

Share Pledging and Corporate Securities Fraud
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Abstract

We examine the effect of insider share pledges on corporate fraud. We find a positive, causal relation between share pledges by controlling shareholders and detected corporate fraud. Firms whose controlling shareholders pledge have longer fraud detection cycles and receive lighter punishments. Firms with pledging controlling shareholders who hold pledging contracts with multiple financial institutions or continuous pledge commitments that exceed three years are more likely to commit fraud. We examine two economic mechanisms through which firms with pledging controlling shareholders are more likely to commit detected fraud. Our baseline results are robust to bank monitoring and share repurchases, and to the use of difference-in-differences, instrumental variables, and two types of covariate balancing. Our paper quantifies the real effects of a widespread yet under-explored corporate governance phenomenon on detected corporate fraud.

Keywords: Corporate fraud, Share pledging, Controlling shareholders, Emerging markets, Corporate governance

JEL Classification: G15, G38, K22

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All remaining errors are our own.

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Abstract

We examine the effect of insider share pledges on corporate fraud. We find a positive, causal relation between share pledges by controlling shareholders and detected corporate fraud. Firms whose controlling shareholders pledge have longer fraud detection cycles and receive lighter punishments. Firms with pledging controlling shareholders who hold pledging contracts with multiple financial institutions or continuous pledge commitments that exceed three years are more likely to commit fraud. We examine two economic mechanisms through which firms with pledging controlling shareholders are more likely to commit detected fraud. Our baseline results are robust to bank monitoring and share repurchases, and to the use of difference-in-differences, instrumental variables, and two types of covariate balancing. Our paper quantifies the real effects of a widespread yet under-explored corporate governance phenomenon on detected corporate fraud.

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1. Introduction

The revelation of scandals that involved WorldCom, Cendant Corp, Enron, Tyco, Global Crossing, and others during the 2000–2002 period markedly increased press coverage of corporate fraud and led to the passage of the 2002 Sarbanes-Oxley Act designed to comprehensively reform corporate financial practices. This period of widespread fraud disclosure and firm demise shocked investor confidence in stock markets worldwide (e.g., Lagomarsino, 2002; Strauss, 2002; Lins, Servaes, and Tamayo, 2017). The considerable valuation losses for the firms affected by corporate scandals (e.g., Bernile and Jarrell, 2009; Chen, 2016; Fich and Shivdasani, 2007) led many scholars to examine the causes, consequences and detectors of fraud (e.g., Dyck, Morse, and Zingales, 2010) and to explore how corporate governance could change to prevent and detect fraud (e.g., Chen et al., 2006). Largely absent from these studies is the relation of the share-pledging behavior of corporate insiders with corporate fraud. To address this deficiency in the literature, we investigate the impact of the equity share pledges of controlling shareholders on detected fraud commission for a sample of Chinese firms.

Corporate insiders not only widely use pledged shares as collateral to secure their loans for personal investments but also extract other private benefits from their share ownership in relatively dispersed and concentrated markets. In developing markets including India, China mainland and Taiwan, 35-50% of publicly listed firms have pledging controlling shareholders (Dou, Masulis, and Zein, 2019). The controlling shareholders have power over firms that exceeds their cash flow rights through pyramid structures and participation in management (La Porta, Lopez-De-Silanes, and Shleifer, 1999). By pledging shares to financial institutions to secure their personal loans, these insiders can exacerbate price shocks due to margin calls triggered by a decline in stock prices. If margin calls cannot be met, pledging institutions can sell the pledged shares to close out the loans, which in turn pushes the stock price further down which can result in future margin calls (Chan et al., 2018; Dou, Masulis, and Zein, 2019). The margin call pressure may encourage pledging controlling shareholders to commit fraud to prop up stock prices, as the risk of a severe stock price

decline is a strong incentive to commit fraud (Johnson, Ryan, and Tian, 2009) especially for liquidity constrained pledging controlling shareholders.

Alternatively, firms with pledging controlling shareholders may be subject to more intense bank monitoring that may deter incidences of fraud (Cerqueiro, Ongena, and Roszbach, 2016; Rajan and Winton, 1995) or resort to share repurchases as a safer strategy to prevent margin call threats (Chan et al., 2018; Guo et al., 2021). Although there is anecdotal evidence of firm fraud being associated with share pledges especially in the U.S. and China,¹ our research question about whether firms with pledging controlling shareholders are more likely to commit fraud is an empirical question. Our sample includes 28,906 firm-year observations, and 4,954 fraud disclosures for 3,401 Chinese firms from 2003 to 2020. Our baseline results report a significantly positive relation between share pledges by controlling shareholders and detected corporate fraud. The relation is economically significant. Compared to their counterparts with non-pledging controlling shareholders, the probability of fraud detection increases by 6.65 percent for firms with pledging controlling shareholders and by 10.81 percent for a unit change in the pledge ratio for firms with pledging controlling shareholders. This result is robust to the use of a sample which excludes the small number of shares repurchasing firms, thereby ruling out share repurchases as an alternative driver that affects detected fraud commission. Furthermore, we show that more intense bank monitoring does not affect the positive relationship that we identify between share pledging and detected fraud commission.

We use four different strategies to address potential identification and endogeneity issues. Our first and second identification approaches use propensity score matching and entropy balance approaches to ensure that treated and control samples are covariate balanced. Our third

¹ For example, WorldCom was punished by the Securities and Exchange Commission (SEC) after revelations of an \$11 billion accounting fraud, one of the largest corporate accounting scandals in U.S. history (Searcey, Young, and Scannell, 2005). The main incident behind the fraud was the attempt of its ex-CEO to avoid the threat of a margin call on his pledged shares. In another example, China's U.S.-listed company Luckin Coffee paid a fine of US\$180 million to the SEC after revelations that Luckin fabricated much of its 2019 sales (Kurtenbach, 2020), while the firm's chairman held margin loans totaling US\$518 million at multiple securities corporations (Zhu and Hughes, 2020).

identification approach uses a quasi-natural experiment to investigate the effect of a shock to share pledging on corporate fraud. The shock is the enactment of a regulatory rule as of January 9, 2016 requiring pledging controlling shareholders to inform their own firms of pledging activities within two days of pledging shares as collateral to institutional lenders and also to publicly disclose their share pledges. As a negative informational event for firms with shares pledged by controlling shareholders, this rule increased the incentive for actions such as firm fraud designed to alleviate the likelihood of a margin call against the pledging controlling shareholders. The regulation was not designed to affect (increase) securities fraud. The results of our DiD tests support our main finding that share-pledging firms are more likely to commit fraud after the passage of the 2016 rule. Our fourth identification approach uses an instrumental variable (IV) analysis to address the issue of omitted variables and reverse causality. Our instrument is the average percentage of pledged shares by controlling shareholders for non-fraud conducting firms in the same province and same year as the fraud conducting firms. The results of the IV approach are consistent with our baseline results that firms with share pledges by controlling shareholders are more likely to commit detected fraud.

Accounting for various fraud characteristics and pledge contract characteristics, we conduct additional tests investigating the effect of share pledging on detected frauds. We find that share pledges by controlling shareholders have a longer elapsed time from fraud origination to regulatory resolution. A firm with pledging controlling shareholders is more likely to be lightly punished for fraud commission. A firm with pledging controlling shareholders is more likely to commit detected fraud when its controlling shareholders pledge shares to multiple financial institutions. Furthermore, a firm with pledging controlling shareholders is more likely to commit fraud when its controlling shareholders have continuous pledge commitments that exceed three years.

Our study contributes to two strands of the literature. First, our paper is related to the literature on the economic impact of share pledging. Prior research shows that share pledging increases the tail risk for U.S. firms (Anderson and Puleo, 2020), and exacerbates the crash risk of pledging firms but makes controlling shareholders more financially constrained which can lead to the loss

of the private benefits of control (Dou, Masulis, and Zein, 2019). Pledging increases the probability of share repurchases (Chan et al., 2018) but decreases dividend payouts (Li et al., 2020) and impedes innovative activities (Pang and Wang, 2020). We investigate each aspect of fraud including the fraud detection cycle (fraud origination to regulatory resolution), fraud penalty, and aspects of pledging contracts including the number of pledging institutions and the durations of continuous pledge commitments. Our paper is totally distinct from DeJong, Liao, and Xie (2020), which investigate how share pledging by controlling shareholders impacts a firm's financial reports. Our study finds that China's controlling shareholders with pledged loans have strong incentives to commit fraud to prevent margin call pressure, although firms with pledging controlling shareholders are subject to more intense bank monitoring but are severely restricted from using share repurchases to bolster stock prices.

Second, our paper contributes to the literature that investigates the incentives for corporate fraud (e.g., Johnson, Ryan, and Tian, 2009; Wang, Winton, and Yu, 2010; Wu, Johan, and Rui, 2016; Zhang, 2018), the characteristics of fraudulent firms (e.g., Burns and Kedia, 2006; Efendi, Srivastava, and Swanson, 2007; Khanna, Kim, and Lu, 2015), and the detection of fraud (e.g., Dyck, Morse, and Zingales, 2010; Yu and Yu, 2011). We differ in that our focus is on the fraud incentives of pledging controlling shareholders, specific corporate governance characteristics, and the factors that affect corporate fraud.

The remainder of the paper is organized as follows. Section 2 reviews the literature and develops the hypotheses. Section 3 describes the data and variable constructions. Sections 4 and 5 present baseline and additional empirical tests. Section 6 explores the underlying channels for transmitting the effect of the share pledges of controlling shareholders on firm fraud. Section 7 concludes.

2. Literature Review and Research Question Development

Concentrated corporate ownership is predominant in many countries, where controlling shareholders have power over firms that exceeds their cash flow rights through pyramid structures

and participation in management (La Porta, Lopez-De-Silanes, and Shleifer, 1999). Ownership is even more concentrated in developing or emerging markets (La Porta et al., 1998), where more than two-thirds of East Asian corporations have a single large shareholder (Claessens, Djankov, and Lang, 2000), who controls a firm's operations and decision-making through various self-dealing transactions. Concentrated ownership provides controlling shareholders with greater opportunities to undertake self-interested personal consumption or investment.

Previous studies find that the share pledges of controlling shareholders have a negative impact on firm value. Dou, Masulis, and Zein (2019) find that insider pledging exacerbates a firm's negative price shocks due to the threat of possible margin calls triggered by a decline in stock prices. If margin calls cannot be met, pledging institutions can sell the pledged shares to close out the loans, which in turn pushes the stock price further down and can result in further margin calls (Chan et al., 2018). Anderson and Puleo (2020) find that insider pledging significantly increases stock volatility since to fund their margin requirements, insider pledgers may be forced into fire sales at depressed prices or liquidation by lending institutions. Pledging controlling shareholders may lose their control rights or benefits from extorting private benefits if share prices fall below the minimum collateral margin requirement (Chan et al., 2018). The margin call pressure may encourage pledging controlling shareholders to commit fraud to inflate stock prices, as the risk of a severe stock price decline is a strong incentive to commit fraud (Johnson, Ryan, and Tian, 2009) especially for liquidity constrained pledging controlling shareholders. Based on the parsimonious theoretical model of Parsons, Sulaeman and Titman (2018) for financial misconduct, a rationale pledging controlling shareholder would exercise its control position by encouraging financial fraud in its investee firm if the marginal benefits of doing so are at least equal to the marginal costs of not doing so or the expected costs from the fraud being detected. Expected benefits from financial fraud in an investee firm for a rationale pledging shareholder would be associated with the alleviation of potential margin call risk by minimizing downward pressure on the investee firm's share price. If pledging controlling shareholders are rationale and only conduct financial fraud when they deem that the a priori net present value of doing so is positive, we would conjecture

that companies with pledging controlling shareholders are more likely to commit fraud that may be detected compared to firms whose controlling shareholders do not pledge shares.

However, one could argue that firms with pledging controlling shareholders do not have to resort to fraud since there is a substantially less risky strategy for alleviating margin call risk. Given the opportunity that did not exist in China prior to the relaxation of the in-principle prohibition of share repurchases in 2018 (Guo et al., 2021), pledging controlling shareholders may prefer to repurchase firm shares in the open markets to prop up stock prices to alleviate a potential margin call (Chan et al., 2018; Guo et al., 2021). Firms in some markets can time the market by repurchasing shares when prices have declined (Liu and Swanson, 2016; Stumpf, 2014) to increase firm valuations and inflate stock prices. We subsequently deal explicitly by ensuring that our results are not affected by the small overlap in time periods where share repurchases could have been used in China.

One could also argue loans from banks are associated with more intense monitoring that could deter the use of fraud by pledging controlling shareholders to alleviate market call risk. As delegated monitors and insiders, banks have a comparative cost advantage in monitoring borrowers to prevent the moral hazard costs of borrowers (Diamond, 1984; Fama, 1985). A bank has an incentive to increase its monitoring of the firm when the value of the shares pledged for loans by the firm is risky (Cerqueiro, Ongena, and Roszbach, 2016; Rajan and Winton, 1995) but it is unclear how much the monitoring of the firm increases when the shares are pledged for loans of the firm's controlling shareholders and not the firm itself. Furthermore, a 2013 pledging regulatory rule in China allowed securities firms with less expertise in monitoring to get involved in share pledge funding.² Thus, we expect that any enhanced monitoring by lenders only would exert a small effect on fraud commission (Li, Makaew, and Winton, 2018). Nevertheless, we subsequently examine how our baseline results are moderated by the level of borrower monitoring.

