Controlling Shareholder Stock Pledge, Aggravated Expropriation and Corporate Acquisitions

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Abstract

We examine the effects of controlling shareholder stock pledge on corporate acquisition decisions and associated performance. Consistent with our aggravated expropriation hypothesis, we find that pledging firms in China initiate more takeovers, but these acquisitions conducted by pledging firms experience lower announcement returns. We adopt the difference in differences and the instrumental variable approaches to establish causality. Channel tests further reveal that pledging acquirers overpay for the deals and are more likely to be involved in related party transactions. Cross-sectionally, we find that the relations between the share pledge and corporate acquisitiveness and returns are more pronounced for non-SOEs and firms with high-level excess cash. Lastly, we document that pledging acquirers underperform in the long-run in terms of lower ROAs and a greater likelihood of goodwill impairment. Overall, our findings indicate that controlling shareholders increasingly expropriate minority shareholders through self-serving corporate takeovers after the stock pledge.

1. Introduction

Highly concentrated ownership and the existence of large controlling shareholders in listed firms stand for distinguished institutional features, among others, in many financial markets. Correspondingly, agency conflicts between controlling and minority shareholders due to such ownership structure supersede traditional vertical agency problems among listed firms in in transition economies. In this paper, we focus on a specific capital market activity from the controlling shareholder, namely, the stock pledge and investigate its economic consequences on corporate mergers and acquisitions[2].

Controlling shareholders are subject to the limitation that they cannot easily liquidate their holdings for cash since sales from corporate insiders may convey negative signals to the market and hurt stock prices. Alternatively, controlling shareholders can pledge their shares in exchange for their own financing needs without any dilution on the control of firms. In fact, stock pledge by the corporate controlling shareholder for personal loans is an international phenomenon which can be observed in developed financial markets such as the U.S., the U.K, Australia, Hong Kong, and Singapore, as well as in emerging economies such as China, Taiwan, and India (Chen et al., 2018; Ouyang et al., 2019; Dou et al., 2019). Especially, there is an increasing tendency for the stock pledge to be made by controlling shareholders of Chinese listed firms over the last decade as compared to firms operating in other global economies (Chan et al., 2018; Li, Liu and Scott, 2019).

Nevertheless, it is worth noting that concerns and debates exist among the government, academic researchers, the media, and investors on the insider's stock pledge behavior with mixed results exhibited in the extant literature. On the one hand, studies show that the controlling shareholder stock pledge has negative impacts on corporate decisions and the shareholder's wealth (Chen et al., 2018; Dou et al., 2019). More specifically, the stock pledge is associated with greater equity risk exposure and further divergence of ownership and control, subsequently triggering price-supporting share repurchase activities (Chan et al., 2018), decreased executive pay-for-performance sensitivity (Ouyang et al., 2019), decreased cash dividend payouts (Li, Zhou. Yan, and Zhang, 2019); more earnings management (DeJong, Liao, and Xie, 2020; Signgh; 2018) and reduced innovation productivity (Pang and Wang, 2020). However, on the other hand, some research concludes that the stock pledge is not harmful to shareholder wealth and is even positively

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[2] In this paper, we use the merger and acquisition, M&A, acquisitions and takeovers interchangeably.

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associated with firm value by showing that the pledge can signal the corporate insider's confidence in a firm's future performance (Chen and Hu, 2018; Li, Liu, and Scott, 2019).

To shed light on the above debate, we empirically examine, for the first time in the literature, how the controlling shareholder stock pledge would affect corporate M&A decisions and performance based on the sample of listed firms in China. Associated with the growing prevalence of stock pledge, the regulation in the Chinese financial market requires listed firms to provide detail and timely disclosure of their shareholder's pledge of stocks which provides excellent data availability for comprehensive empirical investigation[3]. We emphasize on corporate acquisitions because they are among the biggest investment decisions with large impacts on the firm's growth and value (Betton, Eckbo, and Thorburn, 2008) and M&A activities of listed firms in China has been expanding over the decade (Jiang, Jiang, and Kim; 2017). Moreover, controlling shareholder expropriation through M&As by means of overpayments, related-party transactions as well as self-serving target selections is severe in emerging markets with weak investor protection and with listed firms with highly concentrated ownership (e.g., Bae et al., 2002; Thraya, 2015; Yang et al., 2019). Recently, this type of expropriation by the corporate insiders in the financial market has raised much attention from the Chinese government and regulatory institutions.[4]

We develop the aggravated expropriation hypothesis which proposes that the controlling shareholder stock pledge would exacerbate the incentives of tunneling, leading to self-serving corporate takeovers and worse acquisition performance. Because the controlling shareholders are often the ultimate owners of the firms via the utilization of ownership pyramids and participation in top management (e.g., Shleifer and Vishny, 1997; La Porta et al., 1999), they are able to take advantage of their decisive voting power and make favorable corporate decisions for their own benefit which could potentially jeopardize the interests of other minority shareholders. When the

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[3] In the early days of the establishment of the Chinese financial market, regulations were developed to provide legislative endorsement for stock pledging as collateral (the PRC Security Law, 1995; the PRC Guarantee Law, 1995). Unfortunately, though this regulatory framework originally aimed to facilitate shareholders' personal financing and to improve market mechanism and efficiency, it could be misused and even abused by the large shareholders and corporate insiders. As per the 2013 publication of "The Guidance on Stock Pledge Repurchase Transactions, Registration, and Settlement", security companies are permitted to participate in pledge activities as pledgees further expand the supply of credit and encourage shareholders to pledge their shares as collateral for personal financing.

[4] See the official conference press on February 27th, 2019 by YI Huiman, the chairman of the China Securities Regulatory Commission (http://egs.stcn.com/live/detail?id=563) and also the media address on the Shenzhen Stock Exchange (http://www.21jingji.com/2019/2-28/1MMDEzNzhfMTQ3MzU1Mg.html).

controlling shareholders pledge shares, they transfer their cash-flow rights on the pledged stocks to loan providers[5] while retaining the voting power of those pledged shares. As long as the stock price does not trigger the margin calls, the stock pledge would result in a further divergence between the cash flow rights and control rights of the corporate insiders. More importantly, the stock pledge by the controlling shareholder is not a temporary behavior in the short term. In fact, such pledge status can remain for a prolonged period.[6] Consequently, the further divergence of cash flow rights and control induces long-lasting entrenchment problem. The existing expropriation by the controlling shareholders could be aggravated either due to the exacerbated negative entrenchment effect brought by the relatively increased control rights (e.g., Stulz, 1988; Claessens et al., 2002) or to the weakened positive incentive effect because of the reduced cash-flow rights (e.g., Morck et al., 1988; Claessens et al., 2002).

Firms subjected to severe agency problems on the controlling shareholder are more likely to make poor investment decisions, especially self-interested acquisitions (e.g., Jensen, 1986; Morck et al., 1990; Stulz, 1990; Harford, 1999; Bebchuk, Kraakman, and Triantis, 2000; Bae et al., 2002). To be more specific, by using M&A transactions, the controlling shareholder could tunnel cash flows (Bae et al., 2002); achieve related party transactions (Cheung et al., 2006; Cheung et al., 2009); overpay in M&A deals at the expense of minority shareholders to extract private benefits (Thraya, 2015; Thraya and Hamza, 2019); and gain political benefits from the local government (Yang et al., 2019). Thus, the aggravated expropriation hypothesis predicts that firms with stock pledges are more likely to conduct ill-willed acquisition, leading to a relatively poor stock market reaction upon announcements.

Empirically, we do find that the aggravated expropriation hypothesis dominates in the observations of our sample. First, we find that firms have increased acquisition activities after their controlling shareholders pledge stock. Second and more importantly, acquisitions initiated by

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[5] According to *The Guarantee Law of the People's Republic of China of 1995*, "A pledgee has the right to collect the derivatives of the hypothecated assets". See the article 68 of the law (http://www.npc.gov.cn/wxzl/gongbao/1995-06/30/content_1480123.htm).

[6] The pledges in our sample are long-term, 81.08% of the firms remain stock pledge status in two years after the M&A. For all firms in our sample, once a firm start to have controlling shareholder stock pledge, over 61.07% of the firms have pledge status to the end of the year in our sample. 62.8% firms remain stock pledge status for overt eight years.

pledging firms[7] experience lower announcement returns. Our results are robust to alternative variable measures, samples, and fixed effects. To establish causality, we conduct two additional analyses using the difference in differences (DID) and the instrumental variable (IV) approaches on our main baseline analyses. The results are consistent with the prediction that stock pledges made by the controlling shareholder would induce agency problems, increase incentives of expropriation and lead to self-serving acquisitions.

Next, exploring mechanisms of expropriation through corporate M&As, we find that the controlling shareholder stock pledge is positively related to the takeover premiums, thereby indicating that corporate decision-makers systematically overpay in those transactions. In addition, we document that acquisitions made by pledging firms are more likely to be related party transactions, supporting our argument that controlling shareholders of the pledging firms tend to exploit corporate acquisition as a tool of extracting private benefits at the expense of minority shareholder interests. Besides, we document that the relationship between the stock pledge and returns is stronger for non-SOEs and firms with high-level excess cash. Lastly, we find that firms with controlling shareholders engaged in stock pledging underperform in the long run as reflected by lower ROAs and a greater likelihood of goodwill impairment after the acquisitions. Overall, we find that stock pledge increases the propensity of corporate takeovers but such acquisitions are subjected to the tunneling and expropriation.

This paper responses to the call of Jiang and Kim (2020) on further research in the interaction between corporate governance and stock markets as well as in the market of corporate control in China. Specifically, the contributions of this paper are three-fold to the literature. Firstly, we make contributions to the vast literature exploring the economic consequences of agency problems and controlling shareholder expropriation. In many developed financial markets, agency problems mainly present in the form of a conflict of interests between shareholders and the corporate manager. Therefore, most of the research examines the agent-principal problem, as well as managerial self-interest as determinants of motivation for M&A activity. However, the agency conflict between controlling and minority shareholders dominates in the emerging economies including China (e.g., La Porta et al., 1999; Claessens et al., 2000; Jiang and Kim, 2020). Due to such agency problems, the corporate acquisition is unlikely to be purely driven by the economic

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[7] In this paper, we also use pledging firms to refer firms with controlling shareholder stock pledge.

incentive (Yang et al., 2019). Therefore, we provide new evidence that even controlling shareholder's personal behavior, i.e., share pledge, would affect important corporate decisions. Ultimately, our findings deepen the understanding that controlling shareholders could expropriate the interests of minority shareholders through the mechanism of corporate acquisitions.

Secondly, we further contribute to the literature on the merger and acquisition. While the M&A literature has investigated the antecedents of acquisition behavior in some aspects of the corporate insider, including CEO compensation (e.g., Agrawal and Walkling, 1994; Sanders, 2001; Deutsch, Keil, and Laamanen, 2007), managerial hubris (e.g., Hayward and Hambrick, 1997; Malmendier and Tate, 2008), executive networks (e.g., Haunschild, 1993; Haunschild and Beckman, 1998; Westphal, Seidel, and Stewart, 2001), acquisition experience (e.g., Haleblian, Kim, and Rajagopalan, 2006), the effect of the controlling shareholder stock pledge on corporate acquisition decision and performance is still unexplored. Hence this paper provides an innovative angle to explain the incentive of corporate takeovers, and we find that stock pledge made by the controlling shareholder is one of the important antecedents for corporate acquisition which is still uncovered in the prior literature.

Last but not at least, we extend the growing research on the share pledge by documenting its effect on corporate real investment decisions and the long-term economic consequences. The unique characteristic of the stock pledge has attracted extensive attention from the academia. However, only limited studies have been conducted to investigate the effects of controlling shareholder stock pledge behavior on corporate real-investment decisions such as corporate takeovers and their associated performance. By documenting a causal effect of share pledging on self-serving M&A decisions, our findings have significant policy implications regarding minority shareholder protection and the debate on the propriety of the stock pledge.

The rest of the paper proceeds as follows: Section 2 discusses the related literature and presents the development of our main hypothesis; Section 3 introduces the data and sample as well as descriptive statistics; and the empirical results are shown in Section 4. In Section 5, we conclude the paper.

