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Valuation Effects of Private M&As in China

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A B S T R A C T

We examine the valuation effects of Chinese M&As involving a listed acquirer and private target. Using public peers as benchmarks to generate valuation premium/discount for private targets, we show that initial equity ownership reduces acquisition premium. We argue that previous ownership serves as an effective strategy for acquirers to obtain privileged information to negotiate for a lower premium for the private target transactions. Next, using a two-stage model, our findings indicate that instrumented premium/discount and previous ownership negatively affect announcement abnormal returns. This finding is consistent with the first-stage results for acquisition premium.

Keywords: Mergers and acquisitions; Valuation premium and discount; Private targets
JEL classification: G14; G32; G34

1. Introduction

Our main motivation for this study is based on Betton and Eckbo (2000), which suggest that the expected payoff to target firm's shareholders decreases when the acquirer previously owns stake in the target. Extending this argument, we hypothesize that previous ownership is a form of real option and the subsequent acquisition is an evidence of exercising such an option. Logically, an acquirer would not be bothered to pursue additional equity ownership of a target, which it already owns partially unless the acquirer determines that there exists a high possibility of further value creation. Thus, it is reasonable to expect that an acquirer takes advantage of the previous ownership by obtaining privileged information and getting acquainted with the senior management of the target firm. Such an informational advantage as an insider should lead to the possibility of negotiating for a better price. To maximize the information asymmetry between target and acquirer and therefore the value of such a real option, we purposely select Chinese M&A activities involving a private target and listed acquirer using a two-stage least square regression framework. We have two reasons to justify our data choice and empirical design.

Cheng and Mak (2015) first examine the valuation discount-premium puzzle of private firms in China and indicate that a significant portion of their sample exhibits valuation premiums (45% using one-peer matching and 38% with a three-peer matching). This result concludes that non-liquidity factors dominate a liquidity discount in these private target valuations in the Mainland. First, in this study, we choose private M&A deals in China as our sample firms to maximize the information asymmetry between targets and acquirers. In the past two decades, Chinese firms are operating under an economic and business environment with rapid growth. Thus in theory, these fast growing Chinese firms should be ready for IPOs in a relatively short period of time. However, government intervention in the Chinese IPO market is a common phenomenon. For example, there were a total of eight IPO suspensions imposed by the Chinese regulator from 1994 to June 2014. These suspension periods ranged from 4 months to 14 months, making it difficult for qualified Chinese firms to seek required capital for their business through IPOs. Such a fast growth environment with constant intervention to the IPO market can stimulate more private firms with strong growth elements to employ M&As as a viable channel to secure funding for their businesses to compete in the product market[1]. Theoretically, private targets with high growth opportunities imply that a larger portion of their value is based on growth option and smaller portion is due to asset in place, leading to a higher asset valuation uncertainty. Such a data setting should allow us to explore the possible relationship (if any) between private target valuation premium/discount and real option value measured by initial ownership.

Next, we purposely select deals with a private-target and public-acquirer combination because we aim to assess the market reactions of these valuation premiums and discounts. Dong et al. (2006) demonstrate a negative relationship between public target's valuation and the bidder's announcement return. Thus, our analysis can complement the findings on public deals from Dong et al. (2006) by providing empirical evidence on private target transactions. Using an event-study methodology, we can observe the listed acquirer's abnormal return (CAR) around the announcement date and evaluate the stock market effect of private target valuation

[1] For example, in 2013, the volume of M&As in mainland China has increased by 24.3% reaching 1,232 deals and jumped 83.6% to USD 93 billion in terms of dollar value. As of June 2014, the number of deals has already reached 784 (a 79.8% 6-month growth rate) with a total value of USD 51 billion. Also, the proportion of private targets increased significantly, for instance, by 86% during 2014 to March 2015.

