phase is defined as day -42 to day -1. The mark-up phase ranges from day 0 to day +126 or the delisting date, whichever occurs first. The premium interval represents day -42 to day +126 or the delisting date, whichever occurs first. These intervals follow Officer et al. (2010). The BHARs are calculated by subtracting the compound returns of the CRSP value-weighted market index (including dividend distributions) from the compound returns of the target shares over the given time periods (Officer et al., 2010). This results in the following formulas:

$$BHAR_{runup} = \prod_{-42}^{-1}(1 + return_i) - \prod_{-42}^{-1}(1 + value\ weighted\ return_i), \quad (2)$$

where *i* denotes completed takeover *i.*

$$BHAR_{mark-up} = \prod_{0}^{126}(1 + return_i) - \prod_{0}^{126}(1 + value\ weighted\ return_i), \quad (3)$$

where *i* denotes completed takeover *i.*

$$BHAR_{premium} = \prod_{-42}^{126}(1 + return_i) - \prod_{-42}^{126}(1 + value\ weighted\ return_i), \quad (4)$$

where *i* denotes completed takeover *i.*

Table 3 shows the different types of shareholder returns and the differences in means between different buyer clusters. The 4-week premium is expressed as a raw return, while the runup, mark-up and premium are expressed as raw returns as well as buy-and-hold abnormal returns. Returns are clustered into club deal, sole-sponsored deal and the full sample.

When considering the raw returns, it can be derived that – on average – sole-sponsored deals are paying the lowest acquisition premiums, while club deals have lower premiums than the full sample. When examining the BHARs it becomes evident that - except from the runup phase - club deals pay the lowest premiums, followed by sole-sponsored deals and the full sample. From Table 3 it can be found that there are deviations in returns to shareholders between the full sample, private equity clubs and sole private equity bidders. The difference in 4-week premium between the full sample and the sole-sponsored private equity deals is significant at the 1% significance level. None of the other differences are significant.

Table 3

Target shareholder percentage returns, for bidder types. Table 3 shows averages and medians (below) for different measures of target returns (in per cent) in the sample of deals from SDC described in the description of Table 1. 4-week premium is the percentage difference between the offer price per share and the share price four weeks before the announcement of the deal. This metric was retrieved from SDC, or - if missing - calculated as described in section 4.1. Runup is the compound return measured over the (-42 days to -1 day) period (defined as trading days relative to the announcement date (0)), Mark-up is the compound return measured over the (0 days, to +126 days) period (unless the target is delisted before trading day +126), and Premium is the compound return measured over the (-42 days to +126 days) period. All BHARs are the compound return to the target shares minus the compound return to the CRSP value-weighted market index (with dividend distributions) over the same period (Officer et al. 2010). A detailed description can be found in Section 4.1. The differences in the means are calculated by performing a 2-sample t-test. If a coefficient is significantly different from zero, this is indicated by *, ** and *** at the 10%, 5%, and 1% levels, respectively.

	Full Sample	Club	Sole PE	Full - Club	Full - Sole		Club - Sole
Raw returns							
4-week premium	38,18%	31,47%	28,42%	6,88%	10,58%	***	3,06%
	30,87%	28,13%	24,10%				
	1354	34	104				
Runup	8,14%	7,78%	6,89%	0,38%	1,36%		0,89%
	5,68%	7,18%	5,46%				
	1350	34	104				
Markup	29,27%	22,81%	25,30%	1,36%	6,63%		-2,49%
	23,49%	16,20%	19,61%				
	1312	34	101				
Premium	38,07%	30,01%	32,34%	4,30%	8,28%		-2,32%
	32,81%	25,42%	27,77%				
	1308	34	101				
Buy-and-hold abnormal returns							
Runup BHAR	6,12%	5,58%	4,62%	0,19%	1,19%		0,92%
	3,63%	5,94%	2,07%				
	1349	34	104				
Markup BHAR	25,74%	19,32%	22,65%	5,80%	2,50%		-3,34%
	19,81%	10,31%	17,88%				
	1312	34	101				
Premium BHAR	32,48%	24,31%	27,41%	7,63%	4,70%		-3,10%
	27,80%	18,93%	22,11%				
	1308	34	101				

4.2. Statistical specification of the hypotheses

The validity of the hypotheses will be tested through Ordinary Least Squares (OLS) regressions. Dependent variable of the regression will be the markup and premium buy-and-hold abnormal return as well as the 4-week acquisition premium. To overcome the omitted variable bias, a selection of conventionally used control variables is being added to the regression models: firm size, deal size, leverage, return on assets, Tobin's Q, market-to-book, intangibles and target related. Each equation contains those control variables.

Hypothesis 1: Takeover premiums in corporate takeovers won by prominent private equity firms, are – on average – lower than non-private equity mergers and acquisitions.

$$\textbf{H1}: Takeover\ Premium_i = \beta_0 + \beta_1 PEI50_i + \beta[Control\ Variables_i] + \varepsilon_i \quad (5)$$

Evidence in support of Hypothesis 1 can be found if $\beta 1 < 0$ and is statistically significant.