2. Research background and hypothesis development

2.1 Related literature

There is a growing body of research providing evidence that insiders' stock pledge is associated with equity risk and agency problems. By analyzing manually collected pledging data from US firms against an exogenous shock to the credit market lending capability (2008 financial crisis), Anderson and Puleo (2020) find a significant causal effect between insider pledge behavior and firm-specific risk. There are also antecedent studies using stock pledge data in Taiwan. Chen and Kao (2011) find that stock price volatility is positively related to bank insiders' stock pledges. They further document such pledge activity as being negatively associated with firm value. Chan et al. (2018) find that firms controlling shareholder stock pledges are more likely to engage stock repurchase, especially when they face margin call pressure. Wang and Chou (2018) find that regulatory amendments on preventing pledges could mitigate the agency problem. Moreover, Dou et al. (2019) find that the negative causal impact of stock pledges on shareholder wealth is due to the increased crash risk of firms and reduced corporate risk-taking.

Besides, more studies rely on the pledge data in Mainland China and make considerable contributions. To illustrate, Pang and Wang (2020) find that both the existence and the quantitative level of the stock pledge by the firm's controlling shareholder are negatively associated with corporate innovation outputs. Ouyang et al. (2019) contend that stock pledge initiated by the corporate insider exacerbates agency problems and find that insiders' stock pledges are negatively associated with executive pay-for-performance sensitivity. Li, Zhou, Yan, and Zhang (2019) find that firms with shares pledged by controlling shareholders have fewer cash dividend payments as compared to firms without such a stock pledge. They also find that firms tend to pay fewer cash dividends after their controlling shareholders pledge the shares, further concluding that such a decrease in the tendency of dividend payout reflects the controlling shareholders' strong incentive to transfer cash and assets to expropriate minority shareholders. From the accounting perspective, Singh (2018) and DeJong, Liao, and Xie (2020) provide evidence that stock pledge by the controlling shareholder encourages a firm's earnings management by using the S&P 1500 firms and Chinese listed firms respectively.

Our study also relates to the literature of the controlling shareholder expropriation on corporate resources and investments. The horizontal agency problem contends that the conflicts

between controlling and minority shareholders are more prevalent and severe among firms with high concentration of ownership and in countries with poor investor protection (e.g., Shleifer and Vishny, 1997; La Porta et al., 1999; Claessens et al., 2000). Such a wedge between control and ownership would induce severe agency problems and expropriation over the minority shareholders. Shleifer and Vishny (1997) suggest that large shareholders would prefer to make corporate decisions to generate private benefits of control that are not shared by other minority shareholders. Zingales (1994) suggests that the pricing premium associated with voting rights attributes to the private benefits of control brought by the concentrated ownership. Bebchuk, Kraakman, and Triantis (2000) also propose that dispersion between controlling shareholders' voting rights and cash flow rights creates a substantial magnitude of agency costs. Stulz (1988) argues that concentrated ownership gives corporate insiders more discretion to misallocate resources. Similarly, Morck, Wolfenzon, and Yeung (2005) suggest that such divergence can result in inefficient investments when controlling shareholders seek their own private benefit. Further, empirical studies document that controlling shareholders initiate self-serving takeovers at the expense of minority shareholders.[8] For instance, Bae et al. (2002) provide evidence that controlling shareholders would make acquisitions through affiliated firms to increase their own wealth while leaving the minority shareholders to lose. In sum, there is adequate empirical evidence showing that the agency problem affects corporate acquisition incentives and outcomes.

2.2 The aggravated expropriation hypothesis

Previous studies suggest that the entrenchment effects induced by excess control rights would lead controlling shareholders to engage in various forms of expropriation such as tunneling and misallocating resources. Consistent with this line of literature, the aggravated expropriation hypothesis suggests that, due to the divergence of cash flow rights and voting rights caused by the prolonged stock pledge, the controlling shareholder has more incentive but lower costs to expropriate, driving self-interested acquisitions while sacrificing the interests of minority shareholders.

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[8] Notable related M&A research also includes but not limited to: Amihud and Lev (1981); Jensen (1986); Lang et al. (1991); and Harford (1999).

The stock pledge activities among Chinese listed firms are prevalent as controlling shareholders typically pledge a large proportion of their shares and such pledge status would remain for a long duration. In our sample among the pledging firms, controlling shareholders pledge 59.7% of the total shareholding on average and once a firm starts to have controlling shareholder stock pledge, over 61.07% of the firms have pledge status to the end of the year in our sample. 62.8% of firms remain stock pledge status for overt eight years. Stock pledge activities can aggravate the expropriation because when controlling shareholders pledge their shares for a prolonged period, they transfer cash flow rights on the pledged stocks to the pledgee.[9] As long as the pledge does not default, pledgers still retain their voting rights (Li, Zhou, Yan, and Zhang, 2019). The relatively excessive control rights enable controlling shareholders to take self-serving corporate policies while lower cash flow rights would lead to entrenchment problems and increase the incentives of the large shareholder to expropriate (Bozec and Laurin, 2008). Therefore, a long-term stock pledge would result in prolonged excessive voting rights of controlling shareholders, thus encouraging them to pursue private benefits at the expense of minority shareholders (Bozec and Laurin, 2008; Wang and Chou, 2018; Zhao et al., 2019; Ouyang et al., 2019; Li, Zhou. Yan, and Zhang, 2019).

More specifically, the controlling shareholders who pledge their shares maintain their decisive voting power on important corporate decisions but incur less risk to bear the residual claims generated by the operating cash flows from the firm. Previous studies suggest that the payoff structure of stock pledge is "call option like" where controlling shareholders reap benefits on their cashed out capital and unlimited potential appreciation on the stock but the downside risk is effectively hedged by transferring the obligations to the capital providers such as banks and security firms (Dou et al., 2019; Pang and Wang, 2020). Moreover, controlling shareholders typically have a large proportion of their stock pledged and long-lasting pledge status once they initiate pledging activities. Consequently, the costs of conducting expropriation for self-interest is reduced in the long run, and controlling shareholders are thus more prone to spend corporate resources to generate private benefits of control that are not shared by minority shareholders even if such actions are not profit-maximizing (Shleifer and Vishny, 1997). As a result, the stock pledge

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[9] One may have concern that the controlling shareholder could time or decrease the dividend payout. However, as found by Li, Zhou, Yan, and Zhang (2019), pledging firms have 19% payout ratio which is still substantial and comparable (though less) to non-pledged firms which have 22% payout ratio.

exacerbates entrenchment effects and weaken the positive incentive effect on the controlling shareholder (Claessens et al., 2002) in the long horizon.

Controlling shareholder expropriation in the form of acquisitions is common in emerging markets with weak investor protection and with highly concentrated ownership, especially among the listed firms in China (Yang et al., 2019). The extant literature suggests that controlling shareholders exploit acquisitions in many ways to pursue private benefits. First, the controlling shareholder could use M&A transactions to tunnel the cash flows among the subsidiaries within the firm or transfer the wealth out of the current corporation (e.g., Johnson et al., 2000; Bae et al., 2002). Secondly, when the related party transaction is involved in the acquisition, the acquirer takes advantage of transfer prices to facilitate transactions with certain entities affiliated to the controlling shareholder (Cheung et al., 2006; Cheung et al., 2009). Thirdly, corporate acquisitions in China could also provide potential opportunities for controlling shareholders to gain political benefits from the local government (Yang et al., 2019). Fourthly, controlling shareholders can utilize the acquisitions to exercise their discretion on corporate activities to divert resources (e.g., cash) away from the distribution to other shareholders (Harford, 1999; Bhaumik and Selarka, 2012). Fifthly, the prior literature contends that controlling shareholders overpay in M&A deals at the expense of other stakeholders to satisfy their private benefits (Thraya, 2015; Thraya and Hamza, 2019). Last but not at least, in countries where nepotism is a common practice, managers are closely related to the family of the controlling shareholder (e.g., Shleifer and Vishny, 1997; La Porta et al., 1999). When controlling shareholders possess excess control rights, they may collude with managers to expropriate the minority shareholders (Zhang et al., 2014). Thus, such rent-sharing behavior among controlling shareholders and managers would alter the corporate decision prone to takeovers for the benefit of the manager's own job security (e.g., Amihud and Lev, 1981) or empire-building to increase the firm size for excessive compensations (e.g., Jensen, 1986).

We are not unaware that there are other reasons to believe that stock pledge could decrease the incentive of conducting corporate acquisition. For instance, Dou et al., (2019) suggest that margin call pressure after the stock pledge increases the firm's crash risk and creates the fear of losing control among the corporate insiders. To avoid unexpected fluctuation in the stock price, controlling shareholders' reduced risk-taking preference may result in a decline in the level of M&A activity. However, in the practice, the controlling shareholder can avoid the forced sale of

their pledged shares by supplementing more assets to collaterals and negotiating with the pledgee to extend the pledging duration.[10]Thus, the negative effect of stock pledge on the acquisition motivation is unlikely to manifest compared to the prolonged expropriation incentives.

In short, pledge-induced entrenchment resulted from the prolonged divergence between controlling shareholders' cash flow rights and voting rights drive expropriation over minority shareholders in the preference of self-interested acquisitions to pursue private benefits. Thus, the aggravated expropriation hypothesis firstly predicts that firms with the stock pledge by their controlling shareholders are more likely to conduct merger and acquisitions subjected to tunneling. Moreover, the previous studies also provide evidence that the market reacts less favorably and that the acquirer typically experiences negatively announcement returns when the acquisitions are suspected as self-serving takeovers (e.g., Lewellen, Loderer, and Rosenfeld, 1985; Morck, Shleifer, and Vishny, 1990; Lang, Stulz, and Walkling, 1991; Berkovitch and Narayanan, 1993; Harford, 1999; Harford et al., 2012). Therefore, the expropriation hypothesis also posits that acquisitions driven by the controlling shareholder's own interests tend to have bad quality and unfair payment in the deal, which in return, receives the negative market reaction when pledging firms announce their decision of acquisition. Collectively, although tension exists in the research question, on balance, we state our primary hypothesis as follows:

The aggravated expropriation hypothesis: *Stock pledge is positively related to the level of corporate acquisition activity but negatively related to the announcement returns of these acquisitions.*

3. Data and descriptive statistics
3.1 Sample construction

Our initial sample includes all firm year observations of A-share Chinese listed companies from 2003-2017. All the financial information is taken from the China Stock Market and Accounting Research (CSMAR) database. Our sample begins in 2003 because CSMAR starts to report pledge information of the top 10 shareholders in that year. Following the prior literature, we

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[10] See official media address from both Shanghai Stock Exchange (http://www.sse.com.cn/aboutus/mediacenter/hotandd/c/c_20180626_4579779.shtml) and the Shenzhen Stock Exchange (http://www.szse.cn/aboutus/trends/news/t20180626_552064.html).

exclude firms in the financial sector. All the continuous variables are winsorized at 1% and 99% levels to mitigate the concern of the extreme values. We obtain M&A data from CSMAR Chinese Listed Firms' M&A and Asset Restructuring Research Database. It worth noting that our M&A sample is from 2004-2018, one year ahead of pledge and other controls. We follow the previous studies to define the largest shareholder as the controlling shareholder (e.g., Jiang et al., 2010; Jiang and Kim, 2015, Pang and Wang, 2020). In our sample, the mean of the largest shareholders' ownership is 36.3% which also far exceeds 20% ownership cutoff suggesting the existence of controlling shareholder defined by La Porta et al. (1999).

We use the following criteria to filter our M&A sample: (1) acquirers would be A-share publicly-listed companies; (2) transaction type is limited to mergers, tender offers, and acquisitions of assets; (3) we exclude the observations with more than one deal announced during one year to mitigate the concern of contamination issue (e.g., Zhou et al., 2015; Bi and Wang, 2018); and (4) the acquirers must have necessary data in our first M&A tendency regression. Our final M&A sample includes 6,553 deals. Because in the CAR (cumulative abnormal return) analysis, we need deal level information as well as data on the preannouncement stock return to estimate the market model, our sample further drops to 5,532. We include both complete and failed deals in the sample following Yang et al. (2019). However, in the long-term tests, i.e., post-M&A accounting performance and goodwill impairment, we only include complete deals.

3.2 Summary statistics

Table 1 presents the summary statistics for the key variables of the full sample and subsamples for acquirers and non-acquirers. A detailed definition of variables is provided in Appendix A. On average, 37.1% controlling shareholders from the acquirers pledge the shares during the sample period, while only 30.5% of the non-acquirers do so. The difference is significant at 1% level, indicating that pledging firms are more likely to conduct M&A transactions.

