Master Thesis

Financial Economics

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The impact of private equity club deals on target shareholders and its determinants

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Abstract

In this thesis I research whether club deals (deals where an acquiror consists of two or more private equity firms) result in target shareholders receiving lower acquisition premia. Using a sample of transactions from 2000 until mid-2019 I find little evidence that club acquirors pay lower acquisition premia compared to sole private equity acquirors. Furthermore, I do not find evidence of buy-side financial advisors driving any potentially low abnormal returns to target shareholders in club deals. Finally, I analyse consortium structure and again find no evidence that a club deal discount is attributable to any particular consortium composition.

6 April 2021

Preface and Acknowledgements

With this thesis I present to you the culmination of five years of education in the form of university studies, industry experience and personal development. This represents the conclusion of my MSc in Financial Economics at Erasmus University Rotterdam.

My inspiration for writing on this topic of club deals initially stemmed from an internship in investment banking which I undertook after my bachelor's degree. Here, I was exposed to the world of financial institutions (including financial sponsors) and some of the strategies which they execute in their transactions. After this internship, I returned to university with a renewed ambition to study these financial institutions from an academic perspective which led me to take a course in corporate finance and private equity where I was first introduced to club deals and the regulatory challenges which they face. I now find myself having conducted research on this topic myself and having gained more insights than I could have expected at the beginning of this process. Further to this, I am now at the very beginning of a new chapter of my lifelong education: my transition to industry as I begin my career at ING's investment bank where I hope to gain further insights into the workings of the industry.

I would like to thank my thesis supervisor, Yashvir Gangaram Panday, for his continued support and flexibility throughout this entire process. A big thank you as well to my friends and colleagues over the past year who have continually encouraged and motivated me to keep going. Finally, and most importantly, thank you to my parents who I know have made countless sacrifices for me to study in The Netherlands and allow me to grow into the person I am today.

I hope you enjoy reading this thesis.

Josh Albert-Smith

Rotterdam, April 2021

Contents

1. Introduction

In 2018, private equity deal volume surpassed peaks last seen in 2007 before the economic crisis and, as of the end of 2019, total assets under management by private equity firms totalled $4 trillion (McKinsey & Company, 2020). One of the differences between the period we are currently in and that of 2007 is that the prevalence of club deals has noticeably decreased. Despite this decrease, club deals have not disappeared entirely and with increasing levels of dry powder in the industry and a limited availability of companies to target, it is not inconceivable that these so-called club deals may make a comeback.

While private equity has existed in some form or another though much of the 20th century, it only rose to prominence in the 1980s when it experienced its first boom and bust cycle. In this decade, the highly leveraged nature of the deals which culminated in the enormous leveraged buyout of RJR Nabisco caused private equity firms to, by large, be viewed as nothing more than corporate raiders by the general public (Carey & Morris, 2012). By 1990, the excesses of the previous decade began to show with increased bankruptcies of firms involved in buyouts and many other firms adopting anti-takeover measures such as poison pills.

After an uncertain two years, the private equity industry began its next boom cycle which would last until the early 2000's. In this decade, the growth of private equity would outpace that of every other asset class with almost $306 billion in investor commitments by the close of the decade (Caceis Investor Services, 2010). Alongside these growing capital commitments, private equity investors also became more involved in the long-term development of businesses and took a more friendly stance towards target management teams. The Economist (2004) remarks that 'big companies that would once have turned up their noses at an approach from a private-equity firm are now pleased to do business with them'. When the dot-com bubble burst in the early 2000's, the private equity industry was left reeling: significant investments began to fail and investors were looking to reduce their exposure to the private equity asset class.

While the bursting of the dot-com bubble caused several casualties, it also marked the beginning of one of the most heated periods of private equity activity, as well as the rise to prominence of club deals which are of particular interest to this research. During the period of

2002-2007 (the years leading up to the global financial crisis) private equity firms were sitting on record levels of dry powder accompanied by low interest rates. These factors lead to private equity firms having returns which were triple those of the S&P500 and earned this period in private equity the title of being the ‘golden age’ (Krantz, 2006). This ‘golden age’, however, did not last as the financial crisis in 2008 caused markets to come to a standstill and deals to either be renegotiated or withdrawn.

Since the financial crisis, the private equity industry has undergone continuous fundraising activity resulting in record levels of dry powder as of the end of 2019. This has been accompanied by increasingly higher levels of leverage in leveraged buyout deals and higher EV/EBITDA purchase price multiples which are currently peaking due to the COVID-19 pandemic (Bain & Company, 2020).

While club deals appeared to be gaining traction in the 2002-2007 period, this trend did not continue into the future. Several potential reasons exist for this: First, in 2005 financial news outlets began expressing concerns about club deals. Andrew Sorkin wrote in The New York Times that ‘what has gone largely unquestioned is whether the formation of these consortiums of firms, or "clubs" in industry parlance, has the potential to artificially depress buyout prices and hurt corporate shareholders’ (2005). Shortly after this undesirable attention was brought on the private equity industry, the U.S. Department of Justice began an informal inquiry into the practice which alerted private equity firms that they were now being more closely monitored by regulators and government officials (Berman & Sender, (2006) and Sorkin, (2006)).

Indeed, what followed in the years after 2006 was a notable decrease in the number of club deals being undertaken each year. Although the DOJ retreated from the issue of club deals, the plaintiffs of a class action lawsuit filed in 2007 continued to press forward with the matter (White & Case, 2009). Ultimately, in 2014 several private equity groups including Kohlberg, Kravis, Roberts & Co. and Blackstone Group reached a $590.5 million settlement, although none of the firms admitted any wrongdoing (Harris, (2014) and Burke, Hackett, Mitchell, Wilke & Williams (2018)).

The primary concern by regulators, and target firms, regarding these club deals is that the intention of the club is to curb competition in bidding for a target and in so doing depress the price being paid for a target. Graham and Marshall (1987) analyse collusive bidder behaviour in auctions and find that such collusive behaviour is a dominant strategy. Further to this, collusion reduces prices in an auction setting even if only a single round is played.

Despite this concern from regulators, the reason why private equity firms may club together is not always clear. While curbing competition may well be one reason, another cause may be increasing amounts of dry powder trying to be invested in a fixed number of firms. Further to this, numerous benign motivations for club formation exist. The first of these is resource pooling: if no single private equity firm is able to bid for a target due to a lack of financial resilience, a club may allow a successful bid to be placed. In addition to this, a club may also be able to get more favourable financing terms from a bank relative to a single private equity acquiror. Alongside resource pooling is the motivation of risk-sharing: when clubbing together, firms share the risk of an investment and in so doing are able to submit a bid which would not be possible if acting alone (Marquez & Singh, 2013).

Finally, the motivation for clubs cited most often by private equity firms themselves is value creation. The reasoning here is that a club is more valuable for a target due to increased synergies between private equity firms and the target firm. One method for this value creation is proposed by Scellato and Ughetto (2013) where the sharing of resources and expertise leads to more involvement by private equity firms in the investment phase.

In this paper I aim to extend prior research by Officer, Ozbas and Sensoy (2010) and Boone and Mulherin (2011). Both of these papers researched club deals in the period leading up to 2007, however, while Officer, Ozbas and Sensoy (2010) find that club acquirors systematically underpay for targets, Boone and Mulherin (2011) find no evidence of this. I follow a similar methodology in my research to Officer et al. (2010), however, I incorporate a more recent dataset of transactions ranging from 2000-2019. In addition to this more recent dataset, I identify deals with private equity involvement in a more robust manner than Officer et al. (2010). While their paper primarily relies on the Private Equity International 2007 ranking of the top 50 private equity firms by amount of capital raised, I incorporate more recent PEI rankings from 2020 as well as Preqin data on capital raising by private equity firms. This provides me with a more complete and time-varyant list of ‘prominent’ private equity firms.

Alongside comparing club deals to sole sponsored deals, I also analyse the structure of the club itself. I categorise clubs as being comprised of two or more prominent private equity firms or only one prominent private equity firm working with non-prominent private equity firms. By doing this I am able to detect whether particular consortia structures lead to lower premia being paid to target shareholders. This may be the case, for example, if clubs with prominent private equity firms possess the market power to meaningfully depress competition more so than clubs comprised of both prominent and non-prominent private equity firms.

Furthermore, I also test whether the geographic location of private equity firms in a club influences the premia that target shareholders receive. I categorise clubs as being comprised of private equity firms headquartered in the same country or different countries. By doing this, I am able to proxy for frictions on cooperation and coordination costs and determine whether this explains the premia paid to target shareholders.

Finally, I investigate whether buy-side financial advisors may be co-ordinating club activity and, therefore, low premia but find no evidence of this. I also analyse consortium structure in an effort to attribute a club deal discount to particular types of consortia. I first analyse clubs comprised of only prominent private equity acquirors compared to clubs comprised of prominent and non-prominent private equity acquirors and find no significant difference in the acquisition premium being paid to target shareholders. Next, I categorise clubs as being comprised of private equity firms headquartered in the same country or being comprised of private equity firms headquartered in different countries. Again, I find no significant difference in premia being paid between the two groups.

The results of my analysis largely contrast with those of Officer et al. (2010). While Officer et al. (2010) find that target shareholders receive lower premia when being acquired by a private equity club, I find little evidence for this in my dataset. Similarly, I do not find the same systematic break in club deal activity post-2005 which Officer et al. (2010) find. Despite this, I do find that capital constraints proxied by target size do increase the likelihood of an acquiror being a private equity consortium.

I proceed with my research as follows: section two provides an overview of the literature on club deals, and from this literature I develop the hypotheses which I will test. Following this, section three details how I construct my dataset, how I transform variables and ultimately provides descriptive statistics on select variables and return measures as a preliminary overview of abnormal returns across acquiror types. Next, I detail my research methodology in section three. Here, I describe the design of the event study that I conduct and design the regression models I use within the event study. In this section I also elaborate on why I have chosen to include particular variables in my models. After defining the regression models, I proceed to analyse the results in section four. Here, I provide outputs in the form of regression tables alongside a discussion and analysis of said outputs. Finally, section 5 concludes my findings, discusses limitations to this research and provides suggestions for future researchers.

2. Literature review

While a wealth of research on the different aspects of mergers and acquisitions exists, the research into club deals by private equity firms is limited. The first paper to extensively analyse these club deals was written by Officer et al. (2010). They analyse a sample of LBOs in the US with acquiror firms being prominent private equity firms and target firms being publicly traded. Their sample spans 1984 to 2007 and they find that target shareholders receive premia in club deals which are 40% lower than similar acquisitions where only a single private equity firm is involved. These results are robust to target and deal characteristics such as size and risk measures which leads the authors to conjecture that collusive motivations may be at play in these deals.

If collusive motivations were to be at play, then the number of potential bidders for a target would be reduced leading to a depression of the price paid to the target shareholders. This is illustrated with the following example: Suppose that a firm is being sold and there are two or more parties interested in acquiring this firm. Each party will continue bidding for the firm until the bid exceeds the intrinsic value that they place on the firm. However, if two or more parties form a club and in so doing agree not to bid against each other then there will be fewer bids for a target leading to fewer opportunities for the acquisition price to continue increasing. This becomes particularly apparent if we assume that the two potential acquirors with the highest valuation of a target club together. Here, having the two highest potential bids cooperating prevents the acquisition price from exceeding the valuation of the second highest bidder.

In addition to this research on club deals, research based on auction theory also raises concerns about club deals. From this perspective, collusion of acquirors will result in lower prices being paid for a target (Graham & Marhsall, 1987). Further to this, coalitions of any size are found to be profitable and the payoff to each club member increases with club size. My first hypothesis follows from this:

H_1: Target shareholders in club deals with prominent private equity acquirors receive lower premia than target shareholders in deals with a sole private equity acquiror.

While Officer et al. (2010) do find significantly lower target returns in club deals, another paper by Boone and Mulherin (2011) published the following year fails to find these lower abnormal returns. In their research, Boone and Mulherin (2011) analyse a sample of deals between 2003 and 2007 with a minimum deal value of $50 million, compared to the minimum deal value of $100 million of Officer et al. (2010). In addition to this, their research includes all private equity firms who may be involved in club deals - not only prominent private equity firms from the 2007 PEI Top 50 rankings.

Further to the discrepancy in premia to target shareholders between club deals and sole-sponsored deals, Officer et al. (2010) also find that this discrepancy is concentrated in the pre-2006 period. Financial news outlets had begun taking an interest in these club deals towards the end of 2005 and in 2006 this culminated in an inquiry into the practice by the United States Department of Justice. This increased attention on club deals may lead to them being more difficult to undertake, particularly if there are already suspicions of collusion. This, taken with the findings of Officer et al. (2010) leads to my second hypothesis:

H_2: The club deal discount in acquisitions involving prominent private equity firms is more prevalent in the period of 2000-2005 than the period of 2006-2020.

While collusion in private equity deals is suspected of being a motivation for club deals, other benign motivations may exist. One of these motivations relates deal size to capital constraints and risk. Officer et al. (2010) posit that club deals are a mechanism for private equity firms to share risk which is present in large transactions. In addition to this, they find mixed evidence for whether capital constraints are a driving force behind club formation. In their sample, club deals are significantly larger on average than sole-sponsored deals which they take as initial evidence of capital constraints driving club formation. Further to capital constraints, private equity firms are often restricted from investing more than a certain percentage of their funds in a single firm (Gompers & Lerner, (1996), Weisbach, Axelson, Jenkinson, & Stromberg, (2007)). Finally, Marquez and Singh (2013) discuss participation costs as a limiting factor for competition in bidding. They postulate that the smaller deals included in the sample of Boone and Mulherin (2011) go hand in hand with lower participation costs which in turn leads to a higher level of competition. Examples of participation costs are due diligence (with increasing firm size, such as with a conglomerate, there is typically increasing complexity in the amount of information required to be processed which will result in a larger number of hours being spent on due diligence processes) and arranging of financing should a bid be successful. Given this, targets involved in a club deal can be expected to be a larger size than targets in sole-sponsored deals.

