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The formation of prominent private equity clubs and the involved alignment costs in club leveraged buyouts

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Abstract

In this research, I analyzed the pricing, target firm characteristics and involved alignment costs in club deal leveraged buyouts. Using a dataset of completed and withdrawn leveraged buyouts of publicly traded U.S. targets, I found that target shareholders receive between approximately 8,5% and 34% lower premiums compared to sole-sponsored leveraged buyouts in the pre-2006 time period. There is no difference in the premium in the post-2005 time period. These results are robust to the usual M&A control variables, including size, risk, and industry and time fixed effects. By examining withdrawn deals, I studied two influences: (1) the likelihood of a completed deal after the announcement is lower for club leveraged buyouts consisting of one merely one prominent private equity firm compared to sole-sponsored private equity deals, and (2) the duration between the announcement date and the date of completion/withdrawal is longer compared to sole-sponsored private equity deals, also merely for clubs consisting of one prominent private equity firm. I found motives for capital constraints in the post-2005 time period which is merely evident for clubs consisting of two prominent private equity firms, but no indication in favor of diversification motives.

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1. Introduction

"You've got to make sure everybody's objectives are aligned and their timetables are aligned. And it doesn't always work."

James Flemming – CEO of Sandaire

The above quote was derived from an interview about club deal leveraged buyouts between Forbes and James Flemming, Chief Executive Officer of Sandaire, a family office based in London (Forbes, 2019). The quote indicates that club deals do not only revolve around benefits, such as the discount on the paid premium as found by Officer, Ozbas & Sensoy (2010). This thesis looks at the possible downsides of club formation in leveraged buyouts with focus on the alignment costs ('LBOs').

The transaction value of leveraged buyouts has grown from around 31 billion USD in 1995 to around 673 billion USD in 2007 (Bain & Company Inc., 2015). Along with this growth, private equity activity also grew, primarily in the developed markets (Lerner, Sorensen & Strömberg, 2009). LBOs executed by private equity firms can be separated into two categories, namely sole-sponsored private equity deals and club deals. The latter is when private equity firms form an alliance to take over a potential target. At the end of 2005, club deals got criticism from the media, because there was suspicion of conspiring activities. The U.S. Department of Justice started an inquiry into the practice in 2006, as a response to this suspicion (Berman & Sender, 2006).

One of the major complaints of club deals is the discount on paid premiums as found by Officer et al. (2010). The authors looked at a sample of 4.031 leveraged buyouts over the 1984 to 2007 time period. In this period, 201 deals were executed by prominent private equity firms including 70 club deals. The authors compared the paid premium of club deals with deals financed by a sole acquiring private equity firm and with publicly traded acquiring firms as well as privately held acquiring firms. Boone & Mulherin (2011) found no such discount when looking at a sample of 870 leveraged buyouts over the 2003 to 2007 time period. The authors identified 75 clubs by looking at prominent as well as non-prominent private equity firms. The 2003 to 2007 time period was the focus of the U.S. Department of Justice who requested information from prominent private equity firms about their business practices by sending them informal letters (Vaiana & Nurnberg, 2007).

This research focuses on the alignment costs of club deals compared to sole-sponsored private equity deals and the implications in terms of the likelihood of a deal completion and duration between the announcement date and the settlement date over the 1984 to 2019 time period. Hereby, I looked at possible reasons why prominent private equity firms should not form such a consortium. I do so by looking at the duration between the announcement date and the effective date and found that club deals take longer between the announcement and the effective date.

The research question of this thesis is as follows:

What is the impact of the composition of clubs for the paid premium, deal completion and the time of settlement in Leveraged Buyouts over the 1984 to 2019 time period?

With this research question, I attempt to answer possible downsides for private equity ('PE') firms[1] and target firms of private equity clubs.

This research adds a new look at private equity club deals by dividing club deals into clubs consisting of one prominent private equity firm and clubs consisting of two prominent private equity firms. This research also uses a unique new angle by examining withdrawn deals while looking at the duration between the announcement date and the completed date or withdrawn date.

Looking at the paid premiums by different acquirers, I found a discount on the paid premiums by club acquirers compared to sole-sponsored private equity acquirers, after controlling for usual M&A control variables, similar to prior research (Officer et al., 2010). However, this discount on paid premiums by club deals disappeared after 2005 when the U.S. Department of Justice started an informal inquiry into the practice of club formation (Berman & Sender, 2006). The number of bidders in a club deal is not significantly different from sole-sponsored prominent private equity deals as well as from publicly traded acquirers or privately held acquirers. Also, target companies of clubs are larger, defined by the market value of equity 43 days prior to the announcement date to abstain from possible rumors, compared to target companies of sole-sponsored private equity deals and of publicly traded acquiring firms and privately held acquiring firms. This size difference is, however, only evident in the post-

[1] In this research, I used private equity and PE alternately.

2005 time period and for clubs consisting of two prominent private equity firms. So, prominent private equity firms may club in order to raise sufficient funds. Besides this, target companies of clubs do not differ in risk, as measured by pre-announcement systematic risk and pre-announcement return volatility compared to targets of sole-sponsored private equity firms.

Looking at the duration between the announcement date and the end date, defined as either the effective date or the date of withdrawal as reported by the Securities Data Corporation, I found that duration is significantly longer in a club deal setting consisting of only one prominent private equity firm compared to sole-sponsored private equity deals. Also, when examining withdrawn deals, I found that after a takeover is announced, the likelihood that a deal will lead to a completed deal is significantly lower for club acquirers than for sole-sponsored private equity acquirers

Concluding, I found a significant difference in the paid premium between private equity clubs and sole-sponsored private equity deals in the period prior to 2006. Clubs invest in larger target companies, which can be substantiated by the argument that clubs are formed because of capital constraints or diversification purposes. Further, there is no significant difference in target risk between clubs and targets of sole private equity firms. Also, the time between the announcement date and the effective/withdrawal date is significantly longer for club deals compared to sole-sponsored private equity deals. Also, announced deals with a club acquirer have a decreased likelihood to be completed compared to announced deals with a sole-sponsored acquirer.

This thesis proceeds as follows. In Chapter 2, I present a brief history of private equity, along with related literature that is relevant regarding club deals. In Chapter 3, I describe the required steps for the sample, along with the summary statistics. Chapter 4 describes the methodology used to answer the research question. Chapter 5 shows the results and Chapter 6 concludes and discusses.

2. Theoretical framework and hypothesis development

2.1 A brief history of private equity

Private equity started in 1901 with the establishment of Bessemer Trust. Bessemer Trust was created by Henry Phipps after he sold Carnegie Steel Co. together with Andrew Carnegie (Vault, 2009).

In a leveraged buyout, private equity firms acquire firms using a limited amount of privately invested capital and the remaining share by external debt (Kaplan & Strömberg, 2009). Jensen (1989) predicted that private equity could become the leading form of acquiring companies. After a firm is acquired, the portfolio company has more obligations in terms of redemption and interest payments. According to Kaplan (1989), this saves taxes and is a source of substantial gains. However, the increased financial obligations, resulting from interest and redemption payments, decreases the free cash flow and subsequently decreases the room for managerial errors (Opler & Titman, 1993).

Private equity is a cyclical business, with three historical waves. The first wave in deal value was in the 1980s with a flourishing junk bond market, the second in the 1990s as a result of high GDP growth ending with a crash with the dot-com bubble and the last wave in the early 2000s ending in a crash with the financial crisis in 2008-2009 (Bain Capital, 2010). More recent research shows a new wave in the 2010s with a low of 321 billion USD in 2010 to a high of 930 billion USD in 2017 (Bain Capital, 2020).

2.1.1 Club deals

Club deals are the phenomenon where PE firms acquire companies by joining forces. One of the major concerns about club deals revolves around the discount on the paid takeover premium found by Officer et al. (2010) compared to sole-sponsored private equity acquirers.

Boone & Mulherin (2011) looked into the competition in a club deal setting and found that private equity firms start clubbing for competitive reasons based on scale, risk and bidder expertise. Betton, Eckbo and Thorburn (2008) looked into the competition in leveraged buyouts and found low levels of observable competition, but the authors did not touch upon a club deal setting. The authors report that 95% of their sample consists of friendly transactions without competition. These deals are completed with one-on-one negotiations. The authors provided a takeover model featuring two stages, providing evidence why the number of actual bidders should be irrelevant in corporate takeovers. This is because an insufficient offer will not be accepted by the target shareholders and there is a threat of rival bidders in case the offer is insufficient. Aktas, de Bondt and Roll (2010) looked at the influence of unobserved competition and the anticipated costs of selling with an auction. They found a significantly positive effect of latent competition on the paid premium and a significantly negative effect of auction costs. Bulow & Klemperer (1996) show that the increase of one

more bidder in an English auction is always beneficial for the target shareholder, resulting in a higher takeover premium. This confirms the notion that more competition leads to higher prices. However, one-on-one negotiations do not always imply the complete absence of competition, because of the threat of rival bidders. Even though selling a company through an auction should result in higher prices, does not mean it is always the preferred way (Bulow & Klemperer, 1996). Auctions involve auction costs and Aktas et al. (2010) show that auction costs have a negative effect on received premiums and therefore incentivize targets to participate in one-on-one negotiations.

Early research regarding LBO activity examined a sample of 81 going private transactions (DeAngelo, DeAngelo & Rice, 1984). They found no decrease in the wealth of target shareholders in their sample covering the 1973 to 1980 time period. The literature of leveraged buyouts is relatively comparable with the literature of venture capital, because both invest private capital in businesses. The main differences between private equity and venture capital is that venture capital invests preferably in young or emerging companies without looking for majority control (Kaplan & Strömberg, 2009). The motives for syndication in venture capital lies in spreading risk, or diversification (Brander, Amit & Antweiler, 2004). In contrast, Officer et al. (2010) found little support for diversification motives in the leveraged buyout setting for club deals. However, Officer et al. (2010) found a discount on paid premiums in a club deal setting compared to sole-sponsored club deals for the 1984 to 2005 time period. This discount disappeared for the 2006 to 2007 time period. Similar to paid premiums in LBOs, Hochberg et al. (2010) found a discount on valuations for syndicated deals compared to sole-sponsored deals.

Contradicting research found no such discount on paid premiums for club deals in the leveraged buyout setting for the 2003 to 2007 time period (Boone & Mulherin, 2011). The authors found a significantly higher level of takeover competition for private equity acquirers, for sole-sponsored deals as well as for club deals, compared to publicly traded and privately held acquirers. Bailey (2007) concluded similar hypotheses. She refutes the idea that bidder competition decreases in club deals based on a reasoning analysis. In case of a large target company, many sole-sponsored private equity firms either do not have the resources to acquire the target on their own or are not willing to “put so many eggs in one basket”. By

forming a club with several PE houses, smaller firms without sufficient funds are now also able to participate in (the bidding of) larger transactions.

2.1.2 Performance of Private Equity

Even though Officer et al. (2010) found a discount on the paid premiums for the 1984 to 2005 time period, there is yet no evidence about the actual performance of these club deals. Research by The Boston Consulting Group shows that private equity does not outperform public capital markets on a risk-adjusted basis (Meerkat, Rose, Brigl, Liechtenstein, Prats & Herrera, 2008). They, however, found that some private equity firms outperformed their competition due to competitive advantages. The authors show that larger, more geographically or industrially diversified private equity funds are not necessarily better performing firms. The authors report three competitive advantages of better performing funds, namely: networked access, domain expertise and operational improvement.

Networked access is the capacity where the private equity firms become real insiders of the target industry. High ranking employees are not just dealmakers, but also professionals from within the industry. This led the professionals to be very well connected to the industry. Sometimes, senior employees of the private equity firm even have a seat in the board of portfolio firms, because they contribute to the company due to their specialism in this industry.

Domain expertise is the process where PE firms focus on a single industry or a small subset of industries. The authors found that the more a firm focuses on deals in a narrow sector or particular types of deals, the more experience and expertise the firm acquirers. This is, however, not only the case for smaller private equity firms. Larger firms specify themselves by organizing specialized divisions.

Operational improvement is the capacity to influence the portfolio firm favorably on the operational efficiency. This is very much an extension of industry expertise. By, for example, improving the day to day operations, the portfolio firm can obtain a higher EBITDA. This is in line with the conclusions found by Gompers, Kaplan & Mukharlyamov (2016). These authors found that the primary mechanisms private equity firms use to make money are ‘financial engineering’, ‘governance engineering’, and ‘operational engineering’. **Operational engineering** is the same process as described.

Financial engineering is improving the capital structure of a portfolio firm. Often this is done by increasing the debt to equity ratio. This could be a multiple of either debt-to-total-capital (debt/equity-ratio) or debt-to-EBITDA, focusing on the interest cover ratio (Dothan, 2006). The authors found that PE firms typically forecast five years into the future. This is similar to the average exit period of between four and seven years (Cebron Group, 2019). The authors found an increase in average holding period of PE firms over the past decade from four in 2008 to about seven in 2019. One of the explanations found by McKinsey & Company (2018) is that owners often struggle to create value after the initial holding period of one to three years.

Governance engineering is the process of either changing the board of directors of the portfolio firm or changing the monitoring, hiring and firing of the top management. The authors found that PE investors are highly involved in their portfolio companies, primarily in an advising role. They also found that in more than 30% the PE firms recruit a senior management team before the actual investment to replace the existing management team.

2.2 Hypotheses development

The research question will be answered using the following hypotheses. The hypotheses are divided into three types. The first hypothesis focuses on the paid premiums and whether clubs enjoy a discount compared to sole-sponsored private equity firms. The second hypothesis looks into the characteristics of the target firm and focuses specifically on the size and risk difference between target companies of clubs and target companies of sole private equity firms. Lastly, the third hypothesis revolves around the alignment costs involved by clubs and the impact on the duration and likelihood of a completed deal. All hypotheses are divided into sub-hypothesis.

