Role of Investment Banks in Acquisitions of Private Targets

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We fill a research void by identifying characteristics that influence the decision to hire investment banks as advisers in acquisitions of private targets. We find that a bidder is more likely to hire an investment bank when the deal is large (in both relative and dollar terms), when it uses equity financing, when it has less experience in acquisitions of private targets, and when it is a high-tech firm. A private target is more likely to hire an investment bank for advice when the deal is large (in dollar terms), when the bidder has low growth opportunities, and when the bidder is more exposed to potential bankruptcy.

JEL classification: G32; G34; G38
Keywords: Mergers & Acquisitions; Investment Banks

1. Introduction

Investment banks have a significant role as financial advisors in the market for corporate control. They can reduce information asymmetry between bidders and targets. They can improve the quality of the matching between bidder and target, and accelerate the matching process. They also allow prospective bidders and targets to seek partners with anonymity in the preliminary stages before the negotiation process begins.

Little is known about the role and influence of investment banks in acquisitions of private targets. And yet, acquisitions of private targets are quite common and exhibit a pronounced degree of asymmetric information, which may create mistrust during the negotiation process. Thus, the role of an investment bank may be especially valuable for a bidder that is pursuing a private target, or for a private target that is being pursued by a bidder.

Our objective is to apply logistic regression analysis to determine the characteristics that cause a bidder or a target to hire an investment bank when acquiring a private target. We also assess whether the hiring of an investment bank influenced the valuation effects of the bidder at the time of the acquisition announcement, and the valuation of the private target.

We assess a sample of acquisitions of private targets from January 1992 to December 2010. Approximately 40 percent of the bidders hire an investment bank for financial advice on the acquisition process, while 60 percent of the bidders do not hire an investment bank. In addition, 35 percent of the private targets in our sample hire an investment bank for financial advice on the acquisition process, while 65 percent of the private targets do not hire an investment bank. We find that the decision to hire an investment bank is conditioned on many characteristics peculiar to the participating firms or the deal. Specifically, we find that a bidder is more likely to hire an investment bank when the bidder uses equity financing, has less experience in acquisitions of private targets, is a high-tech firm, and when the deal is large in both relative and absolute terms,. Moreover, the bidder that hires an investment bank is more likely to select a top-tier bank when it acquires high-tech targets and when the targets are in the same industry.

The private target is more likely to hire an investment bank for advice when the deal is large, when the bidder has low growth opportunities, and when the bidder is more exposed to

[1] We wish to thank Joseph Farhat (Editor), an anonymous reviewers of this journal, and Luis Garcia-Feijoo, Wm R. McDaniel, Victor Kalafa, and Debbie Smith for their helpful suggestions.

potential bankruptcy. Furthermore, the private target's propensity to use an investment bank is higher when the bidder is a foreign firm and when its own country has weak shareholder protection. The private target that hires an investment bank is more likely to select a top-tier bank under these same country characteristics, when it is in a high-tech industry, and when economic conditions are favourable.

Furthermore, we find that bidder's wealth effect in response to the announced acquisition or its operating performance following the announcement is not related to whether it hires an investment bank. Yet, the private target receives a more favourable valuation when it hires an investment bank, which implies that the hiring of an investment bank allows it to extract more benefits from the bidder.

2. Review of Related Literature

Several studies explain the role that investment banks can play in mergers, and the motivation for merger participants to hire them. According to Rau (2000), investment banks that have successfully completed merger deals in the past have been able to grow their market share. Hunter and Jagtiani (2003) find that top-tier investment banks are more successful than lower tier investment banks at competing transactions, and also achieve a shorter time to completion. Kale et. al. (2003) suggest that the more prestigious advisors perform better when they more frequently advise their clients to withdraw from a takeover that ultimately results in a value-destroying transaction for the successful bidder.

Da Silva Rosa et al. (2004) investigate the decision to hire advisors in the Australian takeover market. They find that advisors are more likely to be hired when the transaction is large, hostile, and involves non-cash compensation. Chahine and Ismail (2009) confirm that investment banks with a very strong reputation are commonly hired to facilitate complex transactions. Forte et al. (2010) find that the decision by a public target to hire an advisor depends on three main factors: (i) the intensity of the previous banking relationship, (ii) the reputation of the bidder company's advisor, and (iii) the complexity of the deal. Moreover, their study suggests a "certification role" of investment banks since the wealth gains of target firms is higher when they have a closer prior banking relationship.

While the existing literature offers insight about the potential benefits of investment banks in facilitating acquisitions of publicly traded targets, little is known about their role and influence in acquisitions of private targets.

According to Akerlof (1970), when a firm without a clear market valuation cannot credibly signal its value to potential bidders, it has to accept a discounted offer price to reflect its limited transparency. Makadok and Barney (2001) claim that the lack of information available on private firms provides more opportunities for bidders to exploit private information situations and gain higher abnormal returns. However, bidders could still mistakenly offer a price that is higher than the true value of the target when it cannot estimate the true value of the target.

The lack of transparency may cause large differences in opinion between the bidder and private target about the appropriate value that should be paid for the target. When the divergence in opinions is large, bidders and targets can obtain opinions from investment banks. In this case, the bidders reduce the risk of over-paying while the targets can improve their bargaining power. Deeds et al. (1999) argue that bidders are less aware of the existence of private targets because those targets are less visible and transparent to the investment community than are public targets, and they are not assigned a continuous valuation by the market. It is more difficult to identify and value suitable private targets without the support of investment banks. Yet, while the aforementioned potential benefits of hiring an investment bank are strong, Forte et al. (2010) finds that many acquisitions of private firms occur without the aid of an investment bank.

3. Hypotheses for Why Bidders and Targets Hire Investment Banks

We develop hypotheses for the characteristics that lead to the hiring of an investment bank advisor for acquisitions of private targets. Our hypotheses are categorized as transaction

characteristics, information asymmetry characteristics, contracting cost characteristics, and country characteristics.

Transaction Characteristics

Size of Transaction. Since an investment bank can reduce the misvaluation errors, its potential benefits to either a bidder or a private target should be more pronounced when the size of the transaction is large (see Servaes and Zenner (1996)). Acquisitions of private targets are exposed to misvaluation errors, which may be especially pronounced for large transactions, because they could translate into much larger overpayment by bidders. Alternatively, misvaluation errors could cause private targets to sell themselves cheap, and such errors may be especially harmful for large transactions because they translate into a much larger underpayment. In addition, since larger transactions tend to be more complex, they may require investment bank advising. We hypothesize that bidders and targets are more likely to hire investment banks when the size of the transaction is larger. To investigate the effect of the transaction size, we use a variable SIZE which represents the natural logarithm of the transaction size.

Relative Size. The potential impact of the size of a transaction on a bidder or private target may be dependent on their own size. A transaction valued at a specific dollar amount should have a larger impact on a bidder (or target) that is relatively small. Therefore, we also consider an alternative proxy to account for transaction size relative to the size of the bidder. We use a variable RELSIZE, which equals the transaction size divided by total market capitalization of the bidder, as of 4 weeks before the transaction.

Information Asymmetry Characteristics

Method of Payment. The form of payment can affect the degree of complexity in acquisitions. If transactions are entirely financed by cash, it is easier for both the bidder and target to evaluate. On the other hand, if equity is used as payment, the information asymmetry may cause greater concerns. When bidders use equity to finance their investments, targets may be concerned about the true value of the equity and may want to hire an investment bank to value the bidder's equity.

In addition, bidders that wish to use equity as payment may need investment banks to verify the true value of their equity. We hypothesize that the likelihood of either bidders or private targets hiring investment banks as financial advisors will increase when equity is being used as payment. We use the variable EQUITY, which is a dummy variable set equal to 1 if the bidder uses all or partial equity payment and 0 otherwise.

Bidder's Prior Takeover Experience. Servaes and Zenner (1996) argue that more experienced bidders may be more capable of overcoming information asymmetry problems, and are less likely to need investment banks to assist them in acquisitions. We use this logic to hypothesize that the likelihood of bidders using investment banks when acquiring private targets is negatively related to their prior experience. Following Kale et al. (2003), we measure the bidders' prior experience by the number of takeover related activities undertaken by the bidders in the preceding 10-year period (PRIOR).