premium/discount through a two-stage model. Such an empirical design allows us to observe how the market would price the private target discount as well as premium. A significant relationship between bidders' CAR and premium/discount can also support the conjecture that premium deals are not random noise or outliers but a significant component in M&A activities.[2]

Using an option model to evaluate takeover is not new (e.g., Margrabe, 1978; Hancock, 2010). Our theoretical argument on previous partial ownership as a real option is also based on the literature that information uncertainty determines the value of time-to-build real options and in turn affects how much ownership a firm should acquire initially (Kulatilaka and Perotti, 1998; Folta and Miller, 2002). Folta and Miller (2002) show that firms will acquire majority control under a low level of uncertainty. On the other hand, facing a high level of uncertainty and information asymmetry, firms would prefer partial acquisitions, strategic alliances and joint ventures (Kogut, 1991; Tong et al., 2008; McCarter et al., 2011), instead of committing themselves to large irreversible investment. Through time, information asymmetry is gradually resolved, acquirers have the flexibility to halt, abandon or expand their investment in the target firm. In conclusion, acquirers obtain the time-to-build a real option through the initial ownership stake, and exercise the time-to-build real option by making subsequent larger investments when the conditions are favorable (Li, James, Madhavan and Mahoney, 2007). Consequently, we hypothesize that previous ownership is a form of time-to build real option and negatively related to a private target's valuation premium/discount.

2. Methodology

We first extract Chinese M&A transactions from Thomson One. There are initially 4,373 completed transactions from 1993 to March 2015 (both acquirers and targets are all Chinese companies). The data shows that deals with private targets take up 75% of all transactions in our sample period. There are 3,189 transactions with private targets, (among which, 1,775 deals are acquired by listed acquirers). Finally, only 245 domestic deals with private targets (acquired by listed firms) can be successfully matched with suitable public peers to estimate the valuation premium/discount. For the listed bidder financial statements and stock market data, the China Stock Market and Accounting Research (CSMAR) database is used.

2.1 Estimating Valuation Premium/Discount

Three approaches have been documented in estimating private company valuation: 1) the restricted stock approach; 2) the IPO approach; and 3) the acquisition approach. The first two approaches required that the firm eventually achieve or resume a listing status with observable market prices. Such a requirement will ignore the valuation of most private firms, which would not achieve a listing status. Thus we adopt the acquisition approach, which uses public peers as benchmarks to formulate the private target valuation. Officer (2007) finds the average discounts for private companies relative to matched public companies are 15% to 30%. In this study, we follow Officer (2007) to examine the valuation premium/discount issue for private targets in Mainland China.

Our matching criteria works as follows: (1) the public peer must have the same first three-

[2] Officer (2007), in the data cleaning process, documents that nearly 70% of private targets in the sample are sold at a discount relative to their public peers. This leaves 30% of the private targets are actually transacted at a premium, which were deleted as outliers. We argue that these premium deals involving private targets are not random noises and reflect proper valuation. In this case, premium deals should be included in the sample and these valuation premiums together with the discounts should be priced by the market through the announcement effects.

digit SIC code with the private target[3]; (2) the public target transaction announcement date must be within nine months before or after the announcement of the private target transaction; (3) if there is more than one public targets meeting the first two criteria, the public target with the closest sales amount to the private target's is chosen as the peer. Following Officer (2007), we choose DV/Revenue ratio[4] to calculate the premium/discount[5]:

$$Pre/Dis = \frac{DV/Sales\_Private}{DV/Sales\_Public} - 1 \quad (1)$$

DV/Sales_Private is the DV/Sales ratio of the private target and *DV/Sales_Public* is the same multiple of the public peer.

2.2 Regression Model

Betton et al. (2009) find that a bidder with greater existing ownership (toehold) on a target is able to get a higher probability of merger incidence and a lower premium. We hypothesize that original ownership in the target firm is a form of real option and effectively reduces the valuation premium in the transaction. In addition, we also expect there exists an ownership control premium, leading to a positive relationship between ownership control and the valuation premium. This is our first stage analysis. In order to explore the subsequent valuation effect to listed acquirer, we perform a second stage analysis using bidder's CAR as dependent variable.