H_3: The average deal size of club deals is larger than that of sole-sponsored deals.

Next, I analyse the influence of buy-side financial advisors in club deals. Because these buy-side advisors have direct influence over the structure and valuation of a transaction, abnormal return characteristics may be partially attributable to them, and not necessarily the acquiror alone. This is particularly apparent when we consider that it is the buy-side advisor's mandate to negotiate the best price (which entails lowest premium) for a transaction on behalf of the acquiror.

In addition to the negotiating power of the advisor, it is possible that the advisor plays the role of club coordinator. In this case the advisor would act as the underlying network connecting different buyside participants to each other to participate in a deal. From the perspective of the advisor providing the network, this is beneficial as it reduces the number of interested parties and therefore increases the chance of being able to earn fees on a successful transaction. Furthermore, if a bank were also providing the financing for a transaction, then this may be easier to arrange with a lower transaction price. If this were to be happening, then I would expect any low abnormal returns to be partially attributed to financial advisors and not private equity firms alone.

In practise, this may work as follows: A firm is in the market to be taken over and a particular acquiror is interested. This acquiror will then employ the services of an investment bank to assist with the process. Most prominent investment banks, however, will have close relationships with many financial sponsors due to financial sponsor coverage teams. These coverage teams will consequently allow the bank to reach out to various other parties who they believe may be interested in the target and facilitate the creation of the club (Having said this, there is also a case to be made for sell-side advisors facilitating club creation; this is further discussed in the conclusion).

Prior research has found that different buy-side financial advisors can cause significant differences in target abnormal returns. Loyeung (2018) finds that boutique financial advisors are associated with higher cumulative abnormal returns for targets compared to bulge bracket financial advisors. Given these findings which were attributable to individual advisors, it is possible that individual advisors may be responsible for low target abnormal returns in the context of a club deal.

H_4: The club deal discount varies with different buy-side financial advisors.

In continuing to analyse the structure of consortiums, I also investigate whether the composition of a consortium influences the premium or discount target shareholders might receive in a deal. Officer et al. (2010) focus on prominent private equity firms in their analysis as 'minor private equity firms are less likely to have the market power to meaningfully reduce competition and therefore prices (inadvertently or otherwise) by forming clubs'. The reason for these minor firms lacking market power is that in a bidding process they may not be able to afford to pay and consequently bid as much as larger firms. From the perspective of not being able to pay as much as larger firms, this may arise due to insufficient capital or insufficient ability to raise additional capital (leverage). A further reason is inability to tempt more acquirors into a club which will further depress the winning bid (Graham & Marhsall, 1987).

Later research by Boone and Mulherin (2011) includes minor private equity firms to test the conjecture put forward by Officer et al. (2010) and in doing so they find that this club deal discount disappears. While Boone and Mulherin (2011) extended the work done by Officer et al (2010), they stop short of analysing the structure of the clubs themselves. If a prominent firm were to partner with a non-prominent firm, I expect the market power of the joint entity to be reduced compared to an entity comprised of two or more prominent firms in line with the reasoning of Officer et al. (2010). Therefore, my fifth hypothesis is:

H_5: The club deal discount is larger for consortiums comprised of only prominent private equity firms compared to consortiums comprised of prominent and non-prominent firms.

In addition to being prominent or non-prominent, private equity firms can also be classified as domestic (U.S.-based) or foreign. In the context of club deals, this distinction is relevant from the perspective of coordination costs. Officer et al. (2010) touch on the idea of coordination costs and describe how an increase in these costs between consortium members may lower the willingness of the consortium to pay for a target. Throughout the deal process a large amount of cooperation is required and working with a foreign firm may introduce frictions to this process which will in turn decrease the efficiency with which the transaction can be executed.

Liu, Purda and Zhu (2016) analyse syndicate diversity in cross-border LBOs and find that one prominent friction in syndicate diversity is a lack of high-quality partners to partner with in the target firm nation. This lack of quality, in turn, leads to the transaction process being slowed down which itself is a cost to private equity firms. These increased costs lead to a lower price which an acquiror is willing to pay, and my final hypothesis is therefore:

H_6: The club deal discount is larger when a foreign private equity firm is part of a consortium compared to when a consortium consists of only domestic firms.

3. Data

I begin selecting my sample of deals in a manner similar to Officer et al. (2010). I use Thomson One's SDC database on mergers and acquisitions and filter for deals which include a US target, and which were announced between January 2000 and June 2019. I also require that the deal be completed by December 2020, that the deal be classified as a merger, acquisition or LBO and that the acquiror is looking to own 50% or more of the target's outstanding shares. Additionally, deal value must be disclosed and at least USD 100 million.

These search parameters are chosen for two primary reasons: First, these criteria are similar to those used by Officer et al. (2010) and Boone and Mulherin (2011) which will allow the results from this paper to be compared to those by the aforementioned authors. Second, the more recent time period will extend on prior research by evaluating how club deal activity has changed in recent years.

From SDC, I also download variables for the deal attitude, whether a deal consisted of a tender offer, the method of payment and the percentage of shares that an acquiror owns at announcement. These variables are transformed into indicator variables and are used as controls in the regression models I use in my analysis (further discussed in the methodology section).

Table 1 below illustrates how the distribution of deals has varied with time. It is notable that for all private equity acquirors there is a trend of an increasing number of deals in the years leading up to 2007. Additionally, for club acquirors we see numerous deals every year over the period of 2000-2007, after which the number of deals per year decreases significantly.

Alongside the sample of deals, I download associated historical target daily return data for trading day -379 to trading day +126 from the Centre for Research in Security Prices (CRSP). These data are used to calculate market capitalisation of a target 43 days prior to a deal announcement as well as compound returns and abnormal returns which proxy for premia or discounts in the acquisition price. These data are also used to estimate market model parameters (discussed further in the methodology section). These abnormal returns are then matched to targets which results in private targets being dropped from the sample.

The different abnormal return measures I calculate are cumulative abnormal returns (CARs) and buy-and-hold abnormal returns (BHARs). For both measures, I calculate abnormal returns over the periods of [-42, 126], [-42, -1], [-1, +1] and [0, 126]. The methodology section derives and discusses these measures in further detail. CRSP return data are also used to calculate prior 12-month return, prior 12-month return volatility (daily) and beta estimated over the prior year.

Table 2 below illustrates descriptive statistics for the abnormal return measures. It is important to note that significance levels are calculated with t-tests for all measures except buy-and-hold abnormal return measures which used a skewness-adjusted t-statistic (as described in the methodology section). Here, we see preliminary evidence that club private equity acquirors pay a lower premium than sole private equity acquirors. There is a negative and significant difference between club PE abnormal returns and sole-sponsored PE abnormal returns which persists for most time frames of both CAR (3/4) and BHAR (2/4) measures. In addition to this, I find mixed evidence that a difference in premia between prominent-prominent acquirors and prominent-non-prominent acquirors exists with negative and significant differences for some measures.

Table 1

Time-series distribution of the sample of deals by different types of acquirors over the period of 2000-2019. Transactions have a minimum deal value of USD 100 million and a publicly traded US target for which share price data are available. Transactions are classified into years based on announcement date. Private equity acquirors are identified by searching the deal synopsis in SDC for the name of a prominent private equity firm. These deals by prominent private equity firms are then further classified into sole-sponsored deals, club deals, clubs with two prominent acquirors and clubs with one prominent acquiror by hand using the deal synopsis and merger filings. Below, P-P acquiror refers to 'prominent-prominent' acquiror and P-NP refers to a 'prominent-non-prominent' acquiror. Total deal value is expressed in millions of US Dollars.

Year	All acquirors		Private equity acquiror										Other acquirors			
							Club acquiror									
			All private equity acquirors		Sole acquiror		All club acquirors		P-P acquiror		P-NP acquiror		Private acquiror		Public acquiror	
	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	No. of deals	Total deal value	No. of deals	Total deal value	No. of deals	Total deal value
2000	337	1,029,221.9	5	1,661.8	3	923.1	2	738.7	1	589.4	1	149.3	62	58,564.8	270	968,995.4
2001	202	319,274.3	2	2,957.4	1	396.7	1	2,560.7	1	2,560.7	0	0.0	35	19,980.9	165	296,336.0
2002	128	161,753.7	6	6,815.0	3	4228.8	3	2,586.3	1	100.0	2	2,486.3	39	18,606.7	83	136,332.0
2003	147	228,807.2	4	4,503.6	3	3421.6	1	1,082.0	1	1,082.0	0	0.0	24	26,599	119	197,704.6
2004	158	424,430.7	11	21,095.1	6	7145.6	5	13,949.6	4	11,955.4	1	1,994.2	16	68,282.7	131	335,052.8
2005	191	490,540.6	16	32,242.7	8	7744.0	8	24,498.7	5	21,930.1	3	2,568.6	46	53,178.2	129	405,119.7
2006	224	557,207.2	35	202,522	16	17530.9	19	184,991.0	15	160,842.5	4	24,148.5	53	73,202.2	136	281,483.0
2007	254	778,204.8	39	176,865.2	31	117814.9	8	59,050.3	3	42,215.7	5	16,834.7	62	305,228.7	153	296,110.9
2008	122	362,417.7	11	10,847.7	11	10847.7	0	0.0	0	0.0	0	0.0	35	103,052.4	76	248,517.6
2009	87	303,932.0	11	7,959.8	8	2483.2	3	5,476.6	2	1,438.6	1	4,038	15	17,252.6	61	278,719.6
2010	157	228,685.8	17	19,743.8	15	15333.1	2	4,410.7	2	4,410.7	0	0.0	50	61,305.8	90	147,636.3
2011	129	293,399.4	17	20,332.3	12	11618.9	5	8,713.4	3	6,600.3	2	2,113.2	56	68,894.8	56	204,172.2
2012	122	212,933.7	16	15,081.7	13	10877.4	3	4,204.3	1	236.4	2	3,967.9	31	43,456.1	75	154,395.9
2013	133	238,771.1	14	44,163.2	12	36003.8	2	8,159.5	0	0.0	2	8,159.5	36	68,422.1	83	126,185.8
2014	124	396,327.2	12	14,421.4	11	11114.3	1	3,307.0	0	0.0	1	3,307.0	19	50,940.1	93	330,965.7
2015	170	797,366.2	15	53,953.1	10	30717.9	5	23,235.2	1	4,546.2	4	18,689.0	40	186,309.7	115	557,103.4
2016	166	652,860.5	25	43,434.1	20	34608.2	5	8,825.9	0	0.0	5	8,825.9	37	113,157.5	104	496,268.9
2017	137	341,583.7	21	36,046.0	18	33875.7	3	2,170.3	2	1,716.8	1	453.5	34	56816.1	82	248721.6
2018	124	531,298.3	18	57,668.7	14	40325.8	4	17,342.9	0	0.0	4	17,342.9	20	46802.2	86	426827.4
2019	67	479,744.7	9	42,683.8	6	8064.5	3	34,619.4	1	11,930.6	2	22,688.8	12	28856.7	46	408204.2
Total	3,179	8,828,760.5	304	814,998.5	221	405,075.9	83	409,922.6	43	272,155.3	40	137,767.3	722	1,468,909.3	2,153	6,544,853.0

Table 2

Target percentage returns by acquiror type. Means and medians are reported for all measures, with medians being the values in brackets. Cumulative returns represent the total return over a period, while buy-and-hold abnormal returns and cumulative abnormal returns represent excess returns above a benchmark (CRSP value-weighted index) as described in the methodology section. The numbers in parentheses represent the time period relative to the announcement date over which returns are calculated where day 0 is the day of the announcement. Differences between means and medians are also reported and significance is tested with t-tests and Kruskal-Wallis tests respectively. Significance is denoted by ***, ** and * which represent significance at the 10%, 5% and 1% levels respectively.

	Club						Differences				
	Total	P-P	P-NP	Sole PE	Private	Public	Total club – Sole PE	P-P – P-NP	Sole PE - Private	Sole PE - Public	Private - Public
Cumulative returns											
[-42, -1]	9.25	15.39	2.64	6.17	7.56	10.19	3.08	12.76**	-1.39	-4.01***	-2.62**
	[6.86]	[11.04]	[3.42]	[4.29]	[4.98]	[7.13]	[2.57]	[7.62]**	[-0.69]	[-2.84]**	[-2.15]***
[-1, +1]	14.08	9.53	18.98	22.00	23.47	24.35	-7.91***	-9.44**	-1.47	-2.36	-0.88
	[11.93]	[9.84]	[14.13]	[18.71]	[18.97]	[18.79]	[-6.78]***	[-4.29]**	[-0.26]	[-0.08]	[0.18]
[0, +126]	19.47	15.68	23.54	27.21	26.59	28.95	-7.74**	-7.86	0.61	1.74	-2.36
	[15.54]	[16.57]	[14.78]	[23.80]	[22.88]	[24.71]	[-8.26]***	[1.79]	[0.92]	[-0.91]	[-1.83]
[-42, +126]	29.23	30.00	28.41	33.71	34.22	40.66	-4.48	1.59	-0.51	-6.95***	-6.45***
	[25.97]	[30.61]	[22.18]	[29.52]	[33.21]	[34.53]	[-3.55]*	[8.43]	[-3.69]	[-5.01]**	[-1.32]**
No. of observations	83	43	40	221	719	2,152					
Buy-and-hold abnormal returns											
[-42, -1]	6.98	13.18	0.31	3.96	6.04	8.81	3.02	12.87***	-2.08	-4.85***	-2.77***
	[5.14]	[7.65]	[0.54]	[2.03]	[2.57]	[5.08]	[3.11]	[7.11]***	[-0.54]	[-3.05]***	[-2.51]***
[-1, +1]	13.85	9.52	18.51	21.85	23.41	24.32	-8.00***	-8.99**	-1.57	-2.48	-0.91
	[12.75]	[10.53]	[14.26]	[19.29]	[18.63]	[18.71]	[-6.54]***	[-3.73]*	[0.66]	[0.58]	[-0.08]
[0, +126]	13.36	9.15	17.89	22.97	24.38	26.77	-9.60***	-8.74	-1.41	-3.80**	-2.39
	[9.84]	[9.84]	[9.79]	[18.29]	[20.64]	[21.63]	[-8.45]***	[0.05]	[-2.35]	[-3.34]	[-0.99]
[-42, +126]	20.73	21.02	20.42	27.15	30.44	37.02	-6.41	0.60	-3.28	-9.87***	-6.58***
	[16.09]	[19.30]	[14.37]	[25.13]	[27.82]	[29.93]	[-9.04]***	[4.93]	[-2.69]	[-4.80]***	[-2.11]**
No. of observations	83	43	40	221	719	2,152					
Cumulative abnormal returns											
[-42, -1]	7.76	12.62	2.54	4.01	6.19	7.01	3.75	10.08*	-2.19	-3.00**	-0.81
	[4.74]	[6.03]	[0.48]	[2.51]	[3.87]	[4.71]	[2.23]	[5.55]*	[-1.36]	[-2.20]*	[-0.84]
[-1, +1]	13.69	9.23	18.48	21.84	23.19	23.98	-8.15***	-9.25**	-1.36	-2.14	-0.79
	[12.24]	[10.91]	[14.35]	[19.34]	[18.86]	[18.70]	[-7.10]***	[-3.44]**	[0.48]	[0.64]	[0.16]
[0, +126]	13.23	6.44	20.52	22.83	24.73	23.23	-9.61***	-14.08**	-1.90	-0.40	1.50
	[9.75]	[7.99]	[15.08]	[19.18]	[21.35]	[18.89]	[-9.43]***	[-7.09]*	[-2.17]	[0.29]	[2.46]
[-42, +126]	20.99	19.06	23.06	26.84	30.93	30.24	-5.86	-4.00	-4.08	-3.40	0.68
	[17.55]	[17.55]	[16.95]	[24.25]	[27.93]	[25.93]	[-6.70]**	[0.60]	[-3.68]	[-1.68]	[2.00]
No. of observations	83	43	40	223	721	2,151					