Hypothesis 2: Takeover premiums in corporate takeovers won by prominent private equity clubs, are – on average – lower than sole-sponsored deals and non-private equity mergers and acquisitions.

$$\textbf{H2}: Takeover\ Premium_i = \beta_0 + \beta_1 PEI50xClub_i + \beta[Control\ Variables_i] + \varepsilon_i \quad (6)$$

Evidence in support of Hypothesis 2 can be found if $\beta 1 < 0$ and is statistically significant.

Hypothesis 3: Takeover premiums in corporate takeovers won by prominent private equity firms in an auction are – on average – lower than other corporate takeovers.

$$\textbf{H3}: Takeover\ Premium_i = \beta_0 + \beta_1 PEI50xAuction_i + \beta[Control\ Variables_i] + \varepsilon_i \quad (7)$$

Evidence in support of Hypothesis 3 can be found if $\beta 1 < 0$ and is statistically significant.

Hypothesis 4: Takeover premiums are lower for club deals than for sole-sponsored private equity deals.

$$\textbf{H4}: Takeover\ Premium\ (PEI50 = 1)_i = \beta_0 + \beta_1 Club_i + \beta[Control\ Variables_i] + \varepsilon_i \quad (8)$$

Evidence in support of Hypothesis 4 can be found if $\beta 1 < 0$ and is statistically significant.

Hypothesis 5: Auctions obtain lower takeover premiums, when prominent private equity firms win, than negotiations.

$$\textbf{H5}: Takeover\ Premium\ (PEI50 = 1)_i = \beta_0 + \beta_1 Auction_i + \beta[Control\ Variables_i] + \varepsilon_i \quad (9)$$

Evidence in support of Hypothesis 5 can be found if $\beta 1 < 0$ and is statistically significant.

Hypothesis 6: Private equity club takeovers in one-on-one negotiations lead to higher acquisition premiums than other prominent private equity takeovers.

H6: $Takeover\ Premium\ (PEI50 = 1)_i = \beta_0 + \beta_1 ClubxNegotiation_i + \beta[Control\ Variables_i] + \varepsilon_i (10)$

Evidence in support of Hypothesis 6 can be found if $\beta 1 > 0$ and is statistically significant.

4.3. Descriptive statistics

Table 4 shows the deal characteristics of the full sample, club deals and sole-sponsored deals. All financial ratios have been winsorized on the 0,5% and 99,5% level, to curb the influence of outliers. Additionally, the differences of means between the buyer clusters – full sample, club, sole-sponsored – are being displayed.

It can be derived that the average deal value ($4,03bn) is the largest for club deals. Sole-sponsored deals have significantly lower deal values ($1,65bn) than club deals and the rest of the sample ($3,36bn). A similar pattern can be found looking at the acquired firm's size. However, with the full sample being the largest ($3,36bn) and club deal being the second largest ($2,26bn). Again, sole-sponsored deals are significantly smaller in firm size than the other two clusters. When looking at leverage it can be identified that sole-sponsored deals have on average the highest leverage (51,23%) relative to firms size. The leverage is significantly larger than for the full sample. Furthermore, clubs acquire - on average - firms with significantly higher returns on assets (15,13%) than the full sample (5,78%), and sole-sponsored private equity firms (9,96%). Similarly, sole-sponsored private equity firms acquire firms with a significantly higher return on assets than the full sample as well. It can be observed that Tobin's Q is the highest for the full sample (2,59) followed by sole-sponsored deals (2,11) and club deals having the lowest (1,94). None of the differences are significant. The market-to-book ratio is the highest for sole-sponsored deals (7,26) followed by club deals (5,09) and the full sample (4,68). The differences are insignificant as well. The intangibles ratio shows that prominent private equity buyers – club (27,5%) and sole-sponsored (27%) – acquire firms with significantly higher intangibles relative to their firm size, compared to the full sample (19,72%).

Table 4

Deal characteristics, for bidder types. This table shows averages and medians (below) for different target characteristics. Below medians, the number of observations are displayed. Deal value is the total transaction value, as indicated by SDC, measured in billions of dollars. Firm size is the targets market capitalization 43 days the bid announcement (right before the beginning of the runup period), measured in (in $b) (Officer et al., 2010). Leverage is calculated as the long-term debt plus current liabilities divided by the book value of total assets. Values are winsorized at 0,5% and 99,5% (Aktas et al., 2010). Return on assets is calculated as the operating income before depreciation over the book value of total assets. Values are winsorized at 0,5% and 99,5% (Aktas et al., 2010). Tobin's Q is equal to the market value of assets divided by the book value of assets. This is calculated by subtracting the book value of ordinary equity from the book value of assets and adding the market value of equity, divided by the book value of assets (Aktas et al., 2010). Values are winsorized at 0,5% and 99,5% (Aktas et al., 2010). Market-to-book is calculated as the ratio of the market value of equity to the book value of ordinary equity. Values are winsorized at 0,5% and 99,5% (Aktas et al., 2010). Intangibles are calculated as the value of the intangible assets over the book value of total assets the year prior to the announcement of the deal. Values are winsorized at 0,5% and 99,5% (Fidrmuc et al., 2012). Target related is a dummy variable equal to one if the target's SIC code is equal to the acquirer's SIC code. The differences in the means are calculated by performing a 2-sample t-test. If a coefficient is significantly different from zero, this is indicated by *, ** and *** at the 10%, 5%, and 1% levels, respectively.