The first sub-hypothesis looks at the paid premium by clubs compared to sole-sponsored private equity firms and whether there is a discount. This sub-hypothesis is consistent with Officer et al. (2010). Their idea originated from the concern that clubs depress prices by limiting the number of competing bidders. According to auction theory, bidder collusion may decrease sales prices (Graham & Marshall, 1989). Officer et al. (2010) found a negative effect on the paid premium in corporate takeovers with club deals for the 1984 – 2007 time period compared to sole-sponsored private equity deals. They showed, however, that the discount disappeared after 2005. My hypothesis checks whether this premium discount re-emerged in

the 2008 – 2019 time period. The premium will be calculated using different measures, such as the cumulative abnormal returns (CARs), buy-and-hold abnormal returns (BHARs) and raw returns. These measures for premiums are all used by various papers regarding LBOs and M&A activity (Schwert, 1996) and (Bargeron, Schlingemann, Stulz & Zutter, 2008).

Hypothesis 1.1: There is a discount on the paid premium in club deals as compared to sole-sponsored private equity deals.

The second sub-hypothesis looks at the difference in the formation of the club. Looking at the differences between the sample used by Officer et al. (2010) and the sample of Boone & Mulherin (2011), Officer et al. (2010) mainly looked at prominent private equity firms, defined as a top 50 fundraisers over the preceding five years. Since Officer et al. (2010) uses the 2007 report of Private Equity International, which present the top 50 firms had the highest fundraising over the 2002 to 2006 time period. Boone and Mulherin (2011) looked at all club deals, even without prominent PE firms. The sample of Officer et al. (2010) includes 29 clubs consisting of more than one prominent private equity firm. Since the top 50 prominent private equity firms had higher fundraising over the preceding five years, it seems less likely that funding problems are the rationale behind the formation of the club. For that reason, I want to research whether the composition of club deals has an impact on the discount, i.e. do clubs composed of more prominent PE firms actualize higher discounts than clubs consisting of only one prominent PE firm? This is the basis for the second sub-hypothesis:

Hypothesis 1.2: Clubs composed of more prominent PE firms enjoy higher discounts on the paid premium to target shareholders.

The second hypothesis looks at the size and risk characteristics of targets. The first sub-hypothesis looks at the size difference between target companies of clubs and target companies of sole prominent private equity firms.

As mentioned before, it is said that club deals reduce competition by working together, which was the concern of the media (Berman & Sender, 2006). However, Bailey (2007) argues in a reasoning analysis that PE firms do not always have sufficient funds in order to acquire a target on their own because the deal is too big. By clubbing, this creates more opportunities for firms with insufficient funds. As a result of clubbing, more bidders can potentially participate in the bidding process.

Hypothesis 2.1: Club acquirers invest in larger target firms compared to sole-sponsored private equity acquirers.

The second sub-hypothesis looks at the risk in target firms of clubs. Risk is measured as either systematic risk, or beta, and return volatility to be consistent with prior research (Officer et al., 2010). The authors found that one of the reasons PE firms execute club deals is potentially because of shared risk. Based on this reasoning, club deals should revolve around target firms with higher betas and higher return volatility. Risk is measured as the estimated beta using the market-model to be consistent with Officer et al. (2010). This is the basis for the second sub-hypothesis:

Hypothesis 2.2: Clubs invest in target firms with higher pre-announcement market beta and higher return volatility compared to sole prominent private equity firms.

The third and last hypothesis looks at the alignment costs involved by club deals and is divided into two sub-hypotheses as well. Officer et al. (2010) speculated about coordination costs, which they did not provide any further research on. In this research, I call it alignment costs, since the parties involved in a club need to be aligned with each other's preferences. In an interview with Harvard Business Review, Joseph Rice, one of the founders of Clayton, Dubilier & Rice (#46 in the top 50 prominent private equity firms, 2020), explains that in the takeover of a public target, there is little else to negotiate about than price (Kester & Luehrman, 1995). In a club deal, however, the parties involved in the club need to align with each other. In an interview with Forbes, James Flemming, Chief Executive Officer of Sandaire, a London based family office, says: "You've got to make sure everybody's objectives are aligned and their timetables are aligned. And it doesn't always work." (Forbes, 2019). These parties have to align their expectations, for example, regarding the majority control, which needs to be shared (ClubDeal, 2020).

Reasoning from there, I developed two sub-hypotheses to research these alignment costs of club deals, since there is, to my knowledge and literature review, no research yet which touches upon this. Because it is more challenging to align parties on the terms and conditions of the club deal, I expect club deals to withdraw their offer more often compared to sole-sponsored private equity deals. This is the basis for the first sub-hypothesis:

Hypothesis 3.1: The likelihood of a completed deal is smaller in a club deal setting compared to a sole-sponsored deal.

The second sub-hypothesis looks at the time between the announcement date and the effective date or the date of withdrawal. Because the involved parties need to agree upon the terms and conditions of the deal, I expect this process to be longer for club deals compared to sole-sponsored deals. This is the basis for the second sub-hypothesis regarding the alignment costs of club deals:

Hypothesis 3.2: The duration between the announcement date and the effective/withdrawal date is longer for club deals compared to a sole-sponsored deal.

By answering these hypotheses, I attempt to provide an answer on why prominent private equity firms form alliances to take over a target company, in terms of takeover premium as well as the preferences of target firms of clubs compared to sole private equity targets. Also, I attempt to shed some light on possible downsides when starting negotiations with a club deal, as a target as well as for the club.

3. Data

3.1 Forming the base samples

My first base sample looks at the completed deals and is extracted from the Securities Data Corporation (SDC) database. I start with all mergers and acquisitions which are announced between January 1st, 1984 and December 31st, 2019. All deals should be completed by the end of 2019. To be consistent with prior research, I only looked at transactions with a deal value of 100 million USD or more and where the acquirer(s) are looking to acquire at least 50% of the outstanding shares (Officer et al., 2010). The deal should be characterized as a merger, acquisition, or leveraged buyout (LBO). This gives a sample of 24.350 total deals. Because I only wanted publicly traded target firms, I matched this sample to the Center of Research in Security Prices (CRSP) database. Here, I required the target firm to have a stock price at least once in the seven days prior to the announcement date as reported by the SDC. This requirement leaves 5.204 completed acquisitions of publicly traded target firms.

The second base sample looks at the withdrawn deals and is extracted from the SDC database as well. Here, I used similar requirements as for the completed deals sample. Every deal must be announced between January 1st, 1984 and December 31st, 2019. The withdrawal

date must be before the end of 2019 as well and the deal must have a deal value, as reported by the SDC, of 100 million USD or more. This gives a sample of 2.587 withdrawn deals. Matching this sample to the CRSP database, to eliminate non-public target firms, leaves 1.232 withdrawn deals of publicly traded target firms.

To determine whether a deal should be categorized as a club deal, I followed the procedures as used by Officer et al. (2010). This is done by reading the deal synopsis manually and looking for names of prominent private equity firms as the acquiring firm(s). Prominent private equity firms are defined as the 50 largest PE firms as reported by the *Private Equity International* ('PEI'). PEI constructed this list based on the funds each firm raised in the preceding five years. Since Officer et al. (2010) used the 2007 report for their sample, the list represents the top 50 fundraising firms over the 2002 – 2006 time period. To be consistent with Officer et al. (2010), I used the PEI 2007 report as well. For the extended time period, the 2008 to 2019 time period, I used the top 50 of the 2020 report (Private Equity International, 2020). In the 2020 report, Blackstone (#1), The Carlyle Group (#2) and Kohlberg Kravis Roberts (#3) are the leading firms, whereas in the 2007 report, The Carlyle Group (#1), Kohlberg Kravis Roberts (#2) and Goldman Sachs Principal Investment Area (#3) were the leading firms.

The categorization of acquirers goes as follows. If the deal synopsis contains the name of one prominent private equity firm for the role of the acquirer, the deal is categorized as a private equity deal. When the deal synopsis contains a second name of a private equity firm, the deal is categorized as a club deal. The second name, however, does not require to be a prominent private equity firm. However, I made the distinction between clubs consisting of one prominent private equity firm and two private equity firms. This procedure left me with a total of 295 deals categorized as a private equity deal, of which 89 are categorized as a club deal, or approximately 30%, for the completed deals. For the withdrawn deals, I found 78 announced deals with at least one prominent private equity firm involved including 35 club deals. Table A1 in the Appendix is a list of all private equity deals including year, target name and acquirer name(s). Panel A contains all deals done by clubs and Panel B contains all remaining deals done by prominent private equity firms. Table A2 in the Appendix shows all withdrawn deals. Again, Panel A contains all withdrawn deals by clubs and Panel B contains all sole-sponsored withdrawn deals.

Table 1 (below) shows the distribution of the total sample per year and deal type. The table contains four different types of acquirers, namely prominent private equity club deals, sole-sponsored private equity deals, private acquirer deals and public acquirer deals. The remaining 4.909 of 5.204 deals, which were not executed by one or more prominent private equity firms, are categorized as follows: the acquirers of the remaining deals are matched to the CRSP database and are also required to have at least one stock price in the seven days prior to the announcement date as reported by the SDC. When the acquiring firm is listed, and therefore publicly traded, it is categorized as a public bidder and as a private bidder otherwise. Therefore, private bidders also include private equity firms that are not listed as a prominent private equity acquirer.

Table 1

Sample distribution of deals over the 1984 – 2019 time period. Every acquisition contains a publicly traded target. Years indicate the moment of announcement. Sample is obtained from the SDC. Private equity (PE) deals are identified using a text search on the names of individual prominent PE firms. Prominent private equity houses are defined as the 50 PE firms that raised the most money in the past five years per 2007 for the 1984 to 2007 time period and per 2020 for the 2008 to 2019 time period, according to the Private Equity International (PEI). When the deal synopsis contains one name of a prominent private equity firm, the deal is categorized as a Sole PE deal. However, if the synopsis contains a second name of a private equity firm, not a prominent one per se, the deal is categorized as a club deal. The remaining sample consists of deals where no prominent private equity house is involved. These are categorized as publicly held firms and privately held firms. These also contain non-prominent private equity firms. The total deal value is the sum of deal value as reported by the SDC in million USD per year.

Years	All deals		Deals by prominent private equity firms				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
1984	76	43.656	0	0	2	962	45	19.214	29	23.481
1985	104	108.469	1	637	4	13.344	55	57.948	44	36.540
1986	119	90.518	1	168	7	14.804	66	53.575	45	21.971
1987	118	81.764	1	104	4	5.841	77	53.461	36	22.359
1988	121	141.207	0	0	8	35.810	85	83.063	28	22.334
1989	90	98.326	1	1.700	1	1.999	66	79.607	22	15.020
1990	45	48.276	0	0	2	1.238	28	31.925	15	15.112
1991	44	29.489	0	0	0	0	25	18.429	19	11.060
1992	47	27.674	0	0	0	0	27	18.398	20	9.276
1993	65	73.410	1	154	1	374	24	59.279	39	13.603
1994	116	96.323	0	0	2	5.535	62	66.820	52	23.968
1995	164	180.841	2	3.424	2	1.638	94	99.223	66	76.556
1996	201	289.975	1	138	3	1.921	98	193.838	99	94.077
1997	327	359.077	2	4.906	11	12.626	159	223.272	155	118.272
1998	328	1.032.755	3	1.990	3	2.152	163	804.054	159	224.559
1999	375	908.006	5	3.936	8	16.846	198	444.522	164	442.702

Table 1 *(continued)*

2000	303	947.126	1	557	3	3.416	182	646.955	117	296.199
2001	170	266.942	0	0	0	0	84	164.313	86	102.629
2002	97	140.575	2	1.632	2	785	50	45.995	43	92.163
2003	132	201.055	0	0	2	565	57	70.135	73	130.355
2004	152	390.608	5	16.790	5	8.292	54	141.246	88	224.279
2005	179	505.182	7	22.981	8	12.690	85	161.434	79	308.077
2006	223	747.192	17	159.215	17	60.606	102	252.073	87	275.297
2007	229	603.617	9	98.569	17	93.710	120	256.034	83	155.303
2008	104	328.814	0	0	8	7.703	56	184.039	40	137.073
2009	75	293.433	3	6.343	4	615	30	85.541	38	200.934
2010	135	246.875	2	5.656	6	16.741	75	93.239	52	131.239
2011	123	360.596	5	7.972	7	8.767	78	213.561	33	130.296
2012	105	190.877	1	979	7	4.306	58	118.825	39	66.767
2013	109	243.417	1	6.535	8	28.252	53	119.656	47	88.974
2014	124	525.384	4	13.123	6	8.403	54	260.230	60	243.628
2015	146	834.090	5	42.314	7	15.143	70	369.768	64	406.865
2016	149	631.998	4	8.696	17	45.276	67	270.155	61	307.871
2017	125	412.186	3	12.906	7	14.775	53	110.614	62	273.892
2018	112	553.557	0	0	8	34.434	48	233.333	56	285.790
2019	72	459.433	2	19.824	9	52.469	34	124.297	27	262.842
Total	5.204	12.492.722	89	441.249	206	532.038	2.682	6.228.071	2.227	5.291.365

Table 1 shows a relatively even distribution of club deals over the sample period, except for 2006 with a peak in total deal value, of over 150 trillion, as well as in the number of deals. The median of clubs over the sample period is 1, with an average of 2,5. Total deal value is 441 trillion USD over 89 club deals, compared to the 460 trillion USD over 206 deals done by sole-sponsored deals. The three waves are evident with the first peak in 1988 with a total value of over 130 trillion USD over 121 deals, the second peak in 2000 with over 900 billion in total deal value over 303 deals, the third peak in 2006 with over 700 trillion USD over 223 deals and possibly a fourth peak yet to come.