Further to this, I download target historical income statement items and balance sheet items from Compustat for the year ending prior to the announcement date to be used as control variables. Specifically, I download values for EBITDA, book value of total assets, book value of total debt, book value of common equity and deferred taxes. I download institutional ownership data from Thompson Financial's 13F holdings database and, finally, I use CRSP to download stock price data to calculate market capitalisation (measured in billions of dollars), prior 12-month return, prior 12-month BHAR, prior 12-month return volatility and beta. The transformations to Compustat variables are detailed below:

$$Adjusted\ EBITDA\ = \frac{EBITDA}{Total\ assets} \tag{1}$$

$$Leverage = \frac{Book\ value\ of\ total\ debt}{Total\ debt + Market\ capitalisation} \tag{2}$$

$$Q = \frac{Total\ assets + Market\ capitalisation - Common\ equity - Deferred\ taxes}{Total\ assets} \tag{3}$$

The Adjusted EBITDA measure is calculated as a firm's EBITDA (which proxies for operating cash flow) divided by its total assets. I make this adjustment to account for the fact that firms with different amounts of assets will likely have different earnings potentials as assets are employed by firms to generate earnings. By dividing the EBITDA measure by total assets, I measure how effectively a company employs its assets to generate earnings and I account for different asset bases in different firms. Finally, this adjustment allows me to make more accurate comparisons between firms.

The measures for adjusted EBITDA and Tobin's Q are transformed once more to create variables for industry-adjusted EBITDA and industry-adjusted Q. Industry-adjusted EBITDA is defined as the adjusted EBITDA less the average EBITDA for a particular industry in a particular year and industry-adjusted Q is defined as the Q less the median Q for a particular industry in a particular year. Industries are defined by the two-digit SIC code associated with a target. These adjustments are made to account for inter-industry variations and time-varying differences in line with Officer et al. (2010). I calculate Q in the same manner as Kaplan and Zingales (1997).

Table 3 contains descriptive statistics for the various target and deal characteristics. Here, I find that only size differs significantly between club deals and sole PE deals with club deals having higher average values. Additionally, there are significant differences in values for prominent-prominent clubs and prominent-non prominent clubs for size, return and beta characteristics.

Finally, it is of note here that I do not winsorise or trim my data. This is often done by researchers to minimise the impact of outliers in a dataset. The disadvantage of doing this, however, is that 'the distribution relevant to statistical practice is that of the values actually provided and not of the values which ought to have been provided' (Tukey, 1960). winsorisation may therefore lead to a scenario where the relevance of my statistical analyses can be questioned and for this reason, I do not remove or adjust outliers.

Although I do not remove outliers there, are two notable adjustments which I make to my dataset: First, I remove observations where the value for the leverage variable is greater than one. This typically occurs when a firm has a negative equity value due to prior financial restructurings. Because I am not able to interpret a leverage of greater than one in any meaningful way, I remove these observations. Second, I remove observations where institutional ownership of a firm is greater than 100%. I do this for a similar reason, namely, that I am not able to interpret these values in any meaningful way.

Table 3

Descriptive statistics of various target firm characteristics. Means and medians are reported for all measures, with medians being the values in brackets. Size is measured as the target's market capitalisation 43 days prior to the deal announcement date and institutional ownership and institutional ownership data corresponds to the quarter prior to a deal announcement. Prior 12-month return measures, including beta, are measured using return data from the prior year leading up to trading day -43. Differences between means and medians are also reported and significance is tested with t-tests and Kruskal-Wallis tests respectively. Significance is denoted by ***, ** and * which represent significance at the 10%, 5% and 1% levels respectively.

	Club						Differences				
	Total	P-P	P-NP	Sole PE	Private	Public	Total club – Sole PE	P-P – P-NP	Sole PE - Private	Sole PE - Public	Private - Public
Size ($ billions)	3.27	4.11	2.37	1.32	1.23	2.08	1.95***	1.74*	0.08	-0.76***	-0.84***
	[1.89]	2.91	1.33	[0.69]	[0.30]	[0.53]	[1.20]***	[1.58]	[0.39]***	[0.16]*	[-0.23]***
	83	43	40	221	716	2,148					
Industry-adjusted Q	0.23	0.23	0.24	0.12	0.22	5.42	0.11	-0.01	-0.10	-5.30	-5.20
	[0.00]	[0.01]	[0.00]	[0.00]	[0.00]	[0.01]	[0.00]**	[0.01]	[0.00]	[-0.01]***	[-0.01]***
	83	43	40	221	711	2,143					
Industry-adjusted EBITDA/Assets	0.15	0.13	0.17	0.04	0.15	5.37	0.11	-0.04	-0.11	-5.33	-5.23
	[-0.08]	[-0.07]	[-0.08]	[-0.11]	[-0.11]	[-0.02]	[0.03]**	[0.01]	[0.00]	[-0.09]***	[-0.09]***
	83	43	40	221	711	2,143					
Debt/(debt+equity)	0.27	0.25	0.29	0.26	0.29	0.25	0.01	-0.04	-0.03	0.01	0.04***
	[0.20]	[0.15]	[0.21]	[0.20]	[0.22]	[0.18]	[0.00]	[-0.06]	[-0.02]	[0.02]	[0.04]***
	83	43	40	221	716	2,148					
Institutional ownership	0.65	0.62	0.69	0.65	0.49	0.53	0.00	-0.06	0.16***	0.11***	-0.05***
	[0.74]	[0.72]	[0.78]	[0.71]	[0.49]	[0.56]	[0.03]	[-0.06]	[0.22]***	[0.15]***	[-0.07]***
	83	43	40	221	722	2,153					
Prior 12-month return	7.32	15.33	-1.30	7.45	7.21	20.05	-0.13	16.63**	0.24	-12.61***	-12.84***
	[5.61]	[7.97]	[3.15]	[1.82]	[2.73]	[8.15]	[3.79]	[4.82]*	[-0.91]	[-6.33]**	[-5.42]***
	83	43	40	219	701	2,068					
Prior 12-month BHAR	-3.16	2.54	-9.29	-4.33	-2.27	10.82	1.17	11.83*	2.06	-2.06	-13.09***
	[-5.34]	[-3.88]	[-9.60]	[-10.55]	[-8.87]	[-2.17]	[5.21]	[5.72]	[-1.68]	[-8.38]***	[-6.70]***
	83	43	40	219	701	2,068					
Prior 12-month return volatility	2.50	2.49	2.51	2.60	3.09	3.00	-0.01	-0.02	-0.49***	-0.40***	0.09
	[2.11]	[1.98]	[2.35]	[2.33]	[2.59]	[2.59]	[-0.22]	[0.37]*	[-0.26]***	[-0.26***]	[0.00]
	83	43	40	219	701	2,068					
Beta	1.00	0.93	1.07	0.99	0.92	0.94	0.01	-0.14*	0.07*	0.05	-0.02
	[1.00]	[0.93]	[1.14]	[0.97]	[0.90]	[0.91]	[0.03]	[-0.21]*	[0.07]**	[0.06]*	[-0.01]
	83	43	40	221	719	2,149					

This search yields all M&A transactions within the given criteria, however, the scope of this research only pertains to private equity acquirors. While the Thomson One M&A database does include flags for private equity deals and club deals, these flags have been known to be inaccurate and this concern is shared by both Officer et al. (2010) and Boone and Mulherin (2011). To adjust for this, I search the deal synopsis for the name of a prominent private equity firm (the definition of a prominent private equity firm is discussed in the following paragraph). Next, for all deals which involve a prominent private equity firm, I manually code indicator variables for whether a particular deal is a sole-sponsored deal or a club deal. Further to this, I differentiate club deals as those deals which involve prominent private equity firms partnered with other prominent private equity firms and prominent private equity firms partnered with non-prominent private equity firms.

I define the above-mentioned prominent private equity firms in three ways: First, like Ofiicer et al. (2010) I begin with the 50 largest private equity firms in the world according to the May 2007 issue of Private Equity International (PEI) magazine. This list is based on the amount of capital raised by private equity firms in the preceding five-year period. To this list, I add the names of the internal private equity divisions of the investment banks Morgan Stanley, Merrill Lynch and JP Morgan (including Chase Capital Partners) to account for the fact that these parties may not rely on external fund raising, despite their importance. I also include the names of the historically prominent LBO sponsors HM Capital Partners (previously Hicks, Muse, Tate and Furst) and Forstmann Little.

Further to this list, I add the names of the top 50 firms in PEI's 2020 ranking of the world's top 300 private equity firms. Similar to May 2007 issue of PEI magazine, this list is based on the amount of capital private equity firms have raised in the preceding five-year period.

Finally, I also define private equity firms as being prominent by using Preqin's database on private equity firms' capital raising. This database contains data on the amount of capital firms have raised in the prior ten years as of the current year. I download the names of the fifty private equity buyout which have raised the largest amount of capital as of the end of 2020 for the period of 2011-2020 and add these names to the above list. By using these three similar sources to compile my list of private equity firms, I arrive at a comprehensive list which captures the most significant private equity firms over the period of 2000-2019. It is necessary to include these different sources to account for the fact that we do not know the exact methodology and data sources of the lists and by combing them we are able to include as many prominent firms as possible while using similar criteria.

These three separate lists leave me with a gross total of 150 prominent private equity firms, however, when accounting for duplication I arrive at a final list of 81 firms, 54 of which are involved in at least one private equity deal subject to my selection criteria. This list of Private equity firms is illustrated in Table 4 and it is important to keep in mind that it only includes firms which have been involved in at least one deal. A comprehensive list of all prominent private equity firms can be found in Table A1 in the appendix.

Table 4
Prominent private equity acquirors. This table includes all (54) prominent private equity acquirors who have been involved in at least one transaction which falls under the sample selection criteria. Rank is determined by the total number of deals a firm is involved in. Sole PE deals and club PE deals are defined in the data section.

Rank	Private Equity Firm	Headquarters	All deals	Sole PE Deals	Club Deals
1	Blackstone	US	32	18	14
2	TPG Capital	US	26	9	17
3	Apollo Global Management	US	25	19	6
4	The Carlyle Group	US	17	8	9
5	Brookfield Asset Management	Canada	15	13	2
6	KKR	US	15	6	9
7	Thoma Bravo	US	15	13	2
8	Vista Equity Partners	US	12	12	0
9	Hellman & Friedman	US	11	7	4
10	Providence Equity Partners	US	11	4	7
11	Silver Lake Partners	US	11	4	7
12	Madison Dearborn Partners	US	8	5	3
13	Fortress Investment Group	US	7	6	1
14	Leonard Green & Partners	US	7	5	2
15	Permira Advisers	UK	7	3	4
16	Thomas H. Lee Partners	US	7	2	5
17	Welsh, Carson, Anderson & Stowe	US	7	5	2
18	Apax Partners	UK	6	6	0
19	GTCR	US	6	5	1
20	Morgan Stanley	US	6	4	2
21	Warburg Pincus	US	6	4	2
22	Bain Capital	US	5	5	0
23	Cerberus Capital Management	US	5	4	1
24	EQT Partners	Sweden	5	4	1
25	Veritas Capital	US	5	4	1
26	BDT Capital Partners	US	4	4	0
27	Clayton, Dubilier & Rice	US	4	4	0
28	Francisco Partners	US	4	2	2
29	L Catterton	US	4	3	1
30	Lehman Brothers Private Equity	US	4	2	2

31	Onex Corporation	Canada	4	3	1
32	Platinum Equity	US	4	4	0
33	Ares Management	US	3	3	0
34	CVC Capital Partners	UK	3	1	2
35	Genstar Capital	US	3	3	0
36	H.I.G. Capital	US	3	3	0
37	JP Morgan	US	3	1	2
38	Merrill Lynch	US	3	0	3
39	New Mountain Capital	US	3	3	0
40	Riverstone Holdings	US	3	1	2
41	Advent International	US	2	1	1
42	Berkshire Partners	US	2	1	1
43	Centerbridge Partners	US	2	2	0
44	Roark Capital Group	US	2	2	0
45	Sun Capital	US	2	1	1
46	American Securities	US	1	0	1
47	Baring Private Equity Asia	Hong Kong	1	0	1
48	BC Partners	UK	1	0	1
49	EnCap Investments	US	1	0	1
50	Goldman Sachs	US	1	1	0
51	Hillhouse Capital Group	China	1	0	1
52	MBK Partners	South Korea	1	0	1
53	Pacific Equity Partners	Australia	1	1	0
54	PAG	Hong Kong	1	0	1

4. Methodology

My analysis of acquirors and deal performance focuses on market-based measures, namely stock performance. Because of this, I use an event study methodology which captures the unexpected component of economic effects surrounding a particular event date. The event study methodology was originally proposed by Fama, Fisher, Jensen and Roll (1969) and was later further elaborated on by MacKinlay (1997).