	Full Sample	Club	Sole PE	Full – Club		Full - Sole		Club - Sole	
Deal characteristics									
Deal value ($ in billions)	3,36	4,03	1,65	-0,69		1,85	**	2,38	***
	0,95	2,78	1,02						
	1354	34	104						
Firm size ($ in billions)	3,36	2,62	1,77	0,76		1,72	*	0,85	*
	0,87	1,96	0,69						
	1353	34	104						
Leverage	43,65%	46,33%	51,23%	-2,76%		-8,25%	***	-4,90%	
	40,53%	45,27%	48,18%						
	1100	34	89						
Return on assets	5,78%	15,13%	9,96%	-9,60%	***	-4,50%	**	5,17%	**
	8,79%	11,96%	9,91%						
	1303	34	93						
Tobin's Q	2,59	1,94	2,11	0,67		0,53		-0,17	
	1,40	1,65	1,46						
	1343	34	104						
Market-to-book	4,68	5,09	7,26	-0,42		-2,79		-2,17	
	3,22	3,59	3,63						
	1343	34	103						
Intangibles	19,72%	27,50%	27,00%	-7,97%	**	-7,90%	***	0,49%	
	11,23%	24,04%	21,97%						
	1341	33	104						
Related	0,38	0,00	0,13	0,39	***	0,27	***	-0,13	**
	0,00	0,00	0,00						
	1354	34	104						

4.4. Gauss Markoff assumptions

To check whether the data matches the assumptions (conditions) of linearity, randomness, non-collinearity, exogeneity and homoscedasticity, the Gauss Markoff theorem is used, to find the best linear unbiased estimate possible (Anderson, 2018).

4.4.1. Linearity

The condition of linearity requires the relationship between the independent variable and the dependent variable to be linear. This is tested by creating scatter plots. Find these in Appendix 3. Based upon those, there is no evidence for a violation of the linearity assumption found in this sample.

4.4.2. Randomness

The randomness condition requires data to be randomly selected and to be representative of the whole population. Following Officer et al. (2009) data has not been selected randomly, though it is representative for all US publicly listed takeovers with a deal value of more than $100m.

4.4.3. Non-collinearity

Non-collinearity requires regressors to not be perfectly correlated with each other. A correlation matrix is presented in Appendix 4. For the time period, 2010 to 2019 the highest correlations are between the markup BHAR and the premium BHAR as well as the deal size and the firm size. The correlation of markup and premium BHAR (0,743) can be explained by the return measures using partially the same time period of 0 to 126 days after the announcement. The correlation of firms size and deal size (0,788) is explainable by the fact that these variables tend to move together as acquirers would generally pay a higher price for larger firms. Apart from those, there is no correlation above 0,7 in the variables. Therefore, collinearity is not found to be a problem for these regressions.

4.4.4. Exogeneity

The exogeneity condition requires regressors not to be correlated with the error term. The risk of endogeneity cannot be fully eliminated. To minimize risk, the control variables used were consistent with prior research (e.g. Aktas et al., 2010; Officer et al., 2010).

4.4.5. Homoscedasticity

The homoscedasticity condition assumes that the variance of the residual in a regression model is constant. This was tested by using the Breusch-Pagan test for heteroskedasticity. The results have suggested a serious violation of the homoscedasticity assumption. As a consequence of this, robust standard errors have been used to overcome this potential bias.

4.5. Heckman selection model

The Ordinary Least Squares (OLS) regressions treat the entry of a prominent private equity firm in an auction as exogenous. However, there may be other factors such as information asymmetry, implicit competition, size and risk of the deal, and information complexity. Accounting for selection effects on the entry into an auction, the two-stage Heckman (1979) selection model has been employed similarly to Aktas et al. (2010) and Boone and Mulherin (2011). In the first stage, the probability of entering an auction instead of a one-on-one negotiation is modelled. The following probit specification is employed:

$$Auction_i = Probit\,[Control\ Variables_i\,], \tag{11}$$

where Auction denotes a dummy variable equal to one if *i* is an auction and zero otherwise. The following control variables were selected: firm size, deal size, leverage, return on assets, Tobin's Q, market-to-book, intangibles and a dummy for strategic buyer that is equal to one if a strategic buyer is present in the final bidding round. I assume that the presence of a strategic buyer does not have an influence on shareholder return but does have an influence on prominent private equity firms (financial buyer) winning an auction. The results of the probit model can be found in Table 5.

From Table 5 it can be derived that rising return on assets significantly increases the probability of an auction. Furthermore, the presence of a strategic buyer in the last bidding round significantly increases the likelihood of an auction. The other variables are not significant.

Table 5

Determinants of entering an auction. This table reports the first-stage probit used to implement the two-stage Heckman procedure previously described for a prominent private equity firm entering an auction (Aktas et al., 2010). The dependent variable is a dummy that indicates an auction won by a prominent private equity firm. The control variables are consistent with the ones described in Table 4. The dummy for strategic buyer that is equal to one if a strategic buyer is present in the final bidding round. The information is retrieved from the SEC EDGAR database and the Background of the merger deals of the particular deal. If a coefficient is significantly different from zero, this is indicated by *, ** and *** at the 10%, 5%, and 1% levels, respectively.