² By requiring lower interest rates, having fewer restrictions on the usage of the loans, and approving transactions in a quicker manner compared to banks and trust firms, the entrance of securities companies increased competitive pressures on pledgees to lower their monitoring incentives to remain competitive in the marketplace (Li, Liu, and Wang, 2019).

While we expect that the net effect of the above will result in a positive fraud-pledge relation, we acknowledge that the relationship between share pledging of controlling shareholders and firm fraud is a question that remains to be addressed empirically.

3. Data, Variable Construction and Descriptive Statistics

3.1 Data

We collect accounting and financial information from the China Stock Market and Accounting Research (CSMAR) database. The list of rule violation events is provided by the Chinese Securities Regulatory Commission (CSRC), Shanghai Stock Exchange (SSE), Shenzhen Stock Exchange (SZSE) and listed companies themselves. To arrive at an initial list of firms deemed to have exhibited financial misconduct behavior over the period from 2003 to 2020, we first select the rule-violation events by firms where the variable “whether the listed firm violated the rules” equals “Yes”. From this list, we then select the 4,954 events whose firms did not receive a “letter of monitoring”.³ Thus, this sample of rule-violation events eliminates minor misdemeanors. This sample selection approach is similar to that of Li, Makaew, and Winton (2020) and Zhang (2018) but spans a longer period. Since the fraud punishment information collected by CSMAR comes from documents provided by various agents, the incidence of false detection in our sample is likely to be low. Unlike the fraud data processing approach in Yu and Yu (2011) and Khanna, Kim, and Lu (2015), we do not use a threshold penalty payment for our sample of frauds, as the punishment for China’s listed companies is relatively light. The maximum penalty in our sample is RMB461.75 million (about USD71.04 million), and only 644 of the 4,954 fraud cases in our sample were fined.⁴ We further restrict our sample to the firms which have controlling shareholders and those without special treatment (Yang, Lu, and Xiang, 2020). We use the 2012 Guideline of Industry Classification of Listed Companies issued by the CSRC to classify the

³ A letter of monitoring is one type of punishment announcement made by regulatory authorities for a misdemeanor by a firm.

⁴ In China, the punishment for corporate securities fraud is light. For example, Nanjing Textiles Import & Export Corp Ltd. only paid a fine of RMB\$50,000 to the CSRC for its sales fabrication five years in a row from 2006-2010. The punishment release is available in Chinese at: http://www.csrc.gov.cn/pub/zjhpublic/G00306212/201407/t20140707_257345.htm#

industries. Since the manufacturing industry (industry code: C) includes 29 subindustries and more than 2000 companies, we use two codes to classify each firm in the manufacturing industry. Our industry classification is like that in Wu, Johan, and Rui (2016) and Zhang (2018). We remove the firms in the financial industry (industry code: F). Our final sample has 28,906 firm-year observations, covering 3,401 firms.

3.2 Variables

We define observed fraud ($Fraud_{i,t}$) that takes the value of one if firm i commits fraud that is detected in year t and zero otherwise. Due to China's concentrated ownership, we investigate share pledging of controlling shareholders rather than that of other types of shareholders. The financial statements of China's listed companies clearly state the relevant information about controlling shareholders since the absence of a controlling shareholder must be noted in the financial statements. Our identification of controlling shareholders differs from that in Chan et al. (2018) who use a minimum threshold of at least 10% of ownership to identify controlling shareholders. Share pledges of controlling shareholders are measured using a dummy variable of pledged shares or a ratio of pledged shares. The dummy variable ($Pledge_Dummy_{i,t-1}$) is equal to one if controlling shareholders have pledged shares at the end of year $t-1$ for firm i and zero otherwise. The pledge ratio ($Pledge_Ratio_{i,t-1}$) is the ratio of pledged shares to the total shareholdings of controlling shareholders at the end of year $t-1$ for firm i .

We control for various firm characteristics that affect corporate fraud by following the corporate fraud literature (e.g., Khanna, Kim, and Lu, 2015; Wang, 2013; Wang, Winton, and Yu, 2010; Zhang, 2018). Our lagged control variables are: (1) Firm age ($Age_{i,t-1}$) is the number of years since the inception of a firm. (2) Firm size ($Size_{i,t-1}$) is the logarithm of total size. (3) Leverage ratio ($Leverage_{i,t-1}$) is the total liabilities divided by total equity. (4) Growth rate ($Growth_{i,t-1}$) is the rate of change of firm revenue. (5) Tobin Q ($Tobin_{i,t-1}$) is the ratio of a firm's market value to its book value. (6) State-owned enterprise ($SOE_{i,t-1}$) is a dummy variable equal to one if the company is a state-owned enterprise and zero otherwise. (7) Ownership concentration

($Top5_{i,t-1}$) is the sum of the shareholding ratios of the top five shareholders. (8) Institutional holding ($Institution_{i,t-1}$) is the sum of the shareholding ratios of the institutional shareholders. (9) Independent director ($Indep_Director_{i,t-1}$) is the ratio of the number of independent directors to the number of board directors. (10) Board size ($Boardsize_{i,t-1}$) is the logarithm of one plus the number of board directors. (11) Size of the supervisory board ($Supsize_{i,t-1}$) is the logarithm of one plus the number of supervisory members. (12) Board meeting ($Meeting_{i,t-1}$) is the logarithm of one plus the number of board meetings. (13) Analyst ($Analyst_{i,t-1}$) is the logarithm of one plus the number of analysts. (14) Dual ($Dual_{i,t-1}$) is a dummy variable equal to one if the chairman and the CEO are the same person and zero otherwise. (15) Stock turnover ($Turnover_{i,t-1}$) is the transaction amount of the stock during the year divided by the product of number of shares outstanding and annual closing price. (16) Stock return ($Return_{i,t-1}$) is the annual stock return. (17) Stock volatility ($Volatility_{i,t-1}$) is the standard deviation of daily stock returns. Detailed definitions of all the variables of interest and the control variables are provided in the Appendix.

3.3 Summary statistics

We winsorize all continuous variables at the top and bottom 1% of each variable's distribution to minimize outliers. Panel A of Table 1 reports summary statistics of the main variables used throughout the paper. The average observations for fraud and pledging percentage for all firm-year observations are 8.7% and 44.7%, respectively. Panels B, C, and D report the descriptive statistics for corporate fraud and share pledges of controlling shareholders during the period of 2003-2020 by year, industry, and province, respectively. Panel B shows an increasing time trend in the mean values of corporate fraud. The average number of company frauds in the 2010 decade is almost twice that in the previous decade. We also observe that after the relaxation of restrictions on share pledges in 2013 that more controlling shareholders became involved in equity pledging. The results in Panels C and D indicate that corporate fraud and share pledges of controlling shareholders are not concentrated in specific industries or provinces.

[Please Place Table 1 about Here]

4. Empirical Tests

In this section, we first estimate baseline regressions of share pledges of controlling shareholders on corporate fraud. We then address potential endogeneity issues by using propensity score matching (PSM), entropy balancing (EB), difference-in-differences (DiD) and instrumental variable (IV) approaches.

4.1 Baseline regression

We estimate the relationship between share pledges of controlling shareholders and corporate fraud using the following probit regression:

$$Pr(Fraud_{i,t}) = \beta_0 + \beta_1 Pledge_{i,t-1} + \gamma Control_{i,t-1} + \mu_t + \nu_k + \lambda_j + \varepsilon_{i,t} \quad (1)$$

where $Fraud_{i,t}$ is equal to one if fraud is detected for firm i in year t . $Pledge_{i,t-1}$ is the share pledges of controlling shareholders for firm i at the end of year $t-1$, measured by a dummy variable of pledged shares ($Pledge_Dummy_{i,t-1}$) or the ratio of pledged shares ($Pledge_Ratio_{i,t-1}$). The key coefficient of our interest is β_1 . μ_t is year fixed effects, ν_k is industry fixed effects, and λ_j is province fixed effects. We cluster standard errors at the firm level. The control variables $Control_{i,t-1}$ are as previously defined and listed in the Appendix.

Table 2 reports the baseline probit regression results. We find that share pledges by controlling shareholders are significantly and positively related to the probability of detected fraud. The estimated coefficient for $Pledge_Dummy_{i,t-1}$ in column (1) is 0.134, and that for $Pledge_Ratio_{i,t-1}$ in column (2) is 0.302. These coefficients are not only statistically significant but also economically significant. Compared to their counterparts with non-pledging controlling shareholders, the probability of fraud detection increases by 6.65 percent for firms with pledging controlling shareholders and by 10.81 percent for a unit change in the pledge ratio for firms with pledging controlling shareholders.⁵ This finding supports the conjecture that the firms with

⁵ The marginal probability effect of a dummy variable X_j is $\Phi(X_{1i}^T\beta) - \Phi(X_{0i}^T\beta)$, where X_{1i}^T is any vector of

pledging controlling shareholders are more likely to commit detected fraud.

[Please Place Table 2 about Here]

Our sample contains only 79 repurchasing firms before 2018, which is the year the Chinese Company Law was amended to release restrictions on firm share repurchases in open markets. Nevertheless, Chinese regulators and stock exchanges continued to monitor the motives behind any share repurchases. For example, Landocean Energy Services Co., Ltd was asked by the Shenzhen Stock Exchange to explain the reason for its buyback announcement made on Nov. 17, 2018.⁶ This request includes the explanations for the cancellation of the buyback that was intended to prop up stock prices given that its controlling shareholder had pledged 94.61% of his shareholdings, and the firm had changed its corporate governance structure to address this heavy pledging issue. Thus, to rule out the possibility that firms whose controlling shareholders pledge shares may buy back shares to mitigate margin call pressure rather than committing fraud to inflate stock prices, we eliminate firms which repurchased shares in the open markets. The results reported in the columns (3) – (4) of Table 2 indicate that share repurchases are not an alternative driver for corporate securities fraud. The robustness test reinforces our baseline finding that share pledging by controlling shareholders increase corporate fraud.

As only detected frauds are observable (Wang, 2013), we further examine the robustness of the baseline results for the relation between equity pledges and corporate fraud using the bivariate probit model proposed by Wang (2013) for corporate fraud. Supportive results are reported in the Online Supplementary Appendix (OSA) Table A2. They indicate that firms with pledging

regressor values with $X_{ij} = 1$; and X_{0i}^T is any vector of regressor values with $X_{ij} = 0$. The marginal probability effect of a continuous variable X_j is given by $\frac{\partial \Phi(X_i^T \beta)}{\partial x_{ij}} = \Phi(X_i^T \beta) \frac{\partial X_i^T \beta}{\partial x_{ij}}$, where $\Phi(X_i^T \beta)$ is the value of the standard normal probability density function evaluated at $X_i^T \beta$ and $\frac{\partial X_i^T \beta}{\partial x_{ij}}$ is the marginal index effect of X_j . The reference is available at <http://econ.queensu.ca/faculty/abbott/econ452/452note15.pdf>. We use the average marginal effect in Stata to calculate the marginal probability effect for the probit model.

⁶ The website is available at:

<http://reportdocs.static.szse.cn/UpFiles/fxklwxhj/NMK30015723975.pdf?random=0.21472773290549374>

controlling shareholders have a statistically and economically higher incidence of having committed fraud and a statistically and economically higher likelihood of detection given fraud compared to firms whose controlling shareholders never pledged shares.

4.2 Banks' monitoring incentives

When pledging controlling shareholders face margin call threats, the risky collateral can make pledging banks more likely to strengthen their monitoring incentives (Cerqueiro, Ongena, and Roszbach, 2016; Rajan and Winton, 1995), thereby deterring the incidence of fraud (Li, Makaew, and Winton, 2018). Thus, share pledging of controlling shareholders may deter fraud commission when banks have more incentives to monitor firms with share pledged controlling shareholders even when the loans are not to the firm.

Following Ang, Cole, and Lin (2000), we use the debt-to-asset ratio as a proxy for a bank's incentives to monitor firms. The rationale behind this proxy is straightforward. Debt financing is effective in extenuating agency costs between management and shareholders (Jensen and Meckling, 1976), as shareholders may shift the risk of taking negative NPV projects or very risky projects to debtholders. Since a firm's default risk increases with increased leverage, a bank's incentive to monitor the firm increases (Ang, Cole, and Lin, 2000). Any increase in a bank's monitoring incentives can inhibit corporate fraud (Li, Makaew, and Winton, 2018).

To test the impact of bank monitoring on the relationship between the share pledging of controlling shareholders and incidence of detected fraud, we use firm leverage as a proxy for bank monitoring. We estimate the following probit model:

$$\begin{aligned} Pr(Fraud_{i,t}) = & \beta_0 + \beta_1 Pledge_{i,t-1} + \beta_2 Leverage_{i,t-1} \\ & + \beta_3 Pledge_{i,t-1} * Leverage_{i,t-1} + \gamma Control_{i,t-1} + \mu_t + \nu_k + \lambda_j + \varepsilon_{i,t} \end{aligned} \quad (2)$$

where $Leverage_{i,t-1}$ is the debt to asset ratio for firm i in year $t-1$ as defined in Ang, Cole, and Lin (2000). All the other variables are defined as in the baseline regression (1). If banks increase the monitoring of firms with pledging controlling shareholders and this has a material impact on firm fraud, we expect the coefficient of the interaction term $Pledge_{i,t-1} * Leverage_{i,t-1}$ to be

negative.

