Handelshøyskolen BI

GRA 19703 Master Thesis

Final Thesis Master of Science 100%

Predefinert informasjon

Startdato:	08-01-2024 09:00 CET
Sluttdato:	01-07-2024 12:00 CEST
Eksamensform:	T
Termin:	202410
Vurderingsform:	Norsk 6-trinns skala (A-F)
Flowkode:	202410||11436||IN00||W||T
External assessor:	External assessor 1
Internal assessor:	Internal assessor 1

Deltaker

Navn:	Jieyi CAI

Informasjon fra deltaker

Tittel *:	Are share pledge firms more willing to repurchase shares? evidence from China
Navn på veileder *:	Zhenyang Shi

Inneholder besvarelsen konfidensielt materiale?:	Nei	**Kan besvarelsen offentliggjøres?:**	Ja

Gruppe

Gruppenavn:	(Anonymisert)
Gruppenummer:	83
Andre medlemmer i gruppen:	Deltakeren har innlevert i en enkeltmannsgruppe

- Are share pledge firms more willing to repurchase shares? evidence from China -

Hand-in date:
01.07.2024

Campus:
BI Oslo

Examination code and name:
GRA 1970 Master thesis

Programme:
Master of Science in Accounting and Business Control

Name of supervisor: Zhenyang Shi

Abstract

This thesis investigates whether Chinese share pledge firms are more willing to repurchase shares by using a sample of Chinese A-share share repurchases from October 27, 2018, to December 31, 2023. The research indicates that companies with share pledges have a higher propensity to announce larger-scale share repurchases initially but no relationship with actively complete the repurchase plans following the new repurchase system of China. This tendency is observed in both the non-state-owned enterprises (non-SOEs) and lower shareholding ratio of the largest shareholders companies, which are at greater risk of the transfer of control. Moreover, the market reaction to the repurchases of share pledge firms is not as favorable as none share pledge firms, especially for the company under the pressure of share pledge cannot obtain the cumulative abnormal return of repurchase, suggesting that investors appear to be aware of companies using share repurchases to ease the share pledge crisis and discount the potential benefits of repurchase programs. Overall, this research highlights the risks associated with share pledging, especially the risk of the transfer of control, and how these risks influence corporate decisions regarding share repurchases.

Content

1 Introduction

In China, share pledge financing has the benefits of straightforward procedures, streamlined formalities, and less stringent requirements. Moreover, stocks have strong liquidity and are easy to cash in. Therefore corporate insiders have been using shares of their own as collateral obtain equity financing in response to financial necessities in recent year (Xie et al., 2016). Nonetheless, there is a significant risk of a stock price collapse (Xie & Liao, 2018) and a transfer of control rights (Wang et al., 2018), as the value of pledge shares is extremely sensitive to the stock price (Chan et al., 2010; Andriosopoulos & Hoque, 2013). Thus, the corporation is driven to implement the share repurchase plan to stabilize or increase the price of stock in response to pressure from share pledges (Chan et al., 2018).

The Companies Law of the People's Republic of China (hereinafter referred to as the Company Law) was amended by Standing Committee of the National People's Congress in October 2018, and companies are now permitted to repurchase shares on the open market if it is necessary for a listed company to protect the corporate value and the rights and interests of shareholders. According to the signal transmission hypothesis, repurchases can send out either positive or negative signals about the company, indicating that its value is undervalued or that there aren't enough investment prospects there (Vermaelen, 1981). However, China's new share-repurchase program was unveiled in the midst of the 2018 financial crisis, and Huang et al (2018) found that a considerable number of retail investors in the A-share market of China are susceptible to being easily misled by positive announcements from companies due to their diverse educational backgrounds and lack of discernment. To generate significant returns, investors regularly anticipate and buy stocks in companies that release positive news, such as share repurchases. As a result, repurchasing shares is frequently seen as a good sign and has already raised stock prices at the project stage in China. Thus, with the backing of the new share repurchase program of China, the company would be able to repurchase shares based on market value management to increase the value of its share while reducing the risks associated to share pledging (He et al., 2021; Xin et al., 2023).

Share repurchase announcement, however, do not constitute a reliable commitment from the company. By design, they provide managers the flexibility to forego repurchasing stock (Ikenberry & Vermaelen, 1996). This suggests that certain

companies announcing stock repurchase plans more likely, if they observe a favorable short-term market response, potentially garner excess stock returns by proclaiming intentions to repurchase shares without necessarily following through with the action (Babenko et al., 2012). China's repurchase revision, in particular, has given the listed companies and actual controllers greater latitude and decision-making flexibility regarding the release, real execution, and cost of the repurchases plan. As a result of this, although the China Securities Regulatory Commission (CSRC) has the authority to regulate, interrogation, and fine corporations with manipulated share repurchases—that is, a repurchase plan was announced, however it was either never carried out or only partially—such share repurchases have become more common in China (Xin et al., 2023). Companies may improve the completion rate by announcing smaller repurchase sizes to avoid regulatory issues; yet, larger repurchase scales can result in higher excess returns (Manconi et al., 2019).