In utilising an event study, it is necessary to estimate expected returns over an event window. This is typically done by using the market model, the Fama-French three-factor model or the Fama-French five-factor model. I use the market model in my analysis for two primary reasons: First, Brown and Warner (1985) find that market model returns do not systematically deviate from returns of other models as abnormal return variance is not reduced to any significant extent. Second, Officer et al. (2010) and Boone & Mulherin (2011) both use the market model to estimate their expected returns, and to keep my methodology consistent with theirs, I also use the market model (Boone & Mulherin continually refer to the Fama-French three-factor model, however, they report that their results are unchanged when using a market model instead).

The market model itself is derived from the Capital Asset Pricing Model which itself is an ex-ante model (Sharpe, 1964). Because of this, an individual security's return is related to the return of the market portfolio through its covariances. I choose the CRSP value-weighted index (including dividends) as the market portfolio to keep my methodology in line with that of Officer et al. (2010). Furthermore, the market portfolio should be reflective of all firms included in the dataset of a research (Athanasoulis & Shiller, 2000). With this in mind, a dataset as broad as the one I use in terms of industry and market capitalisation is best represented with the CRSP value-weighted index as it includes all listed stocks on the New York Stock Exchange, NYSE MKT, the NASDAQ Stock Market and the Arca Exchange (Center for Research in Security Prices, 2019).

The market model which is used in determining expected returns is formally defined by:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \tag{4}$$

with:

$$E(\varepsilon_{it} = 0) \tag{5}$$

and:

$$var(\varepsilon_{it}) = \sigma^2_{\varepsilon_i} \tag{6}$$

In Equation 4, R_{it} represents the return on the stock of $firm_i$, β_i is the measure of systematic risk attributed to $stock_i$, R_{mt} is the return on the market portfolio on day_t and α_i is the intercept term. The model assumes that the mean return to the stock over the event window is equal to the mean return on the market over that same event window (Seiler, 2003).

In estimating the parameters of the market model, I choose an estimation window of [-379, -127] trading days prior to the deal announcement date in line with officer et al. (2010) and Schwert (1996). Four different event windows are chosen for this research, namely [-42, -1], [-1, 1], [0, 126] and [-42, 126] as these follow prior research by both Officer et al. (2010) and Bargeron, Schlingemann, Stulz and Zutter (2008). Furthermore, the window of [-1, 1] captures the initial effect of the deal announcement (day 0) while the window of [-42, -1] indicates whether there has been information leakage prior to the announcement. The window of [0, 126] allows for detection of long-run abnormal returns as Bernard and Thomas (1989) find a systematic underreaction of shares to financial announcements. It is notable that there is a gap between every event window and the estimation window. The reason for this is that it is necessary to account for factors, such as information leakage, which may cause the price of a stock to change in the days immediately preceding an event (Lo & Lys, 2000).

With the market model parameters defined, I next calculate abnormal returns in a manner similar to MacKinlay (1997). The abnormal returns are calculated over the event window and these abnormal return measures proxy for the premium or discount paid to the target shareholders associated with a deal.

$$AR_{it} = R_{it} - E(R_{it}|x_t) \tag{7}$$

Above, AR_{it} is the abnormal return for $firm_i$ in $period_t$, R_{it} is the observed return for $firm_i$ in $period_t$ and $E(R_{it}|x_t)$ is the expected return for $firm_i$ in $period_t$ without conditioning on the event taking place. Given that I use the market model to estimate expected returns, the abnormal returns are calculated by:

$$AR_{it} = R_{it} - \widehat{\alpha_i} - \hat{\beta}_i R_{mt} \tag{8}$$

After calculating abnormal returns, I first aggregate them across the time dimension to account for the multiple period event window:

$$CAR_i(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_{it} \tag{9}$$

Here, t_1 represents the first day of the event window and t_2 represents the last day of the event window, both relative to the deal announcement date. After aggregating abnormal returns into cumulative abnormal returns (CARs), I further aggregate these CARs across the security level:

$$\overline{CAR} = \frac{1}{N}\sum_{i=1}^{N} CAR_i \tag{10}$$

This aggregated figure, known as the cumulative average abnormal return, mitigates idiosyncratic risk attributed to different companies. N represents the total number of stocks in each acquisition announcement date. The variance of this aggregated CAR is calculated by:

$$\sigma^2_{\overline{CAR}} = \frac{1}{N-1}\sum_{t=1}^{N}\left(CAR_i - \overline{CAR}\right)^2 \tag{11}$$

Alongside the variance, I also test the significance of the aggregate CAR with a t-test. The t-statistic is calculated by:

$$t - statistic = \frac{\overline{CAR}}{\sigma_{\overline{CAR}}} \sqrt{N} \tag{12}$$

N represents the number of days in the event window being used. From this statistic, I test the hypothesis:

$$H_0: E\left[\overline{CAR}\right] = 0 \tag{13}$$

$$H_1: E\left[\overline{CAR}\right] \neq 0 \tag{14}$$

The specific t-test I use is a parametric cross-sectional t-test. I do not use a non-parametric test because non-normality does not affect the explanatory power of the t-test to any significant extent (Dyckman, Philbrick, & Stephan, 1984).

While cumulative abnormal returns are one of the most widespread measures used in event studies, buy-and-hold abnormal returns (BHARs) are also frequently used. Typically, short term abnormal returns are more likely to be measured with CARs (Moeller, Schlingemann, & Stulz, 2004) while long-term returns are better captured using BHARs (Lyon, Barber, & Tsai, 2003). Despite these papers, there is still no consensus as to which measure provides the most appropriate results. One complicating factor is that short-term returns do not capture post-acquisition noise in a dataset and are therefore likely to be less biased compared to long-run returns (De Long, Shleifer, Summers, & Waldmann, 1990).

Contrasting this perspective is Epstein (2005) who finds that it is not feasible to assess value creation in a merger transaction by only using short term measures as synergies and strategy implementation are inherently lengthy processes. I include BHARs alongside CARs in my analysis to keep my findings comparable to Officer et al. (2010) and as a further robustness check of my results. I calculate BHARs according to the formula:

$$BHAR_{iT} = \prod_{t=1}^{T}(1 + R_{it}) - \prod_{t=1}^{T}(1 + R_{mt}) \tag{15}$$

Because the BHAR measure utilises geometric averages, its cumulative biasedness is reduced relative to the CAR metric. Equation 15 shows that BHARs are measured as compounded returns to a stock over a particular event window less the compounded returns to the market index (in this case the CRSP value-weighted index including dividends) over the same window. I use this specification as it is the same one which Officer et al. (2010) use. Additionally, it is notable that with this specification, the estimation period described above for the market model is not relevant.

I test the statistical significance of the BHAR measures with a t-test. The t-statistic associated with this test, however, has a negative bias. This bias arises due to a positive skewness of the BHAR measures and is problematic as it leads to p-values not being accurate. This skewness in my dataset is illustrated in the appendix by figure A1. I also conduct a Shapiro-Wilk test for normality on all BHAR measures and reject the null hypothesis of normality. The results of this test can be found in Table A2 in the appendix. Lyon, Barber and Tsai (1999) research test statistics for long run event studies and propose a skewness-adjusted t-statistic which I use in my analysis:

$$t_{sa} = \sqrt{n}\left(S + \frac{1}{3}\hat{\gamma}S^2 + \frac{1}{6n}\hat{\gamma}\right) \tag{16}$$

Where:

$$S = \frac{BHAR_j}{\sigma(BHAR_j)} \tag{17}$$

and

$$\hat{\gamma} = \frac{\sum_{i=1}^{n}(BHAR_{ij} - \overline{BHAR_j})^3}{n\sigma(BHAR_j)^3} \tag{18}$$

Here, $\overline{BHAR_j}$ is the mean BHAR of the sample and $\sigma(BHAR_j)$ is the volatility of the sample. $BHAR_{ij}$ refers to the BHAR for a particular stock and n is the sample size. With this t-statistic I test the hypothesis:

$$H_0: E\left[\overline{BHAR}\right] = 0 \tag{19}$$

$$H_1: E\left[\overline{BHAR}\right] \neq 0 \tag{20}$$

One final concern pertaining to event studies is that of cross-correlation. This happens when target companies announce mergers during the same period and influence each other's returns in the process. This may happen as corporate finance practitioners use a variety of valuation methods such as discounted cash flow analyses and multiples valuations. When using a multiples-based valuation, firms' valuations in the same industry are by definition correlated with each other which leads to statistical cross-correlation. Chen, Chen and Lee (2013) mitigate some of this concern by finding that firms do share industrial prospects and they are therefore all impacted by the actions of one firm.

This cross-correlation can also lead to the effect of an overreaction or underreaction being overstated and that there is a biased underestimation of standard errors (Salinger, 1992). With this in mind, Abadie, Athey, Imbens and Woolridge (2017) find that clustering estimators has no significant consequences when it is not needed, however, standard errors must be adjusted when clustering does matter. Therefore, I do not perform cross-correlation or serial correlation tests and I adjust all regression models for clustered standard errors accounting for cross-industry effects (see industry fixed-effects below).

The primary tool which I use in analysing my dataset is ordinary least squares (OLS) regression analysis to assess the impact of various explanatory variables on dependent variables (in this case CARs and BHARs over different event windows). Specifically, I use a multivariate regression model which allows for the use of multiple control variables to remove noise and better isolate the effect being tested for. Woolridge (2015) represents this model which uses cross-sectional data by:

$$y_i = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k + u_i \tag{21}$$

In this equation y denotes the dependent variable, β_0 is the intercept, β_k is the slope associated with x_k, x_k represents the explanatory variables and u is the error term. Because my dataset is categorised as panel data, it is subject to time-invariant industry effects and time-variant effects such as the financial crisis in 2008. To account for this, I include time fixed effects (categorised by the year of the deal announcement) and industry fixed effects (categorised by a target's two digit SIC code). These fixed effects lead to a modification of the equation above:

$$y_i = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k + \gamma_i + \delta_i + u_i \tag{22}$$

Here, the variables are defined as before, with the additional variables of γ and δ representing time and industry fixed effects respectively. I include these fixed effects as Officer et al. (2010) also control for time and industry fixed effects in their research. Furthermore, I also conduct an F-test on both fixed effects and find a significant result indicating that these effects should indeed be included in the models.

For any cross-sectional OLS regression model, the following five Guass-Markov assumptions must be satisfied (Woolridge, 2015):

1. Linear parameters
2. Random sample from population
3. Non-collinearity in regressors
4. Non-correlation of regressors with the error term
5. Homoskedasticity

Homoskedasticity refers to the error term of a regression model having the same variance independent of the values of the regressors. This is represented mathematically by:

$$Var(u|x_1, x_2, \ldots, x_k) = \sigma^2 \tag{23}$$

If this assumption is violated (we have heteroskedasticity) then the estimators of the standard error will be biased which can lead to a Type I or Type II error. White's test for heteroskedasticity is often used to test this assumption as it handles non-linear heteroskedasticity better than the more common Breusch-Pagan test. This leads to the following hypotheses:

$$H_0: Homoskedasticity \tag{24}$$
$$H_1: Unrestricted\ heteroskedasticity \tag{25}$$

If H_0 cannot be rejected, then the variance attributed to an independent variable is homoskedastic and it is not necessary to use robust standard errors. Despite this Kezdi (2003) finds that even with homoskedastic variance, robust standard errors can be used without fear of their bad finite sample properties. Because of this, I proceed with using robust standard errors with all regression models.

In this section I specify the regression models which I use to test the hypotheses stated in the literature review section. Each model will be run with the measure of CAR[-1, 1], BHAR[0, 126] and BHAR[-42, 126] as the dependent variable, however, for the sake of brevity I only specify each regression model with the dependent variable of y. I choose these measures for two reasons: The first is that these are the same measures which Officer et al. (2010) use in their regression models and to keep my results comparable to theirs I use these measures. Secondly, as discussed above, CAR measures have been found to better capture short-run abnormal returns while BHAR measures are more appropriate for measuring long-run abnormal returns. Concurrently, the window of [-42, -1] is inherently noisy which leads to the deal premium being difficult to capture in this period alone.

While each regression model tests a different hypothesis, there are still similarities across all models: I control for both time and industry fixed-effects, acquiror type, target size, prior 12-month BHAR, Tobin's Q (in the form of an industry -adjusted Q measure), EBITDA (in the form of an industry adjusted EBITDA/assets ratio), beta, prior 12-month return volatility, whether a payment was all cash or a mix of cash and stock, the acquiror's toehold in the firm at the deal announcement date, whether the takeover method was a tender offer and whether target management reacts in a hostile manner to the takeover offer.

These control variables are similar to those used by Officer et al. (2010). Furthermore, prior research has found that target size is negatively related to the premium that is paid to said target (Comment and Schwert (1995), Officer (2003)). Alexandridis, Fuller, Terhaar and Travlos (2013) posit that this smaller premium for larger targets is a result of high value-at-stake and uncertainties regarding the integration of larger companies. These findings necessitate controlling for size in my analysis.