Previous studies show that the transaction price may affect the stock price of the bidder (Roll, 1986; Moeller et al., 2004; Moeller et al., 2005). Based on the first stage hypothesis, we further expect that CAR is negatively correlated with premium. In other words, the market should prefer a cheaper deal and react accordingly. For attaining ownership control, it should send a good signal to the market and therefore the announcement effect should be positive.

As our key variable, valuation premium/discount would be used in both first stage and second stage analysis, in order to avoid endogeneity problem, we run two-stage least square regression model. Since no literature shows that the private target firm size[6] may directly affect the CAR of the bidder, target firm size will be used as an instrument variable and will not appear in the second stage regression. We use the premium/discount value generated as the dependent variable in our first stage regression:

$$\begin{aligned} Pre/Dis_t = {} & \alpha_0 + \beta_1 OrigOwn_t + \beta_2 ContOwn_t + \beta_3 IndEql_t + \beta_4 TTMt_t + \beta_5 THerf_{t-1} + \\ & \beta_6 AHerf_{t-1} + \beta_7 SOE_t + \beta_8 LnTSales_t + \beta_9 LnASales_t + \beta_{10} DealSize_t + \\ & \beta_{11} Leverage_t + \beta_{12} Tobit'q_t + \beta_{13} Yeardummies \end{aligned} \quad (2)$$

The fitted value of premium/discount from stage-1 regression in Equation (2) in the stage-2 regression as follows:

[3] Cheng and Mak (2015) discussed the rationale in details on using three-digit SIC code matching.

[4] Ratio of Deal Value to Sales: Transaction value divided by the product of the percentage of the Target's shares acquired and the Target's net sales for the last 12 months ending on the date of the most current financial information prior to the announcement of the transaction.

[5] For clearly distinguishing the discount and the premium valuations, we use a negative figure for the discount and a positive figure for the premium.

[6] The large firm size of a public target will serve as an effective defense for being acquired and the bidder need to pay a premium for buying a large public target (Masulis et al., 2007). So we use the revenue of the private target to measure the target firm size and examine if the private target follows the same logic.

$$CAR_t = \alpha_0 + \beta_1 FittedPre/Dis_t + \beta_2 OrigOwn_t + \beta_3 ContOwn_t + \beta_4 IndEql_t + \beta_5 TTMt_t + \beta_6 THerf_{t-1} + \beta_7 AHerf_{t-1} + \beta_8 SOE_t + \beta_9 LnASales_t + \beta_{10} DealSize_t + \beta_{11} Leverage_t + \beta_{12} Tobit'q_t + \beta_{13} Yeardummies \quad (3)$$

Our key variables are *OrigOwn* (original ownership before acquisition) and *ContOwn* (dummy variable: ownership bigger than 50% after acquisition=1 and 0 otherwise). Controlling ownership can alleviate possible conflict of interest in a company (Berle and Means, 1991) and therefore is valuable because it means more unique benefits (Zingales, 1994; Dyck et al., 2004). Thus, we argue that the bidder will pay more for ownership in order to gain the control status of the private target. *Pre/Dis* is the premium/discount from Eq. (1) and *FittedPre/Dis* is the fitted value of *Pre/Dis* generated from Eq. (2).

CAR_i is the cumulated abnormal return for stock i and is calculated using the market model following Brown and Warner (1985). The M&A announcement date (based on Thomson One) is our event day (t=0). Our estimation period (totally 100 days) starts from the day 120 (t=-120) and ends on the day 21 (t=-21) before the event date.