Variable	Coefficient	
Constant	-2,00	***
Firm Size	0,00	
Deal Size	0,00	
Leverage	0,33	
Return on Assets	1,63	***
Tobin's Q	-0,03	
Market-to-Book	0,00	
Intangibles	0,62	
Strategic Buyer	3,26	***
Number of observations	1,086	

w_i is the vector of control variables for completed takeover i and $\hat{\gamma}$ the vector of coefficient estimates obtained by maximum likelihood (Aktas et al., 2010). For each takeover in the auctions subsample, the Heckman's lambda is calculated:

$$\hat{\lambda}_i = \frac{\phi\,[w\prime_i\,\hat{\gamma}]}{\Phi\,[w\prime_i\,\hat{\gamma}]}, \tag{12}$$

Where ϕ and Φ are the Gaussian probability density function and the Gaussian cumulative density function, including mean zero and unit variance, respectively (Aktas et al., 2010).

In the second stage, the determinants of bid premiums in auctions are analysed. I run an OLS regression for the different measures of shareholder return, including control variables and Heckman's lambda $\hat{\lambda}_i$. Incorporating Heckman's lambda in the second-stage regression controls for potential endogenous sample selection. The results are depicted in Table 6.

The coefficient for Heckman's lambda $\hat{\lambda}_i$ is not significant for any of the regressions in Table 6. Thus indicating there is no evidence for selection bias in the sample.

Table 6

Regressions of target returns that control for auction selection of prominent private equity firms. Table 6 reports the second stage of Heckman's two-step estimates of target returns in which the dependent variable is: Markup BHAR, Premium BHAR and 4-week premium. The target returns are the same as defined in Table 3 and Section 4.1. The control variables are consistent with the ones described in Table 4. Lambda is computed using the two-stage Heckman (1979) procedure as described above. If a coefficient is significantly different from zero, this is indicated by *, ** and *** at the 10%, 5%, and 1% levels, respectively.

	Markup BHAR		Premium BHAR		4-week premium	
Constant	0,42	***	0,26	**	0,52	***
Firm Size	0,00	**	0,00		0,00	
Deal Size	0,00		0,00		0,00	
Leverage	0,07		0,04		-0,10	
Return on Assets	-0,06		-0,06		-0,30	
Tobin's Q	-0,02		0,00		-0,01	
Market-to-Book	0,00		0,00	*	0,00	
Intangibles	-0,20		-0,05		-0,24	
Related	0,16	**	0,04		0,01	
Lambda	-0,05		0,01		-0,01	
R2	17,06%		7,85%		14,50%	
Number of observations	70		70		70	

5. Results and Interpretation

In this section, the results of the analysis are reported and interpreted. Firstly, the results for the first three hypotheses of the whole sample will be examined. Secondly, the other three hypotheses of the subsample of prominent private equity firms will be reported and interpreted.

5.1. Interpretation of large sample hypotheses

In this section, the results of the hypotheses relating to the large sample of all takeovers in the time period 2010 to 2019 will be interpreted.

The regression model estimations of the first three hypotheses are laid out in Table 7. In all panels of Table 7, it can be seen that the constant for the markup BHAR, premium BHAR and the 4-week premium is positive and highly significant, which is normal for leveraged buyouts (Torabzadeh & Bertin, 1987). Additionally, firm size has a significantly negative coefficient throughout the sample. Deal size is positive and significant for the 4-week premium regressions of each hypothesis. Return on assets is significantly negative throughout all regressions. Tobin's Q is significantly positive in all but the 4-week premium regressions. Intangibles are significantly negative for all markup BHAR and 4-week premium regressions. Lastly, the target relatedness is always negative and – except for the premium BHAR for Hypothesis 2 – significant. The R^2 ranges from 12,54% to 16,47%.

The first hypothesis examines whether prominent private equity firms pay lower premiums than other acquirers. All hypotheses have been statistically specified in Section 2.2 of this thesis.

Hypothesis 1: Takeover premiums in corporate takeovers won by prominent private equity firms, are – on average – lower than non-private equity mergers and acquisitions.

When looking at the first three panels of Table 7, it can be observed that the dummy variable for a prominent private equity firm (PEI50) is negative in all three regressions, for the different return measures. For the premium BHAR, the PEI50 dummy is significant at the 5% significance level. For the 4-week premium, the PEI50 dummy is significant at the 1% significance level. Therefore, the null hypothesis can be rejected for this sample. For the 4-week premium, acquisition by a prominent private equity firm leads to a 9% decrease in shareholder return. When interpreting these results, it can be seen that prominent private equity firms – on average – acquire companies with lower Tobin's Q than other firms in this sample. A possible explanation could be that prominent private equity firms buy relatively less

overvalued companies and subsequently increase their value by means of financial engineering, governance engineering, and operational engineering (Kaplan & Strömberg, 2009).

The second hypothesis examines whether private equity clubs pay less than other firms. As found by Officer et al. (2010).

Hypothesis 2: Takeover premiums in corporate takeovers won by prominent private equity clubs, are – on average – lower than sole-sponsored deals and non-private equity mergers and acquisitions.