This thesis investigates whether share pledge firms will announce a larger scale repurchase in the initial instance and aggressively complete the repurchase plan following the new repurchase system of China by using a sample of Chinese A-share share repurchases from October 27, 2018, to December 31, 2023. And the finding shows that share pledges firms are more likely to announce larger-scale share repurchases but will not actively complete the repurchase, particularly in firms where the largest shareholder holds a smaller percentage of shares and non-SOEs. This behavior is driven by efforts to maintain control rights. However, despite positive market reactions, the share excess return of share repurchases by share pledge firms is less favorable than that of none share pledge firms.

This thesis's primary research contribution is as follows. First, this research investigates, for the first time, the connection between share pledge share repurchases in the context of CSRS's stringent restriction of share repurchases. Previous literature has found that large shareholders were able to utilize share repurchase to bolster stock prices in order alleviate the margin call pressure and the rick of share price crashes (Xie et al., 2016; Chan et al., 2018; W. He et al., 2021; Xin et al., 2023). This research focuses on, despite the CSRS's serious regulation, share pledge firms will announce larger repurchases in order to obtain higher share returns during a crisis involving share pledge.

Second，my findings are examined in the heterogeneous treatment of the risk of control transfer. Previous literature has found that share pledge firms are more likely to actively execute repurchases for reputational reasons, while financially constrained corporations will become less inclined to do so (Xin et al., 2023). This research examines how the risk of the control right transfer affects this study and find that, in order to preserve control, particularly for non-state-controlled enterprises (non-SOEs) and those where the largest shareholder holds a smaller percentage of the shares, they will declare a larger-scale repurchase program, but the significantly positivity relationship between the completion of the repurchase and share pledge only valid in both state-owned—enterprises (SOEs) and companies with a relatively high proportion of shares held by the largest shareholder, which with low risk of transfer of control rights.

Third，the short-term excess return of the stock price following the repurchase is also examined in this thesis. Previous literature has found that due to stringent disclosure regulations governing the share pledge of Taiwanese non-SOEs companies, investors were able to discern the tunneling intentions of corporate insiders (Chan et al., 2018), in the Chinese mainland, however, small and medium-sized investors neglected to negatively assess those companies that had pledges of share from significant shareholders in addition to share repurchases (Xin et al., 2023).[1] This research finds that the higher the pledge ratio of controlling shareholders, the less positive the market reaction to a repurchase announcement have.

The thesis is organized as follows. The research hypothesis and literature review are covered in the second section. The research design and data are explained in the third section. The empirical analysis is provided in the fourth section, and the thesis's conclusion is the last section.

[1] Since 1997, insiders of Taiwan-listed companies have been obliged to provide monthly reports on their holdings and pledged shares (Chan et al., 2018).

2 Literature Review and Hypothesis Development

2.1 Share Repurchase

Few companies execute share repurchases in the early years due to the theory of capital maintenance and the suspicion of market manipulation in the act of repurchasing. However, by the 1960s, share repurchases were gradually recognized as a form of corporate decision-making (Pettit, 2001).

2.1.1 Motivation of Share Repurchase

Share repurchases are considered to be primarily motivated by signaling. When they think that the value of the company's stock is low, managers of companies typically inform the market and attempt to promote its stock price to rebound to normal levels by repurchasing shares (Dann, 1981; Mitchell & Netter, 1989; Ikenberry et al., 1995; Li & McNally, 2007).

Increasing shareholder wealth is further driving forces for share repurchases. The profitability factors like EPS are probably going to be major drivers behind companies' implementation of share repurchase (Skinner, 2008). Share repurchases can also be used to modify the capital structure because it will decrease the owner's equity and raise the debt-to-asset ratio (Dittmar, 2000). Furthermore, companies have an incentive to substitute share repurchases for cash dividends since it’s more flexible than fixed cash payouts and due to the income tax rate on dividend income is higher than the capital gains tax rate on share distributions (Jagannathan, 2000; Grullon et al., 2002).