Firm size is comparable between acquirers and non-acquirers, with means (median) of 21.8 (21.6). Acquirers show better performance than non-acquirers in terms of both stock return and *ROA*. The mean (median) annual return is 39.6% (10.4%) for acquirers and 29.3% (2.6%) for non-acquirers. The mean (median) *ROA* is 3.9% (3.8%) for acquirers and 3.2% (3.4%) for non-acquirers. With regards to liquidity, acquirers hold more cash and have lower leverage compared

to non-acquirers, which is consistent with the literature which indicates that firms with greater liquidity have a stronger propensity to conduct M&A (e.g., Yang et al.,2019). Acquirers and non-acquirers have a similar percentage of intangible assets and capital expenditures. Acquirers have slightly higher Tobin's Q with the mean (median) of 2.74 (2.10) than non-acquirers (mean: 2.61; median:1.93). The controlling shareholders hold, on average, 35.7% of shares in acquiring companies and 36.5% of shares in non-acquiring companies. In both acquiring and non-acquiring firms, there are about nine directors on the board, and 37% of them are independent board members. Moreover, 41.6% of the acquirers are state-owned enterprises, while 49.9% percent of the non-acquirers are SOEs. The percentage of CEO duality is higher for acquirers (23.2%) than non-acquirers (20.5%).

In terms of deal characteristics, 83.9% deals are paid by pure cash while 8.2% of deals are paid by cash-related payment methods. Takeover premium has a mean of 48.9% and a median of 0.00%. The mean (median) of 7-day and 11-day cumulative abnormal returns are 2.0% (0.2%) and 2.2% (0.2%) respectively. 37.9% of M&A deals are related party transactions. 11.5% of the acquisitions belong to significant deals. On average, the deal value accounts for 23.9% of the acquirer's total assets. The mean (median) stock run-up for 200 trading days ending 61 days before the deal announcement is 23% (4.0%). Most of the deals (93.5 %) are finally completed.

4. Main Results

4.1 Controlling shareholder stock pledge and firm M&A tendency

We first study how controlling shareholder stock pledge affects the M&A tendency. To investigate the relationship, we estimate the following model:

$Prob\ (M\&A_{i,t+1}=1) = a + b_1 Pledge\_Dummy_{i,t} + b_2 Size_{i,t} + b_3 Annual\ Return_{i,t} + b_4 Cash_{i,t} + b_5 ROA_{i,t} + b_6 Intangible_{i,t} + b_7 Leverage_{i,t} + b_8 Capital\ Expenditure_{i,t} + b_9 Tobin's\ Q_{i,t} + b_{10} Controlling\ Ownership_{i,t} + b_{11} Board\ Size_{i,t} + b_{12} Board\ Independent_{i,t} + b_{13} SOE_{i,t} + b_{14} CEO\ Duality_{i,t} + Industry\ FEs + Year\ FEs + Province\ FEs + \varepsilon_{i,t}$ (1)

where i represents the firm, and t represents the year. The dependent variable, $M\&A_{i,t+1}$, is a dummy that equals 1 if firm i announces a merger and acquisition in year $t+1$, and 0 otherwise. The variable of interest, $Pledge\_Dummy_{i,t}$, is a dummy that indicates the existence of controlling

shareholder pledge at the end of the year. The aggravated expropriation hypothesis predicts b_1 to be positive.

We include a set of control variables in the regression following the prior literature. *Size* is the natural logarithm of total assets. *Annual Return* is the annual stock return for the acquirer before the corporate acquisition. *Cash* is the ratio of cash and cash equivalent to the firm's total assets. *ROA* is the net income divided by total assets. *Intangible* equals to intangible assets divided by total assets. *Leverage* equals total debts divided by total assets. *Capital Expenditure* is the capital expenditure scaled by total assets. *Tobin's Q* equals the sum of the market value of equity and total liabilities divided by total assets. *Controlling Ownership* is the percentage of shares owned by the controlling shareholder. *Board Size* equals to the total number of members on the board of directors. Board *Independent* is the ratio of the independent board members to the board size. *SOE* is a dummy variable that equals one if the firm is state-owned in a given year and zero otherwise. *CEO Duality* is a dummy that equals one if the CEO is also the chair of the board and zero otherwise.

We add industry fixed effects to control for industry-specific characteristics that affect M&A tendency. We use the CSRC 2012 Classification to define the industry. CSRC Classification includes one letter and two digits. We also include year fixed effect to control for time-invariant differences. Because there are huge variations of economic conditions and financial developments across provinces in China, it is plausible that the unique characteristics of the province could affect both share pledge and M&A decisions. Therefore, we also add province fixed effects following Yang et al. (2019). The standard errors are clustered at the firm level. We estimate equation (1) using the probit model.

Table 2 shows the regression results. The coefficient on our variable of interest, *Pledge_Dummy*, is positive and significant at 1% level, showing that firms with the controlling shareholder pledging their shares are more likely to announce an M&A in the following year. The results are in line with the prediction that firms with the stock pledge by their controlling shareholders are more likely to conduct merger and acquisitions.

4.2 Stock pledge and announcement effects of M&As

To investigate whether stock pledge by the controlling shareholders affects the value of the acquiring company, we use the event study method and estimate the following OLS model:

$CAR[-3,+3]_{i,t+1}$ / $CAR[-5,+5]_{i,t+1}$ $=a+ b_1Pledge\_Dummy_{i,t} + b_2Size_{i,t} + b_3Annual\ Return_{i,t} + b_4Cash_{i,t}$ $+ b_5ROA_{i,t} + b_6Intangible_{i,t} + b_7Leverage_{i,t} + b_8Capital\ Expenditure_{i,t} + b_9Tobin's\ Q_{i,t} + b_{10}\ Controlling$ $Ownership_{i,t} + b_{11}Board\ Size_{i,t} + b_{12}Board\ Independent_{i,t} + b_{13}SOE_{i,t} + b_{14}CEO\ Duality_{i,t} +$ $b_{15}Related_{i,t+1} + b_{16}Significant_{i,t+1} + b_{17}Relative\ Size_{i,t+1} + b_{18}\ Runup\_stock_{i,t+1} + b_{19}Cash\ Payment_{i,t+1}$ $+ b_{20}Cash\ Mixed_{i,t+1} + Industry\ FEs + Year\ FEs + Province\ FEs + \varepsilon_{i,t}$ $\qquad\qquad (2)$

CAR [-3, +3] (*CAR [-5, +5]*) is the cumulative abnormal stock return over the 7-day (11-day) event window centered on the acquisition announcement date. We estimate the parameters of the market model using 200 trading days ending 61 trading days prior to the deal announcement date. CARs are calculated using the estimated parameter for different event windows.

Compared to equation (1), we further control for deal characteristics. *Related* is a dummy that equals 1 if the deal is a related party transaction, and 0 otherwise. *Significant* is a dummy that equals 1 if the deal is a significant transaction[11], and 0 otherwise. *Relative Size* is the ratio of deal value to the acquirer's total assets. *Runup_stock* is the daily buy and hold Shanghai and Shenzhen value-weighted stock returns over the period beginning at 260 days and ending at 61 days prior to the announcement date. *Cash Payment* is a dummy that equals one if the payment is pure cash, and zero otherwise. *Cash Mixed* is a dummy that equals one if the payment involves cash and other types of payment, and zero otherwise.

Table 3 presents the OLS regression results for CAR. As shown in column (1) and (2), after controlling for the various acquirer and deal-specific factors, the coefficients on *Pledge_Dummy* are still negative and significant. The coefficient of -0.008 (-0.009) suggests that the pledging firms experience 0.8% (0.9%) more negative M&A announced returns during the 7-day (11-day) window as compared to non-pledging firms. The negative coefficients support the aggravated expropriation hypothesis that pledging companies experience more negative market reactions to the M&A deals.

The coefficients on other controls are generally consistent with the literature. Similar to Moeller et al. (2004), we find a negative relationship between *CAR*s and *Size*. As Masulis et al. (2007), our results also show that acquirers with more positive price run-up before announcements

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[11] Also known as major deals which are large M&A deals with the deal value exceeds 50 percent of the listed firm's size. See the appendix of Zhang et al. (2019) for detailed discussion.

are associated with lower announcement returns. While the positive coefficients on *Significant* and *Relative Size* and the negative coefficient on *Cash Payment* and *Cash Mixed* are opposite to the U.S. research, it is consistent with Chinese literature (e.g., Liu et al., 2016; Yang et al., 2019). The results show that Chinese investors have a higher expectation on M&A deals with larger size and noncash payments.

4.3 Robustness tests for baseline results

To confirm the robustness of our results on the relationships between the stock pledge and M&A tendency and announcement returns, we conduct a series of sensitive checks using the alternative definition of stock pledge, fixed effects, and sample selections. Table 4 and Table 5 report the robustness tests results on M&A tendency and CARs respectively. Our first robustness test uses the ratio of the number of shares pledged to the total number of shares held by the controlling shareholder (*Pledge_Percent*) as the independent variable. *Pledge_Percent* measures the degree of further separation of cash flow rights and control rights by the controlling shareholder arising from share pledge. Table 4 column (1) shows that the coefficient on *Pledge_Percent* equals to 0.162 and significant at 1% level, which is consistent with the baseline of M&A tendency. Regarding CARs, coefficients on *Pledge_Percent* are both negative and statistically significant. As presented in Table 5 column (1) ((2)), one standard deviation increase in the percentage of share pledge decreases the 7-day (11-day) announcement return by 0.5% (0.6%).

Secondly, we conduct analyses with firm and year fixed effects to further control for omitted characteristics of acquirers that could affect both pledge and M&A announcement return. Specifically, we are comparing the M&A likelihood and deal announcement returns of the acquirer when its controlling shareholder does not pledge the share with that of the same acquirer when the controlling shareholder pledges the share. Results in Table 4 column (2) and Table 5 column (3) - (4) are consistent with baseline regressions, which suggest that the controlling shareholder expropriation is exaggerated within the firm after their controlling shareholder pledges the shares.

Lastly, we test whether the results hold in different samples. In Table 4 column (3) and Table 5 column (5) - (6), we drop the special treatment (ST) stocks, i.e., firms report losses for two consecutive years. The results remain quantitatively unchanged after dropping those firms. Next, we exclude the small transactions with the deal value of less than 1% of the acquirer's total assets,

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thereby decreasing the M&A sample to 3,822. Results in column (4) of Table 4 and column (7) and column (8) in Table 5 suggest that the relations between the stock pledge and M&A likelihood as well as the announcement CARs are still robust. To mitigate the concern that SOEs have more government interference and the potential differences in the purpose of share pledge between the two types of firms, we exclude the SOEs in an alternative sample. The results from column (5) in Table 4 and column (9) and column (10) in Table 5 confirm that our findings that pledging firms increase acquisition activities but experience more negative market reaction still hold even in the non-SOE sample. It worth noting that all previous tests are based on the sample with only one deal announced during one specific year. In our last set of robustness tests, we expand the sample to include observations with multiple deals during the year. However, we still exclude the sample with multiple deals during the [-5, +5] window to mitigate the contamination issue. The results, shown in Table 4 column (6) and Table 5 column (11) - (12), are still significant and quantitatively comparable to the baseline.

4.4 Endogeneity tests

Although our main results are sound in robustness tests, we are aware that endogenous issues might still exist in our study: (1) unobserved omitted variables could drive both share pledge and M&A behavior; (2) firms with more acquisition or worse M&A performance could be more likely to pledge the shares. To further mitigate the endogenous concern and confirm the casual effects of stock pledge on M&A decisions and performance, we perform two sets of tests: the difference in differences approach and the instrumental variable.

4.4.1 Difference in Differences approach

Firstly, we conduct the difference in differences (DID) tests by utilizing a regulatory change in 2013, i.e., the publication of "The Guidance on Stock Pledge Repurchase Transactions, Registration, and Settlement". Before 2013, shareholders can only pledge shares to banks and trust companies. This regulatory change in 2013 further permits security companies to participate in pledge activities. Therefore, shareholders have broader ways to pledge their shares as collateral after 2013. Besides, security firms tend to have lower interest rates and fewer restrictions on the loan usage (Meng et al., 2019). Therefore, the regulation change encourages the share pledge, especially among shareholders who have difficulties in personal financing previously. On the other

hand, this rule should be unrelated to the firm acquisition decisions as the primary objective of this rule is to regulate share pledge.

We firstly identify the firms that are affected mostly by this rule as the treatment sample. Our primary treatment group includes all firms whose controlling shareholders do not pledge the shares during the pre-regulation period (2011 and 2012) but pledge the shares during the post-regulation period (2014 and 2015). We use the 4-year window around the regulation (2-year pre and 2-year post regulation period) to mitigate the concern that the shareholders coincidently alter their pledging decision after this regulatory change. The primary control group includes all firms whose controlling shareholders do not pledge during the whole 2011-2015 period. We regard those firms as unaffected by the regulatory change. We further conduct a propensity score matching to make sure that the treatment and control are comparable. To be more specific, we firstly run a probit regression of treatment dummy on all the controls in the M&A tendency regression, including the industry, year, and province dummies. Then we use the predicted propensity score to select one control firm for each treatment firm with the nearest score from the same industry, year, and province. Finally, we derive 119 pairs. Yet as not all firms engage in M&A activities during the window, our final sample drops to 132 firms (71 treatment firms and 61 control firms) in the CAR regressions.