Relatedness between Bidder and Target. Chemmanur et al. (2009) show that the relatedness between bidder and target can reduce information asymmetry between the two parties. Thus, the degree of asymmetric information surrounding the target's assets may be lower when bidders are in the same industry as the targets. Servaes and Zenner (1996) argue that when a bidder acquires a target in the same industry, the bidder can rely on its capital budgeting expertise to value the target. Hence, we hypothesize that the likelihood of using investment banks in acquisitions of private targets should decrease when the bidder and target are in the same industry. However, we also allow for a possible counter argument, because a lower level of asymmetric information between bidder and target applies in both directions. Therefore, even in the absence of asymmetric information, each party may rely more on an investment bank for bargaining purposes. We use the dummy variable RELATED, which is set equal to 1 if both parties have the same 4-digit SIC code and 0 otherwise.

Bidder's Technological Status. The information asymmetry surrounding the operations and opportunities of high-tech bidders is large. Therefore, the potential benefits of hiring an investment bank advisor may be especially pronounced for bidders or private targets in the technology sector. We hypothesize that the likelihood of using an investment bank in transactions involving high-tech bidders should be higher than that of transactions that do not involve high-tech bidders. We use the variable BID_TECH which is set equal to 1 if the bidder is categorized in primary SIC codes 3571, 3572, 3575, 3577, 3578 (computer hardware), 3661, 3663, 3669 (communications equipment), 3674 (electronics), 3812 (navigation equipment), 3823, 3825, 3826, 3827, 3829 (measuring and controlling devices), 4899 (communication services), or 7370, 7371, 7372, 7373, 7374, 7375, 7379 (software) and 0 otherwise.

T**arget's Technological Status**. The information asymmetry surrounding the value of technology targets is also high. Hence, the bidders might hire an investment bank when purchasing a high-tech target to minimize the risk of misvaluation. The variable TAR_TECH equals 1 if the target is categorized in primary SIC codes 3571, 3572, 3575, 3577, 3578 (computer hardware), 3661, 3663, 3669 (communications equipment), 3674 (electronics), 3812 (navigation equipment), 3823, 3825, 3826, 3827, 3829 (measuring and controlling devices), 4899 (communication services), or 7370, 7371, 7372, 7373, 7374, 7375, 7379 (software) and 0 otherwise.

Contracting Cost Characteristics

Bidder's Growth Opportunities. The growth opportunities of the bidders may also affect their decision to hire an investment bank. Firms with more growth options may benefit to a greater degree from an investment bank's help. In addition, they might have more to lose because the value of their growth options could be reduced if they make bad acquisitions. We use Tobin's Q (TOBINQ) as a measure of bidder's growth opportunities, which equals market value divided by book value of the bidder.

Bidder Risk. When the bidder has a higher likelihood of going bankrupt, it may be more careful when conducting an acquisition. On the other hand, the target should be cautious when selling itself to a bidder that is more likely to go bankrupt. We investigate the impact of the bankruptcy risk of the bidder on the decision to hire an investment bank by including the variable ZSCORE, which represents the Altman Z-score of the bidder. We also include an alternative risk proxy for the bidder called LEV, which represents the debt ratio of the bidder.

Credit Crisis. Since employing an investment bank is expensive, the decision for the bidder and the target to hire an investment bank might be different during tight credit periods compared to strong economic periods. To investigate the effect of the credit crisis periods on the decision to hire an investment bank, we use a variable called CRISIS, set equal to 1 during the 2001–2002 and more recent financial crisis period (from Q1/2001 to Q4/2002 and from Q3/2007 to Q4/2010) and 0 otherwise.

Country Characteristics

When a bidder decides to acquire a private target in a foreign country, investors may question whether the motivation for the acquisition is to maximize shareholders' wealth or for management empire building. Thus, the bidder's management might use an investment bank to certify that its motives are well intended to serve its shareholders.

Cross-border Transactions. When U.S. bidders acquire cross-border targets, they encounter greater challenges due to institutional and cultural differences. Moreover, the ability of foreign employees to fit into the bidders' organization may be properly assessed only by experienced agents such as investment banks. Therefore, we expect that bidders are more likely to use investment banks when acquiring private targets outside the U.S. On the other hand, we also expect that foreign private targets are more likely than domestic private targets to hire investment banks when being acquired by U.S. bidders. We use the variable FOREIGN, which is a dummy variable that equals 1 if the transaction is listed as a cross-border transaction, and 0 otherwise.

Target Country's Risk and Governance Characteristics. In addition to the general expectation regarding cross-border transactions, country risk and corporate governance characteristics are also important motivations for merging firms to employ investment banks. La Porta et al. (1997 and 1998) show that corporate governance, the quality of the legal system, and the regulatory environment within a country can influence valuations and uncertainty surrounding valuations. Since country characteristics such as weak investor protection or legal system could magnify problems resulting from information asymmetry or the lack of transparency in a merger, they could influence the decision by a public bidder or private target to hire an investment bank. Thus, bidders that pursue private targets in countries with weak country characteristics might require the expertise of investment banks so that they can properly assess the value of these targets and potential synergies from an acquisition.

According to Shleifer and Vishny (1989), outside investors perceive that the management of firms with poor governance may have more freedom to waste free cash flow. Thus, bidders might be more willing to hire an investment bank when they engaged with a counter-party in a country with weak governance characteristics.

On the other hand, managers of firms in countries with poor corporate governance might have some difficulties in evaluating the actual value of their firms under a strong corporate governance system. This might lead to a wider disagreement in the price of private targets. Hence, sellers might be more willing to hire an investment bank when selling themselves to bidders in a country with high corporate governance standard, such as the U.S. We consider the anti-director rights index that is introduced by La Porta et al. (1997) as the measure of country risk and governance to examine the impact of country characteristics on the decision to use investment banks. The anti-director rights index is widely used to control for corporate governance at the country level (see Spamann (2010)), and represents the rights of shareholders. It ranges from 0 to 5, in which a higher number reflects better shareholder protection. . Following Moeller and Schlingemann (2005), we use the variable RIGHTS, which equals 1 if the anti-director rights index of the seller country is three or above and 0 otherwise.

4. Research Design and Data

We use logistic regression models to identify the characteristics that impact the decision of bidders to hire investment banks when acquiring private targets. In our model, the dependent variable is set equal to 1 if the bidder uses an investment bank advisor, and 0 otherwise. To test whether our hypothesized characteristics cause a bidder of a private target to hire an investment bank, we apply the following model:

$$P(\textit{bidder uses an investment bank}) = f(SIZE, RELSIZE, EQUITY, PRIOR, RELATED, BID\_TECH, TAR\_TECH, TOBINQ, ZSCORE, LEV, CRISIS, FOREIGN, RIGHTS)$$

We apply the same models described above to determine the characteristics that cause a bidder to hire a top-tier investment bank. Each hypothesis that argues for the need to hire an investment bank can be extended to argue for the need for a top-tier investment bank. Just as each hypothesis for the need to hire an investment bank has a counter that the benefit is outweighed by the expense, each hypothesis for the need to hire a top-tier investment bank has a counter that the benefit is outweighed by the expense. Therefore, the model used to test why the bidders and private targets hire investment banks can be applied here to test why the bidders and private targets hire top-tier investment banks.

To test the probability that the bidders and private targets hire a top-tier investment bank, we must first distinguish between a top-tier and other investment banks. Following Rau (2000), we measure the average market share of each investment bank as the percentage of the total value of transactions advised by investment banks in any single year. In the spirit of Golubov et al. (2012), we classify the top eight investment banks as top-tier to distinguish them from the others. The rankings are stable across the sample period. In addition to the dummy variable that represents the existence

of an investment bank, we also use a continuous variable that represents the percentage of the market share of a particular investment bank as a robustness check.

$$P(\textit{bidder uses a top tier investment bank}) = f(SIZE, RELSIZE, EQUITY, PRIOR, RELATED, BID\_TECH, TAR\_TECH, TOBINQ, ZSCORE, LEV, CRISIS, FOREIGN, RIGHTS)$$

Next, we test whether our hypothesized characteristics cause a private target to hire an investment bank. In this model, the dependent variable is assigned a value of 1 if the private target hires an investment bank advisor, and zero otherwise.

$$P(\textit{target uses an investment bank}) = f(SIZE, RELSIZE, EQUITY, RELATED, BID\_TECH, TAR\_TECH, TOBINQ, ZSCORE, LEV, CRISIS, FOREIGN, RIGHTS)$$

We re-apply the same models to find the characteristics that cause a private target to hire a top-tier investment bank.

$$P(\textit{target uses a top ter investment bank}) = f(SIZE, RELSIZE, EQUITY, RELATED, BID\_TECH, TAR\_TECH, TOBINQ, ZSCORE, LEV, CRISIS, FOREIGN, RIGHTS)$$

When applying the logistic models to our sample, the quasi-maximum likelihood (QML) White/Huber standard errors are used to correct for heteroscedasticity.