Table 2 is divided into Panel A and Panel B. Panel A shows the number of acquisitions per prominent private equity firm, which is led by Kohlberg Kravis Roberts & Co. with 30 total deals of which eleven club deals. Texas Pacific Group, however, was involved in the most club deals, namely fifteen club deals. Panel B shows the cross-participation to see which firms form clubs with other prominent PE firms. Based on Panel B, it seems that only a few prominent private equity firms are forming clubs with other prominent private equity firms.

Table 2

Completed LBOs per prominent private equity firm. Panel A shows the total number of deals per firm, sole-sponsored and club deals, followed by the number of sole-sponsored acquisitions and lastly the number of club deals this firm was involved in. It is ranked on the total number of acquisitions. Panel B shows the interaction of club deals. For example, The Carlyle Group was involved in one club deal in which Blackstone was involved as well, but The Carlyle Group was not involved in a club deal with Silver Lake. Panel A shows more names than Panel B. This is because the missing names were not involved in club deals with other prominent private equity firms. These columns were omitted to save space.

Panel A: Number of deals

Rank	PEI 50	Name of private equity firm	All deals	Sole PE deals	Club deals
1	3	Kohlberg Kravis Roberts & Co.	30	19	11
2	1	Blackstone Group	29	16	13
3	14	Apollo Global Management	23	18	5
4	4	Texas Pacific Group	23	8	15
5	2	The Carlyle Group	14	8	6
6	47	Goldman Sachs	13	3	10
7	15	Thoma Bravo	13	11	2
8	13	Bain Capital	11	4	7
9	11	Leonard Green & Partners	11	7	4
10	…	Welsh, Carson, Anderson & Stowe	11	8	3
11	10	Vista Equity Partners	10	9	1
12	28	Hellman & Friedman	9	5	4
13	20	Brookfield Asset Management	8	6	2
14	…	Merrill Lynch	8	5	3
15	…	Morgan Stanley	8	7	1
16	33	Silver Lake Partners	7	3	4
17	…	Thomas H. Lee Partners	7	3	4
18	5	Warburg Pincus	7	7	0
19	46	Clayton, Dubilier & Rice	6	5	1
20	…	Forstmann Little	6	6	0
21	…	HM Capital Partners	6	5	1
22	…	Madison Dearborn Partners	6	3	3
23	8	EQT Partners	5	5	0
24	35	BC Partners	4	2	2
25	39	BDT Capital Partners	4	0	4
26	42	Apax Partners	3	3	0
27	7	CVC Capital Partners	3	2	1
28	…	Fortress Investment Group	3	3	0
29	…	GTCR Golder Rauner	3	1	2
30	48	H.I.G. Capital	3	3	0
31	…	JP Morgan	3	1	2
32	…	Providence Equity Partners	3	0	3
33	29	Ares Management	2	1	1
34	…	Berkshire Partners	2	1	1
35	…	Cerberus	2	1	1
36	…	Citigroup	2	0	2
37	…	Onex	2	1	1
38	19	Permira Advisers	2	1	1
39	23	Platinum equity	2	2	0
40	34	TA Associates	2	1	1
41	9	Advent International	1	1	0
42	40	American securities	1	0	1
43	38	Genstar Capital	1	1	0
44	16	Insight Partners	1	1	0
45	41	L Catterton	1	1	0

Table 2 *(continued)*

46	…	Lehman Brothers	1	1	0
47	…	Lehman Brothers PE	1	1	0
48	…	Pacific Equity Partners	1	1	0
49	50	PAG	1	0	1
50	49	Riverstone Holdings	1	1	0
51	…	Sun Capital	1	0	1

Panel B: Cross-participation matrix

	KKR	Blackstone	The Carlyle Group	Madison Dearborn Partners	Goldman Sachs	Texas Pacific Group	CVC Capital Partners	Golder Rauner	JP Morgan	Morgan Stanley	Silver Lake Partners
Blackstone	3	-	-	-	-	-	-	-	-	-	-
Bain Capital	1	2	-	-	-	-	-	-	-	-	-
The Carlyle Group	1	1	-	-	-	-	-	-	-	-	-
Citigroup	1	-	-	-	-	-	-	-	-	-	-
Goldman Sachs	1	2	1	-	-	-	-	-	-	-	-
HM Capital Partners	1	-	-	-	-	-	-	-	-	-	-
Merrill Lynch	1	-	-	1	-	-	-	-	-	-	-
Texas Pacific Group	1	1	-	-	1	-	-	-	-	-	-
Brookfield Asset Management	-	1	-	-	-	-	-	-	-	-	-
Hellmann & Friedman	-	1	1	-	-	1	-	-	-	-	-
Leonard Green & Partners	-	-	-	-	-	1	1	-	-	-	-
Providence Equity Partners	-	-	1	-	1	1	-	-	-	-	-
Silver Lake Partners	-	-	-	-	-	2	-	-	-	-	-
Thomas H. Lee Partners	-	-	-	-	1	1	-	-	-	-	-
TA Associates	-	-	-	-	-	-	-	1	-	-	-
Welsh, Carson, Anderson & Stowe	-	-	-	-	-	-	-	1	-	-	-
Apollo Global Management	-	-	-	-	-	-	-	-	1	-	-
Citigroup	-	-	-	1	-	-	-	-	-	-	-
Onex	-	-	-	-	-	-	-	-	-	1	-
Thoma Bravo	-	-	-	-	-	-	-	-	-	-	1

3.2 Sample characteristics

Below is an elucidation of the used sample characteristics. Most sample characteristics are summarized in Table 3, Descriptive statistics, including the differences between the different types of acquirers.

3.2.1 Toehold

Private equity firms are primarily looking for majority control in the target company, i.e. at least 50% of the target shares. However, some takeovers happen with first a toehold, or minority share. Auction theory suggests that toeholds may yield an advantage over rival bidders in the takeover process towards majority control (Betton, Eckbo & Thorburn, 2009). Research found that minority stakes help financial bidders win auctions, often at a discount (Bulow, Huang & Klemperer, 1999).

3.2.2 Number of bidders

Competition is defined using the number of bidders as reported by the SDC. The SDC defines the number of bidders as all entities (including the acquirer) bidding for a target company. In case the count is 1, it means there were no rival bids, because there was only one bidder (the acquirer).

Early research reports the need to make a high premium initial bid, rather than making low initial bids and increasing them when competition arises (Fishman, 1988). Bulow & Klemperer (1996) show that the increase of one more bidder in an English auction is always beneficial for the target shareholder. This confirms the notion that more competition leads to higher prices.

3.2.3 Prominent private equity firms

'Prominent PE firms' is the variable holding the count of prominent PE firms participating in the club. This is the primary variable regarding the second hypothesis. Officer et al. (2010) found many clubs consisting of more than one prominent PE firm.

3.2.4 Industry-adjusted EBITDA/assets

The efficiency of target firms can be an essential determinant for acquiring companies. Looking at the 2000 to 2009 time period, research reports PE firms to have a preference for larger target firms with low stock volatility and higher operating income (Osborne, Katselas & Chapple, 2012). Because industries are different in the capital intensity, the proxy for efficiency is adjusted by industry differences based on the two digits SIC code. The 'industry-adjusted EBITDA/assets' is defined as the target EBITDA/assets minus the average EBITDA/assets for that industry. A positive outcome indicates a more efficient target compared to the industry average.

3.2.5 Volatility

As mentioned before, PE firms have a preference for stable companies with low volatility (Osborne et al., 2012). In this research, I used the standard deviation in target returns of the twelve months prior to the runup period, i.e. trading day -294 to day -43 prior to the announcement date (0).

3.2.6 Beta

One of the possible reasons, as mentioned above for volatility, private equity houses form clubs is because of sharing risk. A sole-sponsored deal may be too risky for one firm to acquire. I followed a similar approach as used by Officer et al. (2010). They use the beta of the target as a proxy for risk, alongside the volatility risk-measure. To be unbiased for rumors, I used the one-year beta based on a linear regression on daily data of a half year prior to the announcement date, i.e. trading day -379 to day -127 relative to the announcement date (0) and I require a minimum of 100 data points. This is the same method as used by Officer et al. (2010).

3.3 Alignment costs

Regarding the third hypothesis, I examine the likelihood of a completed deal and the time from the announcement date to the effective/withdrawal date. See Table 3 for descriptive statistics regarding the duration and fraction of completed deals.

3.3.1 Completed

'Completed' is a dummy variable which equals one in case the deal led to a completed takeover. The dummy equals zero in case the deal was withdrawn after the announcement. Looking at Table 3, about 72% of the announced club deals led to a completed deal. This is significantly less than the approximately 83% deals a sole-sponsored private equity firm participates in.

3.3.2 Duration

Duration is defined as the days between the announcement date and the effective/withdrawal date. This is a continuous variable based on the number of days between the two dates. Looking at Table 3, the duration is, with 138 days on average, significantly longer compared to the duration of sole-sponsored private equity deals.

Table 3
Target characteristics, by bidder type. This table shows the averages for various target characteristics. Size is the market capitalization (in billion USD) of the target as defined by the number of shares outstanding times the price 43 days prior to the announcement date (at the beginning of the runup period) to control for any rumors. Industry-adjusted EBITDA/assets comes from the Compustat database in the fiscal year prior to the announcement date, which is defined as the EBITDA/assets of the target minus the industries average EBITDA/assets. Industry is defined as the first two digits of the target's SIC code. Debt/(Debt + Equity) is defined as the ratio between total debt of the target company, meaning #9 of the Compustat database plus #34, divided by the same debt calculation plus market value as defined by Size. Prior 12-month return is the raw compound return for the target company twelve months prior to the runup period (day -43) in percentages. Prior 12-month buy-and-hold abnormal returns is the compound of the target company minus the compound value-weighted market index return (including dividend distributions) over the twelve-month period prior to the runup period (day -43) in percentages. Prior 12-month volatility is defined as the standard deviation of the stock price of the target twelve months prior to the runup period (day -43) in percentages. Beta is the sensitivity of the target's stock returns compared to the market volatility as a whole (systematic risk) based on the market-model over the period day -379 to day -127 relative to the announcement date, based on daily data, with a minimum of 100 daily stock prices, otherwise, Beta is set to missing. *, ** and *** indicate that the coefficient estimate is significantly different from zero at the 10%, 5%, and 1% levels, respectively.

					Differences					
	Club	Sole PE	Private	Public	Club - Sole PE	Club - Private	Club - Public	Sole PE - Private	Sole PE - Public	Private - Public
Size ($ billions)	3,014 89	1,365 206	1,412 2.689	1,532 2.237	1,712***	1,600***	1,477***	-0,047	-0,167	-0,120
Bidders	1,15 89	1,17 206	1,08 2.682	1,07 2.237	-0,03	0,06	0,08	0,09***	0,11***	0,02*
Industry-adjusted EBITDA/assets	0,017 57	0,021 139	-0,002 2.008	0,001 1.778	-0,004	0,020	0,017	0,024**	0,020**	-0,003
Debt/(debt+equity)	0,280 51	0,291 124	0,263 1.910	0,256 1.747	-0,011	0,018	0,024	0,028	0,035	0,007
Pior 12-month return	7,76 89	5,84 203	16,38 2.581	21,47 2.139	1,92	-8,62*	-13,71***	-10,54***	-15,63***	-5,09**
Prior 12-month BHAR	-4,76 89	-5,99 203	1,76 2.581	7,02 2.139	1,23	-6,53	-11,78***	-7,76***	-13,01***	-5,26***
Prior 12-month volatility	2,54 89	2,62 206	3,00 2.683	2,97 2.229	-0,08	-0,46**	-0,44**	-0,38***	-0,36***	0,03
Beta	0,99 89	0,98 206	0,89 2.683	0,88 2.229	0,01	0,10**	0,11**	0,09***	0,10***	0,01
Duration	138,76 124	114,08 249	138,82 3.470	138,05 2.625	24,67*** 373	-0,060 3.594	0,71 2.749	-24,74*** 3.719	-23,97*** 2.874	0,77 6.095
Successful	0,72 124	0,83 249	0,77 3.470	0,85 2.625	-0,11** 373	-0,06 3.594	-0,13*** 2.749	0,05** 3.719	-0,02 2.874	-0,08*** 6.095

4. Methodology

4.1 Acquisition premium

The method used to determine the acquisition premium is similar to the method used by Officer et al. (2010). Using the CRSP database, I collect daily return data for all publicly listed companies in the first sample. Here I used the variables 'Holding period return', which is the return to the target shares for that given trading day, 'Value-Weighted returns (including distributions)', which contains the returns on a value-weighted market portfolio and 'price', which is either the closing price for that trading day or the average of the bid-ask spread for that stock in case no closing price is available.

These variables are used to calculate and construct raw returns, buy-and-hold abnormal returns, and cumulative abnormal returns. The returns are divided into the following intervals, which are all relative to the announcement day (0), namely: runup, which is over interval day -42 to day -1; markup, which is over interval day 0 to day +126 or the delisting day, whichever occurs first; and premium, which is over interval day -42 to day +126. These intervals are consistent with Officer et al. (2010), who followed Schwert (1996) and Bargeron et al. (2008).

Buy-and-hold abnormal returns (BHARs) are calculated by subtracting the compound return of the CRSP value-weighted market index from the compound return of the target shares over the given period. For example, the buy-and-hold abnormal runup is calculated as follows:

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

Cumulative abnormal returns (CARs) are calculated by summing the market model residuals. This is done by estimating market-model parameters (α_i and β_i) based on trading day -379 to trading day -127 time period using regression analysis. This estimates alpha as well as beta for that given period. Using these two inputs, I can predict target share returns based on the market-model. For example, the cumulative abnormal runup is calculated as follows:

(2) $CAR_{runup} = \sum_{t=-42}^{-1} return_i - (\alpha_i + \beta_i\, retrun_{market})$

Additionally, I calculated the CR3, which is the cumulative abnormal returns over trading day -1 to day +1 interval, also called the announcement returns. These various premium measures over different time intervals are consistent with Schwert (1996) as well as with Bargeron et al. (2008).

The mean differences between the types of acquirers in the above-mentioned premium measures are shown in Table 4.