According to principal-agent theory, the company’s agency costs will rise if it produces more cash flow than it needs and has limited investment possibilities (Jensen, 1999; Dittmar, 2000; Fenn & Liang, 2001). Share repurchases in this situation can lower the remaining cash flow and do away with the related agency costs. Furthermore, a lot of companies favor using share repurchases as one way of defending acquisitions and mergers in order to ensure control over their company. Repurchases effectively deter hostile takeovers because they raise the price of stock and make it more expensive for outside investors to obtain shares in the company (Dittmar, 2000).

However, certain companies may conceal the potential for opportunities motivations when they repurchase shares. Because of the information asymmetry, outsides shareholders have no access to comprehensive information about the company, so regardless of whether the company is undervalued or not, insiders will have an incentive to declare share repurchases in order to maximize their profits (Liu & Ziebart, 1997; Fried, 2001). Because stakeholders are able to profit from low-priced purchases made prior to the announcement of the repurchase and high-priced sales made thereafter (Wang et al., 2021). And certain companies that announce share repurchase plans may gain excess stock return from proclaiming a scheme to repurchase shares without actually doing so if they find that the market responds favorably in the near term. (Babenko et al., 2012).

Additionally, the latest research found that opportunistic share repurchases are driven by the pressure of share pledging. The shares pledged by the controlling shareholder may be subject to margin calls and the possibility of control transfer if the stock price continues to decline. Therefore, by making share repurchases, the corporation may increase the price of its stock in order to offset the risk of share pledge (Chan et al., 2018; He et al., 2021; Xin et al., 2023).

2.1.2 Market Reaction of Share Repurchase

The market will be more active following the announcement of the share repurchase program (Vermaelen, 1981; Comment & Jarrell, 1991; Ikenberry et al., 1995), which could culminate in both short- and long-term excess stock returns (Dann, 1981).

Vermaelen (1981) employed the event study method to examine companies that declared share repurchases between 1960 and 1980, and found that repurchase offered investors the chance to profit from excess stock returns in short-term, and long-term gains would accrue if keep the stock price above its pre-repurchase level. Ikenberry et al. (1995) examined a sample of open market share repurchases that occurred between 1980 and 1990 and found that the excess stock returns remained greater than zero within 1-2 years of the repurchase. This suggests that the market's long-term response to share buybacks was positive.

Vermaelen (1981) discovered, however, that the excess stock return was 2.37% the day before the repurchase, and its excess yield was only 1% on the day of the repurchase. One of reasons for this disparity is insiders purchasing shares ahead of the repurchase plan's announcement in order to benefit. And, Jagannathan (2000) employed the case study method to examine a sample of 630 American companies that repurchased shares between 1980 and 1992 and discovered that the biggest excess returns happening five days prior to and following the repurchase announcement. This is proof that the share repurchase proposal was leaked. Furthermore, following share repurchases in China, there is a short-term excess stock return, but not a long-term one (Li & He, 2010; He et al., 2016; Qin et al., 2021; Gu & Xin, 2022). This might be due to investors react negatively to such speculative repurchases because they are aware that the tunneling motivation of the corporation insiders via share repurchases.

2.2 Share Pledge

The shares of the controlling shareholder being pledged, which may trigger investor panic and speculation. The controlling shareholder will pledge the shares as collateral to the financial institution in order to get a loan. However, the share pledge will actually make it harder for companies to get financing (Li & Zheng, 2015), and it will strengthens the division between cash flow rights and the control of controlling stockholders, which will raise the agency costs between controlling shareholders and small and medium-sized shareholders (Lee & Yeh, 2004). Furthermore, there is a risk of a stock price collapse because the value of the pledged shares is closely tied to the stock price (Chen & Hu, 2007; Anderson & Puleo, 2020; Xie et al., 2016)，and even the possibility of a transfer of control exists (Chan et al., 2018).

Because of its great control over the company, the controlling shareholder has a strong motive for advocating the company to engage in market value management activities in order to prevent the stock price from falling to a level that violates the loan maintenance criteria.[2] For example, the earnings management space (Xie &

[2] The Guaranty Law of the People's Republic of China states that when a controlling shareholder pledges equity, the equity is only used as collateral for the rights of the creditor; its substantive status remains unchanged, and it retains all of its corresponding shareholder rights, including the ability to vote of the

Liao, 2018), disclosing good news, hiding bad news (Qian & Zhang, 2018), utilizing the performance commitment of mergers and acquisitions (Xu et al., 2021), and via share repurchases to signaling that the sock price is greatly undervalued (Li et al., 2018). And in turn, market value management can strengthen the controlling shareholder's hold on the company (Li et al., 2018). Consequently, once the controlling shareholder has pledged the shares, it is a benefit practice for company to advocate market value management initiatives.