Looking at panel four to six of Table 7, it becomes apparent that the Club dummy variable is negative but insignificant for the markup BHAR and 4-week premium. For the premium BHAR, it is negative and significant at the 10% significance level. Hence, no evidence has been fount to reject the null hypothesis for 4-week premium and markup BHAR. Evidence is found to reject the null hypothesis for the premium BHAR. For the premium BHAR, acquisition by a prominent private equity club leads to a 6% decrease in shareholder return. These results can be interpreted as a middle ground between Boone and Mulherin (2011) and Officer et al. (2010). Insignificant results for the markup BHAR and 4-week premium could be interpreted as support for Boone and Mulherin's (2011) findings, that private equity clubs do not pay less. However, the significantly negative premium BHAR supports Officer et al. (2010), who find that prominent private equity firms do pay significantly less. Their sample ranges from 1984 to 2007. Officer et al. (2010) find that club discount virtually disappears for the period of 2006 onwards. This goes hand-in-hand with the rising concerns of authorities about private equity clubs during that time. A possible explanation could be that club discount is slowly disappearing after 2006 – though still existent for prominent private equity firms - and would hence not be an inhibiting factor for an efficient takeover market. The insignificance of the Club dummy – for markup BHAR and 4-week premium - could lead to another argument for private equity firms to establish a bidding club. The pooling of resources and information could reduce capital constraints and reduce information asymmetry which would be a valid reason for private equity firms to form bidding consortiums (Cho et al., 2002; Marquez & Singh, 2013).

The third hypothesis examines the effect of auctions on shareholder returns. With Hypothesis 3 it is tested whether the theory of the winner's curse or the lemon's hypothesis is applicable for this data sample.

Hypothesis 3: Takeover premiums in corporate takeovers won by prominent private equity firms in an auction are – on average – lower than other corporate takeovers.

In panel seven to nine of Table 7, it becomes clear that the Auction dummy variable for prominent private equity firms is significantly negative for all return measures. For all return measures, the coefficient is significant at the 1% significance level. Hence, evidence is found to reject the null hypothesis. For the 4-week premium, the acquisition by a prominent private equity firm in an auction leads to a 12% decrease in shareholder return. When examining these results, it could be interpreted as evidence for the lemons hypothesis of Akerlof (1970). Information asymmetry - between buyer and seller - about the quality of a firm would depress the prices of firms sold in auctions. These findings could also be related to the information cost hypothesis by Boone and Mulherin (2007). It notes that the use of auctions is costly and that auctions are not dominating negotiations. Hence, it could be argued that especially prominent private equity firms - when engaging in an auction – are applying an auction discount due to information asymmetry.

Table 7

Multivariate regression explaining target returns for the full sample. This table exemplifies the results on the markup- and premium buy-and-hold-return and the 4-week acquisition premium, in percentages, as described in Table 3. The categorization club, sole-sponsored, auction and negotiation is the same as described in Section 3.2. The control variables are consistent with the ones described in Table 4. If a coefficient is significantly different from zero, this is indicated by *, ** and *** at the 10%, 5%, and 1% levels, respectively.

	Markup BHAR	Premium BHAR	4-week premium	Markup BHAR	Premium BHAR	4-week premium	Markup BHAR	Premium BHAR	4-week premium
Constant	0,31***	0,35***	0,49***	0,31***	0,34***	0,49***	0,31***	0,35***	0,49***
PEI50	-0,04	-0,06**	-0,09***						
Club				-0,05	-0,06*	-0,05			
Auction							-0,08**	-0,10***	-0,12***
Firm Size	0,00*	0,00***	0,00***	0,00*	0,00***	0,00***	0,00**	0,00***	0,00***
Deal Size	0,00	0,00	0,00***	0,00	0,00	0,00***	0,00	0,00	0,00***
Leverage	0,03	0,06	-0,01	0,03	0,06	-0,02	0,03	0,06	-0,01
Return on Assets	-0,41***	-0,46***	-0,64***	-0,41***	-0,46***	-0,65***	-0,40****	-0,46***	-0,65***
Tobin's Q	0,00**	0,01***	0,01	0,00**	0,01***	0,01	0,00**	0,01***	0,01
Market-to-Book	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Intangibles	-0,07*	-0,02	-0,11**	-0,07*	-0,02	-0,12***	-0,07*	-0,02	-0,11**
Related	-0,04**	-0,04*	-0,06**	-0,04**	-0,03	-0,05**	-0,04**	-0,04*	-0,06**
R2	12,63%	15,66%	16,37%	12,54%	15,46%	15,98%	12,83%	15,90%	16,47%
Number of observations	1049	1046	1086	1049	1064	1086	1049	1046	1086

5.2. Interpretation of subsample hypotheses

In this section results of the hypotheses belonging to the subsample of prominent private equity deals will be interpreted.

The regression model estimations of Hypotheses 4 to 6 – the subsample - can be found in Table 8. Similarly to Table 7, the constant for the markup BHAR, premium BHAR and the 4-week premium is positive and highly significant, which is normal for leveraged buyouts (Torabzadeh & Bertin, 1987). The market-to-book ratio is significantly negative for the premium BHAR of Hypothesis 5. Additionally, Intangibles is negative and significant for all markup BHAR and 4-week premium regressions. The R^2 ranges from 7,43% to 17,01%.

The fourth hypothesis amplifies the findings of Hypothesis 2 that supported both Boone and Mulherin's (2011) as well as Officer et al.'s findings of club discounts.

Hypothesis 4: Takeover premiums are lower for club deals than for sole-sponsored private equity deals.

