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Private equity alliances in mergers ☆

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ABSTRACT

This paper examines reasons for alliance formation between private equity bidders when compared to sole-sponsored private equity deals. Testing a comprehensive set of hypotheses, we find strong evidence for the relative-risk hypothesis of Robinson (2008), as private bidders are more likely to form an alliance in a diversifying acquisition. We also find that private equity alliances involved more profitable target firms when compared to sole-sponsored private equity deals. Finally, we find that the significantly lower abnormal returns for target firms in private equity alliance deals are eliminated once we control for differences in the types of target firms acquired by private equity alliances and single private equity bidders. The last result suggests that private equity alliances do not generate significantly lower target returns because of collusion.

1. Introduction

In the last decade, private equity firms' activity has increased substantially with capital commitments to U.S. private equity funds reaching 1.57% of market capitalization or over $200 billion in 2007 (see Kaplan and Stromberg, 2008). In a seminal paper, Jensen (1989) argues that the publicly held corporation has been eclipsed by a relatively new organizational structure wherein equity is privately held, better corporate governance is practiced as management has a significant stake to align their interests with its owners, and firms have a much higher leverage ratio to restrict managerial interests from spending free cash flow.

One area of corporate governance practiced by private equity bidders that has come under increasing scrutiny is when two or more private equity bidders form an alliance or club[2] to jointly takeover a target firm. The Department of Justice has raised concerns about private equity firms submitting low bids in a club deal when taking over a public firm (Berman and Sender, 2006). Private litigation has also alleged collusive practices between private equity firms in rigging deal prices for target firms while disclosing revealing emails between private equity executives (Erman and Hals, 2012). One email exchange is revealing according to the complaint. Blackstone Group president Tony James to KKR co-founder George Roberts: "We would very much rather work with you guys than against you. Together we can be unstoppable, but in opposition we can cost each other a lot of money." Roberts in reply: "Agreed."

Accordingly, this paper makes the following contributions. First, we examine the economic reasons for why private equity bidders form alliances in some deals, and not in other deals. In doing so, we examine a comprehensive set of hypotheses[3] posited in the extant literature for alliance formation. Second, while controlling for target firm characteristics, we examine whether target firm shareholders of private equity firms who form an alliance between themselves earn lower, higher, or similar announcement

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[2] In this paper we use alliances and clubs interchangeably.
[3] See Section 2 for a more detailed explanation.

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returns when compared to target firm shareholders of private equity firms who do not form an alliance. We control for target firm characteristics, because Bargeron et al. (2008) find that the target firms of private acquirers have significantly different characteristics than the target firms of public firms, and that such private acquirers pay less than comparable public firms.[4]

We find the following results. First, we find that the incidence of alliances in private equity (12.92%) is much larger than the incidence of alliances in public firms (0.69%). The latter result does not allow us to examine motives for alliance formation in the public bidder sample. Second, in the case of the private equity sample, we find strong support for the relative risk-reduction hypothesis of Robinson (2008) in that private equity alliances are diversifying acquisitions. We also find that private equity alliances are likely to involve more profitable target firms (at the 10% significance level), a result against the lemons hypothesis. Third, we find that the abnormal returns earned by private equity firms in alliances are significantly lower when compared to their sole-sponsored private equity deals. No such effect is found for public bidders. However, the lower abnormal returns earned by targets in private equity alliances disappear when one controls for the differences in target characteristics (using a propensity score methodology). A similar result is found when one uses interaction terms between private equity, alliance formation, and target firm characteristics. This suggests that private equity alliances do not earn significantly lower target returns once one controls for the differences in target characteristics between private equity alliances and single private equity bidders.[5]

The above results suggest that private equity firms do not indulge in bad corporate governance by paying a low price for target firms in a collusive organization form called an alliance or club. Instead, when compared to sole-sponsored deals, private equity alliances are formed to diversify their risk and to some extent (at the 10% level of significance) acquire more profitable firms.

The prior academic evidence shows mixed results. Officer et al. (2010) find that alliances between private equity firms earned lower announcement returns than sole-sponsored private equity deals. Boone and Mulherin (2011) find no significant differences when one controls for the firm's endogenous selection of forming an alliance. But these studies assume that the types of target firms chosen by private equity firms and public bidders are the same. We do not make such an assumption.[6]

In Section 2, we present the various hypotheses that have been posited in the existing literature for alliance formation. Section 3 describes our data and sources and Section 4 presents our tests and results. In Section 5, we conclude.

2. Determinants of strategic alliances between firms

The extant theoretical and empirical literatures on strategic alliances have suggested possible motives for alliance formation. We describe below these hypotheses and their corresponding proxy variables used (see Table 1 for a summary).