We attempt to control for variables documented in the literature conditional to data availability. Literature indicates that two categories (firm characteristics and deal characteristics) of control variables that could affect the abnormal return of the bidder around the announcement day. Firm characteristics in our analysis are firm size (Moeller et al., 2004; Roll, 1986), leverage (Dong et al., 2006; Maloney et al., 1993) and Tobin's q (Lang et al., 1991; Servaes, 1991; Moeller et al., 2005; Masulis et al., 2007), and SOE acquirer. Deal characteristics are deal size, intra or inter industry acquisition, technology related acquisition, and product market competition.

Except target firm size (*LnTSales*), which is not in the stage-2 model (Eq. 3), all control variables for Eq. (2) and (3) are the same.

IndEql is the industry equal dummy (Moeller et al., 2005), which equals 1 if the bidder and target is in the same industry[7] and equals 0 if not. As the Chinese government has encouraged the technology sector including technology, media, and telecommunication (TMT)[8] to improve their efficiency and competitiveness through M&A activities, we control for if the target is in TMT (*TTMT* dummy=1). Masulis et al. (2007) report that acquiring a high-technology related company may receive a higher bidder stock return. Since the TMT industries are experiencing a lot of similar opportunities and challenges brought by technological change, we use TMT as control variable for the CAR regression as well.

Following Masulis et al. (2007), we also control the product market competition. *THerf* and *AHerf* are Herfindahl indices for the target and acquirer industries respectively. We compute the index as the squared sum of the fractions of industry sales by all the firms in the same industry (Lang and Stulz, 1992). We indicate our TMT industry classification in Appendix 3. Firm size has been documented in the literature as an important control variable in M&A

[7] We classify all the companies into 38 industries. They are agriculture, mining (energy), mining (mineral), food products, soft drink & liquor & cigarette, clothing & textile, timber & paper products, manufacturing (consumer goods), manufacturing (energy), chemicals, pharmaceutical products, rubber & plastic products, non-metallic mineral products, metal smelting and pressing, metallic products, general equipment, special equipment, automobiles, transportation equipment, electrical equipment, electronic equipment, measuring & control, utilities, construction, wholesale, retail, transportation, hotels & catering, communication, IT, finance, real estate, business support, environmental protection, personal services, social welfare, media, miscellaneous. We list our matching industry classification in Appendix 3.

[8] TMT is first defined by investment banking division, Goldman Sachs. Available at http://www.wallstreetoasis.com/finance-dictionary/what-is-technology-media-telecommunications-TMT

(Moeller et al., 2004). *LnTSales* and *LnASales* are size proxy computed as target's and acquirer's natural log of sales respectively. *SOE* is the dummy variable (equals to 1) if acquirer is a state own enterprise (SOE). *DealSize* is relative deal size as transaction value divided by total asset. *Leverage* is the acquirer's debt ratio, which is defined as total debt divided by total asset. *Tobin's q* is defined as acquirer's Tobin's q ratio provided by CSMAR. *Yeardummies* is group of year dummies.

3. Results

Table 1 reports the distribution of DV/Revenue ratio after matching by target industry and year. Overall result shows that private targets' mean DV/Revenue ratios are significantly larger than those of their public peers, which is consistent with the conjecture that the private targets are young and high growth companies and results on higher DV/Revenue ratio relative to their more mature public peers (Officer, 2007). Our valuation premium/discount values for different samples[9] are reported in Table 2. We find that, premium deals (N=125) are in fact slightly more than discount deals (N=120), supporting our conjecture that, the private premium is a common phenomenon in Chinese M&A market and premium deals should not be deleted as outlier as suggested by the literature (Officer, 2007). Both mean and median premium/discount values are all significant at 1% level. Since the special role of TMT industry in Chinese M&A market, we also check the premium/discount of TMT subsamples. The TMT mean premium/discount of 25.52% is significantly greater than the mean figure of 2.46% for the whole sample.