From the first three panels of Table 8, it can be derived that the Club dummy is insignificantly different from zero for all return measures. For the markup and premium BHAR, it is negative and for the 4-week premium, it is positive. Therefore, no evidence has been found to reject the null hypothesis. These results falsify the existence of a club discount. When compared to sole sponsored prominent private equity deals, prominent bidding clubs do not pay significantly less in this sample. These findings could be an extrapolation of what Officer et al. (2010) stated: Namely that post 2006 the club discount disappeared.

The fifth hypothesis tests if there is evidence to be found, that auctions won by prominent private equity firms lead to lower shareholder returns.

Hypothesis 5: Auctions obtain lower takeover premiums, when prominent private equity firms win than negotiations.

Panel four to six show the regressions for Hypothesis 5. It appears that the Auction dummy is negative throughout all three regressions. For the markup BHAR and the 4-week premium, it is not significant. For the premium BHAR, it is significant at the 5% significance level. Therefore, the hypothesis can be rejected only for the premium BHAR. For the premium BHAR, the acquisition by a prominent private equity firm via auction leads to an 8% decrease in shareholder return. These outputs can be interpreted as further evidence for the information cost hypothesis of Boone and Mulherin (2007) and the lemons hypothesis of Akerlof (1970). When entering into an auction, prominent private equity firms seem to apply a discount on the

acquisition premium. A reason for this could be asymmetric information about the quality of the firm.

The purpose of the sixth and last hypothesis is supposed to examine another possible motive – other than collusive behaviour – for prominent private equity firms to form bidding clubs. Namely, reducing information asymmetry by pooling information and resources as well as performing thorough due diligence.

Hypothesis 6: Private equity club takeovers in one-on-one negotiations lead to higher acquisition premiums than other prominent private equity takeovers.

From the last three panels of Table 8, it can be perceived that the ClubxNegotiation dummy is positive with all three return measures. For the premium BHAR, the coefficient is positive but not significant. For the markup BHAR and the 4-week premium, the coefficient is positive and significant at the 5% significance level. Hence, the null hypothesis can be rejected. For the 4-week premium, the acquisition by a prominent private equity club in a one-on-one negotiation leads to a 17% increase in shareholder return. These regression results could support the competition hypothesis and the pooling of resources (Cho et al., 2002, Klemperer, 2002). It could be argued that prominent private equity clubs acquire quality firms in one-on-one negotiations. These negotiations reduce the information asymmetry of seller and buyer and leave room for thorough due diligence. By in-depth due diligence, clubs can reduce their risk and could hence acquire larger firms, by pooling information and resources (Cho et al., 2002; Mares & Shor, 2012). When looking at the average deal value – in Table 4 – it can be gathered that bidding clubs acquire significantly larger firms than sole prominent private equity firms.

Table 8

Multivariate regression explaining target returns for the sub-sample. This table exemplifies the results on the markup- and premium buy-and-hold-return and the 4-week acquisition premium, in percentages, as described in Table 3. The categorization club, sole-sponsored, auction and negotiation is the same as described in Section 3.2. The control variables are consistent with the ones described in Table 4. If a coefficient is significantly different from zero, this is indicated by *, ** and *** at the 10%, 5%, and 1% levels, respectively.

	Markup BHAR	Premium BHAR	4-week premium	Markup BHAR	Premium BHAR	4-week premium	Markup BHAR	Premium BHAR	4-week premium
Constant	0,31***	0,32***	0,46***	0,35***	0,23***	0,51***	0,31***	0,31***	0,47***
Club	-0,01	-0,01	0,04						
Auction				-0,07	-0,08**	-0,09			
Club x Negotiation							0,19**	0,06	0,17**
Firm Size	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Deal Size	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Leverage	0,12	0,02	-0,01	0,11	0,00	-0,01	0,09	0,01	-0,04
Return on Assets	-0,36	-0,18	-0,72	-0,36	0,24	-0,70	-0,36	-0,18	-0,70
Tobin's Q	0,00	0,02	0,01	0,00	0,02	0,01	0,00	0,02	0,01
Market-to-Book	0,00	0,00	0,00	0,00	0,00*	0,00	0,00	0,00	0,00
Intangibles	-0,25**	-0,12	-0,22*	-0,24*	0,04	-0,22*	-0,23*	-0,11	-0,22*
Related	0,05	-0,06	-0,08	0,04	-0,05	-0,10	0,07	-0,06	-0,08
R2	10,11%	7,43%	15,14%	12,15%	11,32%	16,83%	13,74%	7,81%	17,01%
Number of observations	118	118	121	118	118	121	118	118	121

6. Conclusion and Discussion

In recent years, private clubs deals have been intensively examined by researchers, regulators and the financial press. Regulators – such as the US Justice Department – have mostly been critical of the consequences that club bidding has on competition in the corporate takeover market (Alden, 2014). Research has found mixed evidence of the wealth effects of consortium bidding on shareholder returns. Officer et al. (2010) find negative effects of club deals on shareholder returns while Boone and Mulherin (2011) find no such effect and argue that regulators should rather "focus on ensuring that the takeover market is an unimpeded and competitive process". In the takeover market, firms can be sold via one-on-one negotiations or auctions. Boone and Mulherin (2007) find almost half of all firms to be sold via one-on-one negotiations, even though the winner's curse of auctions would theoretically make them advantageous for target shareholders. Arguments against auctions being the superior choice in the takeover process are the information cost hypothesis of Boone and Mulherin (2007) and the lemon's hypothesis of Akerlof (1970).