2.1. Absolute-risk reduction hypothesis

The strategic management literature often advocates risk reduction as a motive for alliance formation in that firms are reluctant to finance high-risk projects internally.[7] Under the assumption of perfect capital markets, the financial economic literature would suggest that firm-level risk reduction activities are not optimal for diversified shareholders as they can diversify their own portfolios. Under different market frictions risk reduction can be valuable to shareholders. Several authors provide different characterizations of the frictions that may lead firms to hedge. First, firms might want to reduce their risk because of a convex statutory tax function (see Graham and Smith, 1999; Smith and Stulz, 1985). Second, firms might indulge in risk reduction in order to minimize their expected bankruptcy costs (see Adam et al., 2007; Bessembinder, 1991; Mayers and Smith, 1990; Smith and Stulz, 1985).

The absolute-risk reduction hypothesis stipulates a positive relation between target firm's risk and alliance formation between bidders. We use four proxies for the target firm's risk, with first two being general proxies of firm risk and the latter two being specific to taxes and bankruptcy costs. The first proxy is the firm's standard deviation of stock returns (*std_ret*) calculated from 273 days before the announcement date to 20 days before the announcement date. The second proxy variable is the target firm's leverage ratio (*dratio*), defined as the ratio of total debt to assets in the fiscal year preceding the announcement date. The third proxy is the marginal tax rate (*trate*) of firms, defined as the present value of current and expected future taxes paid on an additional dollar of income earned today (see Graham, 1996). The fourth proxy is Altman's Z-score (*zscore*), defined as a firm's probability of bankruptcy.[8] If absolute-risk reduction is a possible explanation for alliance formation between bidders, we would expect a positive relationship between *std_ret*, *dratio*, *trate*, and *zscore* and the probability of forming an alliance.

[4] We also confirm this result in our sample.

[5] These results of zero abnormal returns are also consistent with those of Boone and Mulherin (2011) but for two slightly different reasons. They attribute it to the endogenous choice of forming an alliance, where as we attribute to different target characteristics.

[6] Kaplan (1989), Smith (1990), Lichtenberg and Siegel (1990) and Acharya, et. al (2013) find significant improvements in the firm's operating performance and innovation when the acquirer is a private equity firm, whereas Leslie and Oyer (2008) and Guo et al. (2011) no significant improvements.

[7] See, for example, Mody (1993), Nanda and Williamson (1995), and Folta (1998). Under this hypothesis, alliances may be viewed as a real option. Companies may be interested in acquiring an activity, but do not want to commit fully until additional information becomes available. This option becomes more valuable as the risk of the environment increases.

[8] Specifically, z-score = (0.012 × (total current assets − total current liabilities) / total assets) + (0.014 × retained earning / total assets) + (0.033 × EBIT / total assets) + (0.006 × market value of equity / (total long-term debt + debt in current liabilities)) + (0.999 × sales / total assets). To control for extreme values we winsorize z-score at the 99% level.

Table 1
Description of variables and sources.

Variable	Description (source)
alliance	If the acquirer is an alliance between two or more bidders, it is set to unity, and zero otherwise. (SDC)
CAR[−1, +1]	Three-day cumulative abnormal return around the announcement date. Abnormal returns (AR) are calculated from market model $R_i = a + \beta R_M + \varepsilon_i$ with an estimation window of [−379, −127]. (CRSP)
retvol	Standard deviation of returns calculated from 273 days before the announcement date to 20 days before the announcement date. (CRSP)
dratio	Total debt / (total debt + market value of equity). Total debt = total long-term debt (DLTT) + total debt in current liability (DLC). (Compustat)
trate	Simulated marginal tax rate as in Graham (1996). (Compustat)
zscore	Altman's Z-score, probability of bankruptcy. (Compustat)
focused	Set to unity if the 2-digit SIC of acquirer and target is same, and zero otherwise. (SDC)
logmve	*Ln* (market value of equity (MVE), where MVE = CSHO × PRCC_F, in million dollars. (Compustat)
HHI	Herfindahl Index, $\sum_i (AT_i / \sum_j AT_j^2)$ for each 2-digit SIC group. (Compustat)
Nbidders	Number of bidders in the deal. (SDC)
cashonly	Set to unity for cash-only offers, and zero otherwise. (SDC)
rnd_ta	Research and development expense (XRD)/total assets (AT). (Compustat)
roa	Earnings before interest and tax (EBIT)/total assets (AT). (Compustat)
mbo	Set to unity if management of the target firm is involved in the deal, and zero otherwise. (SDC)
lbo	Set to unity if the deal is a leveraged buyout, and zero otherwise. (SDC)
price_revision	Percentage change from initial offer price to final price, where initial price is the price on the deal announcement day, and final price is the price on the deal completion day. (SDC)

2.2. Relative-risk reduction hypothesis

Robinson (2008) suggests that an alliance may be formed to overcome incentive problem arising within organizations. In his model, headquarters can only allocate scarce capital to a division only after learning about its profitability (ex-post winner picking). Such an action can be offset by division-level managers choosing a lower level of effort (ex-ante incentive), as managers know that headquarters might renege on its commitment. The ex-post winner picking is noncontractible because courts cannot address conflicts between the firm and itself. In an alliance, Robinson (2008) suggests that the scarce capital can be transferred from one partner's headquarters to the other partner's division manager. If the scarce capital is not transferred, the alliance partner can be sued for breach of contract as they are both distinct firms. Given this possibility, division managers do not choose a lower level of effort, resulting in efficiency gains from ex-post winner picking. Here, the optimal organizational structure is a function of the risk differential between projects available to the firm. Evidence in support of these hypotheses has been found in Robinson (2008) and Palia et al. (2008).