Our initial sample consists of all acquisitions of private targets from January 1992 to December 2010. We obtain the observations from Thomson Financial Securities Data's SDC database that satisfy several screening criteria. First, the bidders must be U.S. publicly traded corporations. Second, targets must be private firms without any restriction on the target country. Third, only successful transactions that have value greater than $1 million and are worth more than 5 percent of the market value of equity of the bidders are investigated. Finally, we eliminate all transactions that belong to regulated industries.

5. Results

Results of Univariate Analysis

We use the SDC database to collect various characteristics of the transactions. In addition, the Center for Research in Security Prices (CRSP) and COMPUSTAT are also used to collect other financial variables of the transactions. The final sample consists of 1,122 acquisitions.

Table 1 provides some useful information regarding the sample. The table indicates that transaction, information asymmetry, contracting cost, and country characteristics are quite different between subsamples in which investment banks are hired as advisors versus subsamples in which investment banks were not hired. The mean and median values of transactions associated with the hiring of an investment bank are much bigger than those for transactions that are not associated with the hiring of an investment bank. This result suggests that bidders and private targets are more willing to hire investment banks when there is more at stake. Moreover, the relative size of the transaction is also higher for transactions associated with the hiring of an investment bank.

Table 1 also shows that the mean proportion of equity payment in transactions in which the bidders (targets) employ an investment bank is higher than that in transactions in which the bidders (targets) do not employ an investment bank. The transactions with equity payment are more complicated and, therefore, both the bidder and the target are more willing to hire an advisor to facilitate more complicated transactions.

Notice that the proportions of bidders and targets in the high-tech sector that hire investment banks are higher than the respective proportions of bidders and targets that are not in the high-tech sector. In addition, the proportion of bidders with relatively high growth prospects (as measured by Tobin's Q) that hire investment banks is higher than the proportion of bidders with relatively low growth prospects that hire investment banks. Interestingly, there is no difference in the country

characteristics between the subsamples of transactions in which an investment bank is hired versus transactions in which an investment bank is not hired.

Table 1
Summary Statistics for the Sample

Panel A

	All Sample		Bidders with Investment Banks		Bidders without Investment Bank		Targets with Investment Banks		Targets without Investment Bank	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
SIZE	144.69	40.03	261.19	93.82	66.09	21.79	220.24	118.81	70.75	22.54
RELSIZE	0.28	0.15	0.34	0.19	0.24	0.13	0.30	0.17	0.27	0.14
TOBINQ	5.09	1.79	5.78	2.05	4.62	1.58	5.74	1.92	4.73	1.71
ZSCORE	1.85	2.95	2.77	3.00	1.22	2.91	1.96	2.86	1.79	2.97
LEV	0.47	0.37	0.41	0.34	0.50	0.37	0.40	0.35	0.48	0.33
INTERESTCOV	-46.36	2.86	-40.00	2.78	-17.76	1.37	-7.28	1.57	-7.18	1.14
CASHHOLDINGS	0.17	0.09	0.17	0.09	0.18	0.09	0.17	0.08	0.18	0.10
NUMBER OF OBSERVATIONS	1122	1122	452	452	670	670	396	396	726	726

Notes: This panel provides the descriptive statistics for the continuous variables that are used in the paper. SIZE is the total asset of the bidder. RELSIZE is the relative size of the transaction to bidder's market value of equity, as of four weeks prior to the announcement. TOBINQ is the Tobin Q's ratio of the bidder. ZSCORE is the Altman Z score of the bidder. LEV is the debt ratio of the bidder. INTERESTCOV is the interest coverage ratio of the bidder. CASHHOLDINGS is the bidder's cash holdings scaled by total assets.

Panel B

	All Sample		Bidders with Investment Banks		Bidders without Investment Bank		Targets with Investment Banks		Targets without Investment Bank	
	Dummy = 1	% of Sample	Dummy = 1	% of Sample	Dummy = 1	% of Sample	Dummy = 1	% of Sample	Dummy = 1	% of Sample
EQUITY	635	0.57	240	0.53	395	0.59	225	0.57	410	0.57
PRIOR	237	0.21	96	0.21	141	0.21	94	0.24	143	0.20
RELATED	406	0.36	180	0.40	226	0.34	158	0.40	248	0.34
BID_TECH	508	0.45	231	0.51	277	0.41	192	0.49	316	0.44
TAR_TECH	456	0.41	207	0.46	249	0.37	179	0.45	277	0.38
CRISIS	267	0.24	105	0.23	162	0.24	97	0.25	170	0.23
FOREIGN	128	0.11	55	0.12	73	0.11	46	0.12	82	0.11
RIGHTS	108	0.10	45	0.10	63	0.09	37	0.09	71	0.10
NUMBER OF OBSERVATIONS	1122	1122	452	452	670	670	396	396	726	726

Notes: This panel provides the descriptive statistics for the dummy variables that are used in the paper. EQUITY is a dummy variable equal to 1 if the bidder uses all or partial equity payment and 0 otherwise. PRIOR equals 1 if the bidder acquires at least 1 target in the previous 10-year, 0 otherwise. RELATED equals 1 if the bidder and target have the same four-digit SIC code, 0 otherwise. BID_TECH equals 1 if the bidder is a high-tech firm, 0 otherwise. TAR_TECH equals 1 if the seller is a high-tech firm, 0 otherwise. CRISIS equals 1 if the transactions happen during 2001-2002 and 2007 crisis, 0 otherwise. FOREIGN equals 1 if the deal is a cross-border deal, 0 otherwise. RIGHTS equals 1 if the anti-director rights index is three or above, 0 otherwise.

Results from Applying Logit Models

Table 2 reports the results from applying the Logit models to the sample to test variables that may influence the decision by the bidder to hire an investment bank.

Table 2
Logit Regression Explaining the Bidder's Decision to Hire Investment Banks When Acquiring Private Targets

	Likelihood of a Bidder Acquiring a Private Target to Hire an Investment Bank (Dependent Variable = BID_IB)		Likelihood of a Bidder Acquiring a Private Target to Hire a Top-tier Investment Bank (Dependent Variable = BID_TOPTIER)	
Variable	Coeff.	z-Stat	Coeff.	z-Stat
Intercept	-3.46	-4.83***	-6.75	-7.73***
SIZE	0.80	12.16***	0.95	11.30***
RELSIZE	0.93	3.64***	0.27	0.96
EQUITY	0.42	2.09**	0.41	1.62*
PRIOR	-0.39	-2.09**	-0.29	-1.25
RELATED	0.07	0.42	0.39	2.01**
BID_TECH	0.40	1.91*	0.16	0.56
TAR_TECH	0.08	0.40	0.59	2.13**
TOBINQ	-0.04	-0.46	-0.03	-0.24
ZSCORE	0.02	1.29	0.01	0.27
LEV	-0.32	-1.03	0.01	0.00
CRISIS	-0.10	-0.56	-0.33	-1.40
FOREIGN	0.88	1.33	-0.46	-0.57
RIGHTS	-0.80	-0.91	0.81	0.76
Number of Observations	1078		1078	
Pseudo R^2	21%		25%	

Notes: The estimation is based on a Logit regression models. The *z*-stats are based on QML (Huber/White) heteroskedasticity-consistent standard errors. The dependent variable in the first model is BID_IB, which equals 1 if the bidder uses an investment bank, 0 otherwise. The dependent variable in the second model is BID_TOPTIER, which equals 1 if the bidder uses a top-tier investment bank, 0 otherwise. Regarding independent variables, SIZE is the logarithm of the total asset of the bidder. RELSIZE is the relative size of the transaction to bidder's market value of equity, as of four weeks prior to the announcement. EQUITY is a dummy variable equal to 1 if the bidder uses all or partial equity payment and 0 otherwise. PRIOR equals 1 if the bidder acquires at least 1 target in the previous 10-year, 0 otherwise. RELATED equals 1 if the bidder and target have the same four-digit SIC code, 0 otherwise. BID_TECH equals 1 if the bidder is a high-tech firm, 0 otherwise. TAR_TECH equals 1 if the target is a high-tech firm, 0 otherwise. TOBINQ is the Tobin Q's ratio of the bidder. ZSCORE is the Altman Z score of the bidder. LEV is the debt ratio of the bidder. CRISIS equals 1 if the transactions happen during 2001-2002 and 2007 crisis, 0 otherwise. FOREIGN equals 1 if the deal is a cross-border deal, 0 otherwise. RIGHTS equals 1 if the anti-director rights index is three or above, 0 otherwise. ***, **, and * indicate statistical significance at 0.01, 0.05, and 0.10 level, respectively.