Table 1: Distribution of DV/Revenue ratios by industry and year

		DV/Revenue Ratio			
		Private		Public	
Industry	N	Mean	Median	Mean	Median
Agriculture, Mining, Construction	4	7.431	7.003	3.185	2.041
Manufacturing	127	5.803	2.398	6.609	4.622
Transportation, Communications, Electric, Gas	5	17.650	3.890	12.133	0.418
Wholesale, Retail	5	3.682	3.088	1.392	1.705
Services	104	15.042	5.463	4.382	2.863
Year	N	Mean	Median	Mean	Median
2010	17	6.767	2.717	12.300	2.261
2011	22	7.613	3.287	8.662	7.758
2012	40	3.994	2.277	4.918	5.557
2013	92	11.855	3.478	4.702	2.971
2014	74	12.227	3.990	4.682	2.863
Total	245	9.950	3.294	5.614	2.971

Table 3 reports the mean and median CAR of the whole sample and three subsamples (discount sample, premium sample and TMT sample). We focus on the short-term

[9] We also replicate Officer (2007)'s procedure to delete the "outliers" with a premium bigger than one. There leaves 164 deals, the mean discount is -30.74% and the median discount is -46.09%, which are both significant different from zero at the 1% level.

announcement windows and conclude that the M&A event has a positive and significant announcement effect Table 4 shows the descriptive statistics of the variable in our regression section. The fitted premium/discount is calculated from the first stage of our regression. All the data are within reasonable range. We also compute the Pearson correlation coefficients of our variables in Appendix 1. Most of the correlation coefficients are relatively low[10], indicating that there is unlikely to be colinearity among the independent variables. The correlations between premium/discount and other variables show the correct signs as expected.

Table 2: Descriptive statistics and two-sample comparison for premium/discount values

	Premium/Discount				
	Total sample	Discount Subsample	Premium Subsample	TMT Subsample	Non-TMT subsample
N	245	120	125	161	84
Mean	2.459**	-0.606**	5.401**	2.531**	2.321**
Median	0.081**	-0.669**	2.150**	-0.133**	0.481**
Min	-0.970	-0.970	0.030	-0.970	-.0970
Max	34.762	-0.024	34.762	34.762	24.762
STD	6.663	0.277	8.335	7.204	5.515
Two-Sample Comparison (Mean Difference)		-6.007		0.210	
P-value (T Test)		0.000**		0.801	
P-value (Wilcoxon Test)		0.000**		0.363	

** Statistical significance at the 1% level.
* Statistical significance at the 5% level.

Table 3: CAR (cumulative abnormal stock return) for various event windows

Table 3 reports the CAR (cumulative abnormal stock return) of the bidder during pre-event window (-10≤t≤-2), announcement windows (-1≤t≤+1, -1≤t≤0, -2≤t≤+2) and post-event window (+2≤t≤+10). We run separately run two-sided t test or Wilcoxon test to examine if the mean or median value is significantly different from zero. We run t test to examine the difference between Premium & Discount subsamples.

		Mean CAR				
	N	(-10,-2)	(-1,0)	(-1,+1)	(-2,+2)	(+2,+10)
Total Sample	245	-0.004	0.029**	0.052**	0.058**	0.017
Discount Subsample	120	-0.020	0.023**	0.036**	0.036**	-0.028
Premium Subsample	125	0.011	0.035**	0.067**	0.080**	0.061**
Mean CAR Difference		-0.031	-0.012	-0.031	-0.044	-0.089
P-value (T Test)		0.144	0.156	0.021*	0.013*	0.003**

** Statistical significance at the 1% level.
* Statistical significance at the 5% level.

[10] Except for Dealsize with Leverage and Tobin's q, and Leverage with Tobin's q.