The coefficients of the interaction terms reported in columns (1) and (2) of Table 3 are positive but insignificant. This indicates that increased bank monitoring of firms with pledging controlling shareholders does not significantly reduce the propensity of fraud. The results are robust when the sample excludes all the share repurchasing firms [see columns (3)-(4) of Table 3].

[Please Place Table 3 about Here]

To summarize, bank monitoring and firm share repurchases have little effect on our baseline finding of a positive relationship between share pledging and the incidence of detected fraud.

4.3 Propensity score matching approach

To reduce the potential biases due to the endogeneity of share pledges of controlling shareholders due to covariate imbalance, we use a propensity score matching approach (PSM). We use one-to-one nearest neighbor matching without replacement to disentangle share-pledged and non-share-pledged firms for each year by controlling all the firm characteristics used in our baseline regression (Anderson and Puleo, 2020; Li et al., 2020). We find no significant differences in the matching parameters after matching. This suggests that the observable characteristics between the matched samples are minimized and that the selection of the two types of firms is much less likely to be biased. We use the matched sample to rerun our baseline regression and report the results in columns (1) and (2) of Table 4. We find that the coefficients on the dummy variable for pledged shares ($Pledge_Dummy_{i,t-1}$) and the ratio of pledged shares ($Pledge_Ratio_{i,t-1}$) for the regression based on the PSM analysis remain significant and positive. This lends further support to our hypothesis that the companies with pledged shares by controlling shareholders are more likely to commit detected corporate fraud.

[Please Place Table 4 about Here]

4.4 Entropy balance approach

As Hainmueller (2012) and King and Nielsen (2019) point out, a weakness of the PSM

approach is its attempt to approximate a completely randomized experiment, rather than a more powerful fully blocked randomized experiment used by other approaches. They suggest an entropy balance (EB) approach to ensure no significant difference in each variable between groups without excluding observations. Using the entropy balance approach, we control the three moments of all control variables to ensure that there is no significant difference in the mean, variance, and skewness between the groups with and without share pledges of controlling shareholders. We then rerun our baseline regression and report the results in columns (3) and (4) of Table 4. We find that the coefficients on $Pledge_Dummy_{i,t-1}$ and $Pledge_Ratio_{i,t-1}$ remain significant and positive. The results reported in Table 4 using the propensity score matching and entropy balance approaches are consistent with our baseline regression, indicating that the effect of share pledging on corporate fraud most likely is not due to selection bias. This provides further evidence supporting our hypothesis that the companies with pledging controlling shareholders tend to commit more fraud compared to firms whose controlling shareholders do not pledge shares.

4.5 Difference-in-differences approach

In this section, we use a quasi-natural experiment to investigate the relation between share pledging and corporate fraud. As of January 9, 2016, the China Securities Regulation Commission (CSRC) enacted a regulatory rule requiring pledging controlling shareholders to inform their own firms of pledging activities within two days of pledging shares to pledging institutions and to publicly disclose their share pledges. The passage of this rule for the disclosure of share pledges is a good candidate for a quasi-natural experiment because the shock only applies to pledging controlling shareholders and not to non-pledging controlling shareholders and is not designed to directly affect securities fraud. Pledging initially drives down stock prices and reduces firm value (Dou, Masulis, and Zein, 2019). The 2016 regulatory rules have a negative informational impact on prices for firms whose pledging controlling shareholders are obligated to disclose collateralization (Cheng, Liu, and Sun, 2021). This additional decline in stock prices makes pledging controlling shareholders more likely to resort to fraud commission. Thus, the passage of the rule for pledging disclosure by controlling shareholders is likely to lead to a more pronounced

positive relationship between share pledging and fraud commission.

We use the DiD approach to compare the securities fraud changes due to the 2016 regulatory rule. We construct our treatment group as firms whose pledge ratios are above the industry median pledge ratio in 2015. These firms are directly affected by the 2015 regulatory rule enactment. Our control group is drawn from firms which never pledged shares in 2015, chosen by the propensity score matching approach by using all the control variables used in the baseline regression. Because the most important assumption for the DiD test is the parallel-trend assumption for treatment and control groups, we conduct a test to verify if the assumption is valid. Column (1) of Table 5 presents changes in the probability of corporate securities fraud in the years around the 2016 regulatory rule. The confidence intervals for the estimates are obtained from the following specification:

$$Pr(Fraud_{i,t}) = \beta_0 + \sum_{k=2013}^{2019} \delta_k EventYear_{i,k} + \gamma Control_{i,t-1} + \mu_t + \nu_k + \lambda_j + \varepsilon_{i,t} \quad (2a)$$

where the dependent variable $Fraud_{i,t}$ is equal to one if fraud is detected for firm i in year t . $EventYear_{i,k}$ is an indicator variable with respect to the reference year 2015. The reference year is one year before the 2016 regulatory rule, similarly to the set-up of Reher (2021). μ_t , ν_k , and λ_j are the year, industry, and province fixed effects, respectively. The control variables are all the explanatory variables used in the baseline regression (1). The standard errors are clustered at the firm level. The estimated coefficients for the two periods following the 2016 shock that are reported in column (1) of Table 5 are significantly positive with increasing magnitudes. In contrast, the coefficients for the years prior to the rule change year are insignificant. The insignificant coefficients suggest the absence of a different observable trend in corporate securities fraud between treatment and control groups prior to the 2016 regulatory rule enactment, which is consistent with the parallel trend assumption.

[Please Place Table 5 about Here]

Following Rodnyansky and Darmouni (2017) and Reher (2021), we plot the estimated

coefficients with their 90% confidence intervals in Figure 1. The graph shows no significant difference between the treatment and control group before the 2016 regulatory rule took effect, but an increasing and significant effect on detected corporate securities fraud starting after 2016. In summary, column (1) of Table 5 and Figure 1 confirm that the treatment and control groups enjoy a common time trend in corporate securities fraud before the enactment of the 2016 regulatory rule for share pledges.

[Please Place Figure 1 about Here]

Next, we conduct the DiD probit regression test by estimating the following model:

$$Pr(Fraud_{i,t}) = \beta_0 + \beta_1 Treat_i + \beta_2 Post_t + \beta_3 Treat_i \times Post_t + \gamma Control_{i,t-1} + \mu_t + \nu_k + \lambda_j + \varepsilon_{i,t} \quad (2b)$$

The dependent variable $Fraud_{i,t}$ is equal to one if fraud is detected for firm i in year t . $Treat_i$ is a dummy variable equal to one for treatment firms, and 0 for control firms. $Post_t$ is a dummy variable equal to one if the fiscal year is after 2016 and zero otherwise. μ_t , ν_k , and λ_j are the year, industry, and province fixed effects, respectively. The standard errors are clustered at the firm level. The coefficient of interest in determining whether treated firms respond differently in terms of the likelihood of detected fraud after the 2016 rule is β_3 . The magnitude and sign on the coefficient of this term indicate how treated firms respond compared to control firms after they are required to disclose their pledges to their firms and publicly.

Columns (2) and (3) of Table 5 report the DiD results based on the probit model for the period of 2013-2019, and 2014-2018, respectively. We find that the coefficients for $Treat_i \times Post_t$ are positive and significant for both columns, which suggests that treatment firms experience an increase in corporate fraud compared to control firms following the enactment of the 2016 equity pledge disclosure rule. The coefficient estimates of the interaction term of 0.295 (0.294) in column 2 (column 3) indicates that the treatment group has a 5.39% (5.57%) higher incidence of detected fraud than the control group following the 2016 pledging regulatory rule.

We then check the robustness of our DiD results by conducting two placebo tests assuming that the exogenous shock in 2016 occurred in 2015. The placebo test results are reported in the Online Supplementary Appendix (OSA) Table A3. We find that the coefficients of the interaction term in the DiD placebo tests are not significant for both pseudo events. This finding shows that companies with controlling shareholders with greater share pledges are more likely to commit detected fraud compared to firms whose controlling shareholders do not pledge shares.

4.6 IV analysis

Although we find a significant and positive relationship between the share pledging of controlling shareholders and corporate fraud, the relationship could be biased because of omitted variables that affect share pledging and corporate fraud simultaneously or a reverse causality relationship where detected corporate fraud may affect the share pledges of controlling shareholders. To find a good instrumental variable which is correlated with share pledging but uncorrelated with corporate fraud, we use the average percentage of pledged shares by controlling shareholders for non-fraud conducting firms in the same province and same year as fraud conducting firms, similar to the IV construction in Pang and Wang (2020).

We implement a two-stage instrumental variable regression using a probit model. The equation of our first-stage regression is:

$$Pledge_{i,t-1} = \beta_0 + \delta_1 Pledge_Mean_NotFraud_{i,t-1} + \gamma Control_{i,t-1} + \nu_k + \lambda_t + \varepsilon_{i,t} \quad (3)$$

where $Pledge_{i,t}$ is the pledged shares of the controlling shareholders as measured by a dummy variable of pledged shares $Pledge_Dummy_{i,t-1}$ or the ratio of pledged shares $Pledge_Ratio_{i,t-1}$. $Pledge_Mean_NotFraud_{i,t-1}$ is the instrumental variable defined as the average percentage of pledged shares (pledged share ratios) by controlling shareholders for non-fraud detected firms from the same province in the same year as for the fraud detected firms. ν_k and λ_t are industry and year fixed effects, respectively. The control variables $Control_{i,t-1}$ are defined in the Appendix of the main paper. We obtain the predicted pledge variable $\widehat{Pledge}_{i,t-1}$ from Eq. (3) and then plug it into the second-stage regression Eq. (4).

The second-stage regression which estimates the impact of predicted share pledges on firm fraud is:

$$Pr(Fraud_{i,t}) = \beta_0 + \delta_2 \widehat{Pledge}_{i,t-1} + \gamma Control_{i,t-1} + v_k + \lambda_j + \varepsilon_{i,t} \quad (4)$$

where $\widehat{Pledge}_{i,t-1}$ is the predicted share pledge from Eq. (3). $Fraud_{i,t}$ is the observed fraud. δ_2 captures the causal effect on corporate fraud of share pledges if the selected instrumental variable is valid.

Table 6 reports the results of the two-stage IV analysis. Columns (1) and (3) present the first-stage results based on Eq. (3), where the shares pledged by controlling shareholders as measured by $Pledge_Dummy_{i,t-1}$ and $Pledge_Ratio_{i,t-1}$ are regressed on the instrumental variable $Pledge_Dummy_Mean_NotFraud_{i,t-1}$ and $Pledge_Ratio_Mean_NotFraud_{i,t-1}$, respectively. The coefficients of the instrumental variable are significantly positive for both measures of pledging.

[Please Place Table 6 about Here]

The second-stage results also are consistent with our baseline results in that the coefficients of $\widehat{Pledge_Dummy}_{i,t-1}$ and $\widehat{Pledge_Ratio}_{i,t-1}$ reported in columns (2) and (4) of Table 6, respectively, are significantly positive. They also have similar magnitudes and the same signs as their counterparts for the baseline regressions reported in Table 2. The F-values for our two independent variables of interest in the first step regression, pledge dummy and pledge ratio, are 143.71 and 153.60, respectively, which comfortably exceed the threshold F-value of 10. This indicates that our instruments are not weak (Staiger and Stock, 1997).

Overall, this IV result along with those presented earlier using the DiD tests suggest that the identified positive relation between the share pledges of controlling shareholders and firm fraud is likely to be causal.

5. Additional Tests

In this section, we conduct tests to investigate if and how the identified pledge-fraud relation changes when we account for fraud characteristics (detection cycle, and punishment degree or severity) and pledge characteristics (pledging institutions and duration).

5.1 Origination to disclosure elapsed time

Controlling shareholders with pledged shares may evade fraud detection by using various strategies to prevent regulatory authorities from investigating and punishing firm violations if detected. Yu and Yu (2011) find that fraud by lobbying firms is less likely to be detected by regulators and to have a longer origination to detection elapsed time. This can provide managers of these firms with more time to sell their stocks before any sharp decline of stock prices after the fraud is revealed to the market (Karpoff, Lee, and Vondracik, 1999).

We now test whether companies with share pledges by controlling shareholders have a longer elapsed time from fraud origination to regulatory resolution (detection cycle). Since only the year that a fraud originated is available, we measure the fraud resolution time ($Origination_to_Disclosure_{i,t-1}$) for average resolution years as the natural logarithm of one plus the difference between the year in which the fraud document was released by the regulatory authority and the year in which the fraud first began. For a non-resolution year for firm i , $Origination_to_Disclosures_{i,t-1}$ is set to missing. Only first-time fraud disclosures for a firm are examined. We replace $Fraud_{i,t}$ in Eq. (1) with $Origination_to_Disclosure_{i,t-1}$ and rerun the baseline probit regression. The coefficient of $Pledge_Dummy_{i,t-1}$ reported in Table 7 is positive and significant which implies that the elapsed time between fraud origination and regulatory resolution is higher for controlling shareholders with share pledges.