Relative rather than absolute project risk would be an important factor in explaining alliance formation under this hypothesis. For example, a risky internet venture might form alliances for all its projects under the risk reduction hypothesis, but the internal capital market hypothesis suggests that the least risky endeavors will be financed internally. We create a dummy variable that is set to unity when the bidder firms and the target firm share a 2-digit SIC code (*focused*). If relative-risk reduction is a possible explanation for alliance formation between bidders, we would expect a negative relationship between *focused* and the probability of forming an alliance.

2.3. Resource pooling hypothesis

Bidders may decide to combine resources because they cannot undertake large-scale investment projects on their own due to various frictions (see Cho et al., 2002; Esty, 2003, 2004; Hendricks and Porter, 1992). Under this hypothesis, the larger an acquisition project, the more likely it is to be developed through an alliance. We use the size of the target firm (*logmve*) defined as the natural logarithm of the market value of the target firm at the end of the year before the merger announcement date. We expect a positive relationship between *logmve* and the probability of forming an alliance.

2.4. Collusion hypothesis

There are two possible types of collusion that have been posited in the existing literature. The first involves possible collusion between bidder and target firms, which for ease of reference we term the bidder–target collusion hypothesis. For example, Chen and Ross (2000) argue that strategic alliances involving the sharing of production capacity may be seen as a form of collusion. If a bidder firm colludes by forming an alliance to underpay the target firm, we would expect underpayment to be more severe when the industry is more concentrated. In order to test this, we calculate the Herfindahl Index (*HHI*) of the target firm, defined as below.

$$HHI = \sum_i \left(AT_i / \sum_j AT_j^2 \right)$$

where AT_i is total assets of firm i, and *HHI* is obtained for each 2-digit SIC group. When we analyze the sub-samples of private (public) bidders in each year, *HHI* of the target firm is calculated by including private (public) bidders only.

The second type of potential collusion is between bidder firms only, which for ease of reference we term the bidder collusion hypothesis. On the one hand, if the number of potential bidders is taken as fixed and exogenous, forming an alliance can be anti-competitive as it reduces the number of potential bidders (Graham and Marshall, 1989; McAfee and McMillan, 1992; Stigler, 1964). On the other hand, if the number of potential bidders is not fixed, forming an alliance can be pro-competitive if it allows targets to get some of the benefits from information pooling and synergies of the alliance partners (DeBrock and Smith, 1983; Marquez and Singh, 2013). We use the number of bidders in a deal (*Nbidders*) as our proxy for the level of bidder collusion.

Under the bidder–target collusion hypothesis, we would expect a positive relationship between *HHI* and the probability of forming an alliance. Under the bidder collusion hypothesis, if we find *Nbidders* to be negatively (positively) related to the target firm's abnormal returns we would have found evidence for the anti-competitive (pro-competitive) effect of bidders forming alliances with each other.

2.5. Specialization hypothesis

Aghion and Tirole (1994, proposition 2) suggest that partners should split property rights according to the partners' comparative advantages in creating value. This idea has been extensively developed in the strategic management literature, wherein firms form alliances to facilitate inter-firm learning, to formulate and coordinate technical standards, and to gain access to another firm's capabilities (Cohen and Levinthal, 1990; Hamel, 1991; Hamel et al., 1989; Kogut, 1988; Mowery et al., 1996). Khanna and Tice (2001) and Guedj and Scharfstein (2004) find evidence against the specialization hypothesis.

This hypothesis predicts synergies between alliance partners and the target firm. If strategic alliance partners expect synergies from gains to specialization, such deals would involve cash offers as the medium of exchange (for example, Berkovitch and Narayanan, 1990; Hansen, 1987). We define a dummy variable *cashonly* which is set to unity if the deal involved a cash offer only, and set to zero otherwise. For the specialization hypothesis to hold, we would expect a positive relationship between *cashonly* and the probability of forming an alliance.

2.6. Asymmetric information hypothesis

Lerner (1994) suggests that syndication in venture capital leads to superior selection of investments as the project requires the approval of two or more venture capital investors to use superior asymmetric information. Accordingly, in target firms with large number of intangibles such as R&D, one might expect the asymmetric information to be more beneficial. We define the variable *rndratio* which is the ratio of the target firm's R&D expenditure to total assets. For the asymmetric information hypothesis to hold, we would expect a positive relationship between *rndratio* and the probability of forming an alliance.