Table 4: Descriptive statistics

	Dummy code=1	Dummy code=0	Mean	Median	Min	Max	STD
CAR (-1,+1)			0.052	0.039	-0.492	0.266	0.103
Pre/Dis			2.459	0.081	-0.970	34.762	6.663
Fitted Pre/Dis			2.459	2.282	-8.099	18.651	3.384
OrigOwn			5.898	0.000	0.000	96.488	14.609
ContOwn	199	46					
IndEql	122	123					
TTMT	161	84					
SOE	34	211					
THerf			0.055	0.037	0.020	0.825	0.065
AHerf			0.080	0.051	0.020	0.839	0.110
LnTSales			2.247	2.235	-3.817	9.153	1.727
LnASales			4.949	4.806	-1.520	8.204	1.116
DealSize			0.843	0.057	0.001	130.766	8.431
Leverage			0.435	0.282	0.048	29.493	1.874
Tobin's q			2.340	1.773	1.048	32.174	2.382

Regression Results

Our regression coefficients correct for heteroscedasticity and the results are shown in Table 5. The first column of Table 5 shows the results of our first step regression. Our key variable, *OrigOwn*, is negative and significant, meaning that a larger original ownership in the private target is correlated with lower valuation premium or higher discount. This result is consistent with our conjecture that previous ownership is similar to owning a time-to-build real option and allows the acquirer to negotiate for a lower premium for the target.

The dummy variable *ContOwn* is significantly positive, meaning that an acquirer pays more to gain the ownership control of a private target. *THerf* is negative and significant, implying that when the target's product market concentration is higher, the firm is sold with a lower premium or larger discount. *LnTsales* is negatively significant while *LnASales* is positively significant. Consistent with Moeller et al. (2005), these results show that a larger target gets lower premium but a bigger acquirer pays more. Finally, *Leverage* is negatively significant, suggesting that acquirer with higher leverage pays lower premium.

The remaining three columns of Table 5 show the results of our second stage regression with CAR as the dependent variable. *Fitted Pre/Dis* is significantly negative for all three event windows. This finding is consistent with Dong et al. (2006), which report a negative relationship between public target's valuation and the bidder's announcement return. Thus, our analysis complements Dong et al. (2006) by providing support to their findings with our private target transactions.

OrigOwn, our key variable measuring the strategic value of negotiating power, is negatively correlated (and significant in all three event windows) with *CARs*. We argue that, a

higher initial ownership of the target means that, a bigger share of the target's value is already internalized by the acquirer. Thus, this previous ownership would reduce the marginal benefit of further equity ownership increase, leading to a weaker market reaction (CAR) upon announcement. As *OrigOwn* has a negative effect on premium in the first-stage regression, together initial ownership actually has two channels affecting CARs. The indirect channel of initial ownership (through premium) reduces premium and in turn increase CARs, resulting a positive effect to CAR. A direct channel is negative however. These findings suggest that future research may be needed to explore the trade-off and optimal amount of initial ownership to maximize the wealth effect for the bidder, which is beyond the scope of this paper.

The dummy variable *ContOwn* is positively significant in two of the three event-windows. This result indicates that the market welcomes acquisitions achieving ownership control and react favorably. However, the significant and negative relationship between CAR and *IndusEqual* (i.e., the target and bidder are in the same industry) is opposite to the traditional finding that related acquisitions should receive better market reaction. Finally, there is some weak evidence that acquirers buying TMT targets receive higher abnormal return. As robustness test, we employ a different version of Herfindahl Index (use revenues from top 10 firms instead of all firms to compute *THerf* and *AHerf*) and repeat the regression analysis. The findings are basically the same and reported in Appendix 2.

4. Conclusion

We conjecture that previous ownership enables the acquirer to get access to internal information of the private target, which is hard to obtain as an outsider. Such a strategic position is similar to owning a time-to-build real option. The acquirer's further action in purchasing the target again is similar to exercising the real option. Of course, the acquirer only exercises the real option under favorable condition, including paying a lower premium for the target. Thus, we hypothesize that previous ownership is a form of time-to-build real option and negatively related to private target's valuation premium/discount and to bidder's CAR.