Prior research from several authors has also found that private equity acquirors are more likely to acquire firms with low Tobin's Q. Tobin's Q is qualitatively described as the market value of a company divided by the replacement cost of its assets (the full calculation I use can be found in the data section). Lang, Stulz and Walking (1989) posit that acquirors are better able to create value in a target if low Q arises due to agency problems, and Bargeron, Schlingemann, Stulz and Zutter (2008) that private equity firms acquire cheaper targets as defined by a target's industry-adjusted Q.

Target leverage has been found to influence the type of acquiror attracted to a transaction. Bargeron et al. (2008) posit that firms with a high leverage have reduced bargaining power in takeover discussions due to increasing recapitalisation difficulty with increasing leverage. This is one potential explanation for private equity firms acquiring firms with relatively higher leverage ratios. Contrasting this, however, Stulz (1988) finds that highly leveraged firms are associated with high concentrated ownership which in turn forces the acquiror to pay a premium for the acquisition. Further to this, Jenkinson and Stucke (2011) presuppose that for a private equity acquiror, enterprise value is more appropriate of a metric than market capitalisation as existing debt must be refinanced with a change of ownership and control (formally known as change-in-control covenants). This implies that the financing choice is not significant as during a transaction both equity and debt need to be included in the price. These contrasting views show that there is no conclusive finding regarding the role of leverage in transactions. As such, I exclude this metric from my analysis.

I also control for operating cash flow in the form of the ratio of EBITDA to total assets for the year prior to deal announcement, as well as the stock return-based measures of performance prior 12-month BHAR. To capture firm volatility, I use measures of prior 12-month return volatility and prior 12-month beta.

A hostile deal attitude and a tender offer are two factors which are both associated with higher premia being paid and this is the reason why I control for them. Alexandridis et al. (2013) and Schwert (2002) both find a hostile takeover process is associated with higher premia as the bid must be significantly higher than the current share price to induce target shareholders to sell their shares. In this strategy, target managers are also seen to negotiate more aggressively. Typically, these hostile bids are made through tender offers which enable an acquiror to bypass target management and directly offer to purchase shares from the target shareholders. Bargeron et al. (2008) find that these tender offers are associated with higher premia and are also more often made by public acquirors.

Finally, in my analysis I include a control variable for institutional ownership. The reason for this is that it is supposed that firms with a large proportion of their shares owned by institutions will be able to better negotiate at the table and in so doing attain higher premia.

In testing my first hypothesis, I use the regression model:

$$y_i = \beta_0 + \beta_1 * Club_i + \beta_2 * Private_i + \beta_3 * Public_i + \beta_4 * Ln(Size)_i + \beta_5 * EBITDA_i + \beta_6 * Q_i + \beta_7 * AllCash_i + \beta_8 * Mix_i + \beta_9 * Toehold_i + \beta_{10} * Tender_i + \beta_{11} * Hostile_i + \beta_{12} * BHAR_i + \beta_{13} * Beta_i + \beta_{14} * Volatility_i + \beta_{15} * InstOwnership_i + \gamma_i + \delta_i + u_i \quad (26)$$

Here, *Club*, *Private* and *Public* are indicator variables for whether an acquiror is a private equity club, a private firm or a public firm, respectively. The base level is therefore set to sole private equity acquiror. *Ln(Size)* represents the natural logarithm of a target's market capitalisation 43 days prior to the deal announcement date, while *EBITDA* and *Q* represent the industry-adjusted EBITDA/Assets ratio and industry adjusted Tobin's Q respectively.

Regarding the *Ln(Size)* variable, it is important to note that this is a transformation which I make to the original size variable which I compute from data downloaded from Compustat. I make this transformation as it allows me to interpret the coefficient of the variable as the change in the independent variable (abnormal return measure) attributable to a percentage change in target firm size.

AllCash and *Mix* are indicator variables for whether a transaction's consideration was all cash or a mix of cash and stock, respectively. As above, this leads to the base level being all-stock consideration. *Tender* and *Hostile* are both indicator variables for whether the offer was a tender offer and whether management reacts in a hostile manner to the merger offer, while *Toehold* represents the fraction of shares already owned by the acquiror at the deal announcement date. *BHAR*, *Beta* and *Volatility* represent the target's prior 12-month BHAR, the target's beta estimated with daily returns over the prior 12 months and the target's daily return volatility over the prior 12 months. Finally, γ, δ and u represent time fixed-effects, industry fixed-effects and the error term, respectively.

In this model, I am most interested in the coefficient of the Club indicator variable as this will indicate if there is a significant difference in abnormal returns between club acquirors and sole private equity acquirors while controlling for all relevant variables.

As a further robustness test, I implement kernel propensity-score matching, the Abedie-Imbens (2011) bias-corrected matching estimator (the bias adjustment compensates for the estimator being biased when there are continuous covariates which cause matching not to be exact, and there are finite samples) and multivariate distance matching. Officer et al. (2010) include both propensity-score matching and bias-corrected Abedie-Imbens matching in their analysis, however, more recent research by King and Nielsen (2019) has found that PSM performs poorly compared to MDM. For this reason, I also include MDM in my analysis, alongside PSM and Abedie-Imbens matching.

My second hypothesis is tested with a regression model similar to the one above, however I include a variable for whether a transaction occurred in the 2000-2006 period or the 2007-2019 period:

$$y_i = \beta_0 + \beta_1 * Club_i + \beta_2 * Pre2006_i + * \beta_3 * Club_i * Pre2006_i + \beta_4 * Private_i + \beta_5 * Private_i * Pre2006_i + \beta_6 * Public_i + \beta_7 * Public_i * Pre2006_i + \beta_8 * Ln(Size)_i + \beta_9 * EBITDA_i + \beta_{10} * Q_i + \beta_{11} * AllCash_i + \beta_{12} * Mix_i + \beta_{13} * Toehold_i + \beta_{14} * Tender_i + \beta_{15} * Hostile_i + \beta_{16} * BHAR_i + \beta_{17} * Beta_i + \beta_{18} * Volatility_i + \beta_{19} * InstOwnership_i + \gamma_i + \delta_i + u_i \quad (27)$$

Here, the variable *Pre2006* is an indicator variable equal to one if a transaction occurred in the 2000-2006 period and equal to zero otherwise. The base level is, therefore, that a transaction occurred post-2006 and that the acquiror is a sole private equity firm. I also interact this indicator variable with each acquiror type (*Club*, *Private* and *Public*) to distinguish the incremental effect on the dependant variable of a transaction being both in the pre-2006 period and the having a different acquiror type. The Club*Pre2006 interaction is most relevant in this equation as it will indicate whether a club deal discount differs by period, if it exists at all, and whether this discount is present for club acquirors and not other acquiror types.

Because this model tests specifically for time-variant differences in the pre-2006 period compared to the post-2006 period I do not control for time fixed effects here. If I were to control for time fixed effects, it may interfere with the *Pre2006* indicator variable which in turn may not be significant, even if there is in fact a time variant effect.

In my third hypothesis, I test for whether size, and by proxy, capital constraints can be an explanatory factor for club deals. To do this I use regression models with the club deal dichotomous outcome variable as the dependent variable instead of abnormal return measures. With a binary dependent variable, however, the linearity of parameters fails (Gauss-Markov assumption one is violated). In addition to this, the linear probability model is prone to heteroskedasticity and it is possible to have negative probabilities which are nonsensical. To account for this, I use a probit regression with maximum likelihood estimation in a manner similar to Boone and Mulherin (2011). This results in the following model:

$$P(club = 1) = \Phi(\beta_0 + \beta_1 * Ln(Size)_i + \beta_2 * Pre2006_i + \beta_3 * EBITDA_i + \beta_4 * Q_i + \beta_5 * AllCash_i + \beta_6 * Mix_i + \beta_7 * Toehold_i + \beta_8 * Tender_i + \beta_9 * Hostile_i + \beta_{10} * BHAR_i + \beta_{11} * Beta_i + \beta_{12} * Volatility_i + \beta_{13} * InstOwnership_i) \quad (29)$$

Here, the coefficients are interpreted as the change in z-score used to calculate probability based on a, ceterus paribus, one unit change of one of the regressors. In equation 29 I test whether target size increases the likelihood of an acquiror being a club while controlling for the same variables as in previous OLS regression models. Alongside the probit regression, I also estimate the average mean effect of each regressor which is interpreted as the increase in probability that a regressor has on an acquiror being classified as a club.

In this research, I also look to test whether a club deal discount or premium may vary with different buy-side financial advisors. Similar to before, I do this by including indicator variables for whether different financial advisors are involved in advising the acquiror in a transaction. The criterion I use for including a specific advisor in my model is that the specific advisor must have been involved in at least ten club deals. With this criterion, I include the following advisors: Deutsche Bank, Citi Group (including Salomon Brothers), Credit Suisse, JP Morgan, Goldman Sachs, Morgan Stanley, Bank of America Merrill Lynch (including the separate entities of both Bank of America and Merrill Lynch prior to their merger) and Barclays (including Lehman Brothers). In this case the base level becomes a sole private equity acquiror and an 'other' advisor. The regression equation is therefore:

$$y_i = \beta_0 + \sum_{j=1}^{8}(\beta_j * Advisor_j) + \beta_9 * Club_i + \beta_{10} * Private_i + \beta_{11} * Public_i$$
$$+ \sum_{j=12}^{19}\left(\beta_j * Advisor_j * Club_i\right) + \sum_{j=20}^{27}\left(\beta_j * Advisor_j * Private_i\right)$$
$$+ \sum_{j=28}^{35}\left(\beta_j * Advisor_j * Public_i\right) + \beta_{36} * Ln(Size)_i + \beta_{37} * EBITDA_i + \beta_{38} * Q_i$$
$$+ \beta_{39} * AllCash_i + \beta_{40} * Mix_i + \beta_{41} * Toehold_i + \beta_{42} * Tender_i + \beta_{43} * Hostile_i$$
$$+ \beta_{44} * BHAR_i + \beta_{45} * Beta_i + \beta_{46} * Volatility_i + \beta_{47} * InstOwnership_i + \gamma_i$$
$$+ \delta_i + u_i \qquad (30)$$

The *Advisor* variable in this model represents each of the eight buy-side financial advisors which I include in my analysis. Additionally, the interaction of *Advisor* and *Club* is of particular interest as it will indicate if a club deal discount or premium can be attributed to any advisor. Within this model, the base level is that the acquiror is a sole private equity firm and that the financial advisor is an 'other advisor' (none of the eight advisors specified above). It is of particular importance here to include interactions of *Advisor* with each acquiror type as I am specifically looking into whether the interaction of an advisor and a club private equity firm has a significant coefficient when the same advisor with a different acquiror type has an insignificant coefficient. If the interaction of *Advisor* with all acquiror types has a significant coefficient then this may indicate that the advisor is particularly skilful in negotiating a good price for any and all buyers. However, if the interaction of *Advisor* and *Club* is significant and negative, while the interaction of *Advisor* and other acquiror types is insignificant this may be taken as evidence in favour of the financial advisor facilitating low abnormal returns being paid.

In addition to financial advisors, I also investigate whether club composition affects the deal premium. I classify clubs as being comprised of either only prominent private equity firms or prominent and non-prominent private equity firms and include an indicator variable for this in my model:

$$y_i = \beta_0 + \beta_1 * Club_i + \beta_2 * ProminentClub_i + \beta_3 * Private_i + \beta_4 * Public_i + \beta_5 * Ln(Size)_i + \beta_6 * EBITDA_i + \beta_7 * Q_i + \beta_8 * AllCash_i + \beta_9 * Mix_i + \beta_{10} * Toehold_i + \beta_{11} * Tender_i + \beta_{12} * Hostile_i + \beta_{13} * BHAR_i + \beta_{14} * Beta_i + \beta_{15} * Volatility_i + \beta_{16} * InstOwnership_i + \gamma_i + \delta_i + u_i \quad (31)$$

The variable *Prominent* in the equation above is an indicator variable equal to one if a club consists of only prominent private equity firms and zero otherwise. In this equation, however, the interpretation of the *Club* variable now changes: In previous models this variable was equal to one when an acquiror was a private equity club and zero otherwise, however, it is now equal to one when an acquiror is a club comprised of both prominent and non-prominent private equity firms. This different interpretation arises as the Club variable and ProminentClub variable are collinear. These terms indicate whether a discount or premium can be attributed to specific consortium structures. Because they are both perfectly collinear with the *Club* variable from previous models, I exclude the *Club* variable in this model.

Finally, I test my sixth hypothesis with a regression model which includes indicator variables for whether a consortium is comprised of firms headquartered in different geographic regions or in the same geographic region. This variable will indicate whether any discount is attributable to frictions of the firms in clubs being headquartered in different countries. Similar to above, the interpretation of the *Club* indicator variable changes: it is now equal to one when a private equity club is comprised of firms headquartered in the same country and zero otherwise.

$$y_i = \beta_0 + \beta_1 * Club_i + \beta_2 * ForeignClub_i + \beta_3 * Private_i + \beta_4 * Public_i + \beta_5 * Ln(Size)_i + \beta_6 * EBITDA_i + \beta_7 * Q_i + \beta_8 * AllCash_i + \beta_9 * Mix_i + \beta_{10} * Toehold_i + \beta_{11} * Tender_i + \beta_{12} * Hostile_i + \beta_{13} * BHAR_i + \beta_{14} * Beta_i + \beta_{15} * Volatility_i + \beta_{16} * InstOwnership_i + \gamma_i + \delta_i + u_i \quad (32)$$

5. Results

In the univariate analysis in Table 2, I find initial evidence for club private equity acquirors paying lower premia for a target firm than a sole private equity acquiror. Here, the difference in abnormal return measures between club acquirors and sole private equity acquirors is both negative and significant at the 1% level. This analysis, however, did not account for different target characteristics.