This thesis' objective is linking private equity club deals with auction theory. The sample consists of 1354 deals completed in the US between 2010 and 2019 out of which 137 were takeovers of prominent private equity firms. After careful analysis of the SEC merger filings, 104 deals were identified as sole-sponsored and 34 as club deals. After classifying the type of deal, the type of sale was determined. This process led to 78 deals being classified as auctions and 59 classified as one-on-one negotiations. The return measure chosen for the regression were markup BHAR, premium BHAR and 4-week premium.

The regressions for Hypothesis 1 showed that prominent private equity firms pay significantly less than the other firms in the sample. The outputs for Hypothesis 2 indicated that there is a small but significant Club discount to be found when compared to other takeovers. The results for Hypothesis 3 indicated that there was a significant discount on auctions applied by prominent private equity firms.

These results were amplified on a subsample exclusively consisting of prominent private equity firms. The regressions of Hypothesis 4 suggested that prominent bidding Clubs do not pay less than other prominent private equity firms. Furthermore, the results for Hypothesis 5 suggested a small but significant discount on auctions to be existent in the subsample. Lastly, the regression results of Hypothesis 6 support the assumption that prominent private equity

Clubs - engaging in one-on-one negotiations - pay significantly more than other prominent private equity firms.

Based on these results, it could be derived that the Club discount, as stated by Officer et al. (2010), can still be found in this sample. However, the magnitude of the results cannot lead to the conclusion that private equity bidding clubs seriously inhibit the takeover market from functioning. It can rather be argued that prominent private equity firms pay less. Additionally, it could be proven that prominent private equity firms pay significantly less when engaging in an auction. Therefore, it can be argued that auctions do not always dominate one-one-one negotiations, which makes it crucial for target firms to evaluate their optimal selling strategy. Some factors to be considered could be firms size, number of possible buyers, complexity of business model, company information available, and length of the due diligence process. With an emphasis on the information cost hypothesis, those factors could be a reason that Clubs pay significant premiums in one-to-one negotiations (Boone & Mulherin, 2007).

The findings of the Hypotheses can be utilized to answer the research question:

What effect does the type of sale have - in private equity clubs deals - on target shareholder returns in the period of 2010 to 2019?

Based on the previously conducted analysis, it can be concluded that private equity clubs do not pay systematically less, but rather the type of sale being a decisive factor in target shareholder returns. In this sample, auctions lead to significantly lower premiums than negotiations, while private equity clubs pay a significant premium in one-to-one negotiations.

There are some limitations to this research. Firstly, there is only a relatively small amount of Club deals (34) in this sample which may make the findings not representative of all club deals. In this thesis, I have chosen to exclusively focus on the largest 50 private equity firms, which led to a total of 137 deals in the US from 2010 to 2019. It is important to note that there are many more private equity firms undertaking takeovers in this time period. However, due to the very extensive research necessary to distinguish the type of deal and the type of sale, an additional extension of the subsample would have gone beyond the scope of this thesis. Furthermore, experts are arguing that we are currently finding ourselves in the fourth wave of private equity, which may make the premiums paid upward biased (Bain, 2020). Therefore, premiums paid by private equity firms may not be representative of premiums paid in the future.

To conclude, this thesis has tapped into the research of club deals and auction theory. After months of hand-collecting data from the SEC merger filings, I found that the club discount is less evident in the past ten years than in Officer et al. (2010). Additionally, auctions won by prominent private equity firms have a significantly negative effect on shareholder returns. These findings have important implications for regulators and scholars. Rather than being concerned about club deals leading to collusive behaviour, it should be ensured that there is a wide variety of individual solutions to corporate takeovers as one size does not fit all. Future fields of research could go into expanding the data with non-prominent private equity firms and type of auction to get a more thorough understanding of shareholder returns in auctions.

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8. Appendices

8.1. Appendix 1: Dropdown of search criteria used in Securities Data Corporation (SDC) Database

Request	Operator	Description / Code	Count
Database	Include	All Mergers & Acquisitions	n/a
Date Announced	Between	01/01/2010 to 12/31/2019	n/a
Date Effective/Unconditional	Between	01/01/2010 to 06/01/2020	386941
Deal Status (Code)	Include	Completed	386888
Target Nation (Code)	Include	United States of America	98432
Deal Value ($ Mil)	Between	100 to HI	10499
Percent of Shares Acquired in Transaction	Between	50 to 100	8735
Deal Type (Code)	Exclude	Undisclosed Value M&A	8496
		Minority Stake Purchases	
		Acquisition of Remaining Interest	
		Privatizations	
		Spinoffs	
		Recapitalization	
		Self-Tenders	
		Exchange Offers	
		Repurchases	