Table 4

Target percentage returns, by bidder type. The table below shows the different measures of target returns in Leveraged Buyouts in percentages over the 1984 to 2019 time period as derived from the ThomsonOne database as described in Table 1. Runup is the compound return calculated over the day -42 to day -1 time period, relative to the announcement date. CR3 is the compound return calculated over the day -1 to day +1 time period, relative to the announcement date. Markup is the compound return calculated over the day 0 to day 126 (or delisting date, whichever occurs first) time period, relative to the announcement date. Premium covers the entire day -42 to day +126 (or delisting date, whichever occurs first) time interval. Raw returns are returns of the target shares. Buy-and-hold abnormal returns are the compound return to target shares minus the compound return on the value-weighted market index (including dividend distributions) as derived from the CRSP database. Cumulative abnormal returns are calculated using the sum of the raw returns on the target shares minus the predicted returns based on market model parameters (Alpha and Beta) using daily data over the day -379 to day -127 time period, with a minimum of 100 data points.

*, ** and *** indicate that the coefficient estimate is significantly different from zero at the 10%, 5%, and 1% levels, respectively.

					Differences					
	Club	Sole PE	Private	Public	Club - Sole PE	Club - Private	Club - Public	Sole PE - Private	Sole PE - Public	Private - Public
Raw returns										
Runup	11,84	8,83	12,71	12,38	3,01	-0,86	-0,54	-3,88***	-3,55**	0,33
CR3	13,61	22,52	22,71	23,54	-8,90***	-9,10***	-9,92***	-0,19	-1,02	-0,83
Markup	18,00	26,49	27,71	28,68	-8,49***	-9,70***	-10,68***	-1,21	-2,19	-0,98
Premium	31,08	36,05	42,76	43,32	-4,96	-11,68***	-12,23***	-6,71***	-7,27***	-0,56
Number of observations	89	206	2.682	2.227						
Buy-and-hold abnormal returns										
Runup BHAR	9,09	6,47	10,21	10,17	2,62	-1,12	-1,08	-3,73***	-3,70***	0,03
Markup BHAR	12,56	22,21	24,13	24,56	-9,64***	-11,57***	-11,99***	-1,93	-2,34	-0,41
Premium BHAR	22,82	29,33	36,62	36,40	-6,51	-13,80***	-14,12***	-7,29***	-7,61***	-0,32
Number of observations	89	206	2.682	2.227						
Cumulative abonormal returns										
Runup CAR	9,53	7,27	9,28	8,69	2,26	0,25	0,84	-2,01	-1,41	0,60
CAR3	13,69	21,91	22,02	22,95	-8,22***	-8,33***	-9,26***	-0,11	-1,41	-0,92
Markup CAR	13,32	22,56	21,82	21,39	-9,24***	-8,51***	-8,07***	0,74	1,17	0,43
Premium CAR	22,85	29,83	31,10	30,08	-6,98*	-8,26**	-7,23*	-1,27	-0,24	1,03
Number of observations	89	206	2.682	2.227						

Table 4 shows the differences between the various types of acquirers over the 1984 to 2019 time period. The main difference of interest is shown in column six, Club – Sole PE, which shows the difference between a club deal and a sole-sponsored private equity deal.

When looking at the raw returns, clubs pay a significantly lower premium compared to sole-sponsored prominent private equity acquirers over the announcement period and the markup period. The difference between clubs and sole PE firms is not significant for the runup period and the premium period. In the runup period, there is also no significant difference between club deals and publicly traded acquiring firms and privately held acquiring firms. There is, however, a significant discount between clubs and publicly traded as well as privately held acquiring firms in the premium period.

Similar results are found when looking at the buy-and-hold abnormal returns, only the markup period is significantly lower between clubs and sole-sponsored PE deals. Similar to the differences for the raw premium measures, over the premium period, there is a significant discount between the clubs and publicly traded acquirers as well as privately held acquirers. There is no significant difference in the runup period between clubs and the other types of acquirers.

Next, when looking at the cumulative abnormal returns, there is no discount between clubs and sole-sponsored prominent private equity firms in the runup period. There is, however, a significant discount at the announcement, the markup period and over the premium period. The latter is significant against 10% where the differences in announcement returns and the markup period are significant against 1%.

To be consistent with Officer et al. (2010), I used the buy-and-hold abnormal markup, buy-and-hold abnormal premium and cumulative abnormal announcement return in the multivariate regression analysis in Table 5, which is based on the model below:

(3) $$Premium_i = \beta_0 + \beta_1 * Club_i + \beta_2 * Private_i + \beta_3 * Public_i + \beta_4 * LnSize_i + \beta_5 * Prior\ 12\ month\ BHAR_i + \beta_6 * Beta_i + \beta_7 * Volatility_i + \beta_8 * Cash_i + \beta_9 * Toehold_i + \beta_{10} * Tender_i + \beta_{11} * Hostile_i + \beta_{12} * Bidders_i + \gamma + \delta + \epsilon_i$$

A negative coefficient for β_1 would indicate that the premium paid by clubs is lower for clubs compared to sole private equity firms, ceteris paribus. In the above model, γ denotes time fixed effects and δ denotes industry fixed effects.

4.2 Target characteristics

The second hypothesis focuses on differences in target characteristics, namely size and risk. Here, I again use the same method as Officer et al. (2010) by first looking at the size difference between target firms of clubs and sole-sponsored private equity firms. This is done using a mean difference t-test.

Size is defined as the market value 43 days prior to the announcement date and the mean differences between the defined types of acquirers are shown in Table 3 in Section three.

Risk is measured in two ways to stay consistent with Officer et al. (2010). The first measure is the pre-announcement systematic market risk, as defined by the market-model (Sharpe,

1964; Linther, 1965). This beta is estimated over trading day -379 to day -127 relative to the announcement day (0). I used daily data with a minimum of 100 observations to have to sufficient data points. The formula used to estimate the pre-announcement beta is as follows:

(4) $\beta_{i,t} = \frac{cov(r_{i,t}, r_{m,t})}{var(r_{m,t})}$

Herein, $r_{i,t}$ is the return of target stock i on day t and $r_{m,t}$ is the return of the value-weighted market index on day t.

The second risk measure I used, is pre-announcement volatility. This is calculated using the standard deviation of the daily percent return of the target company. This is calculated over the year preceding the runup period, which is trading day -294 to day -43 relative to the announcement date (0). The formula used to calculate the pre-announcement return volatility is as follows:

(5) $Volatility = \sqrt{\frac{\sum_{t=-294}^{-43}(x_t - \bar{x})^2}{n-1}}$

Herein, n is the number of observations, x_t is the return on day t and $\bar{x}$ is the mean of x.

4.3 Alignment costs

In section 2.2 Hypothesis development, I argued that clubs bear alignment costs and this could be adjective for clubs compared to sole prominent private equity firms.

The first sub-hypothesis looks into the likelihood of a completed deal after a deal announcement. This is done by a probit-model comparing clubs with sole prominent private equity firms using the following model:

(6) $\Pr(Completed = 1|Club) = \beta_0 + \beta_1 * Club + \beta_2 * Private + \beta_3 * Public + \beta_4 * LnSize_i + \beta_5 * Prior\ 12\ month\ BHAR_i + \beta_6 * Cash_i + \beta_7 * Toehold_i + \beta_8 * Tender_i + \beta_9 * Hostile_i + \gamma + \delta + \epsilon_i$

A negative coefficient for β_1 would indicate that the likelihood of a deal completion is lower for clubs compared to sole private equity firms, ceteris paribus.

The second sub-hypothesis looks into the duration from the announcement to the date of completion or withdrawal. To test this, I used a multivariate regression analysis, where I control for the usual M&A control variables. The model is given by the following formula:

(7) $Duration = \beta_0 + \beta_1 * Club + \beta_2 * Private + \beta_3 * Public + \beta_4 * Completed_i + \beta_5 * LnSize_i + \beta_6 * Prior\ 12\ month\ BHAR_i + \beta_7 * Cash_i + \beta_8 * Toehold_i + \beta_9 * Tender_i + \beta_{10} * Hostile_i + \gamma + \delta + \epsilon_i$

A positive coefficient for β_1 would indicate that the duration of the time between the announcement date and the settlement date is higher for clubs compared to sole private equity firms ceteris paribus.

4.4 Regression assumptions

In this research, I make use of the ordinary least squares method, or linear regression model. This method has five underlying assumptions, i.e. Gauss Markov assumptions (Anderson, 2018).

Linearity: The relationship between the independent variable and the dependent variable must be linear. I tested this using scatter plots, see four examples in Figure A1 in the Appendix. Most used variables, however, are dummy variables as described in section 3.2 and 3.3. Therefore, this should not cause any issues regarding linearity.

Randomness: The sample should be drawn randomly from the population to be representative for the population. My sample is not randomly drawn, but does look at all publicly traded U.S. target firms with a deal value of 100 million USD or more to stay consistent with Officer et al. (2010).

Non-collinearity: Individual independent variables should not be highly correlated with each other. This is done using a correlation table as shown in Table A3.1 and Table A3.2 in the Appendix. Table A3.1 looks at all completed deals in the 1984 to 2019 time period. Table A3.2 looks at all deals in the 1984 to 2019 time period, i.e. completed and withdrawn deals. Here, I found no correlation of |0,7000| or higher, except for the Public dummy with the Private dummy. This can be explained by the fact that 98% of the total sample of completed deals consists of publicly traded and privately held acquiring firms. In the sample consisting of completed and withdrawn deals, publicly traded and privately held acquiring firms combined account for 94% of the total sample. Buy-and-hold abnormal markup has a high correlation with the cumulative abnormal announcement returns and the buy-and-hold abnormal markup has a high correlation with the buy-and-hold abnormal premium, but these variables will not be used together in one regression, so this will not violate this assumption.

Endogeneity: Predictor variables should not be correlated with the error terms of the predicted model. This risk cannot be fully eliminated, but to minimize endogeneity, I used control variables consistent with prior research.

Heteroscedasticity: the error term across all independent variables should be constant. This is guaranteed by using robust standard errors in the regression analysis.

5. Results

5.1 Target return regressions

Based on the results found in Table 4, I can conclude that a discount on the paid premium by clubs, compared to sole-sponsored acquirers, is still existent in some of the premium measures, which are endogenous. This discount may be explained by some of the target and deal characteristics as shown in Table 5.

As the dependent variables, I used the same premium measures as used by Officer et al. (2010), who based their choice of dependent variables on the results found in Table 4. My results found in Table 4 differ slightly from their results but are also significantly negative for the buy-and-hold markup and the cumulative abnormal announcement returns. My results differ slightly because I lost some observations due to current data availability in the SDC, CRSP database and Compustat database. However, I gained some observations because I looked at an extended time period. Regarding the cumulative abnormal announcement returns (CAR3) and buy-and-hold abnormal markup, I found a significant discount for club deals compared to sole sponsors. However, I did not find a significant difference in the buy-and-hold premium between club deals and sole-sponsored PE deals.

Most of the control variables are already defined in the preceding sections. I transformed the ‘market value in thousands’ into the natural logarithm to be consistent with prior literature.

Table 5

Multivariate regression explaining target returns. The table below contains the results of multivariate regressions on the cumulative abnormal announcement returns, the buy-and-hold markup period and the buy-and-hold premium, in percentages as described in Table 4. The categorization (Club/Sole-sponsored/Private/Public) is consistent with Table 1. Prominent/Prominent refers to club deals consisting of more than one prominent private equity firm and Prominent/Non-Prominent refers to club deals consisting of only one prominent private equity firm. Top 5 refers to the five prominent private equity firms which were involved with the most deals in this 1984 to 2019 time period, as described in Table 1. Pre-2006 is a dummy variable which equals one for deals announced before January 1st, 2006, and zero otherwise, to be consistent with the US Department of Justice. Cash is a dummy variable which equals one in case the deal is fully financed using cash. Toehold is the percentage held by the acquirer prior to the announcement date. Tender is a dummy variable which equals one in case the offer is a tender offer and Hostile is a dummy which equals one in case the takeover is a hostile takeover, both as defined by the SDC, and zero otherwise. Sole sponsored private equity deals are included in the constant.
*, ** and *** indicate that the coefficient estimate is significantly different from zero at the 10%, 5%, and 1% levels, respectively.

	CAR3	Markup BHAR	Premium BHAR	CAR3	Markup BHAR	Premium BHAR	CAR3	Markup BHAR	Premium BHAR
Club	-4,46**	-6,49***	-0,38	-0,19	-1,42	6,97			
Prominent/Non-Prominent							0,46	-3,32	-1,02
Prominent/Prominent							-1,15	0,63	15,91*
Pre-2006*Club deal				-6,62**	-13,12**	-28,80***			
Prominent/Non-Prominent							-8,44**	-9,93	-23,33**
Prominent/Prominent							-3,59	-18,28***	-33,94***
Pre-2006*Sole-sponsored				4,41	-0,79	-5,96	4,43	-0,80	-5,99
Private	1,28	1,89	5,12**	2,96*	1,94	3,10	2,96*	1,95	3,14
Public	4,44***	4,63**	8,62***	6,25***	4,87**	6,61**	6,25***	4,87**	6,65**
Ln (Size)	-2,87***	-3,31***	-5,30***	-3,15***	-3,69***	-5,40***	-3,15***	-3,70***	-5,44***
Prior 12-month BHAR	-2,68***	-0,77	-0,30	-2,58***	-0,61	-0,25	-2,58***	-0,60	-0,25
RUNUP BHAR				-0,18***	-0,24***		-0,18***	-0,24***	
Beta	0,83	0,86	1,62	1,05	1,18	1,79	1,04	1,19	1,83
Volatility	0,57	-0,41	0,40	0,67	-0,29	0,38	0,67*	-0,29	0,37
Cash	5,43***	3,42**	4,47***	5,50***	3,48***	4,37***	5,49***	3,49***	4,38***
Toehold at acquisition	-0,09**	0,03	-0,26***	-0,13***	-0,02	-0,27***	-0,13***	-0,02	-0,27***
Tender	8,00***	6,02***	9,19***	8,67***	6,86***	9,12***	8,68***	6,83***	9,06***
Hostile	8,61***	16,17***	11,02***	7,55***	14,74***	11,06***	7,56***	14,74***	11,11***
Bidders	-5,37***	-3,10**	4,27*						
1 Rival bid				-6,10***	-2,54	6,94**	-6,10***	-2,52	7,10**
2 Rival bids				-6,39**	-2,55	4,89	-6,37**	-2,60	4,71
3 Rival bids				-6,43*	1,64	10,96	-6,44*	1,65	10,94
4 Rival bids				-8,31***	-9,60*	-11,03	-7,73***	-10,25**	-9,76
Constant	54,01***	58,41***	80,58***	51,68***	62,04***	88,41***	51,61***	62,21***	88,88***
Time/Industry fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	5.009	5.007	5.007	5.009	5.007	5.007	5.009	5.007	5.007
R-squared	0,16	0,11	0,14	0,18	0,13	0,14	0,18	0,13	0,14

Premiums on sole sponsored private equity deals are included in the constant. The constants are significantly positive for every premium measure, which is typical for LBOs (Torabzadeh & Bertin, 1987).