We conduct our DID tests using the period from 2011 to 2015. We exclude observations in 2013, which is the event year. *Post* is a dummy that equals 1 if the observation belongs to the post-regulation period, and 0 otherwise. *Treat* is a dummy that equals 1 if the firm is from the treatment group, and 0 otherwise. Table 6 column (1) shows the M&A tendency results. The coefficient on *Treat*Post* is positive and significant at 1% level. With regards to the announcement returns, the coefficient on *Treat*Post* in Table 7 column (1) and (2) are negative and significant. The results above indicate that the regulation which encourages the stock pledge activities would further induce agency problem reflected in increased M&A activities and more negative CARs experienced by the acquirer[12].

To further confirm that we have adequately identified the stock pledge shock from the 2013 regulation change, we select another year other than 2013 as a pseudo mandate year and re-estimate

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[12] The DID tests include the same fixed effects as the baseline regressions. We also tried to control for the firm and the year fixed effects and find consistent results.

the DID model. We conduct two placebo tests. For the pre-2013 period, we use 2010 as the pseudo-event year, whereby *Post* is a dummy variable that equals 1 if the observation is after 2010, and 0 otherwise. Second, for the post-2013 period, the pseudo mandate year is set as 2016 so that *Post* equals one for 2014-2015 and zero for 2016-2017[13]. The results are presented in Table 6 column (2) and Table 7 column (3)-(6) for M&A probability and CARs respectively. The coefficients of *Post*Treat* for all the columns are insignificant, implying that this regulation results in significant change in the behaviour of controlling shareholder stock pledge for the treatment firms.

4.4.2 Instrumental variable approach

Our second set of endogeneity tests adopts the instrumental variable approach. Following Pang and Wang (2020), we construct the instrument, *Pledge_Percent (peer)*, as the average percent of shares pledged by the controlling shareholders from the peer companies operating in the same industry and located in the same province. Firms from the same industry have a similar operation environment and financing demand. Besides, we require the peers to be located in the same province because economic conditions and local policy varies across provinces. We predict the amount of the firm's peer pledging level can represent the general level of pledging activity within the firm's industry and location. On the other hand, the M&A tendency and announcement returns should be unrelated to the peer pledge.

The first column in Table 8 shows the first stage regression. The dependent variable, *Pledge_Percent*, is the percentage of shares pledged by the controlling shareholders. All other controls are the same as equation (1). We also include industry, year, and province fixed effects. The second stage regression results for M&A tendency and announcement returns shown in Table 8 column (2) and Table 9 (1)- (2) are consistent with the baseline[14]. It is possible that firms from the same industry and geographic clustering have similar operation outcomes, e.g., M&A decisions. Pang and Wang (2020) solve this problem by only including the non-event firms to construct the instrument. Following their logic, we further exclude peers with M&A activities during the [-1, +1] year window when calculating the instrument[15]. The first stage regression is reported in Table

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[13] Since the post-2013 period only includes four years, the pseudo post period also includes year 2016, which is also the pseudo event year.

[14] The sample in the second stage is smaller than the baseline because some firms do not have peers operating in the same industry and locating in the same province.

[15] Non-M&A firms only account for about 10% of the full sample. Therefore, we only exclude peers with M&A activities during the [-1, +1] year window.

8 column (3) and the second stage results are presented in Table 8 column (4) and Table 9 (3)- (4). Although the sample further drops, the positive correlation between the share pledge and M&A tendency as well as the negative correlation between pledge and announcement returns is still significant.

5 Further investigations
5.1 Mechanisms of expropriation through corporate M&As

Our previous analyses suggest that share pledge by the controlling shareholder leads to more M&A activities but a worse market reaction. The aggravated expropriation hypothesis we discussed previously argues that several mechanisms could drive the effect of share pledge on corporate M&A behaviour. In this section, we formally use multivariate regressions to further explore the potential mechanisms, including overpayment and related party transactions in M&A deals.

The exacerbated agency problem caused by share pledge increases the likelihood of expropriation by the controlling shareholder. Controlling shareholders would have less incentives to maximize the firm value due to the further divergence of voting rights and cash flow rights. Subsequently, pledging firms are more likely to overpay in the M&A deals by self-interested controlling shareholders. Moreover, previous research suggest that overpayment in M&As can be viewed as the symbol of controlling shareholders' private benefits extraction at the expense of minority shareholders (e.g., Thraya, 2015; Thraya and Hamza, 2019). To test this conjecture, we examine the relationship between stock pledge and takeover premium. *Premium* equals to the trading value of the target divided by the estimated value minus one. Column (1) in Table 10 shows that the coefficient of the stock pledge is positive and significant at 5% level[16]. Regarding economic significance, on average, pledging firms pay 23.4 % more premium than non-pledging firms which is consistent with our expectation of controlling shareholders' expropriation.

Furthermore, related party transaction in M&As is widely recognized in the finance literature as another way of controlling shareholder expropriation and tunneling (e.g., Bae et al., 2002; Yang at al., 2019; Jiang and Kim, 2020). Thus, we expect that pledging firms have a greater

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[16] The estimated value of the targets are missing for nearly half of the sample because most targets are private firms.

tendency to engage in related party acquisitions. We regress the related party transaction dummy on share pledge using the M&A sample with the probit model using the same controls as we have equation (1). As shown in Table 10 column (2), the coefficient on *Pledge_Dummy* is positive and significant at the 10% level suggesting that takeovers initiated by pledging acquirers are more likely to involve related party transactions.

In sum, our results on takeover premium and related party transactions indicate that acquisitions made by the pledging firms are indeed subjected to the self-serving target selections and private benefits extraction, consistent with our expropriation hypothesis.

5.2 Cross-sectional tests

In this section, we further conduct a series of cross-sectional tests to deepen the understanding of the relationship between share pledge and corporate acquisition behavior. Our first set of cross-sectional tests focuses on differences between the SOE firms and non-SOE firms. As indicated by Li et al. (2019), the Chinese government imposes stricter restrictions on the stock pledge activities in ultimately government-controlled firms. In fact, any stock pledge conducted by the controlling shareholders in those SOEs should be under special supervision and monitoring from the local government or state-owned asset management department. Therefore, the controlling shareholder has fewer opportunities to expropriate in the firms due to the share pledge. Thus, we expect that share pledge induces more serious agency problems for non-SOEs than SOEs. Column (1) in Table 11 shows the results of M&A tendency. The coefficient on the interaction term between *SOE* and *Pledge_Dummy* is negative and significant, indicating that SOEs are less likely to conduct M&A after their controlling shareholder pledge the shares. The positive coefficient on *SOE*Pledge_Dummy* in column (2) and (3) shows the mitigating effect of government ownership on the negative relationship between share pledge and announcement return. The results collectively provide evidence that controlling shareholders of SOE firms are less likely to tunnel through corporate takeovers after the stock pledge.

Our second set of cross-sectional tests examines whether the relationship between the stock pledge and M&A tendency as well as CARs varies between firms with different level of excess cash. Prior research suggests that controlling shareholders are more likely to expropriate corporate resources through M&A for cash-rich firms (e.g., Jensen, 1986; Lang et al., 1991; Harford, 1999).

Therefore, we expect that the positive effect of share pledge on M&A tendency and the negative effect of share pledge on M&A announcement return is more pronounced when the firm has a higher level of excess cash. Following the prior literature (e.g., Opler et al., 1999; Yang et al., 2019), we estimate the determinate model for cash holding using the following equation:

$Ln(Cash)_{i,t} = a + b_1 MTB_{i,t} + b_2 Size_{i,t} + b_3 CF_{i,t} + b_4 NWC_{i,t} + b_5 Capital\ Expenditure_{i,t} + b_6 Leverage_{i,t} + b_7 Var\_CF_{i,t} + b_8 R\&D_{i,t} + b_9 SOE_{i,t} + Industry\ FEs + Year\ FEs + Province\ FEs + \varepsilon_{i,t}$ (3)

Ln(Cash) is the nature logarithm of cash and cash equivalent to total assets. *MTB* is the ratio of the market value of equity to book value of equity. *CF* is the ratio of cash flow from operation to total assets. *NWC* is the net working capital to total assets. *Capital Expenditure* equals to capital expenditure to total assets. *Leverage* equals total debt divided by total assets. *Var_CF* is the average standard deviations of *CF* of firms in the same industry over the past ten years. *R&D* is the ratio of R&D expenditure to total assets. *SOE* is a dummy for SOE firms. Consistent with the baseline regressions, we add industry, year and province fixed effects.

Xcash is the residual from the regression. We rank the firms by industry, year, and province. *Xcash_H* is a dummy that equals 1 if the firm is among the top 50%, and 0 otherwise. As shown in column (4) of Table 11, high-level excess cash pledging firms initiate more M&As. However, those M&As experience more negative stock market reaction as indicated by the negative coefficients on the interaction terms in column (5) and (6), which is consistent with our predictions.

5.3. The long-term performance for the pledging acquirers

The negative association between CAR and pledge indicates that the market predicts worse future performance for the pledging firms due to their self-serving acquisition. In this section, we provide evidence on long-term performance in terms of post-acquisition ROA and goodwill impairment.

5.3.1 Post-acquisition accounting performance

We firstly test firms' industry adjusted ROAs after the M&A announcement. Industry adjusted ROA is defined as the difference between the firm ROA and industry median. To control for pre-M&A performance, we include adjusted ROA 1, 2, and 3 year(s) before the merger announcement in the regression. As shown in Table 12, coefficients of *Pledge_Dummy* are all

negative and statistically significant at 5% percent level (for column 1) and at 1% level (for column 2 and 3). The results suggest that acquirers with their controlling shareholder stock pledge exhibit significantly worse accounting performance up to three years after the acquisition.

The results are in line with our previous findings documenting a negative relation between announcement returns and stock pledge, indicating that market participant worse future performance because these takeovers are subjected to controlling shareholder expropriation to extract private benefits through M&A transactions. In addition, in an untabulated analysis, we find consistent and robust results if we use changes in post-M&A ROA as the alternative dependent variable.

5.3.2 Post-acquisition goodwill impairment

Our aggravated expropriation hypothesis predicts that pledging firms are more likely to engage in self-serving acquisitions due to the agency problem induced by the divergence of voting rights and cash flow rights. In addition to the evidence on announcement returns and post-M&A ROA, we further test our prediction with goodwill impairment to identify the quality of the acquisition in the long run. In the accounting literature, the goodwill impairment predicts worse operating performance and signals a disappointing outcome from the M&A deal (e.g., Li et al., 2011; Gu and Lev, 2011; Glaum et al., 2018).

Extended from our aggravated expropriation hypothesis, we further expect the pledging acquirers to be more likely to undergo goodwill impairment. We define *Impairment_Dummy* as a dummy variable that equals one if the firm confirms the goodwill impairment during three years after their M&A announcements, and 0 otherwise. Since goodwill impairment data in CSMAR begins in 2007 and we require firms with enough data during 3 years of post-M&A period, our sample only covers M&A deals during 2006-2015 in this test. Using the probit model, the coefficient on *Pledge_Dummy* in Table 13 is positive and significant at 5% level, indicating that the acquirers fail to benefit from those takeovers as expected. As a result, the minority shareholders suffer from such acquisitions subjected to the controlling shareholder's tunneling behavior[17].

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[17] Since the sample using the probit model drops significantly, we also conduct OLS regression for a robustness check. The results are consistent with findings reported Table 13.

6. Conclusion

In this paper, we examine the effect of the controlling shareholder stock pledge on corporate acquisitions. We find that firms are more likely to conduct corporate acquisitions after the share pledge by their controlling shareholders. Moreover, M&A deals initiated by pledging firms obtain lower announcement returns. The negative relationship between the stock pledge and return is robust to the alternative variable definition, fixed effects, and sample selections. To mitigate the endogeneity concerns, we conduct the instrumental variable approach as well as the difference in differences tests utilizing a regulation change in 2013. We further examine the mechanisms driving the impediment effect from share pledge. We find that acquirers with the controlling shareholder pledging their shares tend to overpay in the deals and are more likely to be involved in related party transactions. Besides, the relationship between share pledge and returns is stronger for non-SOEs and the firm with high-level excess cash. Moreover, pledging firms have worse post-M&A performance in terms of lower ROA and greater likelihood of goodwill impairment.