In the first model, regarding the transaction characteristics, the SIZE and RELSIZE variables are positive and significant, which are consistent with the univariate results and support the hypothesis that the likelihood of hiring an investment bank of the bidders is higher when the transaction size and the relative size are large.

The EQUITY variable is positive and significant, which supports our hypothesis that the bidders are more likely to retain an investment bank when at least some equity payment is used. The

PRIOR variable is negative and significant, which supports our hypothesis that the bidders are less likely to use an investment bank when it has some prior experience in acquisitions. Moreover, the BID_TECH variable is positive and significant, which is consistent with the univariate results and supports the hypothesis that the high-tech bidders are more likely to hire investment banks as advisors when acquiring private targets.[2].

The second model shows results from testing the characteristics that affect the decision of the bidders to use a top-tier investment bank. Again, the coefficient of SIZE is positive and significant, which supports our hypothesis that the bidders are more likely to hire a top tier investment bank advisor if the transaction size is large. However, the relative size of the transaction is not significantly related to the bidder's decision to hire a top-tier investment bank.

Regarding the information asymmetry variables, the bidders are more likely to hire a top tier investment bank when equity is used as partial or full payment. Moreover, the TAR_TECH variable is positive, which suggests that the bidders are more likely to use a top tier investment bank when acquiring a high-tech private target. The coefficient of RELATED is positive and significant in the second model, which indicates that bidders are more likely to hire a top-tier investment bank when they acquire targets in the same industry.

Interestingly, the contracting cost and country characteristic variables do not have any impact on the decision of the bidders[3]. Regarding the power of the Logit regressions, the Pseudo R-squares of the two models are 21% and 25%, respectively. Moreover, the likelihood ratio indicates that the models are significant at the 1 percent level.

Table 3 reports the characteristics that influence the decision of the private targets to hire investment banks. The first model shows that SIZE is an important factor that influences the private target's decision to hire an investment bank. However, RELSIZE is not significant, indicating that the relative size of the transaction is not an important factor affecting the decision of the private targets. Regarding the contracting cost variables, TOBINQ is negative and significant, which suggests that the targets are more likely to use an investment bank when the bidders have low growth opportunities. The ZSCORE variable is also negative and significant, indicating that the targets are more likely to use an investment bank when the possibility of being bankruptcy of the bidders is high.

The private target's decision to hire an investment bank is affected by country characteristics. When foreign private targets are being acquired by U.S. bidders, they are more likely to hire an investment bank. Furthermore, when the shareholder protection in the target countries is poor, the targets are more likely to use an investment bank.

The second model reports the factors that influence the decision to use a top-tier investment bank of the private targets. The SIZE variable remains positive and significant, offering strong evidence that larger transactions in absolute value trigger the hiring of a top-tier investment bank. The TAR_TECH variable is positive significant, indicating that the targets are more likely to use a top-tier investment bank when they are in a high-tech industry. The CRISIS variable is negative and significant, which suggests that the likelihood of the private targets to hire a top-tier investment bank is lower when economic conditions are weak. Rau (2000) reports that the expense of hiring a top-tier investment bank is high. Thus, the targets might want to avoid the excessively high investment bank fees during the tight credit periods.

Regarding country characteristic variables, the FOREIGN and RIGHTS variables are both

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[2] We also consider whether insider ownership of the bidders might affect the decision to hire investment banks in acquisitions. We have information about insider ownership of the bidder for 300 observations. We run separate regression models with OWNERSHIP variable. The results show that insider ownership of the bidder does not have any impact on the bidder's or private target's decision to hire an investment bank.

[3] As robustness tests for the country characteristic variables, we replace RIGHTS with FREEDOM, which is the natural logarithm of the economic freedom rating of the target's country, and COMMON, which is a dummy variable equals 1 if the target country has common law system and 0 otherwise. The results for FREEDOM and COMMON are similar to that of RIGHTS.

significant. The positive size of the FOREIGN variable suggests that foreign targets are more likely to use a top-tier investment bank when they are being acquired by a U.S. bidder, whereas the negative sign of the RIGHTS variable indicates that the possibility of using a top-tier investment of the targets are higher when it is located in a country that has poor shareholder protection. Regarding the power of the logit models, the Pseudo R-squares of the models are 22%, and 32%, respectively. Moreover, the likelihood ratio indicates that the models are significant at the 1 percent level.

Table 3
Logit Regression Explaining the Target's Decision to Hire Investment Banks

	Likelihood of A Private Target Hiring an Investment Bank (Dependent Variable = TAR_IB)		Likelihood of A Private Target Hiring a Top-tier Investment Bank (Dependent Variable = TAR_TOPTIER)	
Variable	Coeff.	z-Stat	Coeff.	z-Stat
Intercept	-3.08	-4.39***	-5.22	-5.85***
SIZE	0.92	13.41***	1.23	11.64***
RELSIZE	0.05	0.23	0.09	0.30
EQUITY	0.06	0.32	0.42	1.54
RELATED	0.04	0.25	0.04	0.15
BID_TECH	0.01	0.05	-0.40	-1.24
TAR_TECH	0.12	0.54	0.75	2.34**
TOBINQ	-0.01	-2.27**	-0.01	-1.60
ZSCORE	-0.02	-1.89*	-0.01	-0.14
LEV	-0.06	-0.81	0.03	0.26
CRISIS	-0.09	-0.50	-0.46	-1.67*
FOREIGN	1.51	2.22**	2.23	2.98***
RIGHTS	-1.73	-1.90*	-3.40	-3.14***
Number of Observations	1078		1078	
Pseudo R^2	22%		32%	

Notes: The estimation is based on a Logit regression models. The *z*-stats are based on QML (Huber/White) heteroskedasticity-consistent standard errors. The dependent variable in the first model is TAR_IB, which equals 1 if the target uses an investment bank, 0 otherwise. The dependent variable in the second model is TAR_TOPTIER, which equals 1 if the target uses a top-tier investment bank, 0 otherwise. Regarding independent variables, SIZE is the logarithm of the total asset of the bidder. RELSIZE is the relative size of the transaction to bidder's market value of equity, as of four weeks prior to the announcement. EQUITY is a dummy variable equal to 1 if the bidder uses all or partial equity payment and 0 otherwise. RELATED equals 1 if the bidder and target have the same four-digit SIC code, 0 otherwise. BID_TECH equals 1 if the bidder is a high-tech firm, 0 otherwise. TAR_TECH equals 1 if the target is a high-tech firm, 0 otherwise. TOBINQ is the Tobin Q's ratio of the bidder. ZSCORE is the Altman Z score of the bidder. LEV is the debt ratio of the bidder. CRISIS equals 1 if the transactions happen during 2001-2002 and 2007 crisis, 0 otherwise. FOREIGN equals 1 if the deal is a cross-border deal, 0 otherwise. RIGHTS equals 1 if the anti-director rights index is three or above, 0 otherwise. ***, **, and * indicate statistical significance at 0.01, 0.05, and 0.10 level, respectively.

Robustness Tests

As a test of robustness, we use a continuous dependent variable to measure market share of the investment bank in place of the top-tier dummy variable that was derived from the investment bank's estimated market share, and apply Tobit regression models. Our results (not shown to conserve space) reinforce the findings of the previous models that were applied to determine the characteristics that lead to hiring top-tier investment banks. As an additional robustness check, we run the ordered Probit regression for the decision to hire an investment bank of the bidder and the

target. The results (not shown to conserve space) hold in the ordered Probit regressions[4].

6. Impact of Hiring an Investment Bank on Bidder Wealth Gains

We hypothesize that the bidders who hire investment banks as advisors when acquiring private targets should experience more favorable wealth gains in response to the announced acquisitions than if they do not hire investment banks. Their hiring of an investment bank as an advisor in the acquisition process should allow them to more properly value private targets, and therefore avoid the potential overpayment that could occur from misvaluation of the target. However, a counter argument is that some investment banks may be focused on closing a deal, and therefore might not extract benefits for the bidder. In addition, the cost to the bidder of hiring an investment bank is substantial, which could offset the potential benefits.

Measuring the Impact of Hiring Investment Banks on Bidder Wealth Gains

To assess whether the bidder wealth gains in response to announced acquisitions are more favorable when bidders hire investment banks, we use the standard event study methodology. We use the market model for estimation, with an estimation period from t =-300 to t=-46 days relative to the event day t = 0. Then we apply the following cross-sectional model with White's correction for heteroscedasticity:

$$CAR_i = f(explanatory\ variables, control\ variables)$$

where:

CAR_i is the cumulative abnormal returns of bidder i in the event window (-1, +1) surrounding the announcement day t = 0[5].