Addressing the premium measures first, club deals do not enjoy lower premiums for the 2006 to 2019 time period, compared to sole-sponsored private equity firms, after controlling for the control variables. Club deals do, however, actualize significantly lower premiums compared to sole-sponsored deals in the pre-2006 time period, after controlling for the usual

M&A control variables. For the pre-2006 time period, this discount is 6,62% for the cumulative abnormal announcement returns, 13,12% for the buy-and-hold abnormal markup period and 28,80% for the buy-and-hold abnormal premium. Dividing the discount over clubs consisting of only one prominent private equity firm and clubs consisting of two prominent private equity firms, I found a discount of 8,44% for clubs consisting of one prominent private equity firm and no significant discount for clubs consisting of two prominent private equity firms for the cumulative abnormal announcement returns. For the buy-and-hold abnormal markup, the results are the opposite. There is a significant discount of 18,28% for clubs consisting of two prominent private equity firms and no significant discount for clubs consisting of only one prominent private equity firm. For the buy-and-hold abnormal premium, there is a significant discount for both clubs consisting of one prominent private equity firm of 23,33% and a significant discount of 33,94% for clubs consisting of two prominent private equity firms.

Public firms do pay higher premiums, compared to sole-sponsored private equity firms according every premium measure, before and after controlling for the usual M&A control variables. This is consistent with research that argued that the majority of corporate takeovers are done for synergistic reasons and therefore pay a premium (Kode, Ford & Sutherland, 2003). Most managers, however, do not actualize these forecasted synergies and execute these takeovers from an empire-building standpoint and therefore overpay (Roll, 1986). This is also consistent with the research done regarding CEO overconfidence in the behavioral economics field (Malmendier & Tate, 2008).

For every measure of the takeover premium, Ln(Size) is significantly negative, indicating that larger target firms receive less premium compared to smaller target firms.

'Prior buy-and-hold abnormal returns' is significantly negative correlated with the paid premium around the announcement date and is consistent with the results found by Officer et al. (2010).

Buy-and-hold abnormal runup is significantly negative for the premium measure around the announcement date and the markup period. In contrast to the control variables used by Officer et al. (2010), I did not include the buy-and-hold abnormal runup control variable for the buy-and-hold premium, since the runup period is included in the premium period.

The coefficient regarding the number of bidders is at least remarkable. According to prior literature, this sign should be positive, since more rival bids increases the expected transaction price (Bulow & Klemperer, 1996). However, a possible explanation could be that there is more risk on an information leakage which lowers the surprise effect (Aitken & Czernkowski, 1992). There is, however, no direct evidence on this in club deals. Also, the number of deals in this sample with multiple bidders is relatively low, 359 out of 5.204, or 6,9%. Out of these 359 deals, 305 deals are deals with only one rival bid, the remaining 54 deals have two rival bids or more and can therefore be subject to the law of small numbers (Kahneman & Tversky, 1993).

5.2 Target characteristics

As stated in Hypothesis 2.1 and Hypothesis 2.2 in section two, I expect clubs to invest in larger target firms and targets firm of clubs to have higher risk, as defined by the pre-announcement beta and return volatility. The results of the mean difference analysis are shown in Table 6 below.

Table 6
Size in thousands. The table below shows the difference in size between targets of clubs and sole-sponsored private equity deals. Clubs are divided into clubs consisting of one prominent private equity formed with one or more non-prominent private equity firms and clubs formed by two prominent private equity firms.
*, ** and *** indicate that the coefficient estimate is significantly different from zero at the 10%, 5%, and 1% levels, respectively.

	Full sample		Pre-2006		Post-2005	
	Size	Size	Size	Size	Size	Size
Club	1.648.971***		37.791		2.325.918***	
Prominent/Non-Prominent		384.729		-309.637		797.144
Prominent/Prominent		3.345.716***		732.646		4.065.556***
Constant	1.365.236***	1.365.236***	834.490***	834.490***	1.621.063***	1.621.063***
Observations	295	295	94	94	201	201
R-squared	0,06	0,12	0,00	0,03	0,09	0,15

Table 6, above, estimates the difference in size between targets of clubs and targets of sole private equity firms. In the full sample, clubs invest in target firms that are significantly larger compared to target firms of sole private equity firms. This difference is approximately 1,6 billion USD for the 1984 to 2019 time period. Dividing the clubs into clubs formed by one prominent private equity firm and clubs consisting of two prominent private equity firms, this difference is only significantly positive for clubs consisting of two prominent private equity firms. This is in contrast with the findings of Officer et al. (2010), who found no significant size

difference between targets of clubs in general and target of sole private equity firms. Officer et al. (2010) did not make a distinction between different formation of clubs. Dividing the full sample period into a pre-2006 and a post-2005 time period, there is no significant size difference in the pre-2006 time period. Likewise, when separating the different compositions of clubs, there is no significant difference compared to sole PE deals. In the post-2005 time period, the size difference is significantly positive, indicating that the size difference found over the complete 1984 to 2019 time period is mostly driven by the post-2005 time period. This difference in the post-2005 is, similar the full sample period, merely driven by clubs consisting of two prominent private equity firms. This size difference is approximately 4 billion USD.

Next, I address the risk differences on the basis of Table 7 below. Panel A in Table 7 shows the results of the mean difference analysis for the pre-announcement market beta and Panel B shows the mean difference analysis of the pre-announcement return volatility.

Table 7

Pre-announcement beta and pre-announcement volatility, in percentages. The table below shows the difference in risk between targets of clubs and sole-sponsored private equity deals. Clubs are divided into clubs consisting of one prominent private equity formed with one or more non-prominent private equity firms and clubs formed by two prominent private equity firms. Pre-announcement beta is the target's market beta estimated over trading day -379 to day -127 relative to the announcement date (0) using daily data with a minimum number of observations of 100 daily returns. Panel B shows the pre-announcement volatility of the target return over the trading day -294 to day -43 relative to the announcement date (0). Volatility represents the standard deviation of the target returns.

*, ** and *** indicate that the coefficient estimate is significantly different from zero at the 10%, 5%, and 1% levels, respectively.

	Full sample		Pre-2006		Post-2005	
	Beta	Beta	Beta	Beta	Beta	Beta
Panel A: Differences in pre-announcement market beta						
Club	0,01		0,14		-0,05	
Prominent/Non-Prominent		0,02		0,14		-0,03
Prominent/Prominent		-0,00		0,15		-0,07
Constant	0,98***	0,98***	0,83***	0,83***	1,05***	1,05***
Observations	295	295	94	94	201	201
R-squared	0,00	0,00	0,01	0,01	0,00	0,00
	Volatility	Volatility	Volatility	Volatility	Volatility	Volatility
Panel B: Differences in pre-announcement return volatility						
Club	-0,08		0,28		-0,23	
Prominent/Non-Prominent		0,03		0,58		-0,28*
Prominent/Prominent		-0,23		-0,31		-0,18
Constant	2,62***	2,62***	2,75***	2,75***	2,55***	2,55***
Observations	295	295	94	94	201	201
R-squared	0,00	0,00	0,01	0,05	0,01	0,01

Table 7, above, estimates the difference in pre-announcement beta between targets of clubs and targets of sole private equity firms in Panel A. For the full sample, there is no significant difference in the pre-announcement beta between targets of clubs and targets of sole private equity firms for the complete 1984 to 2019 time period. There is also no significant difference in the pre-announcement market beta of targets of any formation of clubs and targets of sole-sponsored private equity firms for this full sample period. Dividing the full sample period into a pre-2006 time period and a post-2005 time period, there is no significant difference between targets of (any formation of) clubs and targets of sole private equity firms in both periods.

Similar returns are found when looking at the pre-announcement volatility, see Panel B. However, I found a significantly lower volatility of 0,28% for targets of clubs consisting of one prominent private equity firm for the post-2005 time period compared to targets of sole PE deals.

These results are similar to the results found by Officer et al. (2010). The authors also found no significant risk difference in targets of clubs and targets of sole private equity firms.

5.3 Alignment costs

As stated in Hypothesis 3.1 and Hypothesis 3.2, I expect club deals to have a longer duration, defined as the number of days between the announcement date and the effective/withdrawal date. The results are shown in Table 8 below.

Table 8

Panel A: Likelihood of completion, in z-scores, and Panel B: duration, in days. Completion as expressed by a probit-model by bidder type. The first four columns contain z-score coefficients compared to the constant. Club, Private and Public represent the different types of acquirers and the coefficient shows the difference between the acquirer and a deal funded by a sole prominent private equity. Size is the market capitalization 43 days prior to the announcement day. Prior 12-month BHAR represents the buy-and-hold abnormal returns, which is the compound return on the target company minus the compound return of the CRSP value-weighted index (including dividend distributions) over the twelve months prior to the runup period, which start at day -43 prior to the announcement date. Cash is a dummy variable equal to one in case the deal is funded or would be funded (in case of a withdrawn deal) in all cash. Toehold is the continuous variable indicating the percentage hold by the acquirer prior to the announcement. Tender (Hostile) is a dummy variable which equals one if the deal is a tender offer (hostile takeover, as defined by the SDC). Duration is expressed as the number of days between the announcement date and the effective/withdrawal date as defined by the SDC and is the result of a multivariate regression analysis. The variables used are the same as described above for the probit-model, except for the completion variable. This is a dummy variable which equals one in case the deal is completed before the end of 2019 and zero otherwise.

*, ** and *** indicate that the coefficient estimate is significantly different from zero at the 10%, 5%, and 1% levels, respectively.

	Full sample		Pre-2006		Post-2005	
	Completed	Completed	Completed	Completed	Completed	Completed
Panel A: Likelihood of deal completion						
Club	-0,46***		-0,61**		-0,38	
Prominent/Non-Prominent		-0,62***		-0,79***		-0,51**
Prominent/Prominent		-0,15		-0,48		0,22
Private	-0,17	-0,20*	-0,11	-0,21	-0,25*	-0,18
Public	-0,01	-0,08	0,00	-0,13	-0,00	0,01
Ln (Size)		-0,02		-0,03*		-0,03
Prior 12-month BHAR		0,03		0,23***		-0,00
Cash		-0,13***		-0,21***		-0,04
Toehold at acquisition		-0,02***		-0,02***		-0,03***
Tender		0,93***		1,04***		0,76***
Hostile		-1,43***		-1,32***		-3,01***
Constant	-0,43	0,20	-0,93	-0,30	1,46***	1,86***
Observations	6.436	6.240	4.284	4.128	2.113	2.074
Time/Industry fixed effects	YES	YES	YES	YES	YES	YES
R-squared	0,10	0,20	0,12	0,22	0,08	0,17
Panel B: Duration from announcement date to effective/withdrawal date						
	Duration	Duration	Duration	Duration	Duration	Duration
Club	18,72**		8,42		21,84**	
Prominent/Non-Prominent		24,97**		23,21		19,54
Prominent/Prominent		-2,85		1,09		-15,66
Private	10,61**	10,74**	-3,92	-3,30	19,71***	20,41***
Public	4,33	-0,08	-10,49	-13,64	15,31**	10,79
Completed		25,43***		36,00***		0,28
Ln (Size)		7,68***		4,23***		13,73***

Table 8 *(continued)*

Panel B: Duration from announcement date to effective/withdrawal date

	Duration	Duration	Duration	Duration	Duration	Duration
Prior 12-month BHAR		0,92		-2,94		1,92
Cash		-21,10***		-22,39***		-19,51***
Toehold at acquisition		0,92***		1,30***		0,29
Tender		-35,30***		-30,28***		-47,09***
Hostile		34,38***		35,14***		24,68
Constant	373,72***	263,86***	423,61***	368,16	207,75***	20,46
Observations	6.468	6.270	4.315	4.157	2.153	2.113
Time/Industry fixed effects	YES	YES	YES	YES	YES	YES
R-squared	0,19	0,24	0,21	0,25	0,18	0,27

Because the main indicator variables are ‘Club’, ‘Private’ and ‘Public’, the omitted variable is sole-sponsored private equity deals. The omitted category is included in the constant. When looking at Panel A of Table 8, club deals have a significantly negative coefficient, which indicates that the likelihood of a completed deal is lower when a target firm would be acquired by a club deal. This result is robust to time fixed effects as well as the described control variables. This result is according to expectations because clubs need to agree on terms such as sharing the majority control, which could lead to a withdrawal. This result is, however, merely evident in the pre-2006 time period.

Dividing clubs in clubs consisting of one or two prominent private equity firms, the difference is merely significantly negative for clubs consisting of one prominent private equity firm and not significant for clubs consisting of two prominent private equity firms. This significantly negative difference was evident for the pre-2006 as well as the post-2005 time period.