2.3 Research Hypothesis

The share pledge of controlling shareholder increases the risk of a transfer of control rights, which will impair their ability to manage company resources and reap personal gains (Jarrell et al., 1988; La Porta et al., 1999). This risk can be alleviated by keeping the stock price from declining or by having enough extra collateral or money on hand for margin calls. Among these, a practical and affordable strategy for companies with funds insufficient is stabilize or even boost the stock price by announcing a plan to repurchase shares to signaling the market that the stock price of company is undervalued. Chan et al. (2018) examine into of share repurchase of Taiwan and found that controlling shareholders have incentives to initiate open-market share repurchases programs for private benefits when they pledge share. Xin et al. (2023) investigated share repurchases in China between 2018 and 2020 and found that controlling shareholders are likely to use share repurchases as a tactic to stabilize stock prices after they have pledged their shares due to China began using market value management as a justification for share repurchases in 2018.

However, manipulated share repurchases occur often in China with the gradually relaxed restrictions on China's share repurchase system in recent year, the government realized the seriousness of the problem, and the CSRC has also released measures to increase oversight and investigate and penalize noncompliant corporations. Therefore, some companies will declare smaller scale of repurchases to minimize the possibility of facing penalties if they are unable to carry out the repurchase. However, companies that announce larger scale repurchases have higher excess returns (Manconi et al., 2019) for those looking to use share

pledged equity, the right to subscribe for new shares before they are released from the market, the right to dividends, and so on.

repurchase as a short-term strategy to boost stock prices and ease the share pledge pressure.

Taken together, I will present the first hypotheses of this thesis：

H0: There is no relationship between share pledge firms and announcing a larger share repurchase program.

H1: There is a positive relationship between share pledge firms and announcing a larger share repurchase program, means share pledge firms are willing to announce a larger share repurchase program.

H2: There is a negative relationship between share pledge firms and announcing a larger share repurchase program, means share pledge firms aren't willing to announce a larger share repurchase program.

Because the company has flexibility and discretion in executing the repurchase program (Wiggins, 1994; Stephens & Weisbach, 1998; Chan et al., 2010), the issuance of an open market share repurchase plan is not a strong, credible commitment (Ikenberry & Vermaelen, 1996) and can be a tool for companies to mislead investors, particularly when the company has a high shares pledge ratio and is under significant pressure from the falling of share price (Chan et al., 2010). Additionally, although certain companies will actively complete the repurchase plan for reputation concerns, the share pledge indicates that the company or the controlling shareholders themselves are somewhat constrained financially, which will possibly cause some companies to lack ability in execute the repurchase plan and then turning into opportunistic repurchases (Xin et al., 2023).

Therefore, the second hypotheses of this thesis is:

H0: There is no relationship between share pledge firms and the completion of the repurchase.

H1: There is a positive relationship between share pledge firms and the completion of the repurchase, means share pledge firms will actively complete the share repurchase program.

H2: There is a negative relationship between share pledge firms and the completion of the repurchase, means share pledge firms will not actively complete the share repurchase program.

3 Research Design and Data

The institutional background of share repurchases in China as well as the regression models used in this thesis's empirical analysis will be covered in this chapter. And also describe the construction of the analytical samples.

3.1 Share Repurchases in China

Before 2005, the primary purpose of share repurchases in China was to adjust the equity structure of state-owned enterprises. China made the first amendments to the Company Law in 2005, allowing companies to repurchase shares on the open market. This enhanced the autonomy and commercial intent of corporations to repurchase shares, and it also marked the legalization of share buybacks in China (Gu & Xin, 2022). Nevertheless, the process of deregulation was not achieved via a single law; rather, it was accomplished gradually by passing multiple laws (Wang et al., 2021).

Following the global financial crisis in 2008, China's share repurchase regulations were relaxed by CSRC in October, which promoted the marketization of share repurchases by converting the system from one of administrative approval to one of reporting. In 2015, CSRC and other institutions together released a notification about share repurchase to advise listed companies to use share repurchase as a means of boosting stock prices as the extreme volatility of the Chinese stock market (Gu & Xin, 2022). In 2018, more fluctuations in China's stock market again because of the impression of many factors, for example, China–United States trade war. The newly updated Company Law was released in October 2018, offering institutional backing for listed firms to manage their market value through share repurchases in the open market. Later, in November, a notice was released to encourage listed companies to buy back shares. This further loosened restrictions on the source of buyback funds, permitting companies to use funds they have on hand or funds they have raised on their own. Consequently, a share repurchase boom was sparked in China (Gu & Xin, 2022; Xin et al., 2023).