Overall, our findings suggest that, the controlling shareholders retain their decisive voting power on the corporate investment decisions after they pledge shares. Moreover, the stock pledge would even alter controlling shareholders' behavior to increasingly utilize corporate takeover for private benefits resulting in the expropriation on the minority shareholders. Such results support our aggravated expropriation hypothesis. We shed light on the understanding of agency issues caused by share pledge due to the further deviation of voting and cash flow rights. By documenting the causal effect of share pledge on self-serving M&A decisions, our finding has significant policy implications regarding the minority share protection and the debate on the property of stock pledge.

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Table 1 Descriptive statistics

This table reports the descriptive statistics for the full sample as well as the subsample of acquirers and non-acquirers from 2003-2017. All the variables are winsorized at 1% and 99% levels. Detailed definition of all the variables are listed in Appendix A

Variable	Acquirer (6553) Mean	SD	Median	Non-Acquirer (19207) Mean	SD	Median	All (25760) Mean	SD	Median
M&A	1.000	0.000	1.000	0.000	0.000	0.000	0.254	0.435	0.000
Pledge_Dummy	0.371	0.483	0.000	0.305	0.460	0.000	0.322	0.467	0.000
Size	21.788	1.237	21.648	21.763	1.279	21.608	21.770	1.268	21.620
Annual Return	0.396	0.926	0.104	0.293	0.864	0.026	0.319	0.881	0.043
Cash	0.195	0.150	0.152	0.184	0.145	0.142	0.186	0.146	0.145
ROA	0.039	0.058	0.038	0.032	0.065	0.034	0.034	0.063	0.035
Intangible	0.044	0.051	0.030	0.045	0.053	0.031	0.045	0.053	0.030
Leverage	0.441	0.218	0.439	0.457	0.223	0.453	0.453	0.222	0.449
Capital Expenditure	0.054	0.052	0.039	0.055	0.054	0.038	0.055	0.054	0.038
Tobin's Q	2.744	2.067	2.075	2.605	2.017	1.932	2.640	2.030	1.969
Controlling Ownership	0.357	0.151	0.338	0.365	0.156	0.342	0.363	0.155	0.341
Board Size	8.829	1.808	9.000	8.975	1.853	9.000	8.938	1.843	9.000
Board Independent	0.368	0.053	0.333	0.365	0.052	0.333	0.366	0.053	0.333
SOE	0.416	0.493	0.000	0.499	0.500	0.000	0.478	0.499	0.000
CEO Duality	0.232	0.422	0.000	0.205	0.404	0.000	0.212	0.409	0.000
Cash Payment	0.839	0.368	1.000						
Cash Mixed	0.082	0.275	0.000						
Premium	0.489	2.682	0.000						
CAR[-3,+3]	0.020	0.128	0.002						
CAR[-5,+5]	0.022	0.152	0.002						
Related	0.379	0.485	0.000						
Significant	0.115	0.319	0.000						
Relative Size	0.239	0.770	0.028						
Runup_stock	0.230	0.672	0.040						
Complete	0.935	0.247	1.000						

Table 2 Stock pledge and M&A tendency

This table reports the regression results of M&A tendency on stock pledge based on the Probit model. *M&A* is a dummy that equals one if the firm announces a merger and acquisition, and zero otherwise. *Pledge_Dummy* is a dummy that equals one if the controlling shareholder of the firm has shares pledged at the end of the year, and zero otherwise. The definition of other controls are listed in Appendix A. The regression includes industry, year and province fixed effects. The t-statistics in parentheses are based on standard errors adjusted for firm-level clustering. ***, **, * represent statistical significance at the 1%, 5% and 10% levels, respectively.

	Prob(M&A)
Pledge_Dummy	0.132***
	(5.81)
Size	0.028**
	(2.40)
Annual Return	0.034**
	(2.49)
Cash	0.172**
	(2.31)
ROA	0.796***
	(4.54)
Intangible	-0.265
	(-1.34)
Leverage	-0.055
	(-0.97)
Capital Expenditure	-0.096
	(-0.53)
Tobin's Q	-0.009
	(-1.35)
Controlling Ownership	-0.084
	(-1.22)
Board Size	-0.012*
	(-1.84)
Board Independent	-0.030
	(-0.15)
SOE	-0.128***
	(-5.05)
CEO Duality	0.008
	(0.34)
Industry FEs	Y
Year FEs	Y
Province FEs	Y
Observations	25,757
Pseudo R-squared	0.0219

Table 3 Stock pledge and M&A announcement returns

This table reports the OLS regression results of M&A announcement returns. *CAR [-3, +3]* (*CAR [-5, +5]*) is the cumulative abnormal returns in the 7-day [−3, +3] (11-day [−5, +5]) event window using the market model with parameters estimated over the 200 trading days ending 61 days prior to the deal announcement date. *Pledge_Dummy* is a dummy that equals one if the controlling shareholder of the firm has shares pledged at the end of the year, and zero otherwise. The definition of other controls are listed in Appendix A. The regressions include industry, year and province fixed effects. The t-statistics in parentheses are based on standard errors adjusted for firm-level clustering. ***, **, * represent statistical significance at the 1%, 5% and 10% levels, respectively.

	CAR [-3, +3]	CAR [-5, +5]
	(1)	(2)
Pledge_Dummy	-0.008**	-0.009**
	(-2.02)	(-1.99)
Size	-0.013***	-0.014***
	(-6.17)	(-5.62)
Annual Return	0.005*	0.005
	(1.80)	(1.34)
Cash	0.009	0.016
	(0.64)	(0.95)
ROA	0.077*	0.105**
	(1.87)	(2.06)
Intangible	0.012	0.002
	(0.32)	(0.05)
Leverage	0.016	0.027*
	(1.38)	(1.89)
Capital Expenditure	0.035	0.016
	(1.05)	(0.40)
Tobin's Q	-0.011***	-0.012***
	(-6.86)	(-6.42)
Controlling Ownership	0.021*	0.016
	(1.87)	(1.28)
Board Size	0.002	0.002
	(1.50)	(1.56)
Board Independent	0.047	0.044
	(1.49)	(1.16)
SOE	-0.007	-0.012**
	(-1.55)	(-2.31)
CEO Duality	0.004	0.004
	(1.00)	(0.70)
Related	-0.003	-0.003
	(-0.92)	(-0.80)
Significant	0.038***	0.042***
	(3.31)	(3.12)
Relative Size	0.028***	0.040***
	(6.49)	(7.41)
Runup_stock	-0.022***	-0.033***
	(-6.10)	(-7.91)
Cash Payment	-0.061***	-0.069***
	(-5.54)	(-5.34)
Cash Mixed	-0.027**	-0.039**
	(-2.08)	(-2.49)
Industry FEs	Y	
Year FEs	Y	
Province FEs	Y	
Observations	5,532	5,532
Adjusted R-squared	0.173	0.181

Table 4 Robustness tests for M&A tendency

This table reports the robustness tests of M&A tendency based on the Probit model. *M&A* is a dummy that equals one if the firm announces a merger and acquisition, and zero otherwise. *Pledge_Dummy* is a dummy that equals one if the controlling shareholder of the firm has shares pledged at the end of the year, and zero otherwise. Column (1) uses the percentage of shares pledged by the controlling shareholders (*Pledge_Percent*) as the independent variable. Column (2) uses firm and year FEs. Column (3) drops ST stocks. Column (4) drops small transactions with the deal value less than 1% of the acquirer's total assets. Column (5) drop SOEs. Column (5) includes the sample with multiple deals announced during one year (but exclude sample with multiple deals announced during [-5, +5] day window). The definition of other controls are listed in Appendix A. The regressions (except for column (2)) include industry, year and province fixed effects. The t-statistics in parentheses are based on standard errors adjusted for firm-level clustering. ***, **, * represent statistical significance at the 1%, 5% and 10% levels, respectively.

	Prob(M&A)					
	Pledge Percent	Firm and Year FEs	Drop ST Stocks	Drop Small Deals	Drop SOEs	Expanded Sample
	(1)	(2)	(3)	(4)	(5)	(6)
Pledge_Dummy		0.106***	0.135***	0.143***	0.152***	0.180***
		(3.18)	(5.72)	(5.93)	(5.22)	(8.35)
Pledge_Percent	0.162***					
	(4.90)					
Size	0.028**	-0.000	0.025**	-0.037***	0.010	0.071***
	(2.46)	(-0.01)	(2.03)	(-2.93)	(0.61)	(6.05)
Annual Return	0.035**	-0.016	0.035**	0.031**	0.036**	0.058***
	(2.52)	(-0.74)	(2.39)	(2.15)	(2.14)	(4.85)
Cash	0.156**	0.256**	0.171**	0.228***	0.131	0.237***
	(2.10)	(2.23)	(2.24)	(2.91)	(1.40)	(3.37)
ROA	0.817***	0.698***	0.806***	0.593***	0.721***	0.941***
	(4.65)	(2.94)	(4.01)	(3.19)	(3.14)	(5.76)
Intangible	-0.263	-0.895***	-0.281	-0.346	-0.185	-0.068
	(-1.33)	(-2.92)	(-1.30)	(-1.62)	(-0.63)	(-0.38)
Leverage	-0.060	-0.282***	-0.007	-0.115*	-0.098	-0.019
	(-1.05)	(-2.87)	(-0.11)	(-1.90)	(-1.28)	(-0.34)
Capital Expenditure	-0.078	-0.323	-0.126	0.026	-0.488**	0.011
	(-0.43)	(-1.24)	(-0.67)	(0.13)	(-2.00)	(0.07)
Tobin's Q	-0.008	0.020**	-0.006	-0.003	-0.012	-0.002
	(-1.27)	(2.06)	(-0.80)	(-0.43)	(-1.55)	(-0.38)
Controlling Ownership	-0.066	0.119	-0.092	-0.058	0.064	-0.053
	(-0.97)	(0.75)	(-1.29)	(-0.79)	(0.66)	(-0.78)
Board Size	-0.011*	-0.000	-0.011*	-0.018***	-0.012	-0.014**
	(-1.81)	(-0.01)	(-1.72)	(-2.69)	(-1.20)	(-2.24)
Board independent	-0.033	0.312	-0.060	-0.180	0.033	-0.073
	(-0.17)	(1.00)	(-0.30)	(-0.83)	(0.11)	(-0.39)
SOE	-0.128***	-0.063	-0.128***	-0.131***		-0.169***
	(-4.99)	(-0.96)	(-4.84)	(-4.88)		(-6.85)
CEO Duality	0.011	-0.023	0.013	0.009	-0.011	0.011
	(0.46)	(-0.59)	(0.54)	(0.35)	(-0.39)	(0.46)
Industry FEs	Y				Y	
Year FEs	Y	Y			Y	
Province FEs	Y				Y	
Firm FEs		Y				
Observations	25,757	22,726	24,038	23,983	13,433	30,046
Pseudo R-squared	0.0231	0.111	0.0205	0.0295	0.0259	0.0333

Table 5 Robustness tests for M&A announcement returns

This table reports the robustness tests on the relationship between stock pledge and CAR. *CAR [-3, +3]* (*CAR [-5, +5]*) is the cumulative abnormal returns in the 7-day [−3, +3] (11-day [−5, +5]) event window using the market model with parameters estimated over the 200 trading days ending 61 days prior to the deal announcement date. *Pledge_Dummy* is a dummy that equals one if the controlling shareholder of the firm has shares pledged at the end of the year, and zero otherwise. Column (1) and (2) use the percentage of shares pledged by the controlling shareholders (*Pledge_Percent*) as the independent variable. Column (3) and (4) use firm and year FEs. Column (5) and (6) drop ST stocks. Column (7) and (8) drop small transactions with the deal value less than 1% of the acquirer's total assets. Column (9) and (10) drop SOEs. Column (11) and (12) include the sample with multiple deals announced during one year (but exclude sample with multiple deals announced during [-5, +5] day window). The definition of other controls are listed in Appendix A. The regressions (except for column (3) and (4)) include industry, year and province fixed effects. The t-statistics in parentheses are based on standard errors adjusted for firm-level clustering. ***, **, * represent statistical significance at the 1%, 5% and 10% levels, respectively.