We use the following explanatory variables to examine the influence of investment banks on the total wealth gains from acquisitions of private targets.

Whether the Bidder Is Advised by an Investment Bank (BID_IB). To compare the difference in the wealth gains between the transactions in which the bidder hires or does not hire an investment bank, we use a dummy variable that equals 1 if an investment bank is employed by the bidder, and 0 otherwise.

We also consider an alternative proxy representing whether the bidder hires a top-tier investment bank. We apply a dummy variable BID_TOPTIER that equals 1 if there is at least one top-tier investment bank advising the bidder, and 0 otherwise.

We consider another alternative proxy representing the reputation of the investment bank selected by the bidder (called BID_REP), measured as its market share for advising in takeover activity. If the bidder uses more than one investment bank, following Kale et al. (2003), we measure reputation as the highest market share of multiple investment banks. When the bidder does not employ an investment bank, the value of this variable equals 0. Since the BID_IB, BID_TOPTIER, and BID_REP variables serve as proxies for a similar type of characteristic, only one of these variables is used in any model.

Whether the Private Target Is Advised by an Investment Bank (TAR_IB). To compare the difference in the wealth gains between the transactions in which the private target hires or does not hire an investment bank, we use a dummy variable that equals 1 if an investment bank is employed

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[4] In the ordered Probit regression for the bidder's choice, the dependent variable equals 2 if the bidder hires a top-tier investment bank, equals 1 if the bidder hires a secondary-tier investment bank, and equals 0 if the bidder does not hire any investment bank. In the ordered Probit regression for the target's choice, the dependent variable equals 2 if the target hires a top-tier investment bank, equals 1 if the target hires a secondary-tier investment bank, and equals 0 if the target does not hire any investment bank.

[5] We also use (-2, +2) and (-3, +3) windows for robustness tests. The results for these windows are similar to the results that we report here.

by the target, and 0 otherwise. We also consider an alternative proxy TAR_TOPTIER representing whether the private target hires a top-tier investment bank. We apply a dummy variable that equals 1 if there is at least 1 top-tier investment bank advising the target, and 0 otherwise.

We consider another alternative proxy representing the reputation of the investment bank selected by the private target (called TAR_REP), measured as its market share for advising in takeover activity. If the bidder uses more than one investment bank, following Kale et al. (2003), we measure reputation as the highest market share of multiple investment banks. When the bidder does not employ an investment bank, the value of this variable equals 0. Since the TAR_IB, TAR_TOPTIER, and TAR_REP variables serve as proxies for a similar type of characteristic, only one of these variables is used in any model. Furthermore, we also consider a relative reputation proxy in place of the two variables that measure the reputations of the investment banks selected by bidder and target, which is measured as the difference between the reputation of the bidder's investment bank and the reputation of the private target's investment bank.

In addition to hypothesized variables that were described above, we also control for the transaction, information asymmetry, contracting cost, and country characteristics that were used earlier to explain whether a bidder hires an investment bank, because these characteristics could also affect the bidder's share price response to the announced transactions. In addition, we include interest coverage (INTERESTCOV) and cash (CASHHOLDINGS) variables to control for the impact of the short-term financial health of the bidder on its wealth gains. The INTERESTCOV variable is measured as the interest coverage ratio of the bidder. The CASHHOLDINGS variable is measured as the cash holdings scaled by total market value of the bidder.

Results from the cross-sectional analysis are disclosed in Table 4. There is no evidence that the bidder's hiring of an investment bank results in higher wealth gains (as measured by the CAR), even if the bidder hires a top-tier investment bank. On the other hand, when the private target hires an investment bank, there is evidence that the wealth gains of the bidder are reduced. Thus, the bargaining power of the investment bank may help the private target exploit more benefits from the bidder.

However, the benefits to the private target from using investment banks disappear when the private target hires a top-tier investment bank. Rau (2000) argues that top-tier investment banks focus more on the completion of the transaction, rather than on bringing the most benefit possible for their clients. The results support Rau's argument. Among the control variables, we find that the higher the size of the transaction (in both absolute and relative senses) results in a lower CAR for the bidder. Moreover, the coefficient for the interest coverage ratio of the bidder is positive and significant, indicating a better wealth gain for bidders that have strong financial condition.

Robustness Tests

Golubov et al. (2012) suggest that the decision regarding the hiring of an investment bank could be determined endogenously. Thus, the self-selection bias could emerge. Heckman (1979) argues that the self-selection bias is similar to the omitted variable bias and suggests a two-step procedure to control for the bias. We apply the Heckman two-step procedure for our sample. In the first stage of the procedure, we apply a Logit regression to model the decision to hire an investment bank. In the second stage, we run an OLS regression with a correction for selection bias. Similar to Golubov (2012), we find that the selection term in the second stage (the Inverse Mill's ratio) is insignificant at any conventional level, indicating that the coefficient estimates in Table 4 are reliable.

As a robustness check, we replace the dummy variable used to designate a top-tier investment bank with a continuous variable in order to re-assess the impact of investment bank reputation on the wealth gain of the bidder. Table 5 shows that coefficients for BID_REP, TAR_REP, and REL_REP are insignificant. These results reinforce the lack of an investment bank reputational effect on the wealth gain of the bidder.

Table 4
OLS Regression Explaining the Wealth Gains of Bidders in Acquisitions of Private Targets

	Dependent Variable = CAR of Bidder		Dependent Variable = CAR of Bidder	
Variable	Coeff.	t-Stat	Coeff.	t-Stat
Intercept	0.130	0.42	0.180	0.58
BID_IB	-0.001	-0.03		
TAR_IB	-0.020	-1.96**		
BID_TOPTIER			-0.010	-0.58
TAR_TOPTIER			-0.010	-0.80
SIZE	-0.010	-2.07**	-0.010	-2.32**
RELSIZE	-0.010	-1.67*	-0.010	-1.69*
EQUITY	0.001	0.99	0.001	0.95
PRIOR	0.001	0.10	0.001	0.05
RELATED	-0.002	-0.25	-0.002	-0.25
BID_TECH	-0.020	-1.53	-0.020	-1.55
TAR_TECH	-0.003	-0.30	-0.002	-0.23
TOBINQ	0.001	1.51	0.001	1.53
ZSCORE	-0.001	-1.58	-0.001	-1.27
LEV	0.010	0.51	0.010	0.56
CRISIS	-0.010	-1.54	-0.010	-1.54
CASHHOLDINGS	0.003	0.20	0.003	0.19
INTERESTCOV	0.001	2.38**	0.001	2.26**
FOREIGN	-0.002	-0.16	-0.003	-0.25
RIGHTS	-0.020	-0.22	-0.030	-0.38
Number of Observations	902		902	
Pseudo R^2	3.91%		3.61%	

Notes: The estimation is based on a Least Square model. The t-stats are based on White heteroskedasticity-consistent standard errors & covariance. The dependent variable is the cumulative abnormal return (CAR) of the bidders around the announcement date.. Regarding independent variables, BID_IB equals 1 if the bidder uses an investment banks, 0 otherwise. TAR_IB equals 1 if the target uses an investment banks, 0 otherwise. BID_TOPTIER equals 1 if the bidder uses a top tier investment banks, 0 otherwise. TAR_TOPTIER equals 1 if the target uses a top tier investment banks, 0 otherwise. SIZE is the logarithm of the total asset of the bidder. RELSIZE is the relative size of the transaction to bidder's market value of equity, as of four weeks prior to the announcement. EQUITY is a dummy variable equal to 1 if the bidder uses all or partial equity payment and 0 otherwise. RELATED equals 1 if the bidder and target have the same four-digit SIC code, 0 otherwise. PRIOR equals 1 if the bidder acquires at least 1 target in the previous 10-year, 0 otherwise. BID_TECH equals 1 if the bidder is a high-tech firm, 0 otherwise. TAR_TECH equals 1 if the target is a high-tech firm, 0 otherwise. TOBINQ is the Tobin Q's ratio of the bidder. ZSCORE is the Altman Z score of the bidder. LEV is the debt ratio of the bidder. CRISIS equals 1 if the transactions happen during 2001-2002 and 2007 crisis, 0 otherwise. INTERESTCOV is the interest coverage ratio of the bidder. CASHHOLDINGS is the bidder's cash holdings scaled by total assets. FOREIGN equals 1 if the deal is a cross-border deal, 0 otherwise. RIGHTS equals 1 if the anti-director rights index is three or above, 0 otherwise. ***, **, and * indicate statistical significance at 0.01, 0.05, and 0.10 level, respectively.