In China, however, manipulative share repurchase activities are also common at the same time. In reaction to this occurrence, the Shanghai Stock Exchange (SSE) and Shenzhen Stock Exchange (SZSE) cautioned investors in January 2019 to pay close attention to speculative share repurchases as described in the Share Repurchase

Rules. In 2022 and 2023, additional changes were made to the regulations to prohibit benefit transfers through share repurchasing (Xin et al., 2023).

Appendix Table A1 illustrates the laws of share repurchase in China. The date of publication of the latest revision of share repurchase in the Company Law about share repurchase, October 26, 2018, is used as the start of the legalization period for the new laws in order to construct the analytical samples of this thesis, following the Wang et al. (2021).

3.2 Research Model

This thesis investigates the effect of share pledge on share repurchases and the primary regression model is represented by the following equation:

$$Repurchase_{i,t} = a_0 + a_1 Pledge_{i,t} + a_2 Controls + FE_t + FE_j + \varepsilon_{i,t} \quad \text{Eq. (1)}$$

where $Repurchase_{i,t}$ in Eq. (1) denotes a variable characterizing one aspect of the share repurchase for firm *i* in year *t*. Following Chan et al. (2018) and Xin et al. (2023), define the scale of share repurchase by dividing the number of shares scheduled for repurchase by the total share capital (*Intended ratio*), and define the completion of the repurchase by dividing the number of shares actually repurchased by the total number of announced repurchases (*Completion ratio*). $Pledge_{i,t}$ in Eq. (1) denotes a variable characterizing one aspect of the share pledge of controlling shareholder for firm *i* before share repurchase in year *t*. Following Chan et al. (2018), Xie et al. (2018), and Wang et al. (2018), Set a dummy (*Pledge_dum*), if the controlling shareholder of firm *i* has a share pledge before the share repurchase in year t and it has not been redeemed, the *Pledge_dum* is equal to 1, otherwise it is equal to zero. And following the Xin et al. (2023), define the share pledge ratio by diving the number of shares pledged and not redeemed by the controlling shareholder of firm *i* prior to the share repurchase in year *t* by the total number of shares of the firm held by the controlling shareholder (*Pledge ratio*).

The vector Controls represents a group of firm level variables. To control for potential managerial motives of undervaluation, free cash flow distribution, capital structure adjustment, and dividend substitution, we include in the regressions variables of Price-to-Book Ratio (*PB*), firm-adjusted free cash flow (*FCF*), firm-

adjusted leverage (*LEV*), and after-tax dividend Per Share (*Dividend*) (Ikenberry et al., 1995; Dittmar, 2000; Chan et al., 2004, 2018). And also controls the nature of equity (*SOE*), the size of the board of directors (*Board*), the proportion of independent directors (*Independent*), the proportion of shares held by the largest shareholder (*Top1*), whether the chairman and the general manager are in one (*Dual*), the separation rate of the two powers of the chairman and the general manager (*Separation*), the scale of assets (*Asset*), the return on net assets (*ROE*) and the growth rate of sales revenue (*Growth*) (Wang et al., 2018; Xin et al., 2023). Appendix Table A2 presents detailed variable definitions.

I winsorize all of the continuous control variables at the 1st and 99th percentiles and also control industry and year fixed effects and cluster standard errors at the firm level.

3.3 Data

3.3.1 Sample Construction

I construct my sample by downloading all firm year observations of companies of A-shares in China and had issued share repurchase announcements from 2005 to 2023 from the Wind database. Given data limitation, I first exclude the firms with incomplete repurchase information that were repurchased at any time during these 19 years. The data set is unbalanced as it does not contain data for each firm for all years in the period assessed. And I use the following steps to construct my sample for analyses:

First, as emphasized in the previous section, I manually collect information from various sources of legal filings to identify the date of the new share repurchase rules legalization for China, is October 26, 2018. Given that companies must follow certain procedures to announce share repurchases, including approving resolutions from the board of directors and shareholders owning substantial shares, a sample of companies that announced share repurchases between October 27, 2018, and December 31, 2023 was chosen. I am left with 7,201 samples after the first filtering.

Second, I excluded samples in which the repurchase was accomplished through private bidding, the repurchase procedure and the purposes of repurchase was

unclear.[3] By doing so, I ensure that my sample firms seek to obtain excess stock returns by repurchasing shares on the open market. I exclude 5,874 samples in this filtering step.

Third, only the first data of repurchase will be chosen for a sample of companies who have repurchased shares on open market more than once in the same year, since the market usually reacts favorably to news of the first repurchase. Additionally, a sample of businesses in the utilities and financial sectors were excluded to maintain data comparability. I remove another 87 samples in this step.