2.7. Lemons hypothesis

In the biotechnology industry, Pisano (1997) finds that many more partnered or collaborative projects are terminated than internally developed projects. This result is interpreted as support for Akerlof's lemons theory. In our case, as one possible alliance partner learns about the poor quality of the target firm, she will try to co-finance with another possible alliance partner. We cannot observe the actual contractual timing of each alliance deal, so as to determine who initiated the alliance and when. Therefore we test this hypothesis using target firm profitability data. The lemons hypothesis would predict that less profitable firms would be taken over in strategic alliances. To capture the profitability of the target firms, we use the variable *roa* defined as the annual return on assets (Compustat data items EBIT divided by AT) in the year before the merger announcement date. If the lemons hypothesis is to be confirmed, we would expect a negative relationship between *roa* and the probability of forming an alliance.

3. Data sources and description

We begin creating our sample of target firms by examining Thomson Securities Data Co.'s (SDC) Domestic Merger Database from January 1980 through December 2009. We follow Bargeron et al. (2008) methodology in creating our sample. We only examine completed deals between U.S. acquirers and U.S. targets in which the acquirers own 50% of the target firm after the deal. We also exclude all transactions without disclosed value of the deal, when the target firm is a bank (SIC code $= 60, 61$) and which are labeled by SDC as either recapitalization, spin-offs, self-tenders, exchange offers, repurchases, acquisitions of remaining interest, or minority stake purchases. Consistent with their paper we also exclude firms that cannot be matched to CRSP and where the medium of exchange was solely for stock.

SDC does not provide *gvkey*. Therefore CUSIPs of target companies are used to match Compustat/CRSP items with SDC Database. If any one of the variables in the regression specification is missing, the observation is excluded. This resulted in a sample of 5287 observations. Note that there is only one completed deal per merger case. We used SDC's deal synopsis and acquirers' business description in order to classify whether the bidders formed an alliance or not. As in Bargeron et al. (2008), we use the SDC's public status of acquirers to classify whether the bidders are a private or public company.

Table 2
Descriptive Statistics. We collect our sample from the Securities Data Company's (SDC) U.S. Merger and Acquisition Database. To be included in our sample, it should be a completed deal in which the acquirer owns at least 50% of the shares of the target after the deal. We exclude deals without disclosed deal value, spinoffs, recaps, self-tenders, repurchases, and minority stake purchases. If the bidder is a group of individuals or creditors, or if one or more of the bidders is a private operating company, the deal is excluded. CUSIP is used to match Compustat/CRSP items with SDC Database. If any one of the variables in the regression specification is missing, the observation is excluded.

Variable	Mean	Median	Standard deviation
alliance	0.018	0.000	0.135
CAR[−1, +1]	0.222	0.173	0.277
retvol	0.038	0.032	0.023
dratio	0.217	0.160	0.231
trate	0.330	0.350	0.059
zscore	4.508	3.406	19.725
focused	0.564	1.000	0.496
logmve	4.973	4.842	1.761
HHI	0.059	0.041	0.060
Nbidders	1.073	1.000	0.306
cashonly	0.478	0.000	0.500
rnd_ta	0.050	0.000	0.136
roa	0.056	0.087	0.234
mbo	0.019	0.000	0.136
lbo	0.057	0.000	0.231
price_revision	0.639	0.000	7.953

We find 29 alliances between public bidders and 68 alliances between private equity bidders. There are 4732 sole-sponsored public bidders, and 458 sole-sponsored private equity bidders. This translates into private equity alliances being a much higher percentage of all private equity acquisitions (12.92%) than public firm alliances as a percentage of all public firm acquisitions (0.69%).

In Table 2 we present the descriptive statistics for our sample. We find that the target firms earn an average three-day cumulative abnormal returns (*CAR[−1, +1]*) of 22.2% and a median value of 17.3%. The average (median) size of the target firm is $690.2 million ($118.9 million), and 60.9% of our sample involved cash offers only. The average amount of assets spent on R&D is 5% and the median debt ratio is 16%. The average target firm in our sample had a return on assets of 5.6%, with a corresponding standard deviation of 8.7%. There are approximately the same numbers of deals that involve focused acquisitions as there are diversifying acquisitions, and we have only 5.7% of our target firms involving a leverage buyout. This suggests that looking at club deals that only involve LBOs is quite restrictive. The median number of bidders was one.

In order to check whether there is collinearity between our independent variables, we present the correlation matrix between these variables in Table 3a, 3b. In Table 3a, we present the correlations for our entire sample, and in Table 3b, we present the correlations for the private equity sample. We find no correlation above 0.52 with most variables having significantly lower correlations. To ensure that our regressions do not suffer from multicollinearity we also calculated their condition numbers. We find all our regression specifications to have substantially less than the 30 threshold determined by Belsley et al. (1980).