[Please Place Table 7 about Here]

5.2 Punishment Severity

Karpoff, Lee, and Martin (2008) find that the financial misconduct of U.S. firms is lightly

punished. We posit that this phenomenon also applies to China's firms with pledging controlling shareholders. The eight types of penalties that can be imposed on China's firms range from light to severe, namely: criticism, warning, condemnation, fine, confiscation of illegal income, cancellation of business license, market ban, and others. To investigate the relations between share pledges and penalty severity, we focus only on punished firms. We categorize criticism, warning and condemnation as light punishments, and the remainder as harsh punishments. Since a firm in our sample may get simultaneously a light and a harsh punishment for a fraud (see the example cited in footnote 4), we define the harsh punishment ratio as the number of harsh punishments divided by the total punishments for a firm over a year.

We replace the dependent dummy variable $Fraud_{i,t}$ with $Harsh_Punishment_Ratio_{i,t}$ and run regression Eq. (1). Based on the results reported in Table 8, we find that the coefficients of the pledging dummy in column (1) and pledging ratio in column (2) are negative and significant. This finding indicates that firms with pledging controlling shareholders are lightly punished for detected fraud.

[Please Place Table 8 about Here]

5.3 Pledging institutions

Pledging controlling shareholders can hold multiple pledging contracts with multiple financial institutions. Based on the dynamic theory of multiple borrowing by Green and Liu (2021), we conjecture that a firm with pledging controlling shareholders is more likely to commit fraud when its shareholders pledge shares to multiple financial institutions. To investigate the effect of the number of pledging institutions on detected corporate fraud, we define two groupings of financial institutions, $More_than_one_Institution_{i,t-1}$, which is equal to one if the number of pledging institutions used by the pledging controlling shareholders of a firm is greater than one and zero otherwise, and $One_Institution_{i,t-1}$ which is equal to one if the number of pledging institutions used by the pledging controlling shareholders of a firm is equal to one and zero otherwise. We estimate Eq. (1) by replacing $Pledge_{i,t-1}$ with the indicator variable

$More_than_one_Institution_{i,t-1}$ and $One_Institution_{i,t-1}$ respectively. Table 9 reports the estimated results for controlling shareholders pledging shares to more than one institution in column (1), where we eliminate the observations with one institution, and one institution in column (2), where we eliminate the observations with more than one institution. The coefficient of $More_than_one_Institution_{i,t-1}$ in Table 9 is significantly positive while the coefficient of $One_Institution_{i,t-1}$ is insignificant. The Chi-Square-statistic reported at the bottom of the table suggests that the two coefficients are different at the 1% significance level. These results are consistent with a result from the tractable, dynamic model of multiple borrowing of Green and Liu (2021) that the lack of ex ante commitment power by borrowers can induce more perverse behavior such as over-indebtedness and resource misallocation when they have access to more lenders.⁷ The reason is that overlapping creditors can impose default externalities on each other.

[Please Place Table 9 about Here]

5.4 Pledging duration of one or more consecutive contracts

Pledging controlling shareholders may take advantage of China's pledging system and enter into one or more consecutive pledging contracts to delay loan repayment. Bhanot (2017) argues that borrowers may fail to repay loans because they just want to "take advantage" of the loan system, to get loans that they never intended to repay, and even to disappear with the money proceeds. Thus, we expect that pledging controlling shareholders whose unbroken sequence of pledging contracts covers a longer time period are more likely to commit fraud. To examine the effect of pledging contract renewals on corporate fraud, we define an equity pledge with a continuous pledge time of more than 3 years as a long-term equity pledge, and one with a short time frame (< 3 years) as being a short-term equity pledge.⁸ We estimate Eq. (1) by replacing $Pledge_{i,t-1}$ with the indicator variable $Long_Pledge_{i,t-1}$ ($Short_Pledge_{i,t-1}$). Table 10

⁷ In section five of their paper, Green and Liu (2021) provide a detailed review of the literature on commitment externalities in credit markets.

⁸ The category of long- and short-term pledges is based on the amendments to the equity pledge provisions in 2013 allowing the maximum term of an equity pledge contract to be greater than 3 years.

reports the estimated results for pledging contracts with more than 3-year duration in column (1), where we remove the observations of pledging contracts for less than 3-year duration, and for pledging contracts with less than 3-year duration in column (2), where we remove the observations with pledging contracts for more than 3 years. The coefficient of $Long_Pledge_{i,t-1}$ reported in Table 10 is significantly positive at the 1% level while the coefficient of $Short_Pledge_{i,t-1}$ is significantly positive at 5% level. The Chi-Square-statistic reported at the bottom of the table suggests that the two coefficients are different at the 1% significant level. This finding indicates that a firm whose pledging controlling shareholders with longer periods of consecutive contracts is more likely to commit detected fraud.

[Please Place Table 10 about Here]

6. Mechanisms

This section explores the channels behind the effects of share pledging on corporate fraud. Specifically, we premise that the share pledges of controlling shareholders can facilitate corporate fraud via two channels: tunneling and financial distress. We use the following probit specification to test each of the two channels:

$$Pr(Fraud_{i,t}) = \beta_0 + \beta_1 Pledge_{i,t-1} + \beta_2 GDummy_{i,t-1} + \beta_3 Pledge_{i,t-1} \times GDummy_{i,t-1} + \gamma Control_{i,t-1} + \mu_t + \nu_k + \lambda_j + \varepsilon_{i,t} \quad (6)$$

where $GDummy_{i,t-1}$ is the dummy variable indicating the two groups relevant to each channel. The key coefficient of interest is β_3 , the coefficient on the interaction term $Pledge_{i,t-1} \times GDummy_{i,t-1}$. The magnitude and sign of the coefficient of the interaction term indicate the moderating role of each channel on the effect of share pledging on corporate fraud.

6.1 Tunneling effect

In Chinese stock markets, one primary agency problem arises from conflicts of interest between controlling and minority shareholders. This type of agency problem is often referred to as tunneling, since controlling shareholders can transfer assets out of firms for their private benefit

and expropriate the value of minority shareholders (Johnson et al., 2000). A greater divergence between the control and cash-flow rights of controlling shareholders leads to a higher tunneling cost, which is more detrimental to minority shareholders (Claessens et al., 2002). With more serious conflicts of interests between controlling and minority shareholders, the tunneling effect is higher. In addition, the positive impact of the share pledges of controlling shareholders on corporate fraud may be more intense due to a lack of prudent internal management or the under-protection of minority shareholders.

To test the tunneling effect, we measure the tunneling costs of controlling shareholders as the ratio of other receivables to total assets by following Jiang, Lee, and Yue (2010) who note on page 6 that the ‘other receivables’ account includes money that large shareholders owe the listed company. We estimate Eq. (6) where $Fraud_{i,t}$ is the dependent variable and $GDummy_{i,t-1}$ is replaced with the $ACII_{i,t-1}$ dummy variable, which equals one if the agency cost of a firm due to tunneling is greater than the industry average of agency costs arising from tunneling and zero otherwise. We find that the coefficient of the interaction term $PLE_dummy_{i,t-1} \times ACII_{i,t-1}$ and $PLE_ratio_{i,t-1} \times ACII_{i,t-1}$ in respectively column (1) and (2) of Table 11 is positive and significant. This suggests that firms whose controlling shareholders have pledged loans are more likely to exhibit detected corporate fraud if such firms have serious tunneling issues.

[Please Place Table 11 about Here]

6.2 Financial distress

Pledging controlling shareholders hold concentrated control rights, leading to a divergence between control rights and cash-flow rights. This may increase a firm’s financial distress, as insiders with excess control rights tend to engage in self-dealing activities (Lin, Ma, and Xuan, 2011; Lee and Yeh, 2004). Share pledging exposes a firm to negative price shocks (Dou, Masulis, and Zein, 2019). Pledging firms are more likely to suffer severe financial constraints (Cheng, Liu, and Sun, 2021) that increase its risk of financial distress. Firms with pledging controlling shareholders tend to be more financially constrained than non-pledging firms (Cheng, Liu, and

Sun, 2021). Due to lack of funding resources, firms with pledging controlling shareholders may commit more fraud. We replace $GDummy_{i,t-1}$ in Eq. (6) with a dummy variable of financial distress $Z_{i,t-1}$, which is equal to one if the firm's level of financial distress is greater than the industry average and zero otherwise. A higher Z -score indicates a firm with less financial distress. Table 12 reports a significantly negative coefficient for the interaction term of the pledging variables and financial distress dummy variable, which is consistent with our expectation that firms with pledging controlling shareholders when facing high financial distress are more likely to commit detected fraud.

[Please Place Table 12 about Here]

7. Conclusion

Share pledging is prevalent worldwide and it allows corporate insiders to secure their personal loans by pledging their shares. Although pledging can improve the liquidity constraints of insiders, it may induce insiders to commit fraud when insiders face an increasing threat of a pledge margin call. To fill a gap in the literature, this paper focuses on the effects of share pledges on corporate fraud in China. By ruling out intense monitoring of banks or share repurchases by firms, we find that the share pledging of controlling shareholders are positively related to the likelihood of detected corporate fraud. To address identification and endogeneity concerns, we use both two-stage IV regressions and a DiD approach that relies on a potential exogenous variation in share pledging disclosure enacted by a 2016 pledging regulatory rule in China that required controlling shareholders to disclose their pledging percentage publicly. These tests strongly suggest that the positive effect that we identify is causal.

We further find that firms whose controlling shareholders pledge have a longer fraud detection cycle, and that these firms receive lighter punishment. Firms with pledging controlling shareholders who hold multiple pledging contracts with multiple financial institutions or who use one or more consecutive contracts that cover a longer time duration are more like to commit detected fraud.

We examine two economic mechanisms through which firms with pledging controlling shareholders are more likely to commit detected fraud. We find that share pledges by controlling shareholders facilitate detected corporate fraud if the firms suffer serious tunneling issues and if the firms have higher levels of financial distress. Our study provides implications and extensive information for policy makers, regulatory authorities, and investors when regulating or investing in pledging firms.

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Appendix: Variable descriptions

This table provides definitions of variables used throughout the paper. The subscripts i and t refer to firm and year, respectively. The sample period is from 2003 to 2020 at an annual frequency.

Variables	Definition
<i>Dependent variables</i>	
$Fraud_{i,t}$	An indicator equal to one if a firm has committed a fraud and has been detected, and zero otherwise.
$Origination_to_Disclosure_{i,t}$	The natural logarithm of one plus the time difference between the year of fraud disclosure by regulators and the year of the violation for a year with a fraud investigational disclosure, and zero otherwise. Only first-time fraud disclosures for a firm are examined
$Harsh_Punishment_ratio_{i,t}$	The number of harsh penalties divided by the total number of penalties for a firm over a year.
<i>Independent variables of interest</i>	
$Pledge_Dummy_{i,t-1}$	An indicator variable that takes the value of one if controlling shareholders pledge shares and zero otherwise.
$Pledge_Ratio_{i,t-1}$	The total number of pledged shares by controlling shareholders divided by the total number of shares held by controlling shareholders.
$More_than_one_Institution_{i,t-1}$	An indicator variable that takes the value of one if the number of pledging institutions to which a firm pledges is more than one and zero otherwise.
$One_Institution_{i,t-1}$	An indicator variable that takes the value of one if the number of pledging institutions to which a firm pledges is equal to one and zero otherwise.
$Long_Pledge_{i,t-1}$	An indicator variable that takes the value of one if the continuous pledge time of controlling shareholder is more than 3 years and zero otherwise.
$Short_Pledge_{i,t-1}$	An indicator variable that takes the value of one if the continuous pledge time of controlling shareholder is less than or equal to 3 years and zero otherwise.
<i>Instrumental variable</i>	
$Pledge_Dummy_Mean_NotFraud_{i,t-1}$	The average percentage of pledged shares by controlling shareholders for non-detected-fraud firms for the same province over a year.
$Pledge_Ratio_Mean_NotFraud_{i,t-1}$	The average percentage of share pledge ratios by controlling shareholders for non-detected-fraud firms for the same province over a year.
<i>Group variables</i>	
$ACII_{i,t-1}$	An indicator variable that takes the value of one if tunneling costs (type II agency costs) measured as the rate of other receivables

$Z_{i,t-1}$	(other receivables / total assets) is greater than the industry median in a year and zero otherwise. An indicator variable that takes the value of one if Altman Z-score is greater than industry median and zero otherwise.
<i>Control variables</i>	
$Age_{i,t-1}$	The number of years since the inception of the firm.
$Size_{i,t-1}$	The natural logarithm of total assets.
$Leverage_{i,t-1}$	The ratio of total liabilities divided by total equity.
$Growth_{i,t-1}$	The difference between the revenue of the current period minus that of the previous period divided by the revenue of the previous period.
$Tobin_{i,t-1}$	The market value of the company divided by the book value of total assets.
$SOE_{i,t-1}$	An indicator variable that takes the value of one if a firm is a state-owned enterprise and zero otherwise.
$Top5_{i,t-1}$	The sum of the shareholding ratio of the top five shareholders.
$Institution_{i,t-1}$	The sum of the shareholding ratios of the institutional shareholders.
$Indep_Director_{i,t-1}$	The ratio of independent directors divided by total directors.
$Boardsize_{i,t-1}$	The natural logarithm of one plus the number of directors on the board.
$Supsize_{i,t-1}$	The natural logarithm of one plus the number of directors on the board of supervisors.
$Meeting_{i,t-1}$	The natural logarithm of one plus the number of board meetings held during a given year.
$Analyst_{i,t-1}$	The natural logarithm of one plus the number of analysts following a firm in a given year.
$Dual_{i,t-1}$	An indicator variable that takes the value of one if the company's CEO and the board chairman are the same person and zero otherwise.
$Turnover_{i,t-1}$	The transaction amount of the stock during the year divided by the product of number of shares outstanding and annual closing price.
$Return_{i,t-1}$	Annual stock return.
$Volatility_{i,t-1}$	Standard deviation of a firm's daily stock returns in a given year.