In the end, my main sample for analyses includes 1,240 samples. In addition, the share pledge data of the sample companies is downloaded from the database of East Money Information Co., Ltd., and the other of the data is from the CSMAR database.

3.3.2 Description Statistics

My final sample for the main empirical analyses is a panel data set with 1,240 observations of 1,057 firms from October 27, 2018, to December 31, 2023. Appendix Table A3 presents the correlation matrix of the variables and Table 1 presents the summary statistics.

There are some interesting observations that can be made from the matrix of Table A3. There is a high correlation between the two indicators of share pledge and the *Intended ratio*, however, *Pledge ratio* is significantly negatively correlated with *Actual amount ratio*, at 10% level, indicated that companies that have a large percentage of pledged shares might not really spend money on the repurchase program. Additionally, there are no explanatory variable with correlation above 0.5, means have no strong correlation, so I assess the threat for multicollinearity to be low.[4]

As shown in the Panel A of Table 1, the average *Intended ratio* in my sample is 1.34%, of which about 38.7% of the samples also have controlling shareholder share pledges, and the average share pledge ratio is 37.37% (14.5%/38.8%).

[3] Sample companies whose the repurchase procedure and the purposes of repurchase was unclear are classified as ‘‘other’’ in the Wind database.

[4] I also test this thoroughly by performing a VIF-test and the value of VIF-test of all variables are less than 2.

Examine if any sample firms have a lower *Intended ratio*, which would improve the share repurchase completion rate. Group the companies based on whether the *Completion ratio* exceeds 100% (Abnormal Completion Rate) or not (Normal Completion Rate). As shown in the Panel B of Table 1, in the sample of normal completion rate, the average *Completion ratio* was 72.49%, and the average *Actual amount ratio* was 52.51%, which is consistent with the existing research.[5] And this thesis's prediction is supported by the much lower average *Intended ratio* and average *lnPlanbuyback* in the sample with the abnormal completion rate.

Panel C in Table 1 reports the univariate analysis of controlling shareholder's share pledge and share repurchase. Companies that made the share pledges in my sample had considerably higher *Intentional ratios*, and compared to companies that didn't make the share pledges, there was a significant difference in the mean at the 1% level. Share pledge, however, has no appreciable beneficial effect on the completion rate. This offers some initial empirical support for my research hypothesis.

Figure 1 shows the annual distribution of the number of the repurchases announcement in the open market from 2005 to 2023. Before 2018, the number of companies that repurchased shares on the open market was small and dispersed. And the number of companies announcing repurchase intentions exploded in 2018, and more have repurchased shares in the years that followed. This suggests that companies did take advantage of the legal change to repurchase shares quickly after China's new Company Law legalized the share repurchase program of market value management. As shows in Figure 2, however, the average completion rate of share repurchases significantly decreased in the first year following the implementation of the new repurchase rules, from 2018 to 2019. This indicates that certain companies do, in fact, merely utilize the signal effect of share repurchases and do not execute the plan. And the average completion rate has increased since 2020, but the average intended ratio has decreased, reflecting that certain companies are alleviating the pressure to complete repurchases by lowering the intended ratio.

[5] From 2018 to 2020, the average completion ratio and the average actual amount ratio of China A-share share repurchases was 67.4% and 54.2% (Xin et al., 2023).

Table 1: Descriptive statistics.

Panel A: The statistical distribution of all sample.

Variable	N	Mean	SD	Min	Median	Max
			Explained variables			
Intended ratio (%)	1,240	1.347	1.325	0.080	0.960	8.090
lnPlanbuyback	1,240	15.48	1.492	10.84	15.43	20.72
Completion ratio (%)	1,240	98.95	39.36	7.460	96.39	202.3
Actual amount ratio (%)	1,240	66.83	23.95	5.080	64.73	100.0
			Explanatory variables			
Pledge_dum	1,240	0.387	0.487	0.000	0.000	1.000
Pledge ratio	1,240	0.144	0.235	0.000	0.000	0.951
Pledge ratio Alter	1,240	0.037	0.065	0.000	0.000	0.287
			Control variables			
SOE	1,240	0.103	0.304	0.000	0.000	1.000
Board	1,240	2.209	0.166	1.792	2.303	2.639
Top1	1,240	29.56	13.10	7.080	28.07	66.24
Independent	1,240	0.381	0.053	0.333	0.375	0.571
Dual	1,240	0.395	0.489	0.000	0.000	1.000
Separation	1,240	4.459	6.874	0.000	0.364	26.46
Asset	1,240	22.60	1.265	20.53	22.42	26.71
ROE	1,240	0.090	0.099	-0.299	0.086	0.416
LEV	1,240	0.364	0.185	0.046	0.358	0.772
FCF	1,240	-0.179	1.069	-6.144	0.081	1.329
PB	1,240	3.472	2.709	0.499	2.636	15.06
Growth	1,240	0.198	0.374	-0.532	0.136	1.979
Dividend	1,240	0.312	0.457	0.000	0.160	2.800

Panel B: Normal Completion Rate VS Abnormal Completion Rate.