Coefficients are however in z-scores, which can be converted into probabilities, but this is dependent on the other characteristics. As an example, I look at the last column, the post-2005 time period with clubs divided into clubs consisting of one prominent private equity firm and two prominent private equity firms. The constant (which is significant) has a z-score of 1,86, which converts into a probability of 96,86%. Club deals with only one prominent private equity firm involved have a significantly negative coefficient of -0,51. This results, ceteris

paribus, in a z-score of 1,35 (=1,86-0,51), which converts into a probability of 91,15%, or 5,71 percentage points lower probability.

When looking at Panel B, club deals have a significantly positive coefficient, which indicates that the duration between the announcement date and the effective date/withdrawal date is longer for club deals compared to sole-sponsored deals. This significant difference is, however, merely evident for clubs consisting of one prominent private equity firm. These results are robust to time fixed effects as well as for the usual M&A control variables. The significantly positive difference in duration between clubs and sole PE firms is evident on the complete 1984 to 2019 time period, but this difference is concentrated in the post-2005 time period. After controlling for the usual M&A control variables, this difference is insignificant for the post-2005 time period as well.

6. Conclusion & discussion

6.1 Concluding remarks

This research examines the premium paid by four different types of acquiring firms, namely private equity club deals, sole-sponsored private equity deals, privately held firms and publicly traded firms during the 1984 to 2019 time period. This research adds value to the existing literature by examining an extended dataset as well as an extended time period. To answer the research question, I developed 3 hypotheses, with two sub-hypotheses each, which are answered below.

The first hypothesis addresses the difference in paid premiums by clubs compared to sole private equity firms. The first sub-hypothesis is stated as follows:

Hypothesis 1.1: There is a discount on the paid premium in club deals as compared to sole-sponsored private equity deals.

Addressing the complete 1984 to 2019 time period first, I found a significant discount on paid premiums for club deals compared to sole-sponsored private equity deals for the cumulative abnormal announcement returns and buy-and-hold abnormal markup, after controlling for the usual M&A control variables. I did, however, not find a significant discount for the buy-and-hold abnormal premium for club deals, after controlling for the usual M&A control variables.

Hereafter, I looked at the difference between clubs in the pre-2006 and the post-2005 time period. Here, I found a significant discount for the cumulative abnormal announcement return, the buy-and-hold abnormal markup and the buy-and-hold abnormal premium for the pre-2006 time period, after controlling for the usual M&A control variables. I did, however, not find a significant discount for these premium measures in the post-2005 time period, after controlling for the usual M&A control variables.

The above conclusions are in line with the results found by Officer et al. (2010). In the pre-2006 time period, there may have been collusion in the bidding process which could result in lower paid premiums. The discount disappeared after the U.S. Department of Justice started their inquiry, which may also indicate that clubs had an unfair advantage over sole sponsored private equity firms.

Hypothesis 1.2: Clubs composed of more prominent PE firms enjoy higher discounts on the paid premium to target shareholders.

This hypothesis is tested with the same method as the first sub-hypothesis, but now by dividing the above-mentioned clubs into different types of club deals, namely clubs consisting of one prominent private equity firm and clubs consisting of two prominent private equity firms.

Firstly, addressing the cumulative abnormal announcement returns, I only found a significant discount for clubs consisting of only one prominent private equity firm for the pre-2006 time period, after controlling for the usual M&A control variables. I did, however, not find a significant discount for clubs formed by two prominent private equity firms for this pre-2006 time period, after controlling for the usual M&A control variables. Looking at the post-2005 time period, I did not find a significant discount for club deals, neither for clubs consisting of one prominent private equity firm, nor for clubs consisting of two prominent private equity firms.

Secondly, looking at the buy-and-hold abnormal markup, I only found a significant discount for clubs consisting of two prominent private equity firms for the pre-2006 time period, after controlling for the usual M&A control variables. I did not find a significant discount for clubs consisting of only one prominent private equity firm for the pre-2006 time period, after controlling for the usual M&A control variables. Looking at the post-2005 time period, similarly

to the cumulative abnormal announcement returns, I did not find a significant discount for clubs in general, after controlling for the usual M&A control variables.

Lastly, I addressed the buy-and-hold abnormal premium. Looking at the pre-2006 time period, I found a significant discount for clubs consisting of one prominent private equity firm as well as clubs consisting of two prominent private equity firms, after controlling for the usual M&A control variables. Looking at the post-2005 time period, however, I found a significant positive difference in the paid premium by clubs consisting of two prominent private equity firms compared to sole-sponsored private equity deals, after controlling for the usual M&A control variables. I did not find a significant difference in the paid premium between clubs consisting of one prominent private equity firm compared to sole-sponsored private equity firms, after controlling for the usual M&A control variables.

These findings are in contrast with expectations, because the discount actualized by clubs are not structurally concentrated in clubs consisting of two prominent private equity firms. Because this discount is not concentrated, there may be motivations in favor of clubs in terms of capital constraints (Hypothesis 2.1) or risk-spreading (Hypothesis 2.2).

Hypothesis 2.1: Club acquirers invest in larger target firms compared to sole-sponsored private equity acquirers.

One of the major complaints about club deals was the lack of competition in private equity club deals. The primary counter-argument states that club deals can be a necessity for larger target firms. I tested this using a t-test on the market value of equity 43 days prior to the announcement date (0). To be consistent with Officer et al. (2010), after addressing the full sample period, I divided the sample in a pre-2006 time period and a post-2005 time period.

Regarding the full sample, I found that clubs invest in significantly larger firms compared to sole-sponsored private equity firms over the 1984 to 2019 time period. Secondly, after dividing clubs into clubs consisting of one private equity firm and clubs consisting of two private equity firms, I found that only clubs consisting of two prominent private equity firms invest in significantly larger target firms. For clubs consisting of one prominent private equity firm, this difference is not significant. Addressing the pre-2006 time period next, I found no significant size difference between target firms of clubs in general compared to target firms of sole-sponsored private equity firms. This conclusion still holds after dividing clubs into clubs

formed by one or two prominent private equity firm(s). Lastly, in the post-2005 time period, I found that clubs invest in significantly larger targets firms compared to sole-sponsored private equity firms. Similar to the complete 1984 to 2019 sample, this significant size difference is only evident in clubs consisting of two prominent private equity firms.

This conclusion is in line with Officer et al. (2010) and therefore in line with expectations. The size difference is mainly concentrated in the post-2005 time period, which may indicate that prominent private equity firms became cautious in forming clubs after the U.S. Department of Justice started the inquiry. Because the media expressed their concerns of clubs in terms of an unfair advantage over the pre-2006 time period, clubs were formed out of capital constraint motivations after 2005 and not to actualize lower premiums as in the pre-2006 time period as found in Hypothesis 1.1.

Hypothesis 2.2: Clubs invest in target firms with higher pre-announcement market beta and higher return volatility compared to sole prominent private equity firms.

Another counterargument in favor of clubs, aside from the size as discussed in Hypothesis 2.1, is that clubs are formed to spread risk across more private equity firms. Looking at the differences in the pre-announcement beta, based on the market model, and return volatility, I found that clubs invest in target firms with higher betas and higher return volatility compared to sole-sponsored private equity firms over the 1984 to 2019 time period. These differences are, however, not significant. Again, after dividing the clubs into clubs consisting of one prominent private equity firm and club consisting of two prominent private equity firms, there is still no significant difference in pre-announcement beta, nor in return volatility, between either composition of clubs and sole-sponsored private equity acquirers over the 1984 to 2019 time period. To stay consistent in this research, I also divided the full sample in the pre-2006 time period and the post-2005 time period. Again, I found no significant difference between either clubs in general, clubs consisting of one prominent private equity firm, nor clubs consisting of two prominent private equity firms in neither the pre-announcement beta nor in the return volatility. In the post-2005 time period, however, I found a significant negative difference in return volatility between clubs consisting of one prominent private equity firm compared to a sole-sponsored private equity firm.

All in all, I can conclude that there is no significant risk difference between target companies of clubs compared to target firms of sole-sponsored private equity firms, which is consistent with Officer et al. (2010), who also found no significant difference in risk of target companies.

Clubs are therefore mainly formed to actualize lower premiums in the pre-2006 time period and out of capital constraints for the post-2005 time period. Clubs do not have a preference for target firms with lower pre-announcement beta or pre-announcement volatility.

Hypothesis 3.1: The likelihood of a completed deal is smaller in a club deal setting compared to a sole-sponsored deal.

Looking at the likelihood of an announced deal that will eventually become effective, I found that the likelihood of a completed deal is significantly smaller for clubs compared to deals of sole-sponsored private equity deals over the 1984 to 2019 time period, after controlling for the usual M&A control variables. This difference is, however, only significantly smaller for clubs consisting of one prominent private equity firm. Again, dividing the complete sample period into a pre-2006 and a post-2005 time period, I found that the likelihood of a completed club deal consisting of one prominent private equity firm is significantly lower in the pre-2006 time period, after controlling for the usual M&A control variables, but not when clubs consist of two prominent private equity firms. For the post-2005 I found a significant negative difference in the likelihood of a completed deal for clubs consisting of two prominent private equity firms compared to sole-sponsored private equity firms, after controlling for the usual M&A control variables.

This confirms my expectation that clubs have a lower likelihood of a deal completion compared to sole-sponsored private equity firms. This may be caused by the alignment costs clubs are bearing. The lower likelihood is merely evident for clubs consisting of one prominent private equity firm. This indicates that the alignment costs of clubs with two prominent private equity firms are lower and is in line with Hypothesis 2.1. Clubs formed by two prominent private equity firms see more benefits, namely higher discounts on the paid premium compared to sole sponsored private equity firms for the pre-2006 time period (Hypothesis 1.1) and necessity for club formation because of capital constraints in the post-2005 time period (Hypothesis 2.1). Because clubs consisting of two prominent private equity firms see more benefits, the likelihood of a deal completion is not significantly lower for these clubs.

Hypothesis 3.2: The duration between the announcement date and the effective/withdrawal date is longer for club deals compared to a sole-sponsored deal.

Similar to the previous sub-hypothesis, this sub-hypothesis looks at club deals and the duration between the announcement date and the date of settle, so either the effective date in case an announcement led to a completed deal or the withdrawn date in case a deal is withdrawn. By examining the complete 1984 to 2019 time period, I found that clubs have a significantly longer duration between the announcement date and the date of settlement, after controlling for the usual M&A control variables, which is concentrated around clubs consisting of one prominent private equity firm. After dividing the complete sample period into a pre-2006 and a post-2005 time period, I found no significantly longer duration for club deals compared to sole-sponsored private equity deals for the pre-2006 time period, after controlling for the usual M&A control variables. For the post-2005 time period, I found a significant longer duration between club deals and sole-sponsored private equity deals, which is insignificant, after controlling for the usual M&A control variables.

All in all, over the complete sample period, the duration between the announcement date and the settlement date is significantly longer for club deals compared to sole-sponsored private equity deals, but is merely evident for clubs consisting of one prominent private equity firm. This can be explained by the alignment costs involved by clubs, which are absent in sole private equity firms, and possibly the raising of insufficient funds by the non-prominent private equity firm. Non-prominent private equity firms are therefore likely to form clubs with prominent private equity firms out of capital constraints and/or to actualize a discount on the paid premium, but have more issues aligning the preferences regarding the control sharing of the target company, which decreases the likelihood on a completed deal (Hypothesis 3.1) and a longer duration.

Lastly, I answer the research question:

What is the impact of the composition of clubs for the paid premium, deal completion and the time of settlement in Leveraged Buyouts over the 1984 to 2019 time period?

Previous literature mainly researched the discount on paid premiums enjoyed by clubs compared to sole-sponsored private equity firms (Officer et al., 2010). This research adds value in paying attention to the composition of these clubs and the involved alignment costs

by club formation and deal completion. Herein, I found that the duration between the announcement date and the date of completion/withdrawal is significantly longer for clubs compared to sole private equity firms over the 1984 to 2019 time period. Also, the likelihood that an announced deal will lead to a completed deal is significantly lower with clubs involved compared to announced deals with sole private equity firms over the pre-2006 time period.

6.2 Limitations

This research adds to the academic literature that the duration from an announced takeover to the completion/withdrawal date is significantly longer for club deal LBOs compared to sole-sponsored private equity firms. Also, I found that the announcement of a public takeover by a club deal leads to a withdrawn offer more often compared to announced deals with sole-sponsored private equity firms involved.

One of the shortcomings of this research is the relatively small sample size of club deals. This was inevitable, because I exclusively looked at publicly-traded U.S. target firms acquired by the top 50 private equity firms worldwide reported in 2007 and reported in 2020. Extending the sample with European and/or other markets could potentially increase the number of observations of club deals and thereby improve the internal and external validity of this research.

Besides, this research has not looked at the target returns of deals that are eventually withdrawn and the corresponding market reaction. The market reaction could indicate that the market expected a withdrawal and therefore underreacted compared to announced deals, which eventually became completed.

Additionally, this research did not look at possible motives for clubbing despite the absence of a discount on the paid premium, which was concentrated in the pre-2006 time period. The difference in target size is significantly positive for clubs compared to targets of sole PE firms in the post-2005 time period. This raises the question whether PE firms continue clubbing out of capital constraints.