Figure 1: Corporate securities fraud around the 2016 regulatory rule

This figure plots the key estimated parameters of interest, δ_k , with 90% confidence intervals. The reference year is 2015. The estimates and confidence intervals are obtained from a probit model estimation of the following specification:

$$Pr(Fraud_{i,t}) = \beta_0 + \sum_{k=2013}^{2019} \delta_k EventYear_{i,k} + \kappa Control_{i,t-1} + \mu_t + \nu_k + \lambda_j + \varepsilon_{i,t}$$

where the dependent variable $Fraud_{i,t}$ is equal to one if fraud is detected for firm i in year t . $EventYear_{i,k}$ is an indicator variable with respect to the reference year (2015), one year prior to the 2016 regulatory rule (year zero). μ_t , ν_k , and λ_j are the year, industry, and province fixed effects, respectively. Standard errors are clustered at the firm level.

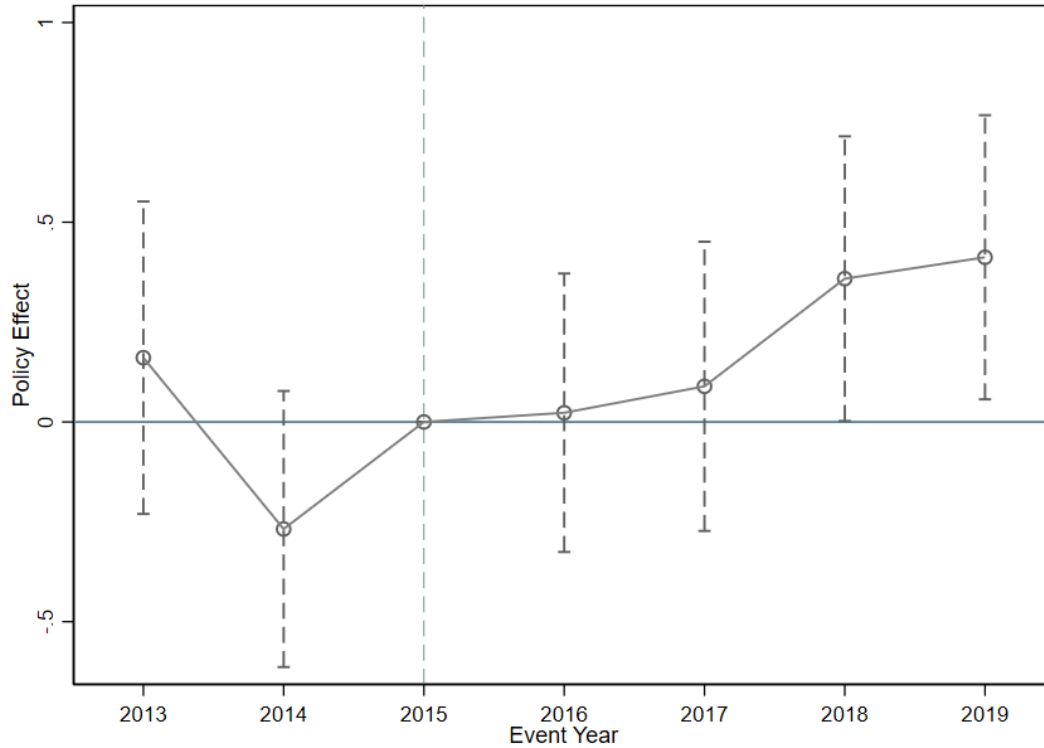


Table 1 Summary statistics

Our sample consists of 3,401 firms and 28,906 firm-year observations over the period from 2003 to 2020. Panel A reports the summary statistics for the main variables used in our study. Panels B, C, and D report the means of corporate securities fraud and share pledges for each year, industry, and province, respectively. The variable *Pledge ratio* is scaled by multiplying by 1000. All the variables are defined in the Appendix.

Panel A. Summary statistics of the main variables from 2003 to 2020

Variables	Observations	Mean	Standard Deviation	Minimum	Median	Maximum
<i>Fraud_{i,t}</i>	28906	0.087	0.281	0	0	1
<i>Pledge_Dummy_{i,t-1}</i>	28906	0.447	0.497	0	0	1
<i>Pledge_Ratio_{i,t-1}</i>	28906	0.258	0.357	0	0	1
<i>Harsh_Punishment_Ratio_{i,t}</i>	2508	0.815	0.388	0	1	1
<i>Origination_to_Disclosure_{i,t}</i>	2374	0.995	0.629	0	1.099	2.890
<i>More_than_one_Institution_{i,t-1}</i>	28906	0.346	0.476	0	0	1
<i>One_Institution_{i,t-1}</i>	28906	0.162	0.368	0	0	1
<i>Long_Pledge_{i,t-1}</i>	28906	0.209	0.407	0	0	1
<i>Short_Pledge_{i,t-1}</i>	28906	0.238	0.426	0	0	1
<i>Age_{i,t-1}</i>	28906	15.767	5.884	1	16	52
<i>Size_{i,t-1}</i>	28906	22.034	1.277	19.222	21.862	27.005
<i>Leverage_{i,t-1}</i>	28906	1.201	1.476	-1.180	0.794	14.279
<i>Growth_{i,t-1}</i>	28906	0.194	0.484	-0.650	0.118	3.874
<i>Tobin_{i,t-1}</i>	28906	1.966	1.811	0.121	1.432	11.509
<i>SOE_{i,t-1}</i>	28906	0.432	0.495	0	0	1
<i>Top5_{i,t-1}</i>	28906	0.533	0.150	0.190	0.536	0.889
<i>Institution_{i,t-1}</i>	28906	0.361	0.241	0	0.358	0.880
<i>Indep_Director_{i,t-1}</i>	28906	0.370	0.052	0.286	0.333	0.571
<i>Boardsize_{i,t-1}</i>	28906	2.153	0.203	1.609	2.197	2.708
<i>Supsize_{i,t-1}</i>	28906	1.261	0.270	0.693	1.099	2.197
<i>Meeting_{i,t-1}</i>	28906	2.299	0.341	1.609	2.303	3.219
<i>Analyst_{i,t-1}</i>	28906	1.688	1.424	0	1.609	4.625
<i>Dual_{i,t-1}</i>	28906	0.234	0.424	0	0	1
<i>Turnover_{i,t-1}</i>	28906	5.967	4.496	0.521	4.745	23.823
<i>Return_{i,t-1}</i>	28906	0.211	0.712	-0.706	0.014	3.177
<i>Volatility_{i,t-1}</i>	28906	0.030	0.009	0.013	0.028	0.057

Panel B. The mean of corporate fraud and share pledges by year. The columns headed by “Mean of fraud” and “Mean of share pledge” report the cross-sectional averages of the indicator variable *Fraud* and the ratio *Pledge* for all firms in a specific year, respectively.

Number of observations	Year	Mean of fraud	Year	Mean of share pledge
268	2004	0.056	2003	0.157
458	2005	0.057	2004	0.190
813	2006	0.033	2005	0.223
1015	2007	0.025	2006	0.254
1047	2008	0.023	2007	0.258
1168	2009	0.032	2008	0.265
1272	2010	0.026	2009	0.295
1354	2011	0.059	2010	0.303
1713	2012	0.099	2011	0.325
1992	2013	0.090	2012	0.344
2166	2014	0.093	2013	0.402
2165	2015	0.130	2014	0.471

2285	2016	0.113	2015	0.523
2452	2017	0.088	2016	0.575
2634	2018	0.095	2017	0.610
3035	2019	0.105	2018	0.605
3069	2020	0.119	2019	0.591
28906	Total	0.087	Total	0.447

Panel C. The mean of corporate fraud and share pledges by industry

Industry Name	Industry Code	Number	Mean of fraud	Mean of share pledge
Agriculture, forestry, Animal husbandry, and fishery	A	478	0.117	0.494
Mining	B	680	0.094	0.412
Agriculture products processing	C13	431	0.095	0.527
Food	C14	307	0.101	0.511
Wine and beverage	C15	441	0.066	0.283
Textile	C17	507	0.089	0.471
Apparel	C18	324	0.108	0.648
Leather products	C19	75	0.040	0.653
Timber	C20	74	0.149	0.716
Furniture	C21	103	0.049	0.641
Paper making	C22	297	0.074	0.451
Printing	C23	91	0.088	0.462
Sports goods	C24	102	0.049	0.588
Petroleum	C25	212	0.118	0.552
Chemical materials	C26	1952	0.100	0.491
Medicine and biological Products	C27	1839	0.102	0.526
Chemistry	C28	273	0.077	0.549
Plastics	C29	566	0.083	0.560
Nonmetal mineral	C30	825	0.076	0.451
Ferrous metals	C31	366	0.057	0.342
Nonferrous metals	C32	615	0.104	0.420
Metal	C33	483	0.077	0.462
Machinery, equipment	C34	1007	0.072	0.399
Special machinery	C35	1477	0.075	0.437
Automobile manufacturing	C36	927	0.092	0.357
Railways, shipbuilding, Astronautics, and other transportation equipment manufacturing Industry	C37	429	0.096	0.231
Electrical manufacturing	C38	1668	0.096	0.498
Computer, telecommunications, and electronics	C39	2431	0.084	0.448
Instruments	C40	297	0.064	0.492
Other manufacturing industries	C41	252	0.107	0.611
Waste resources recycling	C42	17	0.235	0.941
Power, gas, and water	D	1079	0.066	0.238
Construction	E	725	0.091	0.411
Wholesale and retail	F	1760	0.083	0.385
Transportation	G	980	0.053	0.203
Lodging and restaurant	H	111	0.072	0.306
IT	I	1553	0.095	0.540
Real estate	K	1377	0.081	0.534
Rental and leasing	L	371	0.132	0.458
Science research and tech services	M	197	0.061	0.492
Irrigation and environment	N	322	0.090	0.503
Residential service, repair, and other service	O	44	0.091	0.159

Health care and social assistance	P	54	0.111	0.852
Culture, sports, and Entertainment	Q	315	0.117	0.425
Comprehensive industry	R	472	0.059	0.400
Total	S	28906	0.087	0.447

Panel D. The mean of corporate frauds and share pledges by province

Province	Number	Mean of fraud	Mean of share pledge
Shanghai	2361	0.067	0.244
Yunnan	330	0.058	0.406
Inner Mongolia	264	0.095	0.583
Beijing	2454	0.051	0.335
Jilin	443	0.090	0.402
Sichuan	1033	0.110	0.491
Tianjin	464	0.084	0.420
Ningxia	140	0.107	0.471
Anhui	931	0.083	0.379
Shandong	1702	0.076	0.478
Shanxi	357	0.140	0.429
Guangdong	4056	0.099	0.504
Guangxi	367	0.150	0.357
Xinjiang	497	0.070	0.419
Jiangsu	2753	0.071	0.459
Jiangxi	414	0.097	0.459
Hebei	551	0.067	0.479
Henan	726	0.120	0.475
Zhejiang	3091	0.082	0.497
Hainan	274	0.142	0.555
Hubei	971	0.107	0.458
Hunan	830	0.093	0.567
Gansu	315	0.098	0.644
Fujian	1046	0.114	0.572
Tibet	131	0.107	0.687
Guizhou	282	0.064	0.337
Liaoning	709	0.069	0.456
Chongqing	432	0.139	0.505
Shaanxi	474	0.086	0.329
Qinghai	123	0.163	0.667
Heilongjiang	385	0.101	0.410
Total	28906	0.087	0.447