Our first stage regression result shows that that acquisition premium (discount) is negatively (positively) correlated with previous ownership but positively (negatively) correlated with ownership control. We conjecture that previous ownership serves as an effective strategy for an acquirer to obtain privileged information to negotiate for a lower premium for the transaction. On the other hand, in order to gain majority control, the acquirer needs to pay more. Our second stage regression result indicates that instrumented premium/discount and previous ownership negatively affect announcement abnormal return, but ownership control and abnormal return is positively correlated. These findings are consistent with the first-stage results for acquisition premium that a cheaper deal is good for the buyer, resulting in a higher CAR. However, the higher the previous ownership percentage, the less the incremental gain of the purchasing more shares by another acquisition, leading to a negative relationship with CAR. Furthermore, related acquisitions exhibit a negative announcement effect as well.

Table 5: Regression analysis

The results for the two stage least-square regression are shown in this table. Regression results for year dummies are not reported here.

	First stage	Second stage		
	Pre/Dis	CAR(-1,+1)	CAR(-2,+2)	CAR(-1,0)
Intercept	-0.646	0.041	0.030	0.022
Fitted Pre/Dis		-0.005*	-0.005*	-0.005**
OrigOwn	-0.042*	-0.001*	-0.002*	-0.001**
ContOwn	2.281*	0.034**	0.033	0.039**
IndEql	0.621	-0.035**	-0.036*	-0.016*
TTMT	-0.848	0.019	0.036*	0.011
THerf	-8.522*	-0.206	-0.279	-0.130
AHerf	10.684	0.022	0.026	0.022
SOE	1.045	0.021	0.029	0.003
LnTSales	-1.827**			
LnASales	0.777*	-0.010	-0.002	-0.004
DealSize	0.416	0.001	0.014	0.00002
Leverage	-1.821*	-0.013	-0.065*	-0.003
Tobin's q	0.347	0.008	0.007	0.002
Yeardummies	Yes	Yes	Yes	Yes
Adjusted R^2	20.51%	14.69%	13.71%	15.51%
F-statistics	4.94	3.63	3.42	3.80
P-Value	0.000	0.000	0.000	0.000
N	245	245	245	245

** Statistical significance at the 1% level.

* Statistical significance at the 5% level.

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Appendix 1: Pearson correlation coefficients

	CAR (-1,+1)	*Pre/Dis*	*Fitted Pre/Dis*	*OrigOwn*	*Cont Own*	*IndEql*	*TTMT*	*SOE*	*THerf*	*AHerf*	*LnTSales*	*LnASales*	*DealSize*	*Leverage*	*Tobin's q*
CAR(-1,+1)	1.000														
Pre/Dis	0.099	1.000													
Fitted Pre/Dis	0.007	0.507**	1.000												
OrigOwn	-0.211**	-0.105	-0.207**	1.000											
ContOwn	0.089	0.039	0.076	0.082	1.000										
IndEql	-0.209**	-0.062	-0.122	0.222**	0.019	1.000									
TTMT	0.090	0.015	0.029	0.035	-0.061	0.083	1.000								
SOE	0.020	-0.085	-0.167**	0.120	0.133*	0.025	0.091	1.000							
THerf	-0.149*	-0.010	-0.020	0.010	0.026	-0.074	-0.333**	-0.010	1.000						
AHerf	0.017	0.202**	0.399**	0.002	-0.147*	-0.275**	-0.051	-0.064	0.090	1.000					
LnTSales	0.154*	-0.388**	-0.765**	0.029	0.181**	0.045	-0.147*	0.287**	-0.124*	-0.097	1.000				
LnASales	-0.090	0.015	0.030	0.056	0.070	-0.061	-0.016	0.340**	-0.080	-0.031	0.092	1.000			
DealSize	0.020	-0.012	-0.023	-0.037	0.047	0.046	-0.076	-0.018	0.043	0.012	0.192**	-0.398**	1.000		
Leverage	-0.004	-0.023	-0.046	-0.020	0.036	0.053	-0.104	0.011	0.054	0.016	0.195**	-0.315**	0.984**	1.000	
Tobin's q	0.094	0.049	0.096	-0.064	0.055	0.092	0.002	-0.057	-0.005	0.005	0.162*	-0.393**	0.837**	0.796**	1.000

** Statistical significance at the 1% level.
* Statistical significance at the 5% level.

Appendix 2: Robust test

In the robust test, we use the top 10 big firms in each industry to calculate HERF index. The results are totally consistent with our results in Table 6.