VARIABLES	Normal Completion Rate		Abnormal Completion Rate		Difference
	(1)	(2)	(3)	(4)	T-value
	N	Mean	N	Mean	
Intended ratio (%)	720	1.552	520	1.063	0.488***
lnPlanbuyback	720	15.65	520	15.23	0.423***
Completion ratio (%)	720	72.49	520	135.6	-63.096***
Actual amount ratio (%)	720	52.51	520	86.67	-34.161***

Table 1 (continued)

Panel C: Unpledged VS Pledged.

VARIABLES	Unpledged		Pledged		Difference T-value
	(1) N	(2) Mean	(3) N	(4) Mean	
Intended ratio (%)	760	1.252	480	1.496	-0.244***
lnPlanbuyback	760	15.26	480	15.82	-0.570***
Completion ratio (%)	760	100.2	480	97.04	3.126
Actual amount ratio (%)	760	67.57	480	65.66	1.918

This table reports the descriptive statistics of the samples. Panel A shows the summary statistics of 1,240 analytical samples. Panel B reports the statistical distribution of samples with normal completion rate and abnormal completion rate. Panel C presents the descriptive statistical for the analysis between share repurchases and share pledge in this study and including the mean differences. A definition of each variable is presented in Table A2.

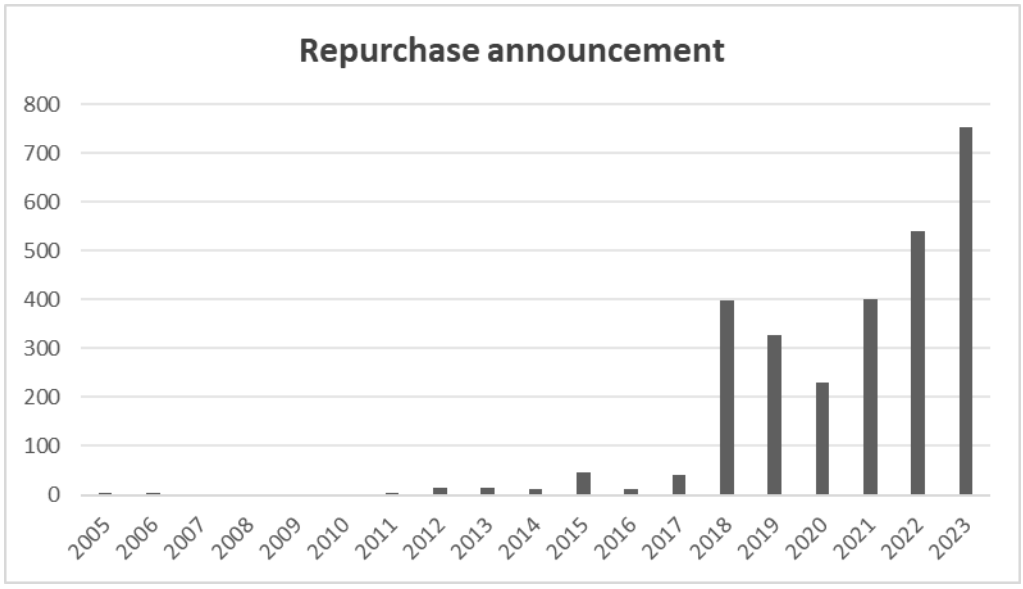


Figure 1: This figure shows the annual distribution of the number of the repurchases announcement in the open market from 2005 to 2023.