Table 2. Baseline probit regression

This table reports the estimated relations between share pledging and detected fraud based on a probit model using annual data from 2003 to 2020. The dependent variable ($Fraud_{it}$) is an indicator variable equal to 1 if firm i in year t has committed fraud which has been detected, and zero otherwise. The independent variables of interest for firm i in year t are $PLE_Dummy_{i,t-1}$, which is a dummy variable that equals one if controlling shareholders have pledged shares at the end of year $t-1$ and zero otherwise, and $PLE_Ratio_{i,t-1}$, which is measured as the total number of pledged shares by controlling shareholders divided by their shareholdings at the end of year $t-1$. All continuous variables are winsorized at the top and bottom 1%. Columns (1) and (2) report the estimated relations using the full sample. Columns (3) and (4) report the estimated relations using the samples excluding all the repurchase firms. The t -statistics, based on standard errors clustered at the firm level, are displayed in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1) $Fraud_{it}$	(2) $Fraud_{it}$	(3) $Fraud_{it}$	(4) $Fraud_{it}$
$Pledge_Dummy_{i,t-1}$	0.134*** (4.886)		0.146*** (4.803)	
$Pledge_Ratio_{i,t-1}$		0.302*** (8.286)		0.324*** (7.764)
$Age_{i,t-1}$	0.002 (0.915)	0.001 (0.560)	0.004 (1.481)	0.003 (1.189)
$Size_{i,t-1}$	0.032* (1.864)	0.030* (1.726)	0.047** (2.426)	0.045** (2.346)
$Leverage_{i,t-1}$	0.063*** (7.844)	0.061*** (7.602)	0.057*** (6.967)	0.055*** (6.716)
$Growth_{i,t-1}$	-0.060** (-2.324)	-0.059** (-2.300)	-0.060** (-2.145)	-0.060** (-2.142)
$Tobin_{i,t-1}$	-0.007 (-0.712)	-0.007 (-0.635)	0.001 (0.125)	0.002 (0.193)
$SOE_{i,t-1}$	-0.194*** (-5.752)	-0.144*** (-4.168)	-0.210*** (-5.760)	-0.155*** (-4.143)
$Top5_{i,t-1}$	-0.406*** (-4.399)	-0.310*** (-3.327)	-0.408*** (-4.010)	-0.310*** (-3.019)
$Institution_{i,t-1}$	-0.151** (-2.069)	-0.178** (-2.447)	-0.140* (-1.708)	-0.167** (-2.052)
$Indep_Director_{i,t-1}$	0.057 (0.218)	0.054 (0.208)	-0.065 (-0.223)	-0.075 (-0.257)
$Boardsize_{i,t-1}$	0.094 (1.254)	0.105 (1.407)	0.048 (0.583)	0.060 (0.734)
$Supsize_{i,t-1}$	-0.029 (-0.520)	-0.023 (-0.408)	-0.011 (-0.171)	-0.004 (-0.063)
$Meeting_{i,t-1}$	0.187*** (5.015)	0.168*** (4.499)	0.167*** (4.035)	0.147*** (3.556)
$Analyst_{i,t-1}$	-0.118*** (-10.961)	-0.110*** (-10.177)	-0.130*** (-10.405)	-0.122*** (-9.722)
$Dual_{i,t-1}$	0.024 (0.845)	0.023 (0.827)	0.025 (0.779)	0.026 (0.833)
$Turnover_{i,t-1}$	-0.018*** (-4.808)	-0.016*** (-4.439)	-0.016*** (-4.060)	-0.015*** (-3.744)
$Return_{i,t-1}$	-0.119*** (-3.981)	-0.116*** (-3.854)	-0.136*** (-4.083)	-0.133*** (-3.968)
$Volatility_{i,t-1}$	23.946*** (8.984)	23.210*** (8.718)	23.088*** (7.818)	22.458*** (7.607)

<i>Constant</i>	-2.887*** (-6.767)	-2.903*** (-6.810)	-3.056*** (-6.507)	-3.093*** (-6.608)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes
Pseudo R ²	0.086	0.089	0.0895	0.0929
Number	28906	28906	23398	23398

Table 3. The effect of banks' monitoring incentives

This table reports the impact of bank's monitoring incentives on the estimated relations between share pledging and detected fraud based on a probit model using annual data from 2003 to 2020. The dependent variable ($Fraud_{it}$) is an indicator variable equal to 1 if firm i in year t has committed fraud which has been detected, and zero otherwise. The main independent variables for firm i in year t are $PLE_Dummy_{i,t-1}$, which is a dummy variable that equals one if controlling shareholders have pledged shares at the end of year $t-1$ and zero otherwise, $PLE_Ratio_{i,t-1}$, which is measured as the total number of pledged shares by controlling shareholders divided by their shareholdings at the end of year $t-1$, and $Leverage_{i,t-1}$, which is the debt to asset ratio for firm i in year $t-1$ as defined in Ang, Cole, and Lin (2000). All continuous variables are winsorized at the top and bottom 1%. Columns (1) and (2) report the estimated relations using the full sample. Columns (3) and (4) report the estimated relations using the samples excluding all the repurchasing firms. The t -statistics, based on standard errors clustered at the firm level, are displayed in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1) $Fraud_{i,t}$	(2) $Fraud_{i,t}$	(3) $Fraud_{i,t}$	(4) $Fraud_{i,t}$
$Pledge_Dummy_{i,t-1}$	0.108*** (2.915)		0.126*** (3.055)	
$Pledge_Ratio_{i,t-1}$		0.326*** (6.471)		0.361*** (6.344)
$Leverage2_{i,t-1}$	0.109*** (2.856)	0.139*** (3.968)	0.104** (2.522)	0.131*** (3.386)
$Pledge_Dummy_{i,t-1} \times Leverage2_{i,t-1}$	0.032 (0.676)		0.020 (0.375)	
$Pledge_Ratio_{i,t-1} \times Leverage2_{i,t-1}$		-0.064 (-1.045)		-0.087 (-1.311)
$Age_{i,t-1}$	0.002 (0.858)	0.001 (0.497)	0.004 (1.432)	0.003 (1.117)
$Size_{i,t-1}$	0.022 (1.225)	0.019 (1.076)	0.036* (1.860)	0.035* (1.785)
$Leverage_{i,t-1}$	0.049*** (5.640)	0.048*** (5.578)	0.045*** (5.068)	0.045*** (5.044)
$Growth_{i,t-1}$	-0.062** (-2.400)	-0.061** (-2.389)	-0.061** (-2.193)	-0.062** (-2.202)
$Tobin_{i,t-1}$	-0.001 (-0.141)	-0.001 (-0.131)	0.007 (0.568)	0.007 (0.563)
$SOE_{i,t-1}$	-0.198*** (-5.896)	-0.151*** (-4.395)	-0.214*** (-5.874)	-0.162*** (-4.341)
$Top5_{i,t-1}$	-0.382*** (-4.131)	-0.284*** (-3.037)	-0.384*** (-3.767)	-0.284*** (-2.759)
$Institution_{i,t-1}$	-0.166** (-2.270)	-0.192*** (-2.636)	-0.153* (-1.861)	-0.179** (-2.185)
$Indep_Director_{i,t-1}$	0.064 (0.244)	0.058 (0.223)	-0.054 (-0.186)	-0.070 (-0.238)

<i>Boardsize</i> _{<i>i,t-1</i>}	0.093 (1.245)	0.105 (1.405)	0.048 (0.584)	0.060 (0.727)
<i>Supsize</i> _{<i>i,t-1</i>}	-0.033 (-0.597)	-0.029 (-0.510)	-0.016 (-0.258)	-0.010 (-0.164)
<i>Meeting</i> _{<i>i,t-1</i>}	0.176*** (4.719)	0.158*** (4.252)	0.158*** (3.814)	0.140*** (3.383)
<i>Analyst</i> _{<i>i,t-1</i>}	-0.116*** (-10.766)	-0.108*** (-9.961)	-0.128*** (-10.223)	-0.120*** (-9.531)
<i>Dual</i> _{<i>i,t-1</i>}	0.022 (0.797)	0.022 (0.779)	0.025 (0.775)	0.026 (0.828)
<i>Turnover</i> _{<i>i,t-1</i>}	-0.018*** (-4.914)	-0.017*** (-4.506)	-0.017*** (-4.150)	-0.015*** (-3.787)
<i>Return</i> _{<i>i,t-1</i>}	-0.127*** (-4.222)	-0.122*** (-4.066)	-0.143*** (-4.288)	-0.139*** (-4.133)
<i>Volatility</i> _{<i>i,t-1</i>}	23.714*** (8.889)	22.842*** (8.565)	22.908*** (7.737)	22.131*** (7.467)
<i>Constant</i>	-2.675*** (-6.235)	-2.700*** (-6.301)	-2.859*** (-6.043)	-2.907*** (-6.167)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes
Pseudo R ²	0.0873	0.0903	0.0906	0.0938
Number	28906	28906	23398	23398

Table 4. Estimations based on two different matching approaches

This table reports the probit regression results of share pledging on corporate fraud by selecting the control sample of controlling shareholders using the propensity score matching and entropy balancing approach from 2003 to 2020 at an annual frequency. The dependent variable ($Fraud_{i,t}$) is an indicator variable equal to 1 if firm i in year t has committed fraud that has been detected, and zero otherwise. The independent variables of interest for firm i in year $t-1$ are $PLE_Dummy_{i,t-1}$, which is a dummy variable that equals one if controlling shareholders have pledged shares at the end of year $t-1$ and zero otherwise, and $PLE_Ratio_{i,t-1}$, which is measured as the total number of pledged shares by controlling shareholders divided by their shareholdings at the end of year $t-1$. All continuous variables are winsorized at the top and bottom 1%. The specifications for columns (1) – (2) use a one-to-one nearest neighbor propensity score matching approach to match the treated firm with pledging controlling shareholders with those non-pledging controlling shareholders based on year-by-year matching with control variables including firm age, size, growth rate, Tobin's Q, institutional ownership, board independence, analyst coverage, and stock return volatility (Anderson and Puleo, 2020; Li et al., 2020). The specifications for columns (3) – (4) use the entropy balancing approach for covariate balancing. The t -statistics, based on standard errors clustered at the firm level, are displayed in the parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1) $Fraud_{i,t}$	(2) $Fraud_{i,t}$	(3) $Fraud_{i,t}$	(4) $Fraud_{i,t}$
$Pledge_Dummy_{i,t-1}$	0.156*** (4.726)		0.183*** (5.765)	
$Pledge_Ratio_{i,t-1}$		0.324*** (8.122)		0.326*** (7.945)
$Age_{i,t-1}$	0.003 (1.040)	0.002 (0.619)	0.000 (0.063)	-0.001 (-0.272)
$Size_{i,t-1}$	0.055*** (2.634)	0.055*** (2.610)	0.028 (1.281)	0.029 (1.304)
$Leverage_{i,t-1}$	0.063*** (6.657)	0.061*** (6.458)	0.064*** (6.404)	0.063*** (6.233)
$Growth_{i,t-1}$	-0.071** (-2.305)	-0.070** (-2.273)	-0.047 (-1.523)	-0.046 (-1.503)
$Tobin_{i,t-1}$	-0.006 (-0.501)	-0.004 (-0.331)	-0.012 (-0.987)	-0.011 (-0.862)
$SOE_{i,t-1}$	-0.218*** (-5.332)	-0.155*** (-3.682)	-0.176*** (-4.488)	-0.133*** (-3.257)
$Top5_{i,t-1}$	-0.470*** (-4.227)	-0.339*** (-3.024)	-0.460*** (-4.071)	-0.369*** (-3.219)
$Institution_{i,t-1}$	-0.128 (-1.497)	-0.166* (-1.941)	-0.137 (-1.534)	-0.162* (-1.815)
$Indep_Director_{i,t-1}$	0.402 (1.307)	0.404 (1.314)	0.035 (0.111)	0.042 (0.136)
$Boardsize_{i,t-1}$	0.172* (1.939)	0.188** (2.122)	0.137 (1.412)	0.149 (1.535)
$Supsize_{i,t-1}$	-0.043 (-0.637)	-0.035 (-0.507)	-0.076 (-1.135)	-0.066 (-0.991)
$Meeting_{i,t-1}$	0.183*** (4.176)	0.158*** (3.618)	0.141*** (3.171)	0.125*** (2.795)
$Analyst_{i,t-1}$	-0.123*** (-9.912)	-0.113*** (-9.061)	-0.124*** (-9.745)	-0.118*** (-9.124)
$Dual_{i,t-1}$	0.042 (1.351)	0.041 (1.315)	0.046 (1.397)	0.045 (1.372)
$Turnover_{i,t-1}$	-0.019***	-0.017***	-0.019***	-0.018***

	(-4.454)	(-4.058)	(-3.825)	(-3.567)
$Return_{i,t-1}$	-0.117***	-0.114***	-0.104***	-0.102***
	(-3.327)	(-3.220)	(-2.895)	(-2.817)
$Volatility_{i,t-1}$	26.277***	25.415***	22.722***	22.209***
	(8.527)	(8.250)	(6.765)	(6.557)
<i>Constant</i>	-3.102***	-3.177***	-2.355***	-2.427***
	(-5.837)	(-5.978)	(-4.470)	(-4.620)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes
Pseudo R ²	0.072	0.076	0.074	0.077
Number	18105	18105	28906	28906

Table 5. Difference-in-differences approach

This table reports the results of the difference-in-differences (DiD) tests on how a firm whose controlling shareholders pledge shares facilitate corporate fraud. Treatment firms are firms whose share pledge ratios are above the industry median in 2015. Control firms are firms that have never pledged shares in 2015 and are chosen using a one-to-one nearest neighbor propensity score matching (PSM) approach with a treatment firm. Column (1) reports the regression results using 2015 as the base year for the three years prior and the three years after the 2016 regulatory rule. Figure 1 provides a plot of the coefficients for the dummy variables that capture each of these six years. Columns (2) and (3) report the regression results for two and three years prior and post to the 2016 regulatory rule, respectively. The t -statistics, based on standard errors clustered at the firm level, are displayed in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. Since the reference year is 2015, there is no coefficient reported in column (1) for that year. In our sample, we removed 16 firms that repurchased shares in the open market during our sample periods.