	Pledge Percent		Firm and Year FEs		Drop ST Stocks		Drop Small Deals		Drop SOEs		Expanded Sample	
	CAR [-3, +3]	CAR [-5, +5]	CAR [-3, +3]	CAR [-5, +5]	CAR [-3, +3]	CAR [-5, +5]	CAR [-3, +3]	CAR [-5, +5]	CAR [-3, +3]	CAR [-5, +5]	CAR [-3, +3]	CAR [-5, +5]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Pledge_Dummy			-0.013**	-0.014*	-0.009**	-0.010**	-0.010*	-0.012**	-0.012**	-0.014**	-0.005*	-0.007**
			(-2.24)	(-1.91)	(-2.31)	(-2.24)	(-1.92)	(-1.98)	(-2.41)	(-2.34)	(-1.70)	(-2.12)
Pledge_Percent	-0.015***	-0.017**										
	(-2.63)	(-2.37)										
Size	-0.013***	-0.014***	-0.029***	-0.034***	-0.012***	-0.012***	-0.017***	-0.019***	-0.017***	-0.019***	-0.011***	-0.012***
	(-6.17)	(-5.62)	(-5.56)	(-5.35)	(-5.61)	(-5.18)	(-5.71)	(-5.46)	(-5.60)	(-5.07)	(-7.51)	(-7.09)
Annual Return	0.005*	0.005	-0.001	-0.003	0.008**	0.008**	0.006	0.006	0.008**	0.008*	0.005**	0.004*
	(1.76)	(1.31)	(-0.11)	(-0.49)	(2.47)	(2.10)	(1.64)	(1.29)	(2.03)	(1.83)	(2.34)	(1.76)
Cash	0.009	0.016	0.027	0.039	0.008	0.016	0.008	0.014	0.001	0.007	0.006	0.008
	(0.62)	(0.95)	(1.15)	(1.44)	(0.55)	(0.89)	(0.41)	(0.64)	(0.07)	(0.30)	(0.50)	(0.63)
ROA	0.073*	0.101**	0.099*	0.143**	0.062	0.084	0.100**	0.140**	0.148***	0.201***	0.040	0.072*
	(1.77)	(1.97)	(1.74)	(1.98)	(1.39)	(1.54)	(1.97)	(2.21)	(2.61)	(2.81)	(1.18)	(1.77)
Intangible	0.013	0.003	0.080	0.142*	-0.003	-0.015	0.002	-0.019	0.068	0.050	-0.004	-0.008
	(0.33)	(0.07)	(1.23)	(1.76)	(-0.09)	(-0.33)	(0.03)	(-0.31)	(1.11)	(0.63)	(-0.13)	(-0.23)
Leverage	0.018	0.029**	0.053***	0.064**	0.006	0.013	0.019	0.037**	0.020	0.035	0.002	0.011
	(1.51)	(2.00)	(2.59)	(2.51)	(0.46)	(0.91)	(1.27)	(2.04)	(1.14)	(1.62)	(0.20)	(0.97)
Capital Expenditure	0.033	0.014	0.020	0.015	0.034	0.013	0.047	0.033	0.045	0.006	0.026	0.018
	(1.00)	(0.36)	(0.40)	(0.24)	(1.03)	(0.35)	(1.08)	(0.65)	(0.89)	(0.10)	(1.05)	(0.64)
Tobin's Q	-0.011***	-0.012***	-0.015***	-0.015***	-0.012***	-0.013***	-0.012***	-0.014***	-0.013***	-0.014***	-0.009***	-0.011***
	(-6.90)	(-6.46)	(-6.21)	(-5.18)	(-6.88)	(-6.42)	(-6.91)	(-6.56)	(-6.63)	(-6.29)	(-8.90)	(-8.62)
Controlling Ownership	0.019*	0.014	0.024	0.054	0.019*	0.014	0.023	0.021	0.028*	0.019	0.009	0.003
	(1.72)	(1.13)	(0.77)	(1.42)	(1.70)	(1.09)	(1.56)	(1.26)	(1.76)	(1.02)	(1.04)	(0.34)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Board Size	0.001	0.002	0.002	0.002	0.002*	0.002	0.002*	0.003**	0.003*	0.003	0.001*	0.002**
	(1.46)	(1.51)	(0.71)	(0.82)	(1.68)	(1.61)	(1.74)	(2.15)	(1.85)	(1.30)	(1.93)	(2.17)
Board Independent	0.047	0.043	0.066	0.058	0.055*	0.058	0.067	0.067	0.048	0.053	0.028	0.021
	(1.49)	(1.15)	(1.15)	(0.85)	(1.73)	(1.52)	(1.55)	(1.32)	(1.00)	(0.90)	(1.06)	(0.70)
SOE	-0.008*	-0.013**	-0.025**	-0.030**	-0.005	-0.008*	-0.010*	-0.018**			-0.004	-0.009**
	(-1.88)	(-2.57)	(-2.09)	(-2.03)	(-1.18)	(-1.70)	(-1.70)	(-2.52)			(-1.34)	(-2.37)
CEO Duality	0.004	0.003	0.019**	0.022**	0.005	0.005	0.005	0.004	0.004	0.003	-0.001	-0.002
	(0.97)	(0.67)	(2.41)	(2.21)	(1.10)	(0.87)	(0.94)	(0.64)	(0.70)	(0.53)	(-0.21)	(-0.46)
Related	-0.003	-0.003	-0.002	-0.001	-0.002	-0.002	-0.004	-0.004	-0.002	-0.003	-0.001	-0.001
	(-0.88)	(-0.77)	(-0.51)	(-0.15)	(-0.62)	(-0.59)	(-0.72)	(-0.75)	(-0.27)	(-0.42)	(-0.25)	(-0.20)
Significant	0.039***	0.042***	0.066***	0.076***	0.033***	0.037***	0.038***	0.042***	0.031**	0.031*	0.020**	0.018*
	(3.36)	(3.16)	(4.69)	(4.58)	(2.72)	(2.68)	(3.27)	(3.09)	(2.18)	(1.81)	(2.21)	(1.72)
Relative Size	0.028***	0.040***	0.025***	0.035***	0.041***	0.053***	0.027***	0.038***	0.035***	0.048***	0.045***	0.062***
	(6.50)	(7.42)	(4.62)	(5.32)	(6.61)	(6.94)	(6.14)	(7.09)	(7.06)	(7.66)	(9.09)	(10.18)
Runup_stock	-0.022***	-0.033***	-0.018***	-0.029***	-0.022***	-0.033***	-0.028***	-0.040***	-0.025***	-0.037***	-0.019***	-0.029***
	(-6.05)	(-7.87)	(-3.91)	(-5.39)	(-6.25)	(-8.02)	(-6.04)	(-7.42)	(-5.40)	(-6.57)	(-7.99)	(-10.20)
Cash Payment	-0.060***	-0.068***	-0.058***	-0.066***	-0.050***	-0.055***	-0.065***	-0.073***	-0.058***	-0.076***	-0.047***	-0.057***
	(-5.51)	(-5.31)	(-4.32)	(-4.11)	(-4.44)	(-4.21)	(-5.71)	(-5.47)	(-3.80)	(-4.05)	(-5.22)	(-5.47)
Cash Mixed	-0.027**	-0.038**	-0.037**	-0.052***	-0.018	-0.027*	-0.032**	-0.043***	-0.022	-0.038*	-0.019*	-0.030**
	(-2.06)	(-2.47)	(-2.42)	(-2.81)	(-1.32)	(-1.69)	(-2.44)	(-2.71)	(-1.29)	(-1.83)	(-1.81)	(-2.34)
Industry FEs	Y							Y				
Year FEs	Y		Y					Y				
Province FEs	Y							Y				
Firm FEs			Y									
Observations	5,532	5,532	4,655	4,655	5,273	5,273	3,822	3,822	3,213	3,213	10,392	10,392
Adjusted R-squared	0.173	0.182	0.213	0.218	0.170	0.172	0.197	0.209	0.203	0.215	0.140	0.153

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Table 6 Difference in differences approach for M&A tendency

This table reports DID results for M&A tendency. The treatment group includes firms whose controlling shareholders do not pledge shares in 2011 and 2012, but pledge shares in 2014 and 2015. The control group includes firms whose controlling shareholders do not pledge shares during 2011-2015 and have the closest propensity score with the treatment firms. *Treat* is a dummy variable that equals 1 if the firm belongs to the treatment group, and 0 otherwise. Column (1) reports the DID results. *Post* is a dummy variable that equals 1 if the observation is after 2013, and 0 otherwise. Column (2) and (3) report the results with pseudo event years. In column (2), the sample covers the year 2008-2009 and 2011-2012. *Post* is a dummy variable that equals 1 if the observation is after 2010, and 0 otherwise. In column (3), the sample covers the year 2014-2017. *Post* is a dummy variable that equals 1 if the observation is in year 2014-2015, and 0 otherwise. The definition of other controls are listed in Appendix A. The regressions include industry, year and province fixed effects. The t-statistics in parentheses are based on standard errors adjusted for firm-level clustering. ***, **, * represent statistical significance at the 1%, 5% and 10% levels, respectively.

	Prob(*M&A*)		
	DID	Pseudo event years	
	2011-2015	2008-2012	2014-2017
	(1)	(2)	(3)
*Post*Treat*	0.413***	-0.107	-0.011
	(2.77)	(-0.73)	(-0.07)
Treat	0.067	0.120	-0.018
	(0.72)	(1.16)	(-0.19)
Annual Return	0.244*	-0.032	0.100
	(1.67)	(-0.17)	(0.80)
Cash	0.697*	0.362	0.574
	(1.80)	(0.85)	(1.25)
ROA	0.701	1.892	-0.123
	(0.50)	(1.16)	(-0.09)
Intangible	-1.189	-2.700	-2.919*
	(-0.70)	(-1.18)	(-1.74)
Leverage	-0.664*	-1.065**	0.189
	(-1.66)	(-2.55)	(0.50)
Capital Expenditure	-1.391	-0.743	-3.493***
	(-1.20)	(-0.55)	(-2.77)
Tobin's Q	-0.021	0.037	-0.007
	(-0.40)	(0.59)	(-0.17)
Controlling Ownership	-0.128	-0.333	0.604
	(-0.29)	(-0.63)	(1.40)
Board Size	0.062	0.103*	-0.023
	(1.12)	(1.67)	(-0.36)
Board independent	1.690	0.443	0.547
	(1.26)	(0.29)	(0.38)
SOE	-0.581***	-0.528***	-0.709***
	(-2.81)	(-2.79)	(-3.52)
CEO Duality	-0.215	-0.100	-0.191
	(-1.61)	(-0.66)	(-1.45)
Industry FEs		Y	
Year FEs		Y	
Province FEs		Y	
Observations	758	531	765
Pseudo R-squared	0.128	0.126	0.126

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Table 7 Difference in differences approach for M&A announcement returns

This table reports results using the difference in differences approach. The treatment group includes firms whose controlling shareholders do not pledge shares in 2011 and 2012, but pledge shares in 2014 and 2015. The control group includes firms whose controlling shareholders do not pledge shares during 2011-2015 and have the closest propensity score with the treatment firms. *Treat* is a dummy variable that equals 1 if the firm belongs to the treatment group, and 0 otherwise. Column (1) and (2) report the DID results. The sample covers the year 2011-2012 and 2014-2015. 2013 is the event year. *Post* is a dummy variable that equals 1 if the observation is after 2013, and 0 otherwise. Column (3) to (6) report the results with pseudo event years. In column (3) and (4), the sample covers the year 2008-2009 and 2011-2012. *Post* is a dummy variable that equals 1 if the observation is after 2010, and 0 otherwise. In column (5) and (6), the sample covers the year 2014-2017. *Post* is a dummy variable that equals 1 if the observation is in year 2014-2015, and 0 otherwise. The definition of other controls are listed in Appendix A. The regressions include industry, year and province fixed effects. The t-statistics in parentheses are based on standard errors adjusted for firm-level clustering. ***, **, * represent statistical significance at the 1%, 5% and 10% levels, respectively.