	First stage	Second stage		
	Pre/Dis	CAR(-1,+1)	CAR(-2,0)	CAR(-1,0)
Intercept	-0.195	0.077	0.066	0.047
Fitted Pre/Dis		-0.004*	-0.004**	-0.005**
OrigOwn	-0.041*	-0.001*	-0.001**	-0.001**
ContOwn	2.265*	0.034**	0.040**	0.038**
IndEql	0.570	-0.035**	-0.017	-0.017*
TTMT	-0.915	0.015	0.018	0.008
THerf10	-11.330**	-0.295	-0.271	-0.189
AHerf10	10.676	0.004	-0.042	0.001
SOE	1.095	0.022	0.008	0.004
LnTSales	-1.846**			
LnASales	0.754*	-0.011	-0.002	-0.005
DealSize	0.372	0.001	0.001	-0.0004
Leverage	-1.647*	-0.010	-0.006	-0.001
Tobin's q	0.369	0.007	0.0003	0.001
Yeardummies	Yes	Yes	Yes	Yes
Adjusted R^2	20.54%	15.91%	13.90%	15.67%
F-statistics	4.94	3.89	3.46	3.83
P-Value	0.000	0.000	0.000	0.000
N	245	245	245	245

** Statistical significance at the 1% level.
* Statistical significance at the 5% level.

Appendix 3: Industry classification (* indicates TMT industry)

No.	Industry description	China Industry	SIC(first 2 or 3 digits)
1	Agriculture	A01-A05	01-02 07-09
2	Mining (Energy)	B06-B07	12-13
3	Mining (Mineral)	B08-B12	10 14
4	Food Products	C13-C14	20
5	Soft Drink, Liquor and Cigarette	C15-C16	21
6	Clothing and Textile	C17-C19	22-23 31
7	Timber and Paper Products	C20-C22	24-26
8	Manufacturing (Consumer Goods)	C24	39
9	Manufacturing (Energy)	C25	29
10	Chemicals	C26 C28	28（283excluded）
11	Pharmaceutical Products*	C27	283
12	Rubber and Plastic Products	C29	30
13	Non-metallic Mineral Products	C30	32
14	Metal Smelting and Pressing	C31-C32	33
15	Metallic Products	C33 C43	34
16	General Equipment	C34	351 354 356 359
17	Special Equipment	C35	352 353 355 358
18	Automobiles	C36	371 375
19	Transportation Equipment	C37	37（371、375excluded）
20	Electrical Equipment*	C38	36（366、367excluded）
21	Electronic Equipment*	C39	357 366-367
22	Measuring and Control	C40-C41	38
23	Utilities	D44-D46	49
24	Construction	E47-E50	15-17
25	Wholesale	F51	50-51
26	Retail	F52	52-57 59
27	Transportation	G53-G60	40-47
28	Hotels and Catering	H61-H62	58 70
29	Communication*	I63	48
30	IT*	I64-I65	737
31	Finance	J66-J69	60-64 67
32	Real Estate	K70	65
33	Business Support	L71 L72 M73- M75	73（737excluded） 81 87
34	Environmental Protection	C42 N76- N78	95
35	Personal Services	O79-O81	72 75-76 88-89
36	Social Welfare	P82 Q83-Q84	80 82-83
37	Media*	C23 R85-R89	27 78-79 84
38	Miscellaneous	S90	86 91-97 99