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Appendix

Table A1

Year	Target Name	Prominent Private Equity firm(s)	Year	Target Name	Prominent Private Equity firm(s)
Panel A: Club deals					
1985	SCOA Industries Inc	Thomas Lee	2006	OSI Restaurant Partners Inc	Bain Capital
1986	PT Components Inc	Merrill Lynch, Madison Dearborn	2006	Readers Digest Association Inc	Merrill Lynch
1987	Decision Industries Corp	WCAS	2006	Sabre Holdings Corp	TPG, Silver Lake
1989	CNW Corp	Blackstone	2006	Biomet Inc	KKR, Blackstone
1993	Digital Communications Assoc	WCAS	2006	ADESA Inc	Goldman Sachs
1995	Riverwood International Corp	Clayton	2007	Laureate Education Inc	KKR, Citigroup
1995	Rockefeller Center Properties	Goldman Sachs	2007	TXU Corp	KKR, TPG
1996	Leslie's Poolmart Inc	Leonard Green & Partners	2007	Topps Co Inc	Madison Dearborn
1997	Revco DS Inc	JP Morgan	2007	Dollar General Corp	KKR, Goldman Sachs
1997	Multicare Cos Inc	TPG	2007	Kronos Inc	Hellman & Friedman
1998	Regal Cinemas Inc	KKR, HM Capital Partners	2007	Eagle Hosp Prop Trust Inc	Apollo Global Management
1998	Republic Engineered Steels	Blackstone	2007	Alltel Corp	TPG, Goldman Sachs
1998	CompDent Corp	Golder Rauner, TA Associates	2007	Avaya Inc	TPG, Silver Lake
1999	Integrated Circuit Systems Inc	Bain Capital	2007	Nuveen Investments Inc	Madison Dearborn, Citigroup
1999	Berkshire Realty Co Inc	Blackstone, Goldman Sachs	2009	BankUnited Financial Corp,FL	Blackstone, The Carlyle Group
1999	Big Flower Holdings Inc	Thomas Lee	2009	IMS Health Inc	TPG
1999	Genesis Health Ventures Inc	TPG	2009	Airvana Inc	Blackstone, Bain Capital
1999	Wilmar Industries Inc	JP Morgan	2010	Prospect Medical Holdings Inc	Leonard Green & Partners
2000	Petco Animal Supplies Inc	TPG, Leonard Green & Partners	2010	Del Monte Foods Co	KKR
2002	National Golf Properties Inc	Goldman Sachs	2011	Smart Modular Technologies	Silver Lake
2002	Quintiles Transnational Corp	TPG	2011	Kendle International Inc	Vista Equity Partners
2004	Panamsat Corp	KKR, The Carlyle Group	2011	BJ's Wholesale Club Inc	Leonard Green & Partners, CVC
2004	Texas Genco Holdings Inc	KKR, Blackstone	2011	Pharmaceutical Prod Dvlp Inc	The Carlyle Group, Hellman & Friedman
2004	AMC Entertainment Inc	Apollo Global Management, JP Morgan	2011	99 Cents Only Stores	Ares Management
2004	Metro-Goldwyn-Mayer Inc	TPG, Providence	2012	Peet's Coffee & Tea Inc	BDT Capital Partners
2004	Select Medical Corp	WCAS, Golder Rauner	2013	BMC Software Inc	Bain Capital
2005	Toys R Us Inc	KKR, Bain Capital	2014	Chindex International Inc	TPG
2005	SunGard Data Systems Inc	KKR, Blackstone	2014	Einstein Noah Rest Group Inc	BDT Capital Partners
2005	UICI	Blackstone, Goldman Sachs	2014	PetSmart Inc	BC Partners
2005	Party City Corp	Berkshire	2014	Riverbed Technology Inc	Thoma Bravo
2005	ShopKo Stores Inc	Sun Capital	2015	Informatica Corp	Permira Advisers
2005	Linens n Things Inc	Apollo Global Management	2015	Cablevision Systems Corp	BC Partners
2005	Town & Country Trust	Morgan Stanley, Onex	2015	SolarWinds Inc	Silver Lake, Thoma Bravo
2006	Albertsons Inc	Cerberus	2015	Keurig Green Mountain Inc	BDT Capital Partners
2006	Education Management Corp	Goldman Sachs, Providence	2015	Blount International Inc	American securities
2006	ARAMARK Corp	Goldman Sachs, Thomas Lee	2016	Apollo Education Group Inc	Apollo Global Management
2006	Kinder Morgan Inc	Goldman Sachs, The Carlyle Group	2016	Lexmark International Inc	PAG
2006	West Corp	Thomas Lee	2016	Rackspace Hosting Inc	Apollo Global Management
2006	Trizec Properties Inc	Blackstone, Brookfield	2016	Blue Nile Inc	Bain Capital
2006	Univision Communications Inc	TPG, Thomas Lee	2017	Panera Bread Co	BDT Capital Partners
2006	Michaels Stores Inc	Blackstone, Bain Capital	2017	Albany Molecular Research Inc	The Carlyle Group
2006	HCA Inc	KKR, Merrill Lynch	2017	Kindred Healthcare Inc	TPG
2006	Intergraph Corp	TPG, Hellman & Friedman	2019	Ultimate Software Group Inc	Blackstone, Hellman & Friedman
2006	Freescale Semiconductor Inc	Blackstone, TPG	2019	Genesee & Wyoming Inc	Brookfield
2006	Open Solutions Inc	The Carlyle Group, Providence			
Panel B: Sole-sponsor deals					
1984	Denny's Inc	Merrill Lynch	2007	Florida East Coast Inds Inc	Fortress Investment Group
1984	Palm Beach Inc	Merrill Lynch	2007	Bausch & Lomb Inc	Warburg Pincus
1985	Storer Communications Inc	KKR	2007	Crescent Real Estate Equities	Morgan Stanley
1985	UNIROYAL Inc	Clayton, Dubilier & Rice	2007	Archstone-Smith Trust	Lehman Brothers
1985	Jack Eckerd Corp	Merrill Lynch	2007	CDW Corp	Madison Dearborn
1985	Beatrice Companies Inc	KKR	2007	Ceridian Corp	Thomas Lee
1986	Sybron Corp	Forstmann Little	2007	Equity Inns Inc	Goldman Sachs
1986	Fruehauf Corp	Merrill Lynch	2007	Guitar Center Inc	Bain Capital
1986	Midland-Ross Corp	Forstmann Little	2007	Hilton Hotels Corp	Blackstone
1986	Safeway Stores Inc	KKR	2008	Bright Horizons Family	Bain Capital
1986	Pandick Inc	Morgan Stanley	2008	Lifecore Biomedical Inc	Warburg Pincus
1986	Owens-Illinois Inc	KKR	2008	Performance Food Group Co	Blackstone
1986	Lear Siegler Inc	Forstmann Little	2008	Getty Images Inc	The The Carlyle Group Group
1987	Comdata Network Inc	WCAS	2008	The TriZetto Group Inc	Apax Partners
1987	Supermarkets General Corp	Merrill Lynch	2008	Angelica Corp	KKR
1987	Jim Walter Corp	KKR	2008	Apria Healthcare Group Inc	Blackstone
1987	Seaman Furniture Co	KKR	2008	Catalyst Semiconductor Inc	TPG
1988	Stanadyne Inc	Forstmann Little	2009	SumTotal Systems Inc	Vista Equity Partners
1988	Stop & Shop Cos Inc	KKR	2009	Entrust Inc	Thoma Bravo
1988	Koppers Co Inc	Lehman Brothers PE	2009	Charlotte Russe Holding Inc	Advent International
1988	Hyponex Corp	Clayton, Dubilier & Rice	2009	Parallel Petroleum Corp	Apollo Global Management

Table A1 *(continued)*

Panel B: Sole-sponsor deals

1988	Cullum Cos Inc	Morgan Stanley	2010	Plato Learning Inc	Thoma Bravo
1988	American Health Cos Inc	Thomas Lee	2010	NBTY Inc	The The Carlyle Group Group
1988	Pullman Co	Forstmann Little	2010	McAfee Inc	TPG
1988	RJR Nabisco Inc	KKR	2010	Internet Brands Inc	Hellman & Friedman
1989	Jefferson Smurfit Corp	Morgan Stanley	2010	Gymboree Corp	Bain Capital
1990	Aristech Chemical Corp	Blackstone	2010	CommScope Inc	The The Carlyle Group Group
1990	Healthco International Inc	HM Capital Partners	2011	Emergency Medical Svcs Corp	Clayton, Dubilier & Rice
1993	Preferred Health Care Ltd	Warburg Pincus	2011	Global Defense Tech & Sys Inc	Ares Management
1994	Borden Inc	KKR	2011	CKx Inc	Apollo Global Management
1994	National Gypsum Co	Goldman Sachs	2011	Immucor Inc	TPG
1995	Diagnostek Inc	Warburg Pincus	2011	Allied Healthcare Intl Inc	CVC Capital Partners
1995	Bruno's Inc	KKR	2011	Emdeon Inc	Blackstone
1996	Community Health Systems Inc	Forstmann Little	2011	Renaissance Learning Inc	Hellman & Friedman
1996	Belden & Blake Corp	TPG	2012	Archipelago Learning Inc	Thoma Bravo
1996	Syratech Corp	Thomas Lee	2012	Great Wolf Resorts Inc	Apollo Global Management
1997	ERO Inc	HM Capital Partners	2012	eResearchTechnology Inc	Genstar Capital
1997	Fort Howard Corp	Morgan Stanley	2012	Par Pharmaceutical Cos Inc	TPG
1997	Smith's Food & Drug Centers	KKR	2012	Mediware Information Systems	Thoma Bravo
1997	Hechinger Co	Leonard Green	2012	BioMimetic Therapeutics Inc	Warburg Pincus
1997	Control Data Systems Inc	WCAS	2012	Westway Group Inc	EQT
1997	Zilog Inc	TPG	2013	Dell Inc	Silver Lake
1997	Amscan Holdings Inc	Goldman Sachs	2013	Gardner Denver Inc	KKR
1997	LIN Television Corp	HM Capital Partners	2013	MPG Office Trust Inc	Brookfield Asset Management
1997	Tuesday Morning Corp	Madison Dearborn	2013	rue21 inc	Apax Partners
1997	Melamine Chemicals Inc	KKR	2013	Keynote Systems Inc	Thoma Bravo
1997	Dynatech Corp	Clayton, Dubilier & Rice	2013	Greenway Medical Tech Inc	Vista Equity Partners
1998	MTL Inc	Apollo Management	2013	The Active Network Inc	Vista Equity Partners
1998	SFX Broadcasting Inc	HM Capital Partners	2013	Arden Group Inc	TPG
1998	Rival Co	Berkshire Partners	2014	American Pacific Corp	H.I.G. Capital
1999	Concentra Managed Care Inc	WCAS	2014	CEC Entertainment Inc	Apollo Global Management
1999	BancTec Inc	WCAS	2014	Cbeyond Inc	KKR
1999	Empi Inc	The Carlyle Group	2014	XRS Corp	Vista Equity Partners
1999	Physicians Specialty Corp	TA Associates	2014	Compuware Corp	Thoma Bravo
1999	General Nutrition Cos Inc	Thomas Lee	2014	TIBCO Software Inc	Vista Equity Partners
1999	White Cap Industries Inc	Leonard Green	2015	E2open Inc	Insight Partners
1999	General Instrument Corp	Forstmann Little	2015	Excel Trust Inc	Blackstone
1999	Walden Residential Properties	HM Capital Partners	2015	Associated Estates Realty Corp	Brookfield Asset Management
2000	Veterinary Centers of America	Leonard Green	2015	GrafTech International Ltd	Brookfield Asset Management
2000	Coinmach Laundry Corp	Golden Rauner	2015	Quality Distribution Inc	Apax Partners
2000	Mark IV Industries Inc	BC Partners	2015	OM Group Inc	Apollo Global Management
2002	Ebenx Inc	WCAS	2015	BioMed Realty Trust Inc	Blackstone
2002	AmeriPath Inc	WCAS	2016	Rouse Properties Inc	Brookfield Asset Management
2003	Varsity Brands Inc	Leonard Green	2016	The ADT Corp	Apollo Global Management
2003	FTD Inc	Leonard Green	2016	Fresh Market Inc	Apollo Global Management
2004	US Oncology Inc	WCAS	2016	Cvent Inc	Vista Equity Partners
2004	Prime Hospitality Corp	Blackstone	2016	ExamWorks Group Inc	Leonard Green & Partners
2004	LNR Property Corp	Ceberus	2016	SciQuest Inc	KKR
2004	Boca Resorts Inc	Blackstone	2016	Electro Rent Corp	Platinum equity
2004	Sola International Inc	EQT Partners	2016	Qlik Technologies Inc	Thoma Bravo
2005	Insight Communications Co Inc	The Carlyle Group	2016	Talen Energy Corp	Riverstone Holdings
2005	Instinet Group Inc	Silver Lake Partners	2016	Diamond Resorts International	Apollo Global Management
2005	Worldwide Rest Concepts Inc	Pacific Equity Partners	2016	Imprivata Inc	Thoma Bravo
2005	Wyndham International Inc	Blackstone	2016	Outerwall Inc	Apollo Global Management
2005	SS&C Technologies Inc	The Carlyle Group	2016	Press Ganey Holdings Inc	EQT
2005	Specialty Laboratories Inc	WCAS	2016	Infoblox Inc	Vista Equity Partners
2005	Amli Residential Ppty Trust	Morgan Stanley	2016	Team Health Holdings Inc	Blackstone
2005	SERENA Software Inc	Silver Lake Partners	2016	Metaldyne Performance Group	Blackstone
2006	Water Pik Technologies Inc	The Carlyle Group	2016	Lionbridge Technologies Inc	H.I.G. Capital
2006	Burlington Coat Factory	Bain Capital	2017	TerraForm Global Inc	Brookfield Asset Management
2006	Sports Authority Inc	Leonard Green	2017	Xactly Corp	Vista Equity Partners
2006	MeriStar Hospitality Corp	Blackstone	2017	Rice Energy	EQT
2006	CarrAmerica Realty Corp	Blackstone	2017	NCI Inc	H.I.G. Capital
2006	SourceCorp Inc	Apollo	2017	WebMD Health Corp	KKR
2006	TransMontaigne Inc	Morgan Stanley	2017	PharMerica Corp	KKR
2006	Laserscope Inc	Warburg Pincus	2017	Barracuda Networks Inc	Thoma Bravo
2006	Encore Medical Corp	Blackstone	2018	Rice Midstream Partners LP	EQT
2006	Aleris International Inc	TPG	2018	Financial Engines Inc	Hellman & Friedman
2006	Glenborough Realty Trust Inc	Morgan Stanley	2018	LifePoint Health Inc	Apollo Global Management
2006	Jacuzzi Brands Inc	Apollo	2018	Forest City Realty Trust Inc	Brookfield Asset Management
2006	SITEL Corp	Onex	2018	Imperva Inc	Thoma Bravo
2006	Yankee Candle Co Inc	Madison Dearborn	2018	Convergeone Holdings Inc	CVC Capital Partners
2006	Columbia Equity Trust Inc	JP Morgan	2018	Arris International Plc	The The Carlyle Group Group
2006	RailAmerica Inc	Fortress Investment Group	2018	MINDBODY Inc	Vista Equity Partners