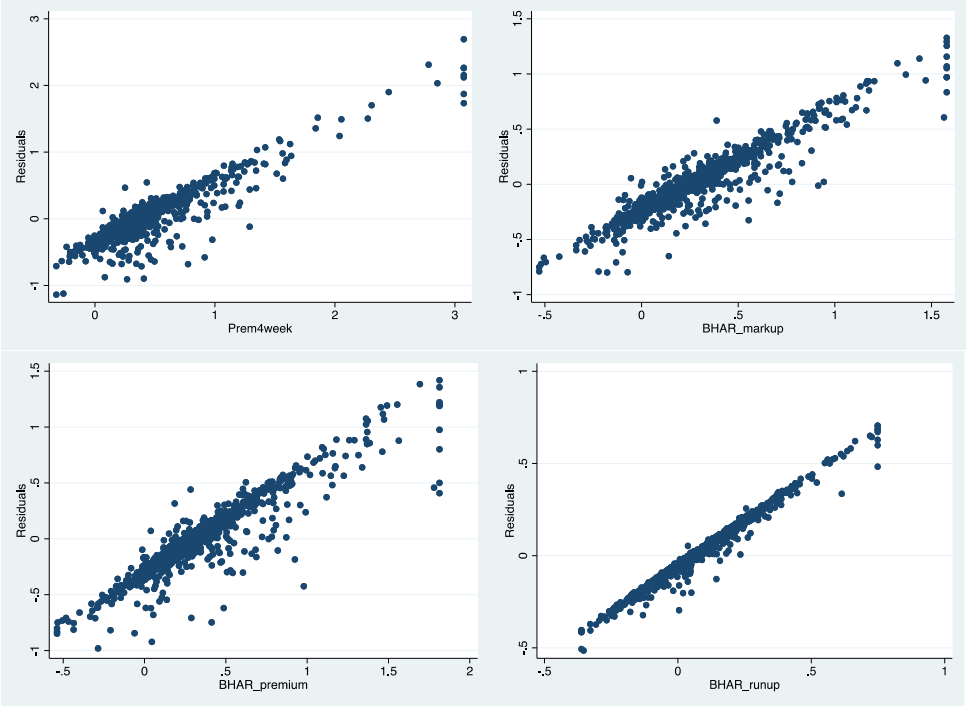
8.2. Appendix 2: List of Prominent Private Equity Firms

The table was retrieved from: Private Equity International (2020)

Rank	**Name**
1	Blackstone
2	The Carlyle Group
3	KKR
4	TPG
5	Warburg Pincus
6	NB Alternatives
7	CVC Capital Partners
8	EQT
9	Advent International
10	Vista Equity Partners
11	Leonard Green & Partners
12	Cinven
13	Bain Capital
14	Apollo Global Management
15	Thoma Bravo
16	Insight Partners
17	BlackRock

18	General Atlantic
19	Permira Advisers
20	Brookfield Asset Management
21	EnCap Investments
22	Fransisco Partners
23	Platinum Equity
24	Hillhouse Capital Group
25	Partners Group
26	Ardian
27	PAI Partners
28	Hellman & Friedman
29	Ares Management
30	Clearlake Capital Group
31	Stone Point Capital
32	Bridgepoint
33	Silver Lake
34	TA Associates
35	BC Partners
36	MBK Partners
37	Baring Private Equity Asia
38	Genstar Capital
39	BDT Capital Partners
40	American Securities
41	L Catterton
42	Apax Partners
43	NGP Energy Capital Management
44	Eurazeo
45	Quantum Energy Partners
46	Clayton, Dubilier & Rice
47	Goldman Sachs Merchant Banking Division
48	H.I.G. Capital
49	Riverstone Holdings
50	PAG

8.3. Appendix 3: Scatter Plot for Linearity Assumption



8.4. Appendix 4: Correlation Table of Variables

	4-week premium	Runup BHAR	Markup BHAR	Premium BHAR	Club	Negotiation	Auction	Firm Size	Deal Size	Leverage	Return on Assets	Tobin's Q	Market-to-Book	Intangibles	Related
4-week premium	1														
Runup BHAR	0,148	1													
Markup BHAR	0,593	-0,243	1												
Premium BHAR	0,66	0,438	0,743	1											
Club	-0,0426	-0,00275	-0,0451	-0,05	1										
Negotiation	-0,0289	-0,0105	0,00352	-0,00526	0,222	1									
Auction	-0,0898	-0,0153	-0,0677	-0,0822	0,455	-0,0588	1								
Firm Size	-0,0983	0,00779	-0,146	-0,132	0,00547	-0,0257	-0,0441	1							
Deal Size	-0,0321	0,0535	-0,127	-0,0845	0,00491	-0,0389	-0,0506	0,788	1						
Leverage	-0,0313	0,0316	-0,00233	0,019	0,025	0,0573	0,0639	0,103	0,0872	1					
Return on Assets	-0,355	-0,0663	-0,306	-0,339	0,0798	0,0528	0,0683	0,0925	0,104	0,0332	1				
Tobin's Q	0,27	0,126	0,222	0,307	-0,0387	-0,04	-0,0363	-0,101	0,0079	-0,00278	-0,485	1			
Market-to-Book	0,0578	0,0283	0,0712	0,0918	0,00073	0,00294	0,0365	-0,02	0,0156	-0,0497	-0,102	0,32	1		
Intangibles	-0,144	0,0332	-0,129	-0,101	0,031	0,0498	0,0895	0,167	0,173	0,143	0,208	-0,172	-0,0329	1	
Related	0,000263	0,0275	-0,0151	0,0105	-0,133	-0,123	-0,173	0,0756	0,0853	0,0243	-0,164	0,0965	-0,00877	-0,0842	1