	(1) (Base year = 2015) <i>Fraud_{i,t}</i>	(2) (2013-2019) <i>Fraud_{i,t}</i>	(3) (2014-2018) <i>Fraud_{i,t}</i>
<i>Treat_{i,t-1}</i>	0.313** (2.01)	0.242** (2.54)	0.181* (1.69)
<i>Post_{i,t-1}</i>		0.140 (0.99)	-0.285* (-1.94)
<i>Treat_{i,t-1} × Post_{i,t-1}</i>		0.295** (2.38)	0.294** (2.09)
<i>Year_2013</i>	0.161 (0.68)		
<i>Year_2014</i>	-0.268 (-1.28)		
<i>Year_2016</i>	0.023 (0.11)		
<i>Year_2017</i>	0.089 (0.41)		
<i>Year_2018</i>	0.359* (1.66)		
<i>Year_2019</i>	0.412* (1.91)		
<i>Age_{i,t-1}</i>	0.005 (0.76)	0.005 (0.75)	-0.001 (-0.09)
<i>Size_{i,t-1}</i>	-0.004 (-0.08)	-0.001 (-0.03)	0.038 (0.70)
<i>Leverage_{i,t-1}</i>	0.034* (1.67)	0.034* (1.68)	0.026 (1.18)
<i>Growth_{i,t-1}</i>	0.016 (0.31)	0.015 (0.29)	-0.010 (-0.17)
<i>Tobin_{i,t-1}</i>	-0.022 (-0.85)	-0.021 (-0.82)	-0.008 (-0.31)
<i>SOE_{i,t-1}</i>	-0.082 (-0.82)	-0.082 (-0.82)	-0.044 (-0.40)
<i>Top5_{i,t-1}</i>	-0.302 (-1.20)	-0.308 (-1.23)	-0.165 (-0.57)
<i>Institution_{i,t-1}</i>	-0.372** (-2.08)	-0.370** (-2.08)	-0.432** (-1.98)
<i>Indep_Director_{i,t-1}</i>	-0.538 (-0.74)	-0.554 (-0.76)	-1.810** (-2.28)

<i>Boardsize_{i,t-1}</i>	-0.204 (-1.00)	-0.199 (-0.97)	-0.364* (-1.76)
<i>Supsize_{i,t-1}</i>	-0.172 (-1.01)	-0.175 (-1.03)	-0.087 (-0.45)
<i>Meeting_{i,t-1}</i>	0.190** (2.00)	0.188** (1.99)	0.264** (2.38)
<i>Analyst_{i,t-1}</i>	-0.117*** (-4.55)	-0.117*** (-4.55)	-0.133*** (-4.29)
<i>Dual_{i,t-1}</i>	0.064 (0.95)	0.063 (0.94)	0.083 (1.05)
<i>Turnover_{i,t-1}</i>	-0.013 (-1.27)	-0.013 (-1.26)	-0.015 (-1.26)
<i>Return_{i,t-1}</i>	-0.141* (-1.80)	-0.150* (-1.93)	-0.052 (-0.59)
<i>Volatility_{i,t-1}</i>	23.499*** (3.78)	23.750*** (3.83)	18.446** (2.57)
<i>Constant</i>	-1.490 (-1.28)	0.005 (0.75)	-0.001 (-0.09)
Industry FE	YES	YES	YES
Year FE	YES	YES	YES
Province FE	YES	YES	YES
Pseudo R ²	0.100	0.096	0.081
Number	3599	3599	2606

Table 6. The instrumental variable (IV) approach

This table reports the two-stage instrumental variable (ivprobit) regressions for detecting corporate fraud on the share pledges of controlling shareholders. The instrumental variable is the average percentage of pledged shares by controlling shareholders for non-fraud detected firms for the same province over a year. The first-stage regression results are presented in columns (1) and (3) and the second-stage regression results are presented in columns (2) and (4). The t -statistics, based on robust standard errors, are reported in the parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1) <i>Pledge_Dummy_{i,t-1}</i>	(2) <i>Fraud_{i,t}</i>	(3) <i>Pledge_Ratio_{i,t-1}</i>	(4) <i>Fraud_{i,t}</i>
<i>Pledge_Dummy_{i,t-1}</i>		0.459*** (3.161)		
<i>Pledge_Ratio_{i,t-1}</i>				0.982*** (4.389)
<i>Pledge_Dummy_Mean_NonFraud_{i,t-1}</i>	0.758*** (30.718)			
<i>Pledge_Ratio_Mean_NonFraud_{i,t-1}</i>			0.694*** (27.566)	
<i>Age_{i,t-1}</i>	-0.000 (-0.828)	0.004* (1.751)	0.002*** (4.918)	0.002 (0.661)
<i>Size_{i,t-1}</i>	0.002 (0.517)	-0.006 (-0.378)	0.004 (1.542)	-0.009 (-0.564)
<i>Leverage_{i,t-1}</i>	0.319*** (19.842)	0.874*** (10.461)	0.265*** (23.140)	0.752*** (8.176)
<i>Growth_{i,t-1}</i>	0.015*** (2.727)	-0.062*** (-2.703)	0.003 (0.882)	-0.058** (-2.549)
<i>Tobin_{i,t-1}</i>	0.002 (1.080)	0.008 (0.866)	0.001 (0.537)	0.008 (0.859)
<i>SOE_{i,t-1}</i>	-0.324*** (-50.046)	-0.101* (-1.748)	-0.273*** (-59.024)	0.034 (0.479)
<i>Top3_{i,t-1}</i>	-0.266*** (-13.801)	-0.207** (-2.199)	-0.354*** (-25.780)	0.043 (0.360)
<i>Institution_{i,t-1}</i>	-0.071*** (-4.579)	-0.205*** (-2.888)	0.020* (1.851)	-0.266*** (-3.769)
<i>Indep_Director_{i,t-1}</i>	0.076 (1.349)	0.022 (0.088)	0.009 (0.219)	0.044 (0.173)
<i>Boardsize_{i,t-1}</i>	-0.046*** (-2.912)	0.108 (1.514)	-0.052*** (-4.635)	0.139* (1.916)
<i>Supsize_{i,t-1}</i>	-0.014 (-1.327)	-0.017 (-0.340)	-0.016** (-2.128)	-0.007 (-0.134)
<i>Meeting_{i,t-1}</i>	0.127*** (15.628)	0.112*** (2.772)	0.103*** (17.763)	0.065 (1.518)
<i>Analyst_{i,t-1}</i>	-0.018*** (-7.831)	-0.103*** (-9.746)	-0.029*** (-17.606)	-0.081*** (-6.540)
<i>Dual_{i,t-1}</i>	0.013** (2.052)	0.019 (0.718)	0.005 (1.172)	0.022 (0.806)
<i>Turnover_{i,t-1}</i>	-0.009*** (-10.919)	-0.015*** (-3.912)	-0.008*** (-13.458)	-0.011*** (-2.735)
<i>Return_{i,t-1}</i>	-0.018*** (-2.885)	-0.125*** (-4.151)	-0.019*** (-4.179)	-0.113*** (-3.721)
<i>Volatility_{i,t-1}</i>	7.186*** (11.753)	19.621*** (7.074)	4.832*** (11.096)	18.050*** (6.439)
<i>Constant</i>	0.036	-2.421***	0.134**	-2.552***

	(0.410)	(-6.051)	(2.142)	(-6.318)
F-test	143.71		153.60	
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Adj. R ²	0.278		0.292	
Number	28,906	28,906	28,906	28,906

Table 7. Origination to disclosure time period

This table reports the probit regression results for the relation between share pledging and the origination to disclosure time period for first-time fraud disclosures for firms from 2003 to 2020 at an annual frequency. The dependent variable ($Origination_to_Disclosure_{i,t}$) is the natural logarithm of one plus the time difference between the year of fraud investigation disclosure and the year of the first violation for a year with a fraud investigation, and zero otherwise. The independent variables of interest for firm i in year $t-1$ are $PLE_dummy_{i,t-1}$, which is a dummy variable that equals one if controlling shareholders have pledged shares at the end of year $t-1$ and zero otherwise, and $PLE_ratio_{i,t-1}$, which is measured as the total number of pledged shares by controlling shareholders divided by their shareholdings at the end of year $t-1$. All continuous variables are winsorized at the top and bottom 1%. The t -statistics, based on standard errors clustered at the firm level, are displayed in the parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1) <i>Origination_to_Disclosure_{i,t}</i>	(2) <i>Origination_to_Disclosure_{i,t}</i>
<i>Pledge_Dummy_{i,t-1}</i>	0.078** (2.370)	
<i>Pledge_Ratio_{i,t-1}</i>		0.087** (2.138)
<i>Age_{i,t-1}</i>	0.006** (2.060)	0.006** (1.975)
<i>Size_{i,t-1}</i>	0.036* (1.922)	0.036* (1.917)
<i>Leverage_{i,t-1}</i>	0.004 (0.671)	0.005 (0.695)
<i>Growth_{i,t-1}</i>	-0.017 (-0.771)	-0.017 (-0.749)
<i>Tobin_{i,t-1}</i>	0.020* (1.901)	0.020* (1.890)
<i>SOE_{i,t-1}</i>	0.123*** (2.970)	0.124*** (2.983)
<i>Top5_{i,t-1}</i>	-0.407*** (-3.834)	-0.395*** (-3.689)
<i>Institution_{i,t-1}</i>	0.052 (0.642)	0.043 (0.529)
<i>Indep_Director_{i,t-1}</i>	-0.207 (-0.710)	-0.194 (-0.668)
<i>Boardsize_{i,t-1}</i>	0.017 (0.200)	0.022 (0.252)
<i>Supsize_{i,t-1}</i>	-0.013 (-0.212)	-0.011 (-0.173)
<i>Meeting_{i,t-1}</i>	0.013 (0.324)	0.014 (0.332)
<i>Analyst_{i,t-1}</i>	-0.007 (-0.564)	-0.006 (-0.440)
<i>Dual_{i,t-1}</i>	-0.038 (-1.235)	-0.037 (-1.196)
<i>Turnover_{i,t-1}</i>	-0.001 (-0.228)	-0.001 (-0.254)
<i>Return_{i,t-1}</i>	-0.048 (-1.392)	-0.046 (-1.321)
<i>Volatility_{i,t-1}</i>	3.474 (1.241)	3.504 (1.252)

<i>Constant</i>	0.634	0.622
	(1.388)	(1.364)
Industry FE	Yes	Yes
Year FE	Yes	Yes
Province FE	Yes	Yes
Adjust R ²	0.044	0.043
Number	2374	2374

Table 8. Punishment severity

This table reports the estimated results for the relations between share pledging and the ratio of harsh punishment for frauds based on a probit model from 2003 to 2020 at an annual frequency. The dependent variables are *Harsh_Punishment_ratio_{i,t}* which is defined as the number of harsh punishment divided by the total number of punishment over a year for a firm. The independent variables of interest for firm *i* in year *t-1* are *PLE_Dummy_{i,t-1}*, which is a dummy variable that equals one if controlling shareholders have pledged shares at the end of year *t-1* and zero otherwise, and *PLE_Ratio_{i,t-1}*, which is measured as the total number of pledged shares by controlling shareholders divided by their shareholdings at the end of year *t-1*. All continuous variables are winsorized at the top and bottom 1%. The *t*-statistics, based on standard errors clustered at the firm level, are displayed in the parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1) <i>Harsh_Punishment_Ratio_{i,t}</i>	(2) <i>Harsh_Punishment_Ratio_{i,t}</i>
<i>Pledge_Dummy_{i,t-1}</i>	-0.028* (-1.688)	
<i>Pledge_Ratio_{i,t-1}</i>		-0.060*** (-2.715)
<i>Age_{i,t-1}</i>	0.002 (1.157)	0.002 (1.281)
<i>Size_{i,t-1}</i>	-0.001 (-0.074)	-0.001 (-0.051)
<i>Leverage_{i,t-1}</i>	-0.001 (-0.319)	-0.001 (-0.253)
<i>Growth_{i,t-1}</i>	-0.002 (-0.122)	-0.002 (-0.119)
<i>Tobin_{i,t-1}</i>	-0.008 (-1.456)	-0.008 (-1.459)
<i>SOE_{i,t-1}</i>	0.029 (1.368)	0.019 (0.880)
<i>Top5_{i,t-1}</i>	0.075 (1.378)	0.056 (1.012)
<i>Institution_{i,t-1}</i>	0.035 (0.729)	0.042 (0.861)
<i>Indep_Director_{i,t-1}</i>	0.028 (0.163)	0.029 (0.173)
<i>Boardsize_{i,t-1}</i>	-0.004 (-0.089)	-0.006 (-0.128)
<i>Supsize_{i,t-1}</i>	-0.015 (-0.485)	-0.018 (-0.578)
<i>Meeting_{i,t-1}</i>	-0.005 (-0.216)	-0.001 (-0.025)
<i>Analyst_{i,t-1}</i>	0.022*** (3.259)	0.021*** (3.048)
<i>Dual_{i,t-1}</i>	-0.022 (-1.293)	-0.022 (-1.303)
<i>Turnover_{i,t-1}</i>	0.005** (2.319)	0.005** (2.277)
<i>Return_{i,t-1}</i>	0.001 (0.073)	0.000 (0.024)
<i>Volatility_{i,t-1}</i>	0.241 (0.150)	0.381 (0.237)
<i>Constant</i>	0.295	0.304