Table A1 *(continued)*

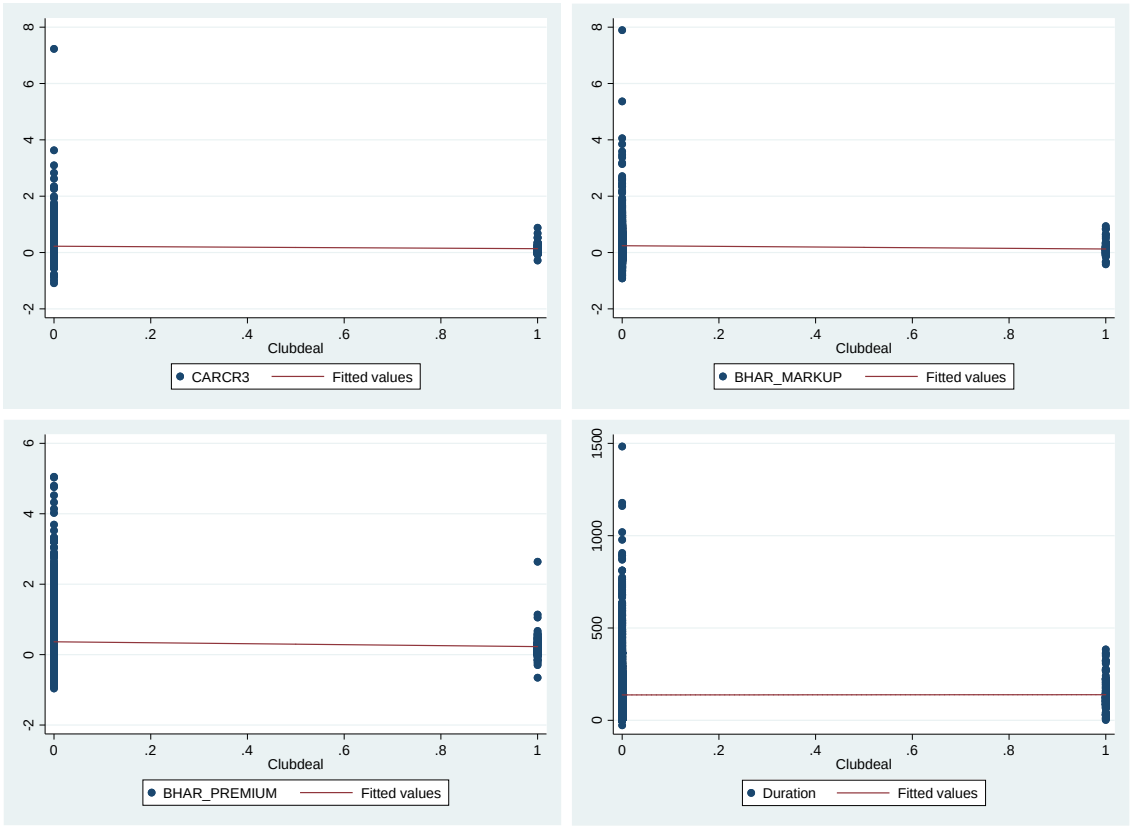
Panel B: Sole-sponsor deals

2006	Equity Office Properties Trust	Blackstone	2019	First Data Corp	KKR
2007	USI Holdings Corp	Goldman Sachs	2019	Ellie Mae Inc	Thoma Bravo
2007	Smart & Final Inc	Apollo	2019	Multi-Color Corp	Platinum equity
2007	ServiceMaster Co	Clayton, Dubilier & Rice	2019	Smart & Final Stores Inc	Apollo Global Management
2007	EGL Inc	Apollo	2019	Control4 Corp	Hellman & Friedman
2007	Claire's Stores Inc	Apollo	2019	Del Frisco's Restaurant Grp LL	L Catterton
2007	Innkeepers USA Trust	Apollo	2019	Cambrex Corp	Permira Advisers
2007	Catalina Marketing Corp	Hellman & Friedman	2019	Presidio Inc	BC Partners
2007	Interpool Inc	Fortress Investment Group	2019	Roan Resources Inc	Warburg Pincus

Table A2

Year	Target Name	Prominent Private Equity firm(s)	Year	Target Name	Prominent Private Equity firm(s)
Panel A: Club deals					
1984	City Investing Co	Merrill Lynch	2005	School Specialty Inc	Bain Capital, Thomas Lee
1985	Revlon Inc	Fortmann Little	2005	Maytag Corp	Goldman Sachs
1985	Sybron Corp	Lehman Brothers	2006	Eddie Bauer Holdings Inc	Sun Capital
1985	SCM Corp	Merrill Lynch	2006	Universal Amer Finl Corp	WCAS
1985	MTV Networks Inc	Forstmann Little	2007	3Com Corp	Bain Capital
1986	Color Tile Inc	Merrill Lynch	2007	Penn National Gaming Inc	Fortress Investment Group
1987	Church's Fried Chicken Inc	Lehman Brothers	2007	Harman Intl Industries Inc	KKR, Goldman Sachs
1988	MICOM Systems Inc	WCAS, Warburg Pincus	2007	SLM Corp	JP Morgan
1989	American Medical International	Clayton, Dubilier & Rice	2007	Affiliated Computer Svcs Inc	Cerberus
1995	Rockefeller Center Properties	Goldman Sachs	2007	Aeroflex Inc	General Atlantic, Francisco Partners
1997	Safety-Kleen Corp	Blackstone, Apollo Global Management	2007	Triad Hospitals Inc	Goldman Sachs
1998	XTRA Corp	Apollo Global Management	2008	Buckeye GP Holdings LP	Lehman Brothers
1999	Coinmach Laundry Corp	Golder Rauner	2009	SumTotal Systems Inc	KKR
1999	North Face Inc	Leonard Green	2011	99 Cents Only Stores	Leonard Green
2000	ResCare Inc	The Carlyle Group, Madison Dearborn	2012	Quest Software Inc	Insight Partners
2003	Right Mgmt Consultants Inc	Hellman & Friedman	2013	Dell Inc	Blackstone, Insight Partners
2004	QRS Corp	Golder Rauner	2019	Navient Corp	Platinum Equity
2005	Maytag Corp	Blackstone, Bain Capital			
Panel B: Sole-sponsor deals					
1984	Esmark Inc	KKR	2004	Hollywood Entertainment Corp	Leonard Green
1985	McGraw-Edison Co	Forstmann Little	2005	Goody's Family Clothing Inc	Sun Capital
1985	Willamette Industries Inc	Onex	2005	Titan International Inc	JP Morgan
1986	EF Hutton Group Inc	Lehman Brothers	2006	Town & Country Trust	Berkshire Partners
1987	Chi-Chi's Inc	Carlyle	2006	ElkCorp	Carlyle
1988	Alco Health Services Corp	KKR	2007	Mills Corp	Brookfield Asset Management
1988	Macmillan Inc	KKR	2007	Myers Industries Inc	Goldman Sachs
1988	Kroger Co	KKR	2007	Alliance Data Systems Corp	Blackstone
1988	Fairchild Industries Inc	The Carlyle Group	2007	Huntsman Corp	Apollo Global Management
1988	American City Business Journal	TA Associates	2007	United Rentals Inc	Cerberus
1989	Gleason Corp	Goldman Sachs	2008	Industrial Distn Group Inc	Platinum Equity
1989	CareerCom Corp	Golder Rauner	2008	Constellation Energy Group Inc	Berkshire
1989	Phillips Industries Inc	Merrill Lynch	2009	Cedar Fair LP	Apollo Global Management
1993	Amoskeag Co(Dumaines Trust)	Apollo Global Management	2009	AMICAS Inc	Thoma Bravo
1995	Rockefeller Center Properties	Merrill Lynch	2010	CKE Restaurants Inc	Thomas Lee
1998	Matlack Systems	Apollo Global Management	2011	Transatlantic Holdings Inc	Berkshire
1998	Centennial HealthCare Corp	WCAS	2011	Renaissance Learning Inc	Thoma Bravo
1999	Student Loan Corp	Citigroup	2013	Cooper Tire & Rubber Co	Apollo Global management
2000	Ocular Sciences Inc	Bain Capital	2013	Steinway Musical Instr Inc	KKR
2000	PSS World Medical Inc	Thomas Lee	2018	Amber Road Inc	Insight Partners
2000	Shaw Industries Inc	Berkshire	2018	LaSalle Hotel Properties	Blackstone
2000	Lodgian Inc	Goldman Sachs			

Figure A1


8
6
4
2
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1
Clubdeal
CARCR3
Fitted values
BHAR_MARKUP
Fitted values
BHAR_PREMIUM
Fitted values
1500
1000
500
0
Duration
Fitted values

Table A3.1

	CAR CR3	BHAR markup	BHAR premium	Club	Sole PE	Pre-2006	Private	Public	LnSize	Prior 12-month BHAR	BHAR runup	Beta	Volatility	Cash	Toehold	Tender offer	Hostile takeover	Bidders
CAR CR3	1,0000																	
BHAR markup	0,7841	1,0000																
BHAR premium	0,5006	0,7129	1,0000															
Club	-0,0439	-0,0434	-0,0394	1,0000														
Sole PE	-0,0029	-0,0106	-0,0306	-0,0277	1,0000													
Pre-2006	-0,0930	-0,0546	0,0587	-0,0845	-0,1199	1,0000												
Private	-0,0096	-0,0022	0,0034	-0,1387	-0,2119	0,0302	1,0000											
Public	0,0226	0,0180	0,0193	-0,1160	-0,1772	0,0399	-0,8890	1,0000										
LnSize	-0,1500	-0,1155	-0,1880	0,0969	0,0545	-0,2860	-0,0447	-0,0025	1,0000									
Prior 12-month BHAR	-0,0791	-0,0236	-0,0152	-0,0173	-0,0303	0,0156	-0,0293	0,0463	0,0701	1,0000								
BHAR runup	-0,1173	-0,1101	0,5641	-0,0047	-0,0299	0,1530	0,0044	0,0088	-0,1415	0,0135	1,0000							
Beta	0,0353	0,0100	-0,0030	0,0242	0,0312	-0,2476	-0,0054	-0,0135	0,2715	-0,0621	-0,0129	1,0000						
Volatility	0,1338	0,1125	0,1800	-0,0320	-0,0416	0,1225	0,0194	0,0055	-0,3140	0,0933	0,1377	0,3089	1,0000					
Cash	0,1894	0,1093	0,0966	0,0633	0,1330	-0,2523	0,1242	-0,1955	-0,0582	-0,0136	0,0163	0,0934	-0,0106	1,0000				
Toehold	-0,0154	0,0055	-0,0284	-0,0139	-0,0051	0,0184	0,0630	-0,0579	0,0329	-0,0092	-0,0512	0,0211	-0,0149	0,0483	1,0000			
Tender offer	0,1956	0,1278	0,1725	-0,0497	-0,0064	0,0881	0,0890	-0,0741	-0,1153	-0,0480	0,1224	0,0115	0,0861	0,3394	0,0695	1,0000		
Hostile takeover	0,0401	0,0533	0,0445	-0,0103	-0,0040	0,1050	0,0236	-0,0195	0,0264	-0,0181	0,0001	0,0016	-0,0453	0,0670	0,0964	0,2136	1,0000	
Bidders	-0,0628	-0,0305	0,0383	0,0249	0,0573	0,0474	0,0043	-0,0338	0,0253	-0,0035	0,0981	-0,0080	-0,0143	0,0605	0,0154	0,1444	0,1388	1,0000

Table A3.2

	Duration	Completed	Club	Sole PE	Public	Private	Pre-2006	LnSize	Prior 12-month BHAR	Cash	Toehold	Tender offer	Hostile takeover
Duration	1,0000												
Completed	0,0335	1,0000											
Club	0,0012	-0,0289	1,0000										
Sole PE	-0,0450	0,0130	-0,0287	1,0000									
Public	0,0039	0,0927	-0,1169	-0,1664	1,0000								
Private	0,0133	-0,0882	-0,1530	-0,2176	-0,8876	1,0000							
Pre-2006	0,0339	-0,0867	-0,0708	-0,1062	0,0217	0,0397	1,0000						
LnSize	0,1270	-0,0084	0,0905	0,0452	0,0217	-0,0642	-0,2810	1,0000					
Prior 12-month BHAR	0,0303	0,0124	-0,0188	-0,0224	0,0332	-0,0187	-0,0061	0,0544	1,0000				
Cash	-0,2108	-0,0334	0,0623	0,1207	-0,2019	0,1343	-0,2370	-0,0526	-0,0257	1,0000			
Toehold	0,0565	-0,1550	-0,0052	-0,0127	-0,0755	0,0807	0,0290	0,0366	-0,0155	0,0683	1,0000		
Tender offer	-0,2124	0,0675	-0,0466	-0,0156	-0,0328	0,0514	0,0817	-0,0875	-0,0317	0,3032	0,0386	1,0000	
Hostile takeover	0,0263	-0,2893	-0,0295	-0,0205	-0,0105	0,0265	0,1307	0,0390	0,0140	0,0719	0,0994	0,2084	1,0000