Table 3a
Correlation matrix for full sample.

	retvol	*dratio*	*trate*	*zscore*	*focused*	*logmve*	*HHI*	*Nbidders*	*cashonly*	*rnd_ta*	*roa*	*hostile*	*lbo*	*price_revision*
retvol	1.00													
dratio	0.00	1.00												
trate	−0.34	−0.01	1.00											
zscore	0.02	−0.03	0.00	1.00										
focused	−0.05	−0.05	−0.01	0.01	1.00									
logmve	−0.42	0.06	0.13	0.05	0.07	1.00								
HHI	0.02	0.12	0.04	−0.01	−0.22	−0.07	1.00							
Nbidders	−0.04	0.03	0.02	0.00	−0.01	0.03	0.02	1.00						
cashonly	−0.02	0.03	0.03	−0.01	−0.25	−0.10	0.11	0.08	1.00					
rnd_ta	0.30	−0.13	−0.32	0.01	0.03	−0.11	−0.10	−0.01	0.01	1.00				
roa	−0.36	0.09	0.43	0.00	−0.08	0.21	0.11	0.02	0.07	−0.67	1.00			
mbo	−0.02	0.04	0.03	0.00	−0.14	−0.04	0.05	0.02	0.12	−0.04	0.05	1.00		
lbo	−0.06	0.05	0.05	0.00	−0.27	0.02	0.09	0.04	0.23	−0.05	0.08	0.53	1.00	
price_revision	−0.04	0.00	0.00	0.00	−0.01	0.03	0.00	0.09	0.06	0.01	0.01	0.02	0.00	1.00

Table 3b
Correlation matrix for private equity bidders only.

	retvol	*dratio*	*trate*	*zscore*	*focused*	*logmve*	*HHI*	*Nbidders*	*cashonly*	*rnd_ta*	*roa*	*hostile*	*lbo*	*price_revision*
retvol	1.00													
dratio	0.07	1.00												
trate	−0.36	0.02	1.00											
zscore	−0.01	−0.06	0.01	1.00										
focused	−0.09	−0.03	0.05	−0.01	1.00									
logmve	−0.51	0.02	0.16	0.01	0.04	1.00								
HHI	0.02	0.13	0.03	−0.03	−0.07	−0.04	1.00							
Nbidders	−0.06	−0.02	−0.01	−0.01	0.02	0.04	−0.03	1.00						
cashonly	0.00	−0.06	0.01	0.01	−0.05	−0.09	−0.03	0.01	1.00					
rnd_ta	0.27	−0.19	−0.30	0.08	0.00	−0.07	−0.16	0.01	0.06	1.00				
roa	−0.41	0.08	0.38	0.04	−0.01	0.20	0.11	0.02	−0.03	−0.67	1.00			
mbo	−0.04	0.00	0.03	−0.01	−0.03	0.02	0.04	0.07	−0.03	−0.01	0.02	1.00		
lbo	−0.20	−0.02	0.11	−0.05	−0.17	0.30	0.04	0.02	0.00	−0.10	0.20	−0.07	1.00	
price_revision	0.05	−0.02	−0.07	−0.01	0.07	−0.03	−0.08	0.19	0.01	0.06	−0.03	0.35	−0.08	1.00

4. Tests and results

4.1. Are targets in private equity acquisitions different from targets in public firm acquisitions?

We are trying to isolate the effect of club formation in private equity acquisitions. But what if the targets in private equity acquisitions are different from targets in public firm acquisitions? Then we would incorrectly picking up the target characteristic and attributing it to the club effect (see Bargeron et al., 2008). These authors find that the target firms of private acquirers have significantly different characteristics than the target firms of public firms. We test this in our sample of single-sponsored acquisitions so as to not pick up any effect of alliances. We estimate a probit regression where the dependent variable is set to unity for private equity bidders, and zero otherwise; and regress this dependent variable on a set of firm and deal characteristics. The regression results are given in Table 4. All standard errors are corrected for heteroskedasticity and for clustering at the bidder firm (CUSIP) level. We also include year dummies to account for any macroeconomic trends, the results of which are not reported.

We find that private equity targets have a greater leverage ratio, higher probability of bankruptcy, more likely to be a diversifying and cash acquisition, involve target firms who are smaller, less profitable, and have lower R&D expenses than the deals involving public firm acquisitions. Private equity deals are also more likely to be LBOs. These results are strongly consistent with those of (Bargeron et al., 2008) and suggest that we should separately control for target and deal characteristics when we analyze the choice of alliance formation.