Table 5
OLS Regression Explaining the Wealth Gains of Bidders in Acquisitions of Private Targets (Continuous Variable Used to Measure Investment Bank Reputation)

	Dependent Variable = CAR of Bidder		Dependent Variable = CAR of Bidder	
Variable	Coeff.	t-Stat	Coeff.	t-Stat
Intercept	0.180	0.60	0.200	0.65
BID_REP	-0.001	-1.00		
TAR_REP	-0.001	-0.33		
REL_REP			-0.001	-0.52
SIZE	-0.010	-2.32**	-0.010	-3.12***
RELSIZE	-0.010	-1.68*	-0.010	-1.88*
EQUITY	0.001	0.97	0.001	1.18
PRIOR	0.001	0.07	0.001	0.15
RELATED	-0.002	-0.22	-0.002	-0.30
BID_TECH	-0.020	-1.51	-0.020	-1.54
TAR_TECH	-0.003	-0.25	-0.004	-0.36
TOBINQ	0.001	1.53	0.001	1.70*
ZSCORE	-0.001	-1.28	-0.001	-1.25
LEV	0.010	0.55	0.010	0.54
CRISIS	-0.010	-1.53	-0.010	-1.43
CASHHOLDINGS	0.003	0.18	0.003	0.19
INTERESTCOV	0.001	2.27**	0.001	2.39**
FOREIGN	-0.003	-0.25	-0.003	-0.24
RIGHTS	-0.030	-0.39	-0.030	-0.43
Number of Observations	902		902	
Pseudo R^2	3.63%		3.50%	

Notes: The estimation is based on a Least Square model. The t-stats are based on White heteroskedasticity-consistent standard errors & covariance. The dependent variable is the cummulative abnormal return (CAR) of the bidders around the announcement date. Regarding independent variables, BID_REP is the market share of the bidder's investment bank in the previous year. TAR_REP is the market share of the target's investment bank in the previous year. REL_REP is the difference between the reputation of the bidder's investment bank and the reputation of the target's investment bank. SIZE is the logarithm of the total asset of the bidder. RELSIZE is the relative size of the transaction to bidder's market value of equity, as of four weeks prior to the announcement. EQUITY is a dummy variable equal to 1 if the bidder uses all or partial equity payment and 0 otherwise. RELATED equals 1 if the bidder and target have the same four-digit SIC code, 0 otherwise. PRIOR equals 1 if the bidder acquires at least 1 target in the previous 10-year, 0 otherwise. BID_TECH equals 1 if the bidder is a high-tech firm, 0 otherwise. TAR_TECH equals 1 if the target is a high-tech firm, 0 otherwise. TOBINQ is the Tobin Q's ratio of the bidder. ZSCORE is the Altman Z score of the bidder. LEV is the debt ratio of the bidder. CRISIS equals 1 if the transactions happen during 2001-2002 and 2007 crisis, 0 otherwise. INTERESTCOV is the interest coverage ratio of the bidder. CASHHOLDINGS is the bidder's cash holdings scaled by total assets. FOREIGN equals 1 if the deal is a cross-border deal, 0 otherwise. RIGHTS equals 1 if the anti-director rights index is three or above, 0 otherwise. ***, **, and * indicate statistical significance at 0.01, 0.05, and 0.10 level, respectively.

7. Impact of Hiring an Investment Bank on Acquisition Prices of Private Targets

We also test how the hiring of investment banks affect the acquisition prices paid for private targets. A popular technique to evaluate private firm value is the comparable valuation method, in which a firm's value is estimated by applying a valuation multiple to the firm's earnings before interest, taxes, depreciation, and amortization (EBITDA), earnings before interest and taxes (EBIT), sales, or some other performance measures.

Following Officer (2007), we use the ratios of offer price to book value, offer price to earnings, transaction value to sales, or transaction value to EBIT. Moreover, we collect the same median valuation multiples of public firms of target's industry for the same size deciles at the time of the transaction. Then, we compare the valuation multiples of private targets adjusted for the median valuation multiples to test for the impact of the existence of investment banks. To conserve space, we only report results for the ratio of offer price to book value in this section. We use the following model in the cross-sectional analysis with White's correction for heteroscedasticity:

$$MP_i = f(explanatory\ variables, control\ variables)$$

where:

MP_i is the adjusted valuation multiples of target i

We attempt to investigate the impact of the hiring of investment banks on these valuation multiples of private targets. We use the same explanatory variables to examine the influence of hiring investment banks on the valuation multiples of private targets that were used to examine the influence of the investment banks on the bidder share price response. Moreover, we also use the same control variables that were used to examine the influence of hiring investment banks on the bidder share price response.

Table 6 contains the results from our analysis of the impact of hiring an investment bank on the ratio of offer price to book value of the target[6]. The results show that the ratio of offer price to book value of the target is not affected by the decision of the bidder to hire an investment bank. The coefficients for the variables representing the bidder's hiring of an investment bank are not significant. On the other hand, the target's hiring of an investment bank has a positive effect on the valuation multiples of the private target. The coefficient for the target's hiring of an investment bank is positive and significant, implying that private targets that hire investment bank advisors receive higher acquisition prices from the bidders. These results corroborate the findings in the previous section that the target's hiring of an investment bank extracts value from the bidder.

Regarding the control variables, the relative size of the target to the bidder and the leverage of the bidder have a negative impact on the valuation multiples of the private target. Bidders with higher growth opportunities (Tobin's Q) tend to pay higher valuation multiples. The coefficient for FOREIGN is negative and significant, indicating lower valuation multiples for foreign targets. In addition, the private target in a country with high investor protection (as measured by RIGHTS) has higher valuation multiples.

As a robustness check for the ineffectiveness of investment banks with better reputations, we replace the dummy variable used to designate a top-tier investment bank with a continuous variable in order to re-assess the impact of investment bank reputation on the valuation multiple of the private target. Results shown in Table 7 reinforce our previous conclusion that the reputation has no impact on the valuation multiples, as the coefficients for BID_REP, TAR_REP, and REL_REP are insignificant.

8. Impact of Hiring an Investment Bank on Operating Performance of Bidders

Next, we empirically test whether a bidder's change operating performance following its acquisition of a private target is influenced by its decision to hire an investment bank as advisor

[6] The results for the ratio of offer price to earnings, the ratio of transaction value to sales, and the ratio of transaction value to EBIT are similar.

during the acquisition process. Healy et al. (1992) show better long-run operating performance following acquisitions. However, Ghosh (2001) finds no evidence that operating performance improves following an acquisition.

Table 6
OLS Regression Explaining the Valuations of Private Targets

	Dependent Variable = ratio of offer price to book value		Dependent Variable = ratio of offer price to book value	
Variable	Coeff.	t-Stat	Coeff.	t-Stat
Intercept	9.85	2.70***	7.68	2.03**
BID_IB	1.62	-0.81		
TAR_IB	4.12	2.00**		
BID_TOPTIER			0.11	-0.04
TAR_TOPTIER			1.72	-0.53
SIZE	0.27	-0.41	0.95	-1.39
RELSIZE	-1.79	-2.18**	-1.16	-1.37
EQUITY	-0.79	-0.54	-0.13	-0.08
PRIOR	1.03	-0.56	1.43	-0.74
RELATED	0.79	-0.49	-1.29	-0.38
BID_TECH	0.28	-0.12	0.50	-0.21
TAR_TECH	0.41	-0.16	-0.01	-0.01
TOBINQ	0.50	2.01**	0.46	1.80*
ZSCORE	-0.27	-1.13	-0.28	-1.22
LEV	-5.53	-1.87*	-4.86	-1.66*
CRISIS	-1.47	-0.91	-2.04	-1.25
CASHHOLDINGS	-1.95	-0.55	-1.29	-0.38
INTERESTCOV	0.002	-0.32	0.003	-0.48
FOREIGN	-7.83	-3.76***	-6.89	-2.53**
RIGHTS	8.86	1.89*	8.51	1.76*
Number of Observations	179		179	
Pseudo R^2	15.28%		11.25%	