	(1.089)	(1.124)
Industry FE	YES	YES
Year FE	YES	YES
Province FE	YES	YES
Adjust R ²	0.136	0.138
Number	2508	2508

Table 9. The number of pledging financial institutions

This table reports the results for the effect of the number of financial institutions where controlling shareholders pledge their shares on observed corporate securities fraud from 2003 to 2020 at an annual frequency. The dependent variable ($Fraud_{i,t}$) is an indicator variable equal to 1 if firm i in year t has committed fraud that has been detected, and zero otherwise. The independent variables of interest on pledging for firm i in year $t-1$ are $More_than_one_Institution_{i,t-1}$, which is a dummy variable that takes the value of one if the number of pledging institutions to which firm i pledges is more than one and zero otherwise, and $One_Institution_{i,t-1}$, which is a dummy variable that takes the value of one if the number of pledging institutions to which a firm pledges is equal to one and zero otherwise. All continuous variables are winsorized at the top and bottom 1%. The t -statistics, based on standard errors clustered at the firm level, are displayed in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1) $Fraud_{i,t}$	(2) $Fraud_{i,t}$
$More_than_one_Institution_{i,t-1}$	0.170*** (5.436)	
$One_Institution_{i,t-1}$		0.030 (0.763)
$Age_{i,t-1}$	0.002 (0.853)	0.001 (0.167)
$Size_{i,t-1}$	0.030 (1.612)	-0.001 (-0.024)
$Leverage_{i,t-1}$	0.061*** (7.001)	0.075*** (6.834)
$Growth_{i,t-1}$	-0.055** (-2.015)	-0.075* (-1.822)
$Tobin_{i,t-1}$	-0.015 (-1.403)	-0.008 (-0.469)
$SOE_{i,t-1}$	-0.196*** (-5.365)	-0.153*** (-3.447)
$Top5_{i,t-1}$	-0.394*** (-3.968)	-0.175 (-1.401)
$Institution_{i,t-1}$	-0.143* (-1.845)	-0.231** (-2.278)
$Indep_Director_{i,t-1}$	0.009 (0.031)	-0.035 (-0.097)
$Boardsize_{i,t-1}$	0.064 (0.793)	0.039 (0.367)
$Supsize_{i,t-1}$	-0.042 (-0.672)	0.038 (0.532)
$Meeting_{i,t-1}$	0.164*** (4.043)	0.143*** (2.783)
$Analyst_{i,t-1}$	-0.125*** (-10.761)	-0.102*** (-6.643)
$Dual_{i,t-1}$	0.019 (0.617)	-0.013 (-0.313)
$Turnover_{i,t-1}$	-0.016*** (-4.064)	-0.014*** (-2.576)
$Return_{i,t-1}$	-0.130*** (-4.007)	-0.050 (-1.165)
$Volatility_{i,t-1}$	24.773*** (8.688)	14.217*** (3.584)
<i>Constant</i>	-2.805***	-2.127***

	(-6.068)	(-3.720)
Industry FE	Yes	Yes
Year FE	Yes	Yes
Province FE	Yes	Yes
Chi2 Statistic	14.70***	
Pseudo R ²	0.0927	0.0832
Number	24,627	18,512

Table 10. Pledge duration of one or more consecutive contracts

This table reports the estimated relation between the pledge duration for controlling shareholders and detected fraud from 2003 to 2020 at an annual frequency. The dependent variable ($Fraud_{i,t}$) is an indicator variable equal to 1 if firm i in year t has committed fraud that has been detected, and zero otherwise. The independent variables of interest on pledging for firm i in year $t-1$ are $Long_Pledge_{i,t}$, which is an indicator variable that takes the value of one if the continuous pledge time of controlling shareholder is more than three years and zero otherwise, and $Short_Pledge_{i,t}$, which is a dummy variable that takes the value of one if the continuous pledge time of controlling shareholder is less than or equal to three years and zero otherwise. All continuous variables are winsorized at the top and bottom 1%. The t -statistics, based on standard errors clustered at the firm level, are displayed in the parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1) $Fraud_{i,t}$	(2) $Fraud_{i,t}$
$Long_Pledge_{i,t-1}$	0.214*** (6.461)	
$Short_Pledge_{i,t-1}$		0.085** (2.571)
$Age_{i,t-1}$	0.002 (0.758)	0.001 (0.214)
$Size_{i,t-1}$	0.015 (0.746)	0.022 (1.054)
$Leverage_{i,t-1}$	0.057*** (6.205)	0.073*** (7.464)
$Growth_{i,t-1}$	-0.032 (-1.098)	-0.086*** (-2.665)
$Tobin_{i,t-1}$	-0.009 (-0.717)	-0.002 (-0.194)
$SOE_{i,t-1}$	-0.190*** (-5.061)	-0.156*** (-3.871)
$Top5_{i,t-1}$	-0.233** (-2.139)	-0.329*** (-3.050)
$Institution_{i,t-1}$	-0.164* (-1.873)	-0.245*** (-2.889)
$Indep_Director_{i,t-1}$	-0.264 (-0.863)	0.085 (0.277)
$Boardsize_{i,t-1}$	0.020 (0.228)	0.082 (0.903)
$Supsize_{i,t-1}$	0.031 (0.485)	-0.028 (-0.428)
$Meeting_{i,t-1}$	0.166*** (3.841)	0.149*** (3.317)
$Analyst_{i,t-1}$	-0.116*** (-9.371)	-0.112*** (-8.500)
$Dual_{i,t-1}$	0.024 (0.711)	0.015 (0.433)
$Turnover_{i,t-1}$	-0.013*** (-2.885)	-0.018*** (-4.219)
$Return_{i,t-1}$	-0.146*** (-3.933)	-0.080** (-2.251)
$Volatility_{i,t-1}$	24.743*** (7.834)	17.546*** (5.338)
<i>Constant</i>	-2.739***	-2.506***

	(-5.365)	(-5.144)
Industry FE	Yes	Yes
Year FE	Yes	Yes
Province FE	Yes	Yes
Chi2 Statistic	14.50***	
Pseudo R ²	0.0994	0.0807
Number	22,028	22,861

Table 11. The tunneling effect

This table reports the results on the impact of pledged shares of controlling shareholders on a firm's corporate fraud reflecting the tunneling effects channel from 2003 to 2020 at an annual frequency. The dependent variable ($Fraud_{i,t}$) is an indicator variable equal to 1 if firm i in year $t-1$ has committed fraud that has been detected, and zero otherwise. The independent variables of interest for firm i in year $t-1$ are $PLE_Dummy_{i,t-1}$, which is a dummy variable that equals one if controlling shareholders have pledged shares at the end of year $t-1$ and zero otherwise, and $PLE_Ratio_{i,t-1}$, which is measured as the total number of pledged shares by controlling shareholders divided by their shareholdings at the end of year $t-1$. All continuous variables are winsorized at the top and bottom 1%. We split the sample into two subsamples based on the industry median of agency costs due to the conflict of interests between controlling shareholders and minority shareholders (type II agency costs). Tunneling type II agency costs are measured as the rate of other receivables (i.e. other receivables / total assets). The indicator variable $ACII_{i,t-1}$ takes the value of one if tunneling (type II agency costs) measured as the rate of other receivables (other receivables / total asset) is greater than the industry median in year $t-1$ and zero otherwise. The t-statistics, based on standard errors clustered at the firm level, are displayed in the parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1) $Fraud_{i,t}$	(2) $Fraud_{i,t}$
$Pledge_Dummy_{i,t-1}$	0.076** (1.995)	
$Pledge_Ratio_{i,t-1}$		0.198*** (3.793)
$ACII_{i,t-1}$	0.134*** (3.857)	0.126*** (4.046)
$Pledge_Dummy_{i,t-1} \times ACII_{i,t-1}$	0.090* (1.902)	
$Pledge_Ratio_{i,t-1} \times ACII_{i,t-1}$		0.155** (2.439)
$Age_{i,t-1}$	0.002 (0.896)	0.001 (0.562)
$Size_{i,t-1}$	0.027 (1.568)	0.025 (1.441)
$Leverage_{i,t-1}$	0.057*** (7.141)	0.055*** (6.906)
$Growth_{i,t-1}$	-0.054** (-2.124)	-0.053** (-2.098)
$Tobin_{i,t-1}$	-0.008 (-0.745)	-0.008 (-0.705)
$SOE_{i,t-1}$	-0.188*** (-5.568)	-0.138*** (-4.012)
$Top5_{i,t-1}$	-0.350*** (-3.779)	-0.259*** (-2.769)
$Institution_{i,t-1}$	-0.151** (-2.065)	-0.180** (-2.462)
$Indep_Director_{i,t-1}$	0.043 (0.165)	0.045 (0.174)
$Boardsize_{i,t-1}$	0.092 (1.233)	0.104 (1.383)
$Supsize_{i,t-1}$	-0.027 (-0.476)	-0.022 (-0.385)
$Meeting_{i,t-1}$	0.161*** (4.297)	0.141*** (3.776)
$Analyst_{i,t-1}$	-0.114*** (-10.576)	-0.106*** (-9.819)

<i>Dual</i> _{<i>i,t-1</i>}	0.025 (0.904)	0.024 (0.857)
<i>Turnover</i> _{<i>i,t-1</i>}	-0.017*** (-4.674)	-0.016*** (-4.370)
<i>Return</i> _{<i>i,t-1</i>}	-0.117*** (-3.888)	-0.113*** (-3.745)
<i>Volatility</i> _{<i>i,t-1</i>}	23.217*** (8.657)	22.580*** (8.429)
<i>Constant</i>	-2.783*** (-6.545)	-2.796*** (-6.573)
Industry FE	YES	YES
Year FE	YES	YES
Province FE	YES	YES
Pseudo R ²	0.089	0.092
Number	28777	28777

Table 12. Financial distress

This table reports the results for the impact of the pledged shares of controlling shareholders on a firm's corporate fraud reflecting the firms' internal control channel from 2003 to 2020 at an annual frequency. The dependent variable ($Fraud_{i,t}$) is an indicator variable equal to 1 if firm i in year $t-1$ has committed fraud that has been detected, and zero otherwise. The independent variables of interest for firm i in year $t-1$ are $PLE_Dummy_{i,t-1}$, which is a dummy variable that equals one if controlling shareholders have pledged shares at the end of year $t-1$ and zero otherwise, $PLE_Ratio_{i,t-1}$, which is measured as the total number of pledged shares by controlling shareholders divided by their shareholdings at the end of year $t-1$. All continuous variables are winsorized at the top and bottom 1%. We split the sample into two subsamples based on the industry median of controlling shareholders' shareholding ratios. The group indicator variable $Z_{i,t-1}$ takes the value of one if a firm's Altman Z-score is greater than the industry median in year $t-1$ and zero otherwise. The t-statistics, based on standard errors clustered at the firm level, are displayed in the parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1) $Fraud_{i,t}$	(2) $Fraud_{i,t}$
$Pledge_Dummy_{i,t-1}$	0.165*** (4.764)	
$Pledge_Ratio_{i,t-1}$		0.320*** (7.304)
$Z_{i,t-1}$	-0.153*** (-3.916)	-0.164*** (-4.530)
$Pledge_Dummy_{i,t-1} \times Z_{i,t-1}$	-0.108** (-2.258)	
$Pledge_Ratio_{i,t-1} \times Z_{i,t-1}$		-0.104* (-1.667)
$Age_{i,t-1}$	0.002 (0.795)	0.001 (0.495)
$Size_{i,t-1}$	0.006 (0.362)	0.005 (0.272)
$Leverage_{i,t-1}$	0.049*** (5.933)	0.048*** (5.771)
$Growth_{i,t-1}$	-0.056** (-2.177)	-0.055** (-2.141)
$Tobin_{i,t-1}$	0.014 (1.323)	0.013 (1.238)
$SOE_{i,t-1}$	-0.200*** (-5.937)	-0.153*** (-4.442)
$Top5_{i,t-1}$	-0.334*** (-3.599)	-0.250*** (-2.670)
$Institution_{i,t-1}$	-0.172** (-2.353)	-0.195*** (-2.667)
$Indep_Director_{i,t-1}$	0.051 (0.193)	0.043 (0.164)
$Boardsize_{i,t-1}$	0.107 (1.430)	0.116 (1.547)
$Supsize_{i,t-1}$	-0.020 (-0.357)	-0.013 (-0.229)
$Meeting_{i,t-1}$	0.168*** (4.497)	0.151*** (4.049)
$Analyst_{i,t-1}$	-0.107*** (-9.916)	-0.101*** (-9.254)
$Dual_{i,t-1}$	0.026	0.026

	(0.939)	(0.936)
<i>Turnover</i> _{<i>i,t-1</i>}	-0.018***	-0.017***
	(-4.789)	(-4.469)
<i>Return</i> _{<i>i,t-1</i>}	-0.124***	-0.121***
	(-4.121)	(-3.994)
<i>Volatility</i> _{<i>i,t-1</i>}	23.629***	22.840***
	(8.781)	(8.495)
<i>Constant</i>	-2.300***	-2.316***
	(-5.255)	(-5.305)
Industry FE	YES	YES
Year FE	YES	YES
Province FE	YES	YES
Pseudo R ²	0.089	0.091
Number	28704	28704