4.2. Determinants of alliance formation

We now run a probit regression where the dependent variable is set to unity for bidders that have formed an alliance, and zero otherwise for the private equity firm sample only. Given there are so few public firm alliances we do not analyze the reasons for forming an alliance in this sample.[9] Table 5 presents the marginal effects and associated t-statistics for the private equity sample only. Given that we only have 68 alliances in the sample of 526 private equity bidders, we allow for a much lower confidence level for statistical significance (10%). We find that all private-equity alliances are diversifying in that they are between firms that do not share a 2-digit SIC code.[10] We also find a negative relationship between the target firm's return-on-assets and the probability of forming an alliance, a result against the lemons hypothesis. Therefore we find evidence for the relative risk reduction hypothesis of Robinson (2008), wherein private equity firms form clubs to diversify their risks. We also find that private equity alliances are likely to involve more profitable target firms, a result against the lemons hypothesis. No evidence is found for the absolute-risk reduction, resource pooling, collusion, and specialization hypotheses. In summary, the results of Table 5 suggest that private equity alliances are for more profitable target firms and for diversifying acquisitions. These results are consistent with the relative-risk hypothesis and against the absolute-risk reduction, resource pooling, collusion, specialization and lemons hypotheses.

4.3. Do alliances create value for target firms?

In Table 6, we begin by calculating cumulative abnormal returns around the event date, defined as the merger announcement date in the SDC Database. For approximately 1000 of these deals we confirmed that SDC's event date is the same as Factiva's event date. For a few deals, SDC has event dates and Factiva does not. In the deals where both sources have the date, they are the same date, allowing us to use SDC's announcement date as our event date. We calculate the three-day cumulative abnormal return (*CAR*

[9] We find that no deal or firm characteristic can help explain alliance formation in public firms. This is because of the small number of transactions that involve alliances when compared to sole-sponsored transactions.
[10] We find similar results when we use three-digit SIC codes for classification.

Table 4
Comparison of sole-sponsored private equity bidders and sole-sponsored public bidders. Dependent variable of the probit model is a dummy variable which is set to one for private equity bidders and zero for single public bidders. Sample is from the Securities Data Company's (SDC) U.S. Merger and Acquisition Database. To be included in our sample, it should be a completed deal in which the acquirer owns at least 50% of the shares of the target after the deal. We exclude deals without disclosed deal value, spinoffs, recaps, self tenders, repurchases, and minority stake purchases. If the bidder is a group of individuals or creditors, or if one or more of the bidders is a private operating company, the deal is excluded. CUSIP is used to match Compustat/CRSP items with SDC Database. Standard errors are corrected for heteroskedasticity and for clustering at the bidder firm (CUSIP) level. Year dummies are included, but not reported in the table.

	Marginal effects
retvol	−0.041
	(−0.57)
dratio	0.020[a]
	(3.67)
trate	0.035
	(1.41)
zscore	0.000[a]
	(3.62)
focused	−0.057[a]
	(−8.29)
logmve	−0.005[a]
	(−4.58)
HHI	0.021
	(1.21)
Nbidders	0.005
	(1.30)
cashonly	0.052[a]
	(8.18)
rnd_ta	−0.055[a]
	(−2.68)
roa	−0.019[b]
	(−2.29)
cash_ta	0.009
	(1.20)
lbo	0.687[a]
	(10.47)
mbo	0.013
	(0.64)
Observations	5,190
Pseudo R-squares	0.566

[a] Statistically significant at the one-percent level.
[b] Statistically significant at the five-percent level.
[a] Statistically significant at the ten-percent level.

[−1, +1]) from a market model. This shorter event window has the advantage of being less dependent on the model used to generate excess returns (Fama, 1981).

In the private equity sample, we find that target firms wherein their bidders formed alliances earned an average three-day cumulative abnormal return of 14.1%, which is statistically significantly lower than the 22.2% earned by target firms when their bidder did not form an alliance. A similar lower differential (namely, 6.92%) was found between the median cumulative abnormal returns of alliance private equity bidders when compared to sole-sponsored private bidders. However, no significant difference is found for alliance formation in public firms. Given that we are doing univariate analysis and have 29 club deals for public firms, we have enough power for finding statistical significance. For the public firm sample, we find that target firms wherein their bidders formed alliances earned an average three-day cumulative abnormal return of 20.2%, which is insignificantly different from the 22.4% earned by target firms when their bidder did not form an alliance. A similar insignificant differential was found when we examine median returns.

In summary, the preliminary univariate results suggest that club deals between private equity firms earned lower abnormal returns than club deals between public firms. We now ask if these results are driven by target firm and deal characteristics which also might affect the abnormal returns. We use two methods to address this issue.

The first method matches target firm characteristics between private equity and public bidders using propensity score matching. In our specifications, to control for the selection bias of forming an alliance between public and private equity firms, we obtain propensity scores for forming an alliance and include it in our regression where the dependent variable is *CAR[−1, +1]*.