Notes: The estimation is based on a Least Square model. The t-stats are based on White heteroskedasticity-consistent standard errors & covariance. The dependent variable is the adjusted ratio of offer price to book value of the targets. Regarding independent variables, BID_IB equals 1 if the bidder uses an investment banks, 0 otherwise. TAR_IB equals 1 if the target uses an investment banks, 0 otherwise. BID_TOPTIER equals 1 if the bidder uses a top tier investment banks, 0 otherwise. TAR_TOPTIER equals 1 if the target uses a top tier investment banks, 0 otherwise. SIZE is the logarithm of the total asset of the bidder. RELSIZE is the relative size of the transaction to bidder's market value of equity, as of four weeks prior to the announcement. EQUITY is a dummy variable equal to 1 if the bidder uses all or partial equity payment and 0 otherwise. RELATED equals 1 if the bidder and target have the same four-digit SIC code, 0 otherwise. PRIOR equals 1 if the bidder acquires at least 1 target in the previous 10-year, 0 otherwise. BID_TECH equals 1 if the bidder is a high-tech firm, 0 otherwise. TAR_TECH equals 1 if the target is a high-tech firm, 0 otherwise. TOBINQ is the Tobin Q's ratio of the bidder. ZSCORE is the Altman Z score of the bidder. LEV is the debt ratio of the bidder. CRISIS equals 1 if the transactions happen during 2001-2002 and 2007 crisis, 0 otherwise. INTERESTCOV is the interest coverage ratio of the bidder. CASHHOLDINGS is the bidder's cash holdings scaled by total assets. FOREIGN equals 1 if the deal is a cross-border deal, 0 otherwise. RIGHTS equals 1 if the anti-director rights index is three or above, 0 otherwise. ***, **, and * indicate statistical significance at 0.01, 0.05, and 0.10 level, respectively.

Table 7
OLS Regression Explaining the Variation in Valuations of Private Targets

	Dependent Variable = ratio of offer price to book value		Dependent Variable = ratio of offer price to book value	
Variable	Coeff.	t-Stat	Coeff.	t-Stat
Intercept	7.92	2.06**	6.71	2.01**
BID_REP	0.03	-0.24		
TAR_REP	0.06	-0.46		
REL_REP			-0.01	-0.09
SIZE	0.91	-1.37	1.17	2.13**
RELSIZE	-1.17	-1.38	-0.95	-1.34
EQUITY	-0.20	-0.14	0.09	-0.06
PRIOR	1.37	-0.70	1.33	-0.69
RELATED	0.63	-0.40	0.66	-0.41
BID_TECH	0.49	-0.20	0.54	-0.23
TAR_TECH	-0.04	-0.02	0.02	-0.01
TOBINQ	0.46	1.79*	0.44	1.77*
ZSCORE	-0.28	-1.21	-0.28	-1.19
LEV	-4.81	-1.65*	-4.76	-1.64
CRISIS	-2.03	-1.27	-2.22	-1.43
CASHHOLDINGS	-1.64	-0.48	-1.52	-0.46
INTERESTCOV	0.003	-0.46	0.003	-0.50
FOREIGN	-6.58	-3.20	-5.72	-3.44***
RIGHTS	8.22	1.77*	7.17	-1.61
Number of Observations	179		179	
Pseudo R^2	11.21%		10.98%	

Notes: The estimation is based on a Least Square model. The t-stats are based on White heteroskedasticity-consistent standard errors & covariance. The dependent variable is the adjusted ratio of offer price to book value of the targets. Regarding independent variables, BID_REP is the market share of the bidder's investment bank in the previous year. TAR_REP is the market share of the target's investment bank in the previous year. REL_REP is the difference between the reputation of the bidder's investment bank and the reputation of the target's investment bank. SIZE is the logarithm of the total asset of the bidder. RELSIZE is the relative size of the transaction to bidder's market value of equity, as of four weeks prior to the announcement. EQUITY is a dummy variable equal to 1 if the bidder uses all or partial equity payment and 0 otherwise. RELATED equals 1 if the bidder and target have the same four-digit SIC code, 0 otherwise. PRIOR equals 1 if the bidder acquires at least 1 target in the previous 10-year, 0 otherwise. BID_TECH equals 1 if the bidder is a high-tech firm, 0 otherwise. TAR_TECH equals 1 if the target is a high-tech firm, 0 otherwise. TOBINQ is the Tobin Q's ratio of the bidder. ZSCORE is the Altman Z score of the bidder. LEV is the debt ratio of the bidder. CRISIS equals 1 if the transactions happen during 2001-2002 and 2007 crisis, 0 otherwise. INTERESTCOV is the interest coverage ratio of the bidder. CASHHOLDINGS is the bidder's cash holdings scaled by total assets. FOREIGN equals 1 if the deal is a cross-border deal, 0 otherwise. RIGHTS equals 1 if the anti-director rights index is three or above, 0 otherwise. ***, **, and * indicate statistical significance at 0.01, 0.05, and 0.10 level, respectively.

Table 8
OLS Regression Explaining the Variation in Change in Operating Performance of Bidders Following Acquisitions of Private Targets (Year -1 to +1)

Dependent Variable	ΔOP		ΔOP		ΔOP		ΔOP	
Variable	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat
Intercept	-1.51	-0.09	-2.53	-0.12	-2.76	-0.13	-2.48	-0.14
BID_IB	-3.17	-0.78						
TAR_IB	4.22	-0.90						
BID_TOPTIER			-0.20	-0.09				
TAR_TOPTIER			0.09	-0.02				
BID_REP					-0.08	-0.65		
TAR_REP					0.05	-0.19		
REL_REP							-0.06	-0.60
SIZE	-0.05	-0.07	0.17	-0.18	0.22	-0.23	0.16	-0.26
RELSIZE	-7.07	-1.67*	-7.08	-1.68*	-7.07	-1.66*	-7.09	-1.69*
EQUITY	4.07	-0.94	3.95	-0.88	3.96	-0.88	3.92	-0.93
RELATED	-3.16	-1.05	-3.15	-1.07	-3.08	-1.06	-3.1	-1.03
PRIOR	-4.14	-1.27	-3.96	-1.23	-3.96	-1.23	-3.93	-1.23
BID_TECH	-0.94	-0.33	-1.28	-0.54	-1.19	-0.51	-1.16	-0.46
TAR_TECH	0.61	-0.36	0.84	-0.54	0.87	-0.55	0.84	-0.50
TOBINQ	1.10	-1.19	1.01	-1.18	1.01	-1.18	1.01	-1.20
ZSCORE	-1.07	-0.96	-1.09	-0.98	-1.09	-0.98	-1.09	-0.98
LEV	16.02	-0.50	16.48	-0.50	16.51	-0.50	16.45	-0.50
CRISIS	3.86	-0.61	3.76	-0.62	3.75	-0.62	3.77	-0.61
CASHHOLDINGS	0.88	-0.23	1.32	-0.29	1.24	-0.27	1.21	-0.29
INTCOVERAGE	0.01	-0.54	0.01	-0.62	0.01	-0.64	0.01	-0.66
FOREIGN	0.50	-0.24	1.27	-0.45	1.13	-0.39	1.00	-0.46
RIGHTS	-3.84	-1.02	-4.68	-0.97	-4.54	-0.93	-4.38	-1.04
Number of Observations	801		801		801		801	
McFadden R^2	11.05%		10.94%		10.95%		10.95%	

Notes: The estimation is based on a Least Square model. The t-stats are based on White heteroskedasticity-consistent standard errors & covariance. The dependent variable is the change in operating performance of the bidder following the acquisition of the private target. Regarding independent variables, BID_IB equals 1 if the bidder uses an investment banks, 0 otherwise. TAR_IB equals 1 if the target uses an investment banks, 0 otherwise. BID_TOPTIER equals 1 if the bidder uses a top tier investment banks, 0 otherwise. TAR_TOPTIER equals 1 if the target uses a top tier investment banks, 0 otherwise. BID_REP is the market share of the bidder's investment bank in the previous year. TAR_REP is the market share of the target's investment bank in the previous year. REL_REP is the difference between the reputation of the bidder's investment bank and the reputation of the target's investment bank. SIZE is the logarithm of the total asset of the bidder. RELSIZE is the relative size of the transaction to bidder's market value of equity, as of four weeks prior to the announcement. EQUITY is a dummy variable equal to 1 if the bidder uses all or partial equity payment and 0 otherwise. RELATED equals 1 if the bidder and target have the same four-digit SIC code, 0 otherwise. PRIOR equals 1 if the bidder acquires at least 1 target in the previous 10-year, 0 otherwise. BID_TECH equals 1 if the bidder is a high-tech firm, 0 otherwise. TAR_TECH equals 1 if the target is a high-tech firm, 0 otherwise. TOBINQ is the Tobin Q's ratio of the bidder. ZSCORE is the Altman Z score of the bidder. LEV is the debt ratio of the bidder. CRISIS equals 1 if the transactions happen during 2001-2002 and 2007 crisis, 0 otherwise. INTERESTCOV is the interest coverage ratio of the bidder. CASHHOLDINGS is the bidder's cash holdings scaled by total assets. FOREIGN equals 1 if the deal is a cross-border deal, 0 otherwise. RIGHTS equals 1 if the anti-director rights index is three or above, 0 otherwise. ***, **, and * indicate statistical significance at 0.01, 0.05, and 0.10 level, respectively.