Models 1, 2 and 3 in table 5 display the results of the regression analysis testing hypothesis one. These regression results incorporate target characteristics and are, therefore, a more robust indication of whether the club deal discount exists compared to the univariate analysis. Models 1 and 2 both have a negative coefficient for the club deal indicator variable which indicates that, ceterus paribus, club acquirors are paying significantly lower premia than sole private equity acquirors (sole acquirors are reflected in the constant of all models). This, however, changes in model 3 where I find that the coefficient of the club variable becomes positive. While the results of these models appear to be conflicting, none of the coefficients are significant and I, therefore, cannot interpret them as having any indication of whether club acquirors are paying less for targets than a sole private equity acquiror (from here onwards I interpret all coefficients ceterus paribus).

This finding differs somewhat to Officer et al. (2010) who find a negative and significant coefficient for the club deal variable for the CAR [-1, 1] and BHAR [0,126] measures. I see two primary reasons for this difference: sample selection and club classification. Officer et al (2010) use a sample of deals from 1984 until 2007 while I use a sample from 2000-2019. In addition to my sample being from a differing period it is also important to note that my sample excludes many years in which club deal activity was more frequent, namely, the years before 2006. Regarding the classification of club deals, I use a more comprehensive measure to identify prominent club deals which differs from Officer. This may cause my sample of private equity deals to include deals which the sample of Officer et al (2010) miss.

Although these results do differ from Officer et al. (2010), they are in line with Boone and Mulherin (2011) who, like me, have a more comprehensive methodology for identifying club deals and do not find evidence for private equity club acquirors paying less for a target than private equity sole acquirors. The final method I use to check for a club deal discount is to look at average treatment effects, the results of which can be found in Table 6. These effects are estimated using parameters which are the same as the regressors in models 1, 2 and 3 in Table 5 and here, I do find negative and significant club treatment effects, albeit only for multivariate distance matching (model 3). Despite this result, there is insufficient evidence to conclude that the club deal discount exists.

Table 5

Multivariate regressions on target abnormal return measures. Here, models 1,2 and 3 test hypothesis 1 and models 4, 5 and 6 test hypothesis 2. CAR[-1, 1] refers to the cumulative abnormal return over the [-1, 1] window, BHAR[0, 126] refers to the buy-and-hold abnormal return over the [0, 126] window and BHAR[-42, 126] refers to the buy-and-hold abnormal return over the [-42, 126] window. CARs are measured as the sum of market-model residual terms over the respective period and BHARs are measured as compound returns less compound returns to the index over the respective period. All models incorporate the same control variables and models 4, 5 and 6 introduce the variable *Pre2006*. All models control for time and industry fixed effects and use robust standard errors. Standard errors are clustered by year and are heteroskedasticity-consistent. Standard errors are in brackets and ***, **, and * indicate that the coefficient estimate is significantly different from zero at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	CAR[-1, +1]	BHAR[0, +126]	BHAR[-42, +126]	CAR[-1, +1]	BHAR[0, +126]	BHAR[-42, +126]
Club	-1.70	-3.27	1.18	-2.14	-5.09	.21
	(2.58)	(3.41)	(4.90)	(2.99)	(4.34)	(6.06)
Private	.08	-2.25	-2.43	.36	-2.25	-4.19*
	(1.44)	(1.71)	(2.24)	(1.95)	(2.24)	(2.21)
Public	6.13***	5.81***	10.19***	6.88***	5.86***	9.27***
	(1.46)	(1.49)	(2.54)	(1.42)	(1.68)	(2.95)
Ln(Size)	-3.62***	-4.71***	-6.11***	-3.24***	-4.19***	-5.47***
	(.50)	(.65)	(.93)	(.50)	(.70)	(.92)
IA-EBITDA/Assets	15.36	9.16	-8.98	14.19	8.99	-6.19
	(9.89)	(16.29)	(15.61)	(10.44)	(17.90)	(15.81)
IA-Q	-15.36	-9.16	8.98	-14.19	-8.99	6.19
	(9.89)	(16.29)	(15.61)	(10.44)	(17.91)	(15.81)
AllCash	9.70***	7.61***	7.88**	9.03***	6.60**	6.02*
	(1.00)	(2.32)	(3.11)	(1.10)	(2.40)	(3.17)
Mix	4.14**	3.24	.21	3.64**	2.75	-.84
	(1.73)	(2.73)	(3.43)	(1.64)	(2.69)	(3.55)
Toehold	-11.96***	-4.41	-14.28***	-12.19***	-4.90	-15.43***
	(2.29)	(4.04)	(4.12)	(2.33)	(4.03)	(3.93)
Tender	7.00***	5.51***	9.03***	7.97***	7.55***	11.76***
	(1.46)	(1.73)	(1.28)	(1.34)	(1.54)	(1.12)
Hostile	-4.19	3.16	-5.23	-4.43	4.23	-4.50
	(5.96)	(8.42)	(8.74)	(6.02)	(8.98)	(8.91)
Prior 12-month BHAR	-2.86**	-2.97**	-3.40	-3.33***	-3.75**	-4.11*
	(1.08)	(1.33)	(2.30)	(1.11)	(1.44)	(2.11)
Beta	-.75	-2.19	-3.34	-2.24*	-4.95**	-6.96**
	(1.11)	(1.79)	(2.64)	(1.13)	(2.20)	(2.92)
Prior 12-month vol.	63.67	4.70	32.33	122.92*	127.42	188.65*
	(79.51)	(106.41)	(143.35)	(62.33)	(75.04)	(103.97)
Inst. ownership	4.35*	5.36*	5.26	4.60**	5.69**	4.98
	(2.13)	(2.79)	(3.17)	(2.10)	(2.62)	(2.94)

Pre2006				-13.70	2.74	25.57
				(13.75)	(17.47)	(17.93)
Club x Pre-2006				5.54	-2.04	-4.76
				(7.14)	(9.15)	(10.25)
Private x Pre-2006				3.19	-2.88	-16.58*
				(6.44)	(8.49)	(8.65)
Public x Pre-2006				5.60	-.66	-11.13*
				(7.00)	(7.79)	(5.84)
_cons	32.05***	43.95***	63.36***	26.65***	30.44**	41.61***
	(6.90)	(10.76)	(12.35)	(7.06)	(10.9)	(11.98)
Observations	3,053	3,047	3,053	3,053	3,047	3,053
R-squared	.15	.12	.17	.15	.12	.17
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	No	No	No

Robust standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

Table 6
Club treatment effects on abnormal return measures. Matching is conducted based on the same variables in Table 5. Standard errors are in brackets and ***, **, and * indicate that the coefficient estimate is significantly different from zero at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
	Propensity-score matching	Abadie-Imbens matching	Multivariate distance matching
CAR[-1, +1]	-1.95	12.19	-8.30***
	(4.06)	(117.36)	(1.89)
BHAR[0, +126]	-1.56	34.54	-12.18***
	(7.88)	(205.83)	(2.83)
BHAR[-42, +126]	3.58	0.67	-14.17***
	(13.40)	(3.33)	(4.44)

Robust standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

Models 4, 5 and 6 in Table 5 are used to test my second hypothesis, namely that the club deal discount is more prevalent in the 2000-2006 period than in the 2007-2019 period. Within these models, it is important to keep in mind that I do not control for time fixed effects as this will confound the effect of the *pre-2006* indicator variable. Similar to models 1 and 2, the coefficients of the club variable in models 4 and 5 are negative which indicates that for deals in in the 2007-2019 period club acquirors paid lower premia than sole private equity acquirors. The coefficient of model 6 is positive (again, similar to model 3) which contradicts the findings of models 4 and 5. Although these findings are in conflict, none of the regressors are significant at the 10% level.

The variable of interest in these models, however, is the interaction of *Club* and *Pre-2006*. The coefficient of this variable in all models will indicate if club acquirors in the pre-2006 period paid less for targets than club acquirors in the post-2006 period. As discussed in the literature review, the reason for this would be increased scrutiny from the US Department of Justice in 2006. Models 5 and 6 present negative coefficients for this interaction variable in line with the theory, however, neither coefficient is significant at the 10% level. This taken in conjunction with the positive coefficient of model 4 indicates that in my dataset there is no evidence of a more prevalent club deal discount in the pre-2006 period than in the post-2006 period.

Model 1 in Table 7 below contains the probit regression output used to test my third hypothesis, namely that private equity club deals are on average larger than sole-sponsored private equity deals and model 8 estimates the average marginal effects of the probit model outputs. Here, the variable of interest is Ln(Size) as this indicates the change in z-score for probability of an acquiror being a private equity club associated with a one unit increase in *Ln(size)* where size is defined as the target firm's market capitalisation 43 days prior to the deal announcement date.

The coefficient of *Ln(Size)* in this model is 0.24 indicating that a unit increase in the natural logarithm of size of a target firm leads to a 0.24 increase in z-score for probability of an acquiror being a private equity club ceterus paribus. Furthermore, this coefficient of 0.24 is significant at the 1% level which allows me to conclude that there is strong evidence that an increasing target firm size increases the likelihood of an acquiror being a private equity club and that capital constraints may in fact play a role in club formation rationale. This is in line with the findings of Boone and Mulherin (2011).

Model 8 allows me to interpret this result more intuitively: the marginal effect of the *Ln(Size)* variable is 0.01 which indicates that for every one unit increase in the value of *Ln(Size)*, the probability of an acquiror being a club increases by 0.01, or 1%.

Table 7

Probit regression on the club deal indicator variable. Here, model 1 tests hypothesis 4. The club indicator variable is equal to 1 if an acquiror is a club and 0 otherwise. Standard errors are in brackets and ***, **, and * indicate that the coefficient estimate is significantly different from zero at the 1%, 5%, and 10% levels, respectively.

	(1) Club	(2) Marginal effects

Ln(Size)	.24***	0.01***
	(.06)	
Pre2006	.03	0.00
	(.15)	
IA-EBITDA/Assets	-1.04*	-0.06*
	(.54)	
IA-Q	1.00*	0.06
	(.52)	
AllCash	4.59***	0.25***
	(.22)	
Mix	4.12***	0.23***
	(.26)	
Toehold	.24	0.01
	(.43)	
Tender	-.82***	-0.05***
	(.17)	
Hostile	.40	0.02
	(.42)	
Prior 12-month BHAR	-.23*	-0.01*
	(.14)	
Beta	-.12	-0.01
	(.11)	
Prior 12-month vol.	6.87	0.38
	(4.40)	
Inst. ownership	-.01	0.00
	(.24)	
_cons	-7.89***	
	(.55)	
Observations	3,053	
Pseudo R^2	.14	

Robust standard errors are in parentheses
**** $p<.01$, ** $p<.05$, * $p<.1$*

In Table 8 below, I test my fourth hypothesis, namely, that the club deal discount varies with different buy-side financial advisors. These models are similar to models 1, 2 and 3 in Table 5, however, I now include variables for the eight financial advisors who advise on the most club deals. These variables are also interacted with the dummy variables for a club acquiror, public acquiror and private acquiror. The interactions with public acquiror and private acquiror indicator variables are not reported in this table for the sake of brevity, however, they can be found in Table A2 in the appendix. Given these specifications, the base level is that the financial advisor is an 'other' advisor and the acquiror type is a sole private equity. Finally, all models control for time and industry fixed effects.

If a discount in club deals were to be attributable to a particular financial advisor, the interaction terms of the club deal variable and financial advisor variables would indicate this with a negative and significant coefficient. In Table 8, Credit Suisse, JP Morgan, Goldman Sachs and Other Advisor (denoted by the *Club* interaction variables) all have negative coefficients for two out of three abnormal return measures. Despite this, none of these coefficients are significant and, therefore, no club deal discount can be attributed to them.

While I fail to find significance in the interaction terms of interest, I do find significant positive values for the Deutsche Bank and Citi indicator variables which indicates that across all targets, acquirors advised by these banks pay a premium in acquisitions relative to other advisors. Additionally, in Table A2 in the appendix the coefficient of the interaction term of the Goldman Sachs and private acquiror interaction variables is negative and significant which indicates that private acquirors advised by Goldman Sachs pay systematically lower premia for targets relative to sole private equity acquirors. Conversely, I find that the interaction term of the indicator variables for Citi and public acquirors is positive and significant. Finally, as in previous models I observe a negative and significant coefficient for the *ln(size)* variable indicting that larger targets receive significantly lower premia on average.