Table 5
Probability of alliance controlling for bidder type in private equity bidders. Dependent variable of the probit model is *alliance* for all columns. Sample is from the Securities Data Company's (SDC) U.S. Merger and Acquisition Database. To be included in our sample, it should be a completed deal in which the acquirer owns at least 50% of the shares of the target after the deal. We exclude deals without disclosed deal value, spinoffs, recaps, self tenders, repurchases, and minority stake purchases. If the bidder is a group of individuals or creditors, or if one or more of the bidders is a private operating company, the deal is excluded. CUSIP is used to match Compustat/CRSP items with SDC Database. Standard errors are corrected for heteroskedasticity and for clustering at the bidder firm (CUSIP) level. Year dummies are included, but not reported in the table.

	Marginal effects
retvol	0.139
	(0.44)
dratio	−0.026
	(−1.10)
trate	0.113
	(0.84)
zscore	−0.003
	(−0.79)
focused	–[d]
logmve	0.006
	(1.56)
HHI	0.075
	(0.96)
Nbidders	0.010
	(0.77)
cashonly	0.005
	(0.25)
rnd_ta	0.080
	(0.80)
roa	0.073[c]
	(1.68)
cash_ta	0.026
	(0.72)
lbo	0.017
	(1.28)
mbo	0.023
	(1.09)
Observations	526
Pseudo R-squares	0.1624

(All alliances are diversified deals. *focused* = 0 for all alliances of private equity bidders.)
[a] Statistically significant at the one-percent level.
[b] Statistically significant at the five-percent level.
[c] Statistically significant at the ten-percent level.
[d] *focused* is dropped as it perfectly predicts the probability of alliance.

Propensity score is defined as a probability of forming an alliance based on target firm characteristics. Specifically these target firm characteristics are the risk of the firm (*retvol*), leverage ratio (*dratio*), tax rate (*trate*), probability of bankruptcy (*zcore*), firm size (*logmve*), industry concentration ratio (*HHI*), profitability (*roa*), R&D expenses (*rnd_ta*) and cash holdings (*cash_ta*). When obtaining these fitted values, we run two separate probit models for public and private equity firms.

In Table 7, we run a multivariate regression, using the propensity score (*propensity*) as an independent variable. In columns (1) and (2), we find that the private equity alliance dummy is statistically insignificant, suggesting that target firm characteristics, not alliance formation, are the reason for private equity alliance targets earning lower abnormal returns. Importantly, the propensity score is statistically significant suggesting that target firm characteristics help explain the abnormal returns. In columns (3) and (4) we also include the deal characteristics. Once again, the private equity alliance dummy is statistically insignificant and the propensity score is statistically significant, suggesting that target firm characteristics are responsible for private equity alliance targets earning lower abnormal returns.

Using an alternative methodology to test the same idea, we use interaction terms between target firm characteristics and the private equity and alliance dummies. The regression results are given in Table 8. In column (1) we present a specification that includes target firm and deal characteristics, and their interaction with the private equity dummy variable. Column (2) adds the interaction between the target firm and deal characteristics with the alliance dummy variable. We do not present the results on

Table 6
Difference in announcement day cumulative abnormal return. Sample is from the Securities Data Company's (SDC) U.S. Merger and Acquisition Database. To be included in our sample, it should be a completed deal in which the acquirer owns at least 50% of the shares of the target after the deal. We exclude deals without disclosed deal value, spinoffs, recaps, self tenders, repurchases, and minority stake purchases. If the bidder is a group of individuals or creditors, or if one or more of the bidders is a private operating company, the deal is excluded. CUSIP is used to match Compustat/CRSP items with SDC Database. If any one of the variables in the regression specification is missing, the observation is excluded.

	Private equity bidders		Public bidders	
	Mean	Median	Mean	Median
Alliance	0.141	0.107	0.202	0.170
Single bidder	0.222	0.176	0.224	0.174
Difference	−0.081[b]		−0.022	
(*t*-test)	(−2.22)		(−0.45)	
Difference		−0.069[a]		−0.004
(Z statistics for rank sum test)		(−3.06)		(−0.47)

[a] Statistically significant at the one-percent level.
[b] Statistically significant at the five-percent level.
[c] Statistically significant at the ten-percent level.

all interaction terms, but just on the private equity dummy, alliance dummy, and the interaction between private equity and alliance. We find this third term to be statistically insignificant in both specifications, suggesting that once again target firm characteristics are responsible for private equity alliance targets earning lower abnormal returns. In column (2), we add interactions between the alliance dummy and target and deal characteristics. Once again, the interaction between private equity and alliance dummy is statistically insignificant, suggesting that target firm characteristics are responsible for private equity alliance targets earning lower abnormal returns.

5. Conclusions

Private equity as an alternative organization form to the publicly owned company has many proponents (for example, see Jensen, 1989). While many have studied the record of private equity firms on the operating performance of the acquired firms, recent evidence on the price paid for publicly traded target firms target by two or more private equity bidders is mixed. The Department of Justice has raised concerns about private equity firms submitting low bids in an alliance or club and private litigation has ensued.