Table 9
OLS Regression Explaining the Variation in Change in Operating Performance of Bidders Following Acquisitions of Private Targets (Year -1 to +2)

	Dependent Variable ΔOP		Dependent Variable ΔOP		Dependent Variable ΔOP		Dependent Variable ΔOP	
Variable	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat
Intercept	11.70	-0.86	12.34	-0.88	12.19	-0.87	12.90	-0.90
BID_IB	-2.34	-1.14						
TAR_IB	-1.50	-0.79						
BID_TOPTIER			-2.40	-0.88				
TAR_TOPTIER			0.70	-0.32				
BID_REP					-0.13	-1.00		
TAR_REP					0.06	-0.48		
REL_REP							-0.10	-0.97
SIZE	0.33	-0.51	0.02	-0.04	0.05	-0.09	-0.10	-0.17
RELSIZE	-3.43	-1.08	-3.46	-1.08	-3.47	-1.08	-3.49	-1.09
EQUITY	0.70	-0.35	0.49	-0.24	0.5	-0.25	0.43	-0.21
RELATED	-1.72	-0.98	-1.57	-0.95	-1.55	-0.94	-1.58	-0.95
PRIOR	-4.28	-1.12	-4.18	-1.11	-4.13	-1.11	-4.08	-1.10
BID_TECH	-2.13	-1.24	-2.10	-1.29	-2.03	-1.26	-1.97	-1.22
TAR_TECH	1.06	-0.67	1.11	-0.70	1.07	-0.68	0.95	-0.62
TOBINQ	0.60	1.70*	0.61	1.70*	0.61	1.71*	0.61	1.70*
LEV	-14.65	-0.88	-14.85	-0.89	-14.80	-0.89	-14.97	-0.89
ZSCORE	-1.22	-0.93	-1.22	-0.93	-1.22	-0.93	-1.22	-0.93
CRISIS	0.38	-0.18	0.44	-0.22	0.48	-0.24	0.50	-0.24
CASHHOLDINGS	-2.30	-0.72	-2.53	-0.75	-2.58	-0.76	-2.66	-0.78
INTCOVERAGE	0.01	-0.85	0.01	-0.87	0.01	-0.87	0.01	-0.88
FOREIGN	0.33	-0.18	-0.68	-0.34	-0.67	-0.33	-1.08	-0.52
RIGHTS	-2.58	-0.71	-1.46	-0.49	-1.43	-0.48	-0.95	-0.34
Number of Observations	703		703		703		703	
McFadden R^2	14.63%		14.58%		14.59%		14.59%	

Notes: The estimation is based on a Least Square model. The t-stats are based on White heteroskedasticity-consistent standard errors & covariance. The dependent variable is the change in operating performance of the bidder following the acquisition of the private target. Regarding independent variables, BID_IB equals 1 if the bidder uses an investment banks, 0 otherwise. TAR_IB equals 1 if the target uses an investment banks, 0 otherwise. BID_TOPTIER equals 1 if the bidder uses a top tier investment banks, 0 otherwise. TAR_TOPTIER equals 1 if the target uses a top tier investment banks, 0 otherwise. BID_REP is the market share of the bidder's investment bank in the previous year. TAR_REP is the market share of the target's investment bank in the previous year. REL_REP is the difference between the reputation of the bidder's investment bank and the reputation of the target's investment bank. SIZE is the logarithm of the total asset of the bidder. RELSIZE is the relative size of the transaction to bidder's market value of equity, as of four weeks prior to the announcement. EQUITY is a dummy variable equal to 1 if the bidder uses all or partial equity payment and 0 otherwise. RELATED equals 1 if the bidder and target have the same four-digit SIC code, 0 otherwise. PRIOR equals 1 if the bidder acquires at least 1 target in the previous 10-year, 0 otherwise. BID_TECH equals 1 if the bidder is a high-tech firm, 0 otherwise. TAR_TECH equals 1 if the target is a high-tech firm, 0 otherwise. TOBINQ is the Tobin Q's ratio of the bidder. ZSCORE is the Altman Z score of the bidder. LEV is the debt ratio of the bidder. CRISIS equals 1 if the transactions happen during 2001-2002 and 2007 crisis, 0 otherwise. INTERESTCOV is the interest coverage ratio of the bidder. CASHHOLDINGS is the bidder's cash holdings scaled by total assets. FOREIGN equals 1 if the deal is a cross-border deal, 0 otherwise. RIGHTS equals 1 if the anti-director rights index is three or above, 0 otherwise. ***, **, and * indicate statistical significance at 0.01, 0.05, and 0.10 level, respectively.

More recent studies investigate the relationship between the change in bidder's operating performance and several other characteristics of merger transactions. For example, Megginson et al. (2004) document a positive relationship between changes in focus and long-term performance. Moreover, Carline et al. (2009) attribute the improvement in operating performance of bidders to the corporate governance characteristics of bidders. They argue that changes in operating performance following mergers vary with different levels of corporate governance.

Even though changes in operating performance of the bidder are extensively investigated, little is known about the impact of investment banks as financial advisors on the operating performance following the transaction. Investment banks play a significant role in finding the best match for merging firms. Hence, they should have a significant impact on the subsequent operating performance of the merger.

To test whether the hiring of investment banks will have a positive impact on the long-term performance of bidders in the acquisition of private targets, we use the same explanatory and control variables as in the previous section. We measure operating performance as operating income scaled by sales. According to Heron and Lie (2002), the operating income scaled by sales is immune to the effects that the method of financing might have on some financial statement items.

We measure the industry-adjusted change in operating performance of the bidder and use the following model in the cross-sectional analysis with White's correction for heteroscedasticity to investigate the impact of an investment bank on the operating performance:

$$\Delta OP_{i,j} = f(explanatory\ variables, control\ variables)$$

where:

$\Delta OP_{i,j}$ is the change in operating performance of bidder i in j years after the transaction (j *= 1 and 2).*

Tables 8 and 9 disclose results for the impact of hiring investment banks on the change in operating performance of the bidders from year -1 to year +1 and year +2. Based on these results, there is no evidence that the hiring of an investment bank by either the bidder or the private target has an impact on the operating performance of the bidder. Regarding the control variables, only RELSIZE and TOBINQ are significant. The negative and significant coefficient for RELSIZE indicates that operating performance of the bidder is worse when it acquires a relatively large target. On the other hand, the positive and significant coefficient for TOBINQ indicates that operating performance of the bidder is better when it has higher growth opportunities.

9. Conclusions

The role of investment banks in acquisitions of private targets has received very limited attention. Due to the fundamental differences between acquisitions of private versus public targets such as the difference in information asymmetry between public and private targets, the influence of investment banks on acquisitions of private targets may be unique.

We find that bidders acquiring private targets are more likely to hire an investment bank as advisor when the target's size is large, when they have less experience in acquisitions, when they use equity as a medium of payment, and when they are in high-tech industries. When bidders hire an investment bank, their propensity to hire a top-tier bank instead of a lower tier bank is associated with large target size, equity payment, relatedness between bidder and target, and whether the target is in a high-tech industry.

Private targets that are being acquired are more likely to hire an investment bank when the transaction size is large, and when bidders have low growth opportunities, and are more exposed to potential bankruptcy. Private targets also are more likely to hire an investment bank when the bidder is foreign or when their own country shareholder rights are weak.

When targets hire an investment bank, the selection of a top-tier bank instead of a lower tier bank is associated with the same characteristics. Furthermore, targets are less likely to select a top-tier investment bank when they are not in a high-tech industry and when the economy is in a crisis period.

We also examine how the wealth gains of bidders and operating performance are influenced by the bidder or private target's decision to hire an investment bank as advisor. We find that the bidder's wealth gains are not significantly related to whether it hires an investment bank as an advisor. We also find that the bidder's operating performance following an acquisition of a private target is not related to the bidder's or private target's hiring of an investment bank advisor. However, the bidder's wealth gains are significantly reduced when its corresponding target hires an investment bank as an advisor. Furthermore, we find that targets receive higher valuation multiples when they hire an investment bank as an advisor. These results suggest when private targets hire investment banks, they can extract more benefits from bidders.

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