Table 8

Multivariate regressions on target abnormal return measures. Here, models 1,2 and 3 test hypothesis 4. CARs and BHARs are defined in Table 2. Indicator variables for the most frequent financial advisors are used in these models, alongside control variables and the regressors of interest (acquiror type). Interaction terms for private and public acquirors with each advisor are not reported for the sake of brevity. All models control for time and industry fixed effects and use robust standard errors. Standard errors are clustered by year and are heteroskedasticity-consistent. Standard errors are in brackets and ***, **, and * indicate that the coefficient estimate is significantly different from zero at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
	CAR[-1, +1]	BHAR[0, +126]	BHAR[-42, +126]
Deutsche	7.95***	8.08**	5.37
	(2.23)	(3.04)	(3.30)
Citi	5.46**	9.74***	6.85
	(1.99)	(2.40)	(5.01)
CS	-2.94	-4.86	-2.48
	(3.07)	(3.25)	(3.38)
JPM	6.04	5.85	6.20
	(3.83)	(5.64)	(5.96)
Goldman	-2.16	-3.28	2.04
	(3.05)	(4.27)	(5.42)
MS	-1.76	2.97	11.5**
	(2.43)	(2.40)	(5.41)
BAML	-6.09**	-6.02	.27
	(2.89)	(3.60)	(5.09)
Barclays	-3.21*	-.94	2.42
	(1.81)	(3.16)	(5.53)
Club	4.03	-9.02	-20.31

	(9.33)	(15.38)	(24.6)
Private	19.91	13.06	16.91
	(11.70)	(14.18)	(13.51)
Public	-6.70	-8.40	-.61
	(8.66)	(10.97)	(10.66)
Deutsche x Club	4.36	8.18	6.36
	(6.30)	(7.58)	(9.53)
Citi x Club	9.36*	11.38**	-.04
	(4.48)	(5.19)	(6.86)
CS x Club	-7.86	-6.33	-3.3
	(4.75)	(5.47)	(8.7)
JPM x Club	-3.23	.65	-7.30
	(6.01)	(6.59)	(7.33)
Goldman x Club	-3.13	-6.36	8.61
	(4.48)	(5.89)	(8.53)
MS x Club	.23	7.97	15.20
	(4.62)	(6.32)	(12.97)
BAML x Club	1.08	-.96	1.39
	(7.88)	(8.45)	(8.96)
Barclays x Club	-9.00	-8.82	3.76
	(6.09)	(5.76)	(9.69)
Ln(Size)	-3.61***	-4.83***	-6.84***
	(.46)	(.63)	(1.01)
IA-EBITDA/Assets	17.49*	11.22	-6.19
	(9.59)	(16.17)	(15.56)
IA-Q	-17.49*	-11.22	6.19
	(9.59)	(16.17)	(15.56)
AllCash	9.76***	7.57***	7.63**
	(1.02)	(2.36)	(3.17)
Mix	4.41**	3.38	.13
	(1.75)	(2.71)	(3.48)
Toehold	-12.12***	-4.65	-14.22***
	(2.41)	(4.10)	(4.15)
Tender	6.96***	5.49***	9.13***
	(1.47)	(1.83)	(1.37)
Hostile	-3.14	3.68	-3.96
	(6.38)	(8.59)	(9.13)
Prior 12-month BHAR	-2.89**	-2.98**	-3.27
	(1.08)	(1.35)	(2.30)
Beta	-.81	-2.18	-3.50
	(1.11)	(1.71)	(2.59)
Prior 12-month vol.	62.81	4.14	22.43
	(78.54)	(104.48)	(146.02)
Inst. ownership	4.54**	5.36*	4.61
	(2.09)	(2.79)	(3.16)
_cons	31.07***	42.28***	68.01***
	(6.26)	(10.48)	(13.34)
Observations	3,053	3,047	3,053
R-squared	.16	.13	.18
Industry FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes

Robust standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

Table 9 displays the regression output used to test my fifth and sixth hypothesis. In models 1, 2 and 3 I test my fifth hypothesis, namely that the club deal discount is larger for consortiums comprised of only prominent private equity firms compared to consortiums comprised of prominent and non-prominent firms. These models are similar to those used to test my first hypothesis, however, I add an indicator variable for whether a club is comprised of only prominent private equity acquirors. The variable which I add, *ProminentClub,* is equal to one when a club is comprised of only prominent private equity firms and zero otherwise. It is important to note here that the interpretation of the *Club* variable now changes: In previous models this variable is interpreted as indicating whether an acquiror is a private equity club or not. However, due to collinearity with the *ProminentClub* variable, the *Club* variable is now interpreted as indicating whether an acquiror is a club comprised of both prominent and non-prominent private equity firms.

Within these models, I would expect to find a more negative, and significant coefficient for the *ProminentClub* variable compared to the coefficient for the *NonProminentClub* variable. My results are somewhat in line with these expectations with the coefficient of *ProminentClub* being more negative than that of *NonProminentClub* in two out of three models. Across all three models and for both coefficients, however, I fail to find significance at the 10% level and can therefore not draw any reliable conclusions regarding different premia for different consortia structures. Consequently, this leads me to assert that there is no evidence that club structure influences the premia which target shareholders receive.

Models 4, 5 and 6 test my sixth and final hypothesis, that the club deal discount is larger when a foreign private equity firm is part of a consortium compared to when a consortium consists of only domestic firms. If I were to accept this hypothesis, the coefficients of the indicator variable *ForeignClub* should be negative and significant, indicating that clubs comprised of private equity firms headquartered in different countries pay lower acquisition premia for targets compared to clubs where the private equity firms are headquartered in the same country. Across all three models, however, I find positive coefficients indicating that clubs comprised of firms headquartered in the same country actually pay a larger premium for targets than clubs comprised of firms headquartered in different countries. Despite these positive coefficients, I cannot take this as evidence in favour of my sixth hypothesis as I fail to find significance at the 10% level for the *ForeignClub* coefficient in any of my models.

Table 9

Multivariate regressions on target abnormal return measures. Models 1, 2 and 3 test hypothesis 5, and models 4, 5 and 6 test hypothesis 6. The indicator variable *ProminentClub* is used in models 1, 2 and 3 and is equal to one if a club is comprised of two or more prominent private equity firms and is equal to zero otherwise. The *ForeignClub* indicator variable is used in models 4, 5 and 6 and is equal to one if a club is comprised of firms headquartered in different countries and zero otherwise. All models control for time and industry fixed effects and use robust standard errors. Standard errors are clustered by year and are heteroskedasticity-consistent. Standard errors are in brackets and ***, **, and * indicate that the coefficient estimate is significantly different from zero at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	CAR[-1, +1]	BHAR[0, +126]	BHAR[-42, +126]	CAR[-1, +1]	BHAR[0, +126]	BHAR[-42, +126]
Club	.33	-1.09	-1.09	-2.32	-3.36	.43
	(3.12)	(5.16)	(9.79)	(3.5)	(4.4)	(6.89)
ProminentClub	-3.96	-4.24	4.43			
	(5.54)	(6.57)	(11.55)			
Private	.06	-2.27	-2.41	.08	-2.25	-2.43
	(1.44)	(1.72)	(2.26)	(1.44)	(1.71)	(2.24)
Public	6.11***	5.78***	10.22***	6.13***	5.81***	10.19***
	(1.45)	(1.49)	(2.54)	(1.46)	(1.49)	(2.54)
Ln(Size)	-3.61***	-4.7***	-6.12***	-3.62***	-4.71***	-6.11***
	(.5)	(.65)	(.92)	(.5)	(.65)	(.93)
IA-EBITDA/Assets	15.27	9.07	-8.89	15.33	9.16	-9.02
	(9.93)	(16.29)	(15.6)	(9.9)	(16.3)	(15.63)
IA-Q	-15.27	-9.07	8.89	-15.33	-9.16	9.02
	(9.93)	(16.3)	(15.6)	(9.9)	(16.3)	(15.63)
AllCash	9.68***	7.6***	7.9**	9.69***	7.61***	7.88**
	(1)	(2.32)	(3.12)	(1)	(2.32)	(3.12)
Mix	4.14**	3.25	.2	4.14**	3.24	.21
	(1.73)	(2.73)	(3.43)	(1.73)	(2.73)	(3.43)
Toehold	-12.02***	-4.48	-14.21***	-11.98***	-4.42	-14.31***
	(2.3)	(4.03)	(4.13)	(2.28)	(4.04)	(4.11)
Tender	7.03***	5.53***	9.01***	7.01***	5.51***	9.05***
	(1.45)	(1.72)	(1.26)	(1.46)	(1.73)	(1.29)
Hostile	-4.34	2.99	-5.06	-4.29	3.14	-5.35
	(5.96)	(8.38)	(8.88)	(5.98)	(8.45)	(8.76)
Prior 12-month BHAR	-2.87**	-2.97**	-3.39	-2.87**	-2.97**	-3.4
	(1.08)	(1.33)	(2.3)	(1.08)	(1.33)	(2.31)
Beta	-.77	-2.21	-3.32	-.75	-2.19	-3.35
	(1.11)	(1.77)	(2.63)	(1.11)	(1.79)	(2.65)
Prior 12-month vol.	64	5.06	31.96	63.93	4.73	32.66
	(79.1)	(106.07)	(143.45)	(79.26)	(106.38)	(143.46)
Inst. ownership	4.33*	5.33*	5.29	4.35*	5.36*	5.26
	(2.14)	(2.81)	(3.16)	(2.13)	(2.79)	(3.17)
ForeignClub				2.01	.28	2.46
				(3.78)	(4.76)	(8.32)
_cons	32.04***	43.94***	63.37***	32.08***	43.95***	63.39***
	(6.95)	(10.81)	(12.32)	(6.95)	(10.76)	(12.36)
Observations	3053	3047	3053	3053	3047	3053

R-squared	.15	.12	.17	.15	.12	.17
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors are in parentheses

**** p<.01, ** p<.05, * p<.1*

6. Conclusion

As the private equity industry has grown in prominence in recent decades, so have concerns about their business practices. One of the primary concerns pertains to collusive behaviour by private equity firms when they work together to acquire a target. In this case, the acquiring firms are known as a private equity club or consortium. This behaviour became increasingly frequent in the period of 2000-2007, however, quickly faded as the practice was brought to the attention of industry regulators.

In this research, I investigate these so-called club deals and look for evidence as to whether these clubs pay a discount for targets relative to sole private equity acquirors. A similar question has been asked before by Officer et al. (2010) and Boone and Mulherin (2011). In this prior research, Officer et al. (2010) found that club private equity acquirors do systematically underpay for targets while Boone and Mulherin (2011) found no such evidence. One potential explanation for this discrepancy is sample selection whereby Boone and Mulherin (2011) include a more comprehensive sample of deals than Officer et al. (2010).

I extend this prior research in two primary ways: First, I incorporate a more recent dataset of transactions. The sample of both Officer et al. (2010) and Boone and Mulherin (2011) stops at 2007 while mine continues until mid-2019. Second, I use a more robust methodology than Officer et al. (2010) to identify private equity club deals.

With this in mind, I test my first hypothesis (target shareholders in club deals with prominent private equity acquirors receive lower premia than target shareholders in deals with a sole private equity acquiror) using regression models and matching estimators similar to Officer et al. (2010) and find little evidence in support of this hypothesis and I, therefore, do not accept it. This finding is in line with the results of Boone and Mulherin (2011).

My second hypothesis tests whether the club deal discount is more prevalent in the 2000-2005 period than in the 2006-2019 period. Again, my findings differ from those of Officer et al (2010). While Officer et al (2010) do find a structural break, I fail to find reliable evidence for this same break while using a regression analysis. I believe that my results differ here due to sample selection both in terms of time period and club identification methodology.

I also look into whether capital constraints and risk sharing may be explanatory factors for club formation. To investigate this, I use a probit regression and find that target size is a highly significant determinant of whether an acquiror of a target is a private equity club. I take this as evidence supporting my hypothesis, however I do not investigate the capital constraints hypothesis further than this. I, therefore, accept my third hypothesis.

After testing my first three hypotheses, I begin to investigate further reasons for club formation which previous research has not explored. My fourth hypothesis looks into whether potential collusive behaviour by clubs may be driven by particular buy-side financial advisors. In this scenario a particular advisor would play the role of network coordinator and a persistently low premium should then be attributable to said advisor. I test this hypothesis with a regression model and find no evidence for low abnormal returns being attributable to any advisors.

Next, I investigate whether consortium structure may be a driving factor behind target shareholders receiving lower premia in club deals than in sole-sponsored deals. I split club acquirors into two categories: clubs comprised of only prominent private equity firms and clubs comprised of prominent and non-prominent private equity firms. I expect that clubs comprised of only prominent private equity firms will pay significantly lower premia for targets than clubs comprised of prominent and non-prominent private equity firms due to market power discrepancies. I again use a regression analysis in testing this hypothesis and find insufficient evidence that consortium structure influences target abnormal returns.

Finally, I analyse consortium structure from a different perspective: I look at whether clubs where private equity firms are headquartered in different countries pay lower premia than clubs where private equity firms are headquartered in the same country. I expect that this may be the case as being headquartered in different countries is a friction which presents a cost for acquiring firms which in turn will decrease willingness to pay for a target. In analysing consortium structure from this perspective, I again find no evidence of either structure paying target shareholders significantly lower abnormal returns.

While my research does add to the existing body of literature it is, of course, not without its limitations. Most apparent perhaps is my sample. I exclude deals with a transaction value less than USD 100 million which significantly reduces my sample size and makes it less representative of the entire universe of transactions. I do this to allow my results to be compared to previous literature such as Officer et al. (2010), however, if future researchers were to include a lower minimum deal value (or no minimum deal value) then the sample would be more representative of the entire transaction universe. Additionally, with a lower minimum deal value, the sample can be analysed for further breaks in a potential club deal discount to see if this is only significant for certain deal values.

Additionally, my fourth hypothesis concerns buy-side financial advisors and whether a club deal discount may be attributable to them. It is notable, however, that in many M&A processes a target who wishes to be acquired will make the first move in the process and engage the services of a financial advisor. Because this financial advisor is now the first to know about a transaction, they are in a better position than a buy-side advisor to facilitate the creation of a club. Consequently, it is possible that any discount may be partially attributable to a sell-side advisor and not a buy-side advisor.

Furthermore, having a perfectly clean dataset with no missing values and verified data points (previous researchers have raised concerns about the accuracy of certain fields in the SDC database) may increase the accuracy of my results, however, having such a dataset would require a time-consuming analysis of SEC filings for each transaction. On a similar note, it is possible that my sample of transactions suffers from sample selection bias where private equity firms may be specifically choosing certain targets to be acquired by a club. This can be partially addressed by future researchers by employing a Heckman two-step selection procedure.

Regarding my identification of prominent private equity firms, I rely on disparate rankings of firms' capital raising activity which I subsequently merge. A more representative way of identifying transactions with prominent private equity acquirors would be to have a yearly ranking of the top capital raising firms which is then matched to the set of transactions on a year-by-year basis. Finally, it is important to realise that in this research intent is not observable. This is a concern shared by previous researchers (Officer et al., 2010) and what it practically means is that we are unable to differentiate between deliberate collusion and a reduction in competition resulting from a reduction of parties interested in a particular target.

Alongside the limitations of this paper, there is much future research which can be done on the topic of private equity club deals. Perhaps most glaringly, this paper only analyses a sample of deals which occur in the U.S., however, this is of course not the only market in the world. Expanding the sample to include Europe will allow for comparisons between the two continents. Particularly, I would be interested to see whether DOJ activity in the U.S. influences private equity behaviour in Europe. If I had included a European sample in my analysis, I would expect to see similar results as in the US due to similar regulatory environments in each region. Finally, I do not research whether club deals result in increased or decreased long-run social welfare while this is undoubtedly an aspect of interest for regulators.