Table 7
Regression of three-day cumulative abnormal return using propensity scores to control for target firm characteristics. Dependent variable of the regression is *CAR [−1, +1]*. Sample is from the Securities Data Company's (SDC) U.S. Merger and Acquisition Database. To be included in our sample, it should be a completed deal in which the acquirer owns at least 50% of the shares of the target after the deal. We exclude deals without disclosed deal value, spinoffs, recaps, self tenders, repurchases, and minority stake purchases. If the bidder is a group of individuals or creditors, or if one or more of the bidders is a private operating company, the deal is excluded. Propensity score (*propensity*) is the probability of alliance for bidders based on target firm characteristics. CUSIP is used to match Compustat/CRSP items with SDC Database. Standard errors are corrected for heteroskedasticity and for clustering at the bidder firm (CUSIP) level. Year dummies are included, but not reported in the table.

	(1)	(2)	(3)	(4)
alliance	−0.019	−0.017	−0.068	−0.070
	(−0.41)	(−0.38)	(−1.47)	(−1.50)
pvt_equity_alliance	−0.040	−0.042	0.001	0.002
	(−0.78)	(−0.81)	(0.03)	(0.04)
pvt_equity		0.048		−0.022
		(1.18)		(−0.54)
propensity	−0.208[a]	−0.515[b]	−0.585[a]	−0.458[c]
	(−2.71)	(−2.03)	(−4.66)	(−1.70)
focused			0.002	0.001
			(0.19)	(0.09)
Nbidders			−0.042[a]	−0.042[a]
			(−4.85)	(−4.87)
cashonly			0.113[a]	0.114[a]
			(13.09)	(13.13)
lbo			0.009	0.011
			(0.31)	(0.37)
mbo			0.039	0.041
			(1.29)	(1.33)
Observations	5287	5287	5287	5287

[a] Statistically significant at the one-percent level.
[b] Statistically significant at the five-percent level.
[c] Statistically significant at the ten-percent level.

Table 8
Regression of three-day cumulative abnormal return with interaction terms. Dependent variable of the regression is *CAR[−1, +1]*. Sample is from the Securities Data Company's (SDC) U.S. Merger and Acquisition Database. To be included in our sample, it should be a completed deal in which the acquirer owns at least 50% of the shares of the target after the deal. We exclude deals without disclosed deal value, spinoffs, recaps, self tenders, repurchases, and minority stake purchases. If the bidder is a group of individuals or creditors, or if one or more of the bidders is a private operating company, the deal is excluded. CUSIP is used to match Compustat/CRSP items with SDC Database. Dummy for public bidders (*public*) and its interaction terms with *alliance* and target and deal characteristics (*retvol*, *dratio*, *trate*, *zscore*, *focused*, *logmve*, *HHI*, *Nbidders*, *cashonly*, *rnd_ta*, *roa*, *cash_ta*, *lbo*, *mbo*) are included in Column (1). In Column (2), in addition to these variables, the interaction terms between *alliance* and the variables for target and deal characteristics are included. Target and deal characteristics and interaction terms are not reported in the table. Standard errors are corrected for heteroskedasticity and for clustering at the bidder firm (CUSIP) level. Year dummies are included, but not reported in the table.

	(1)	(2)
alliance	−0.043	−0.496[c]
	(−0.98)	(−1.85)
pvt_equity × *alliance*	0.208	0.221
	(1.17)	(1.23)
pvt_equity	−0.026	−0.015
	(−0.50)	(−0.21)
Observations	5287	5287

[a] Statistically significant at the one-percent level.
[b] Statistically significant at the five-percent level.
[c] Statistically significant at the ten-percent level.

Using a large sample of public and private equity deals, we find that the incidence of alliances in private equity (12.92%) is much larger than the incidence of alliances in public firms (0.69%). The latter result does not allow us to find any significant result in the public bidder sample. In the case of the private equity sample, we find strong support for the relative risk-reduction hypothesis of Robinson (2008) in that private equity alliances are diversifying acquisitions. We also find that private equity alliances are likely to involve more profitable target firms, a result against the lemons hypothesis. Importantly, we find that target firm and deal characteristics are different between private equity and public firms. This result is consistent with those found in Bargeron et al. (2008) for all private acquirers.

Finally, we find that the target abnormal returns earned by private equity firms in alliances are significantly lower when compared to their sole-sponsored private equity deals. No such effect is found for public bidders. However, the lower abnormal returns earned by targets in private equity alliances disappear when one controls for the differences in target characteristics (using a propensity score methodology). A similar result is found when one uses interaction terms between private equity, alliance formation, and target firm characteristics. This suggests that private equity alliances do not earn lower returns once one controls for the differences in target characteristics between private equity alliances and single private equity bidders. The last result suggests that private equity alliances do not generate significantly lower target returns because of collusion but because of different target firm characteristics.

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