	DID		Pseudo event years			
	2011-2015		2008-2012		2014-2017	
	CAR [-3, +3]	CAR [-5, +5]	CAR [-3, +3]	CAR [-5, +5]	CAR [-3, +3]	CAR [-5, +5]
	(1)	(2)	(3)	(4)	(5)	(6)
Post*Treat	-0.112**	-0.126**	0.025	0.018	0.011	0.025
	(-2.26)	(-2.21)	(0.51)	(0.30)	(0.20)	(0.39)
Treat	0.051	0.054	-0.001	-0.014	-0.020	-0.021
	(1.59)	(1.40)	(-0.03)	(-0.25)	(-0.45)	(-0.40)
Size	0.000	-0.008	0.011	-0.003	-0.069***	-0.080***
	(0.02)	(-0.38)	(0.49)	(-0.11)	(-3.12)	(-3.01)
Annual Return	0.011	0.032	-0.034	-0.033	0.022	0.043
	(0.32)	(0.78)	(-0.58)	(-0.46)	(0.62)	(1.03)
Cash	-0.008	-0.073	-0.049	-0.084	-0.081	-0.112
	(-0.11)	(-0.81)	(-0.83)	(-1.03)	(-0.94)	(-1.01)
ROA	0.150	0.334	0.214	0.344	0.456*	0.676*
	(0.69)	(1.04)	(0.71)	(0.90)	(1.72)	(1.70)
Intangible	-0.945*	-1.266**	-0.677	-0.864	-0.277	-0.259
	(-1.85)	(-2.05)	(-1.57)	(-1.65)	(-0.58)	(-0.37)
Leverage	0.052	0.005	-0.061	-0.137	0.168*	0.182
	(0.60)	(0.04)	(-0.78)	(-1.24)	(1.76)	(1.59)
Capital Expenditure	-0.349	-0.640	0.423	0.631*	-0.688	-1.039
	(-0.64)	(-1.00)	(1.56)	(1.93)	(-1.14)	(-1.47)
Tobin's Q	-0.029**	-0.042***	-0.012	-0.012	-0.044***	-0.056***
	(-2.48)	(-3.08)	(-0.71)	(-0.58)	(-4.46)	(-4.98)
Controlling Ownership	-0.060	-0.031	-0.073	-0.074	-0.025	-0.002

	(-0.52)	(-0.23)	(-0.91)	(-0.80)	(-0.24)	(-0.02)
Board Size	-0.005	-0.009	0.003	0.006	-0.017	-0.022
	(-0.50)	(-0.76)	(0.39)	(0.60)	(-1.51)	(-1.49)
Board independent	0.112	0.138	0.498**	0.605*	-0.161	-0.229
	(0.49)	(0.58)	(2.14)	(1.87)	(-0.46)	(-0.60)
SOE	0.147***	0.171***	-0.059	-0.071	0.081	0.100
	(3.41)	(3.18)	(-0.77)	(-0.78)	(1.29)	(1.16)
CEO Duality	0.040	0.041	0.036	0.020	0.061*	0.075*
	(1.27)	(1.07)	(1.39)	(0.60)	(1.86)	(1.79)
Related	0.011	-0.005	0.030	0.048	-0.007	-0.029
	(0.37)	(-0.14)	(0.92)	(1.04)	(-0.21)	(-0.70)
Significant	0.051	0.075	0.245**	0.147	-0.078	-0.056
	(0.61)	(0.76)	(2.03)	(0.89)	(-1.05)	(-0.61)
Relative Size	0.030	0.044	-0.031	-0.017	0.039**	0.053**
	(1.23)	(1.36)	(-1.21)	(-0.48)	(2.12)	(2.31)
Runup_stock	-0.035	-0.058*	-0.030	-0.058	-0.038	-0.060*
	(-1.24)	(-1.85)	(-1.06)	(-1.66)	(-1.32)	(-1.91)
Cash Payment	-0.043	0.003	-0.002	-0.026	-0.253***	-0.240*
	(-0.80)	(0.04)	(-0.05)	(-0.42)	(-2.65)	(-1.75)
Cash Mixed	0.140**	0.204***	0.210**	0.288**	-0.126	-0.123
	(2.52)	(2.91)	(2.44)	(2.50)	(-1.25)	(-0.84)
Industry FEs			Y			
Year FEs			Y			
Province FEs			Y			
Observations	182	182	104	104	175	175
Adjusted R-squared	0.345	0.377	0.450	0.388	0.255	0.280

Table 8 Instrumental variable approach for M&A tendency

This table reports the results using the instrumental variable approach for M&A tendency. *M&A* is a dummy that equals one if the firm announces a merger and acquisition, and zero otherwise. *Pledge_Percent* equals the percentage of shares pledged by the controlling shareholders at the year-end. *Pledge_Percent (Peer)* is the instrumental variable. In column (1) and (2), the instrument, *Pledge_Percent (Peer)*, is defined as the average percent of shares pledged by the controlling shareholders from the peer companies operating in the same industry and located in the same province. In column (3) and (4), peers with M&A activities during the [-1, +1] year window are excluded when calculating the instrument. *Pledge_Percent (Predicted)* is the fitted value of *Pledge_Percent*. Column (1) and (3) report the first stage regressions. Column (2) and (4) report the second stage. The definition of other controls are listed in Appendix A. The regressions include industry, year and province fixed effects. The t-statistics in parentheses are based on standard errors adjusted for firm-level clustering. ***, **, * represent statistical significance at the 1%, 5% and 10% levels, respectively.

	Full Sample		Excluding Peer with M&A during [-1,1] Year Window	
	First Stage	Second Stage	First Stage	Second Stage
	Pledge (Percent)	*Prob(M&A)*	*Pledge (Percent)*	*Prob(M&A)*
	(1)	(2)	(3)	(4)
Pledge _Percent (Predicted)		0.324***		0.263**
		(3.91)		(2.24)
Pledge _Percent (Peer)	0.902***		0.612***	
	(36.40)		(26.27)	
Size	0.002	0.023*	0.004	0.032**
	(0.38)	(1.77)	(0.84)	(2.13)
Annual Return	-0.025***	0.038**	-0.031***	0.033*
	(-8.20)	(2.38)	(-9.11)	(1.87)
Cash	-0.175***	0.211**	-0.204***	0.154
	(-7.62)	(2.46)	(-8.06)	(1.57)
ROA	-0.333***	0.679***	-0.350***	0.625***
	(-5.97)	(3.31)	(-5.52)	(2.68)
Intangible	-0.009	-0.429*	-0.028	-0.581**
	(-0.12)	(-1.83)	(-0.30)	(-2.10)
Leverage	0.142***	-0.090	0.142***	-0.097
	(6.59)	(-1.32)	(5.87)	(-1.25)
Capital Expenditure	-0.216***	-0.024	-0.229***	-0.148
	(-3.97)	(-0.11)	(-3.68)	(-0.59)
Tobin's Q	-0.002	-0.010	-0.001	-0.009
	(-1.00)	(-1.33)	(-0.60)	(-1.01)
Controlling Ownership	-0.130***	-0.062	-0.136***	-0.012
	(-5.36)	(-0.79)	(-5.24)	(-0.13)
Board Size	-0.007***	-0.004	-0.008***	-0.007
	(-3.20)	(-0.50)	(-3.19)	(-0.77)
Board independent	-0.060	0.061	-0.034	0.064
	(-0.94)	(0.27)	(-0.48)	(0.25)
SOE	-0.192***	-0.103***	-0.207***	-0.123***
	(-20.18)	(-3.03)	(-19.90)	(-2.93)
CEO Duality	-0.001	0.019	-0.003	0.024
	(-0.11)	(0.71)	(-0.28)	(0.82)
Industry FEs			Y	
Year FEs			Y	
Province FEs			Y	
Observations	19,782	19,782	16,816	16,798
Pseudo R-squared	0.381	0.0231	0.321	0.0258

Table 9 Instrumental variable approach for M&A announcement returns

This table reports the results on CARs using the instrumental variable approach. *CAR [-3, +3] (CAR [-5, +5])* is the cumulative abnormal returns in the 7-day [−3, +3] (11-day [−5, +5]) event window using the market model with parameters estimated over the 200 trading days ending 61 days prior to the deal announcement date. *Pledge_Percent (Predicted)* is the fitted value of *Pledge_Percent*. Column (1) - (4) report the second stage. In column (1)-(2), *Pledge_Percent (Peer)* is defined as the average percent of shares pledged by the controlling shareholders from the peer companies operating in the same industry and located in the same province. In column (3)-(4), peers with M&A activities during the [-1, +1] year window are excluded when calculating the instrument. The definition of other controls are listed in Appendix A. The regressions include industry, year and province fixed effects. The t-statistics in parentheses are based on standard errors adjusted for firm-level clustering. ***, **, * represent statistical significance at the 1%, 5% and 10% levels, respectively.

	CAR [-3, +3]	CAR [-5, +5]	CAR [-3, +3]	CAR [-5, +5]
	(1)	(2)	(3)	(4)
Pledge _Percent (Predicted)	-0.030**	-0.035**	-0.059***	-0.059**
	(-2.06)	(-2.02)	(-2.77)	(-2.34)
Size	-0.013***	-0.015***	-0.011***	-0.012***
	(-5.44)	(-5.22)	(-4.02)	(-3.86)
Annual Return	0.006	0.006	0.008*	0.009*
	(1.61)	(1.44)	(1.95)	(1.92)
Cash	-0.006	-0.002	-0.011	-0.011
	(-0.36)	(-0.11)	(-0.59)	(-0.50)
ROA	0.069	0.108*	0.079	0.120
	(1.41)	(1.77)	(1.37)	(1.63)
Intangible	0.022	0.018	0.020	0.013
	(0.47)	(0.32)	(0.32)	(0.17)
Leverage	0.019	0.033*	0.014	0.029
	(1.34)	(1.92)	(0.89)	(1.45)
Capital Expenditure	0.045	0.025	0.051	0.028
	(1.12)	(0.52)	(1.11)	(0.51)
Tobin's Q	-0.012***	-0.014***	-0.013***	-0.015***
	(-6.76)	(-6.63)	(-6.54)	(-6.31)
Controlling Ownership	0.027**	0.017	0.015	0.006
	(2.06)	(1.17)	(1.00)	(0.38)
Board Size	0.001	0.001	0.001	0.000
	(0.96)	(1.06)	(0.61)	(0.21)
Board Independent	0.037	0.037	0.057	0.046
	(1.06)	(0.88)	(1.44)	(0.95)
SOE	-0.012**	-0.020***	-0.018**	-0.023***
	(-2.15)	(-3.07)	(-2.53)	(-2.66)
CEO Duality	0.003	0.001	0.006	0.004
	(0.64)	(0.24)	(1.03)	(0.63)
Related	-0.004	-0.005	-0.001	-0.003
	(-1.09)	(-1.07)	(-0.31)	(-0.59)
Significant	0.035***	0.041***	0.027*	0.036**
	(2.65)	(2.63)	(1.85)	(2.14)
Relative Size	0.034***	0.047***	0.040***	0.052***
	(7.00)	(7.65)	(7.08)	(7.09)

Runup_stock	-0.020***	-0.030***	-0.018***	-0.028***
	(-4.62)	(-6.24)	(-3.60)	(-4.84)
Cash Payment	-0.050***	-0.057***	-0.043***	-0.050***
	(-3.88)	(-3.76)	(-3.00)	(-2.98)
Cash Mixed	-0.018	-0.030*	-0.017	-0.035*
	(-1.21)	(-1.71)	(-1.00)	(-1.75)
Industry FEs		Y		
Year FEs		Y		
Province FEs		Y		
Observations	4,336	4,336	3,299	3,299
Adjusted R-squared	0.169	0.175	0.161	0.166

Table 10 Takeover premium and related party transaction

This table reports the effect of stock pledge on M&A characteristics. *Premium* is the ratio of the trading value of the target on the estimated value minus one. *Related* is a dummy that equals 1 if the deal is a related party transaction, and 0 otherwise. *Pledge_Dummy* is a dummy that equals one if the controlling shareholder of the firm has shares pledged at the end of the year, and zero otherwise. The definition of other controls are listed in Appendix A. The t-statistics in parentheses are based on standard errors adjusted for firm-level clustering. ***, **, * represent statistical significance at the 1%, 5% and 10% levels, respectively.

	Premium	Prob(Related)
	(1)	(2)
Pledge_Dummy	0.234**	0.074*
	(2.01)	(1.80)
Size	0.073	0.033
	(1.13)	(1.52)
Annual Return	0.124	-0.045*
	(0.83)	(-1.69)
Cash	0.122	-0.531***
	(0.32)	(-3.64)
ROA	0.809	-1.168***
	(0.90)	(-3.46)
Intangible	-0.317	0.227
	(-0.26)	(0.59)
Leverage	-0.04	0.153
	(-0.14)	(1.36)
Capital Expenditure	-0.95	-0.226
	(-0.97)	(-0.63)
Tobin's Q	-0.022	0.026**
	(-0.51)	(2.22)
Controlling Ownership	0.627*	0.528***
	(1.68)	(4.23)
Board Size	0.034	-0.020*
	(0.94)	(-1.71)
Board Independent	1.690*	(0.193)
	(1.70)	(-0.51)
SOE	-0.180	0.354***
	(-1.62)	(7.50)
CEO Duality	0.214	-0.203***
	(1.54)	(-4.66)
Related	-0.326***	
	(-3.47)	
Significant	-0.327**	
	(-2.41)	
Relative Size	0.174	
	(1.45)	
Runup_stock	0.139	
	(0.93)	
Cash Payment	0.263	
	(1.48)	
Cash Mixed	-0.316**	
	(-2.22)	
Industry FEs		Y
Year FEs		Y
Province FEs		Y
Observations	3,311	6,540
Pseudo /Adjusted R-squared	0.030	0.079

Table 11 Cross-sectional tests

This table reports the cross-sectional tests on SOE and excess cash. *CAR [-3, +3]* (*CAR [-5, +5]*) is defined the same as that of Table 3. *Pledge_Dummy* is a dummy that equals one if the controlling shareholder of the firm has shares pledged at the end of the year, and zero otherwise. *SOE* is a dummy variable that equals one if the firm is state-owned, and zero otherwise. *Xcash_H* is a dummy that equals 1 if the nature logarithm excess cash ratio of the firm ranks top 50% in the province and industry of a given year, and 0 otherwise. The definition of other controls are listed in Appendix A. The regressions include industry, year and province fixed effects. The t-statistics in parentheses are based on standard errors adjusted for firm-level clustering. ***, **, * represent statistical significance at the 1%, 5% and 10% levels, respectively.