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7. Appendix

Table A1
Prominent private equity acquirors. This table includes all (81) prominent private equity acquirors defined as firms in the 2007 PEI Top 50 ranking, the 2020 PEI Top 300 ranking (top 50), the top 50 firms in the Preqin database on capital raising as of December 2020 and historically significant firms which may not be included in these rankings. Rank is determined by the total number of deals a firm is involved in. Sole PE deals and club PE deals are defined in the data section.

Rank	Private Equity Firm	Headquarters	All deals	Sole PE Deals	Club Deals
1	Blackstone	US	32	18	14
2	TPG Capital	US	26	9	17
3	Apollo Global Management	US	25	19	6
4	The Carlyle Group	US	17	8	9
5	Brookfield Asset Management	Canada	15	13	2
6	KKR	US	15	6	9
7	Thoma Bravo	US	15	13	2
8	Vista Equity Partners	US	12	12	0
9	Hellman & Friedman	US	11	7	4
10	Providence Equity Partners	US	11	4	7
11	Silver Lake Partners	US	11	4	7
12	Madison Dearborn Partners	US	8	5	3
13	Fortress Investment Group	US	7	6	1
14	Leonard Green & Partners	US	7	5	2
15	Permira Advisers	UK	7	3	4
16	Thomas H. Lee Partners	US	7	2	5
17	Welsh, Carson, Anderson & Stowe	US	7	5	2
18	Apax Partners	UK	6	6	0
19	GTCR	US	6	5	1
20	Morgan Stanley	US	6	4	2
21	Warburg Pincus	US	6	4	2
22	Bain Capital	US	5	5	0
23	Cerberus Capital Management	US	5	4	1
24	EQT Partners	Sweden	5	4	1
25	Veritas Capital	US	5	4	1
26	BDT Capital Partners	US	4	4	0
27	Clayton, Dubilier & Rice	US	4	4	0
28	Francisco Partners	US	4	2	2
29	L Catterton	US	4	3	1
30	Lehman Brothers Private Equity	US	4	2	2
31	Onex Corporation	Canada	4	3	1
32	Platinum Equity	US	4	4	0
33	Ares Management	US	3	3	0
34	CVC Capital Partners	UK	3	1	2
35	Genstar Capital	US	3	3	0
36	H.I.G. Capital	US	3	3	0
37	JP Morgan	US	3	1	2
38	Merrill Lynch	US	3	0	3
39	New Mountain Capital	US	3	3	0
40	Riverstone Holdings	US	3	1	2
41	Advent International	US	2	1	1
42	Berkshire Partners	US	2	1	1
43	Centerbridge Partners	US	2	2	0
44	Roark Capital Group	US	2	2	0
45	Sun Capital	US	2	1	1

46	American Securities	US	1	0	1
47	Baring Private Equity Asia	Hong Kong	1	0	1
48	BC Partners	UK	1	0	1
49	EnCap Investments	US	1	0	1
50	Goldman Sachs	US	1	1	0
51	Hillhouse Capital Group	China	1	0	1
52	MBK Partners	South Korea	1	0	1
53	Pacific Equity Partners	Australia	1	1	0
54	PAG	Hong Kong	1	0	1
55	AEA Investors	US	0	0	0
56	Ardian	France	0	0	0
57	Blackrock	US	0	0	0
58	Bridgepoint Advisers	UK	0	0	0
59	Chase Capital	US	0	0	0
60	Cinven	UK	0	0	0
61	Clearlake	US	0	0	0
62	Eurazeo	France	0	0	0
63	Forstmann Little	US	0	0	0
64	FSB	US	0	0	0
65	General Atlantic	US	0	0	0
66	Hg	UK	0	0	0
67	Hicks	US	0	0	0
68	HM Capital	US	0	0	0
69	Insight Partners	US	0	0	0
70	KPS	US	0	0	0
71	NB Private Equity Partners	Guernsey	0	0	0
72	Neuberger Berman	US	0	0	0
73	NGP Energy Capital	US	0	0	0
74	Nordic Capital	Jersey	0	0	0
75	PAI	France	0	0	0
76	Partners Group	Switzerland	0	0	0
77	Quantum Energy	US	0	0	0
78	RRJ Capital	Hong Kong	0	0	0
79	Stone Point Capital	US	0	0	0
80	TA Associates	US	0	0	0
81	Triton Partners	Jersey	0	0	0

Figure A1

Density plot of all BHAR measures as well as the normal density plot. This chart provides a visual representation of the distribution of buy-and-hold abnormal return measures alongside the normal distribution (bold dashed line).

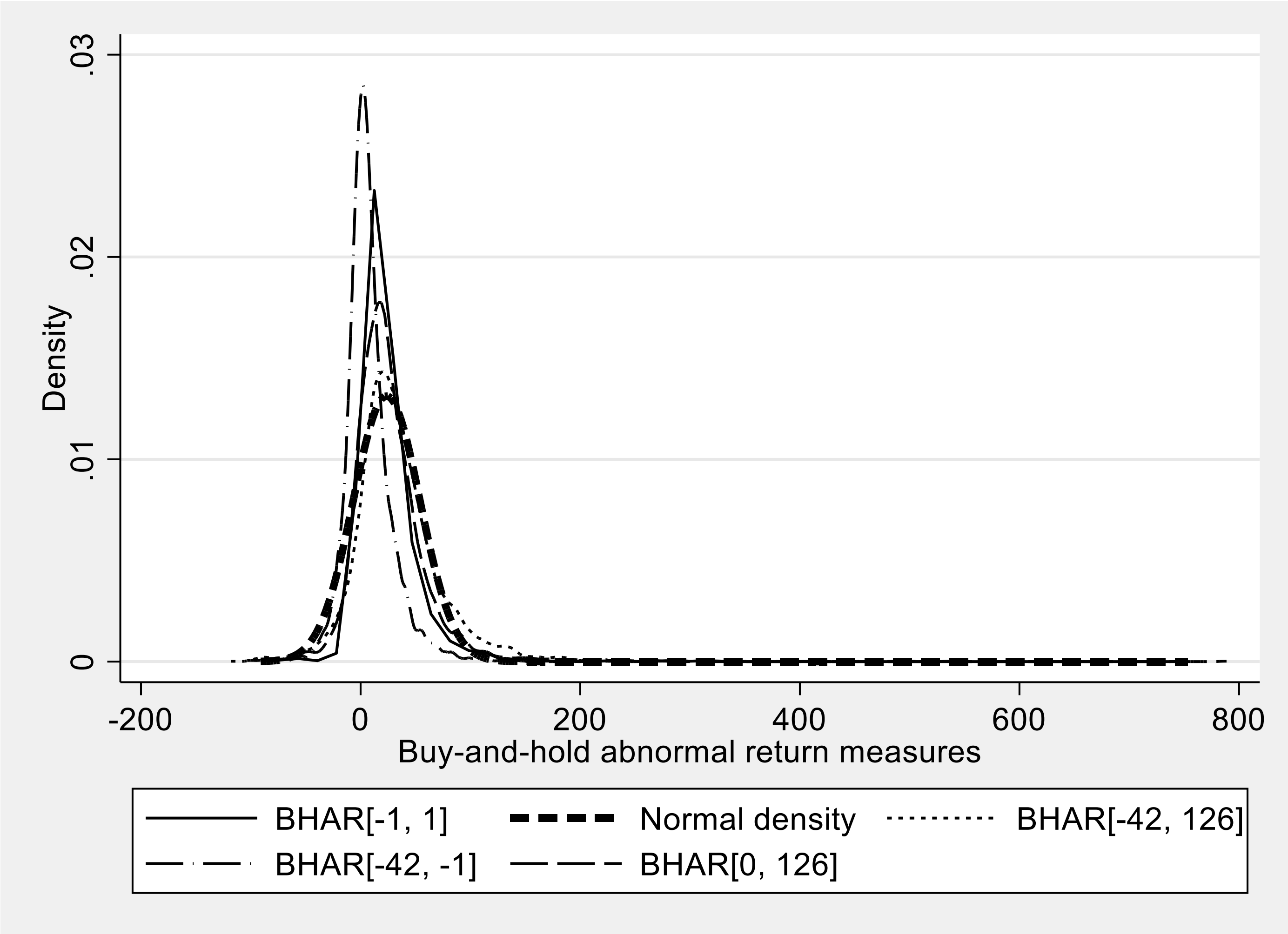

Table A2

Shapiro-Wilk tests for normality on buy-and-hold abnormal return measures. Each BHAR measure is calculated as compounded excess returns to a security minus compounded excess returns to a benchmark, in this case the CRSP value-weighted index.

	z	Prob>z
BHAR[-1, +1]	16.44	0.00
BHAR[-42, -1]	14.69	0.00
BHAR[0, +126]	15.88	0.00
BHAR[-42, +126]	14.519	0.00

Table A3

Multivariate regressions on target abnormal return measures. Here, models 1,2 and 3 test hypothesis 4. CARs and BHARs are defined in Table 2. Indicator variables for the most frequent financial advisors are used in these models, alongside control variables and the regressors of interest (acquiror type). All models control for time and industry fixed effects and use robust standard errors. Standard errors are clustered by year and are heteroskedasticity-consistent. Standard errors are in brackets and ***, **, and * indicate that the coefficient estimate is significantly different from zero at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
	CAR[-1, +1]	BHAR[0, +126]	BHAR[-42, +126]
Deutsche	7.95***	8.08**	5.37
	(2.23)	(3.04)	(3.30)
Citi	5.46**	9.74***	6.85
	(1.99)	(2.40)	(5.01)
CS	-2.94	-4.86	-2.48
	(3.07)	(3.25)	(3.38)
JPM	6.04	5.85	6.20
	(3.83)	(5.64)	(5.96)
Goldman	-2.16	-3.28	2.04
	(3.05)	(4.27)	(5.42)
MS	-1.76	2.97	11.5**
	(2.43)	(2.40)	(5.41)
BAML	-6.09**	-6.02	.27
	(2.89)	(3.60)	(5.09)
Barclays	-3.21*	-.94	2.42
	(1.81)	(3.16)	(5.53)
Club	4.03	-9.02	-20.31
	(9.33)	(15.38)	(24.6)
Private	19.91	13.06	16.91
	(11.70)	(14.18)	(13.51)
Public	-6.70	-8.40	-.61
	(8.66)	(10.97)	(10.66)
Deutsche x Club	4.36	8.18	6.36
	(6.30)	(7.58)	(9.53)
Citi x Club	9.36*	11.38**	-.04
	(4.48)	(5.19)	(6.86)
CS x Club	-7.86	-6.33	-3.3
	(4.75)	(5.47)	(8.7)
JPM x Club	-3.23	.65	-7.30
	(6.01)	(6.59)	(7.33)
Goldman x Club	-3.13	-6.36	8.61
	(4.48)	(5.89)	(8.53)
MS x Club	.23	7.97	15.20
	(4.62)	(6.32)	(12.97)
BAML x Club	1.08	-.96	1.39
	(7.88)	(8.45)	(8.96)
Barclays x Club	-9.00	-8.82	3.76
	(6.09)	(5.76)	(9.69)
Deutsche x Private	3.95	3.12	4.32
	(4.34)	(4.8)	(4.95)
Citi x Private	2.20	7.84	-4.19
	(3.90)	(5.49)	(7.77)
CS x Private	-5.32	-2.11	-5.16
	(3.75)	(4.89)	(5.61)
JPM x Private	9.23*	6.80	-1.77
	(4.69)	(6.95)	(7.12)
Goldman x Private	-9.16**	-11.36**	-8.81
	(3.75)	(5.13)	(6.00)
MS x Private	-8.11	-3.40	5.10
	(4.75)	(5.50)	(5.91)
BAML x Private	-8.25*	-9.17	-2.15

	(4.69)	(5.65)	(5.46)
Barclays x Private	-5.80	-7.61	-6.34
	(4.11)	(5.97)	(9.32)
Deutsche x Public	9.06***	5.71	1.59
	(2.80)	(4.00)	(4.64)
Citi x Public	6.72**	12.76***	6.10
	(2.64)	(3.36)	(5.45)
CS x Public	-4.06	-5.66	-11.07*
	(3.63)	(4.16)	(5.32)
JPM x Public	8.18*	5.51	7.00
	(4.22)	(5.90)	(5.88)
Goldman x Public	-1.08	-2.08	-.30
	(3.16)	(4.13)	(5.55)
MS x Public	-1.77	3.26	9.83
	(3.35)	(3.73)	(5.78)
BAML x Public	-4.75	-4.75	-1.72
	(2.87)	(3.53)	(4.81)
Barclays x Public	1.69	1.26	2.04
	(2.82)	(4.25)	(6.70)
Ln(Size)	-3.61***	-4.83***	-6.84***
	(.46)	(.63)	(1.01)
IA-EBITDA/Assets	17.49*	11.22	-6.19
	(9.59)	(16.17)	(15.56)
IA-Q	-17.49*	-11.22	6.19
	(9.59)	(16.17)	(15.56)
AllCash	9.76***	7.57***	7.63**
	(1.02)	(2.36)	(3.17)
Mix	4.41**	3.38	.13
	(1.75)	(2.71)	(3.48)
Toehold	-12.12***	-4.65	-14.22***
	(2.41)	(4.10)	(4.15)
Tender	6.96***	5.49***	9.13***
	(1.47)	(1.83)	(1.37)
Hostile	-3.14	3.68	-3.96
	(6.38)	(8.59)	(9.13)
Prior 12-month BHAR	-2.89**	-2.98**	-3.27
	(1.08)	(1.35)	(2.30)
Beta	-.81	-2.18	-3.50
	(1.11)	(1.71)	(2.59)
Prior 12-month vol.	62.81	4.14	22.43
	(78.54)	(104.48)	(146.02)
Inst. ownership	4.54**	5.36*	4.61
	(2.09)	(2.79)	(3.16)
_cons	31.07***	42.28***	68.01***
	(6.26)	(10.48)	(13.34)
Observations	3,053	3,047	3,053
R-squared	.16	.13	.18
Industry FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes

Robust standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*