	SOE			Excess Cash		
	Prob(M&A)	*CAR[-3,+3]*	*CAR[-5,+5]*	*Prob(M&A)*	*CAR[-3,+3]*	*CAR[-5,+5]*
	(1)	(2)	(3)	(4)	(5)	(6)
SOE * Pledging_Dummy	-0.130***	0.015**	0.016*			
	(-2.73)	(2.00)	(1.78)			
Xcash_H*Pledging_Dummy				0.085**	-0.017**	-0.015*
				(2.17)	(-2.48)	(-1.81)
Pledging_Dummy	0.174***	-0.012***	-0.014**	0.097***	-0.001	-0.003
	(6.33)	(-2.59)	(-2.42)	(3.68)	(-0.14)	(-0.49)
Xcash_H				0.040	-0.001	-0.004
				(1.61)	(-0.25)	(-0.76)
Size	0.027**	-0.013***	-0.014***	0.027**	-0.013***	-0.014***
	(2.33)	(-6.09)	(-5.55)	(2.30)	(-6.14)	(-5.63)
Annual Return	0.036***	0.005*	0.005	0.035**	0.005*	0.005
	(2.60)	(1.75)	(1.30)	(2.52)	(1.73)	(1.31)
Cash	0.186**	0.008	0.015	0.062	0.023	0.033*
	(2.49)	(0.56)	(0.88)	(0.75)	(1.39)	(1.75)
ROA	0.798***	0.076*	0.105**	0.821***	0.073*	0.101**
	(4.55)	(1.85)	(2.05)	(4.67)	(1.77)	(1.98)
Intangible	-0.250	0.011	0.001	-0.303	0.014	0.005
	(-1.26)	(0.28)	(0.02)	(-1.53)	(0.37)	(0.10)
Leverage	-0.054	0.016	0.027*	-0.080	0.019	0.031**
	(-0.95)	(1.37)	(1.88)	(-1.39)	(1.64)	(2.13)
Capital Expenditure	-0.104	0.037	0.017	-0.107	0.040	0.021
	(-0.57)	(1.10)	(0.45)	(-0.59)	(1.20)	(0.54)
Tobin's Q	-0.009	-0.011***	-0.012***	-0.009	-0.011***	-0.012***
	(-1.42)	(-6.81)	(-6.38)	(-1.33)	(-6.92)	(-6.53)
Controlling Ownership	-0.086	0.021*	0.017	-0.084	0.021*	0.016
	(-1.25)	(1.90)	(1.30)	(-1.23)	(1.88)	(1.25)
Board Size	-0.011*	0.001	0.002	-0.012*	0.001	0.002
	(-1.79)	(1.42)	(1.48)	(-1.81)	(1.39)	(1.45)
Board independent	-0.026	0.046	0.043	-0.025	0.044	0.041
	(-0.14)	(1.47)	(1.14)	(-0.13)	(1.41)	(1.10)
SOE	-0.093***	-0.011**	-0.016***	-0.126***	-0.007	-0.012**
	(-3.32)	(-2.27)	(-2.83)	(-5.01)	(-1.61)	(-2.37)
CEO Duality	0.009	0.004	0.004	0.008	0.004	0.003
	(0.36)	(0.99)	(0.70)	(0.34)	(0.94)	(0.62)

Related	-1.000***	-0.003	-0.003	-0.945***	-0.003	-0.003
	(-3.46)	(-0.90)	(-0.78)	(-3.29)	(-0.93)	(-0.80)
Major		0.038***	0.042***		0.038***	0.042***
		(3.32)	(3.13)		(3.35)	(3.16)
Relative Size		0.028***	0.040***		0.028***	0.040***
		(6.49)	(7.41)		(6.48)	(7.41)
Runup_stock		-0.022***	-0.033***		-0.022***	-0.033***
		(-6.07)	(-7.89)		(-6.07)	(-7.90)
Cash Payment		-0.061***	-0.069***		-0.061***	-0.069***
		(-5.52)	(-5.32)		(-5.54)	(-5.33)
Cash Mixed		-0.027**	-0.038**		-0.027**	-0.039**
		(-2.07)	(-2.48)		(-2.10)	(-2.50)
Industry FEs				Y		
Year FEs				Y		
Province FEs				Y		
Observations	25,757	5,532	5,532	25,731	5,527	5,527
Adjusted (Pseudo) R-squared	0.0222	0.173	0.182	0.0224	0.174	0.183

Table 12 Stock pledge and Post-M&A accounting performance

This table reports the effect of stock pledge on the post-M&A accounting performance. *ROA +1y/2y/3y* is the industry adjusted return on assets 1/2/3 year(s) after M&A announcement year. *Pledge_Dummy* is a dummy that equals one if the controlling shareholder of the firm has shares pledged at the end of the year, and zero otherwise. The definition of other controls are listed in Appendix A. The regressions include industry, year and province fixed effects. The t-statistics in parentheses are based on standard errors adjusted for firm-level clustering. ***, **, * represent statistical significance at the 1%, 5% and 10% levels, respectively.

	ROA +1y	ROA +2y	ROA +3y
	(1)	(2)	(3)
Pledge_Dummy	-0.004**	-0.008***	-0.008***
	(-1.99)	(-3.21)	(-2.64)
Size	0.003***	0.004***	0.004***
	(2.64)	(2.69)	(2.62)
Annual Return	0.001	-0.000	-0.000
	(0.28)	(-0.06)	(-0.16)
Cash	0.038***	0.024**	0.011
	(4.88)	(2.51)	(0.93)
Intangible	0.032*	0.037*	-0.024
	(1.66)	(1.68)	(-0.77)
Leverage	-0.006	-0.008	-0.011
	(-0.84)	(-1.04)	(-1.27)
Capital Expenditure	-0.009	-0.022	-0.009
	(-0.49)	(-1.11)	(-0.35)
Tobin's Q	0.003***	0.001	0.003**
	(3.88)	(1.24)	(2.34)
Controlling Ownership	0.026***	0.010	0.016*
	(4.15)	(1.55)	(1.91)
Board Size	-0.000	-0.001*	-0.000
	(-0.62)	(-1.71)	(-0.59)
Board Independent	-0.064***	-0.035*	-0.033
	(-3.29)	(-1.77)	(-1.40)
SOE	0.000	-0.001	-0.003
	(0.09)	(-0.44)	(-0.89)
CEO Duality	-0.004*	0.000	0.003
	(-1.69)	(0.06)	(0.75)
Related	0.001	0.002	-0.001
	(0.78)	(0.78)	(-0.32)
Significant	0.008*	0.006	-0.014**
	(1.82)	(1.24)	(-1.99)
Relative Size	0.004**	0.006***	0.003
	(2.03)	(3.16)	(1.37)
Runup_stock	0.001	-0.001	-0.001
	(0.56)	(-0.63)	(-0.58)
Cash Payment	-0.012***	-0.008	-0.018***
	(-3.09)	(-1.56)	(-2.98)
Cash Mixed	-0.015***	-0.016***	-0.026***
	(-3.65)	(-2.65)	(-3.21)
ROA -1y	0.287***	0.254***	0.140***
	(11.74)	(9.04)	(3.82)
ROA -2y	0.096***	0.068**	0.096**
	(3.30)	(2.27)	(2.43)
ROA -3y	0.037	0.095***	0.041
	(1.58)	(3.56)	(1.32)
Industry FEs		Y	
Year FEs		Y	
Province FEs		Y	
Observations	4,182	3,707	3,207
Adjusted R-squared	0.176	0.138	0.100

Table 13 Stock pledge and Post-M&A goodwill impairment
This table reports the effect of stock pledge on the post-M&A goodwill impairment with the Probit model. *Impairment_Dummy* is a dummy that equals 1 if the firm reports goodwill impairment during three years after the M&A announcement, and 0 otherwise. *Pledge_Dummy* is a dummy that equals one if the controlling shareholder of the firm has shares pledged at the end of the year, and zero otherwise. The sample covers the M&A deals from 2006 to 2015. The definition of other controls are listed in Appendix A. The regressions include industry, year and province fixed effects. The t-statistics in parentheses are based on standard errors adjusted for firm-level clustering. ***, **, * represent statistical significance at the 1%, 5% and 10% levels, respectively.

	Prob (Impairment_Dummy)
Pledge_Dummy	0.369**
	(2.53)
Size	0.050
	(0.50)
Annual Return	-0.145
	(-0.82)
Cash	0.462
	(0.91)
ROA	1.175
	(0.73)
Intangible	0.754
	(0.59)
Leverage	-1.004**
	(-2.29)
Capital Expenditure	-1.934
	(-1.54)
Tobin's Q	-0.067
	(-1.10)
Controlling Ownership	-1.437**
	(-2.29)
Board Size	-0.019
	(-0.38)
Board independent	-2.086
	(-1.23)
SOE	0.183
	(0.86)
CEO Duality	-0.087
	(-0.51)
Related	0.055
	(0.36)
Significant	-0.028
	(-0.13)
Relative Size	-0.287**
	(-2.09)
Runup_stock	0.220*
	(1.73)
Cash Payment	-0.056
	(-0.17)
Cash Mixed	0.407
	(1.27)
Industry FEs	Y
Year FEs	Y
Province FEs	Y
Observations	1,075
Pseudo R-squared	0.220

Appendix A: Variable definitions

Variable	Definition
Annual Return	Annual stock returns.
Board Independent	The ratio of the number of independent board members to the total number of board members.
Board Size	The total number of directors on board.
Capital Expenditure	The capital expenditure scaled by the total assets.
CAR[-3,+3]	Cumulative abnormal returns in the 7-day [−3, +3] event window using the market model with parameters estimated over the 200 trading days ending 61 days prior to the deal announcement date.
CAR[-5,+5]	Cumulative abnormal returns in the 11-day [−5, +5] event window using the market model with parameters estimated over the 200 trading days ending 61 days prior to the deal announcement date.
Cash	Cash and cash equivalent to total assets.
Cash Mixed	A dummy variable that equals one if the payment involves cash and other types of payment, and zero otherwise.
Cash Payment	A dummy variable that equals one if the payment is pure cash, and zero otherwise.
CEO Duality	A dummy variable that equals one if the CEO is also the chair of the board, and zero otherwise.
Controlling Ownership	Percentage of shares owned by the controlling shareholder
Intangible	Intangible assets divided by total assets.
Leverage	Total debt divided by total assets.
M&A	A dummy that equals one if the firm announces a merger and acquisition, and zero otherwise.
Significant	A dummy that equals one if the deal is a significant deal, and 0 otherwise.
Pledge_Dummy	A dummy that equals one if the controlling shareholder of the firm has shares pledged at the end of the year, and zero otherwise.
Premium	The ratio of trading value of the target on the estimated value minus one.
Related	A dummy that equals one if the deal is a related party transaction, and 0 otherwise.
Relative Size	Deal value divided by the acquirer's total assets.
ROA	Return on assets.
ROA +1y/2y/3y	Industry adjusted ROA 1/2/3 year(s) after M&A announcement year.
ROA -1y/2y/3y	Industry adjusted ROA 1/2/3 year(s) before M&A announcement year.
Runup_stock	Buy and hold daily Shanghai and Shenzhen value-weighted stock returns over the 200 trading days ending 61 days prior to the deal announcement date.
Size	Natural logarithm of total assets.
SOE	A dummy variable that equals one if the firm is state-owned in a given year, and zero otherwise.
Tobin's Q	The sum of the market value of equity and total liabilities divided by total assets