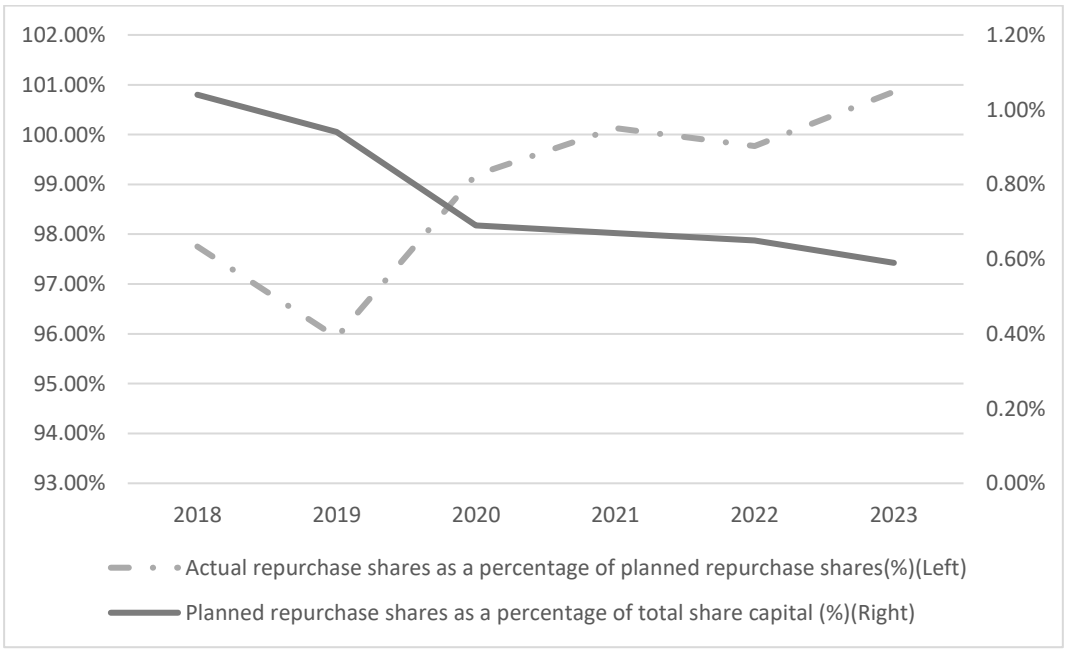


Figure 2: This figure shows the change in the average intended ratio and the average completion rate in the open market from 2018 to 2023.

4 Result

4.1 Share Pledge on the Scale of Share Repurchase

I examine whether the scale of share repurchasing is related to the share pledge firms. Based on prior studies, announce larger scale repurchases have higher excess returns (Manconi et al., 2019) and can alleviate the risk of the transfer of control rights and stock price crash (Xie et al., 2016), I expected a positive relationship between share pledge firms and announcing a larger share repurchase program. To test my hypothesis, I first use all samples to run OSL regressions of the scale of repurchase on share pledges.

The dependent variable is *Intended ratio*. The independent variable of model 1 and model 2 of Table 2 is *pledge_dum* that equals one if the controlling shareholder of firm makes share pledge and it has not been redeemed before the share repurchase in a given year, and zero otherwise, and in the model 3 and model 4 of Table 2, the independent variables is the *Pledge ratio*. Control variables are introduced in Section 2 of Chapter 3 and all variables are as defined in Table A2. Industry and year fixed effects are also included.

Table 2 reports the results of OSL regressions. I find that *Pledge_dum* is significantly and positively related to the *Intended ratio* (model 1). The effect of share pledges remains strong even when I control for a variety of important variables that affect repurchase decisions (model 2). And the relation between *Pledge ratio* and *Intended ratio* is strengthened when the share pledge ratio higher (model 3 and model 4).

I use Model 2 of Table 2 to calculate the baseline, which is the *Intended ratio* when all explanatory variables are in their sample means. I increase one standard deviation of share pledge from its sample mean (i.e., *Pledge_dum* increases from 38.7% to 87.4%) while holding other variables constant. I find that the *Intended ratio* increases by 0.096% points (from 0.199% to 0.296%), which is a 48.07% increase over the base case, when the company experiences an increase of one standard deviation in share pledge.

These results are consistent with my hypothesis: when the controlling shareholder of the company has pledged shares, and when the share pledge rate is higher, a bigger scale of repurchase will be made public at the time of the share repurchase.

Table 2: OSL regressions of the scale of repurchase on share pledges.

VARIABLES	Intended ratio			
	(1)	(2)	(3)	(4)
Pledge_dum	0.170**	0.199**		
	(2.083)	(2.372)		
Pledge ratio			0.439**	0.403**
			(2.401)	(2.137)
Constant	1.274***	5.023***	1.277***	5.029***
	(29.435)	(5.274)	(31.401)	(5.278)
Controls	NO	YES	NO	YES
Year/Ind	YES	YES	YES	YES
Obs	1,227	1,227	1,227	1,227
R^2	0.236	0.310	0.238	0.310

This table presents the impact of share pledge on a company's share repurchase. The dependent variables is the scale of share repurchase by dividing the number of shares scheduled for repurchase by the total share capital (*Intended ratio*).The independent variable are a dummy of pledge (*Pledge_dum*), which equals one if the controlling shareholder of firm makes share pledge and it has not been redeemed before the share repurchase in a given year, and zero otherwise, and the share pledge ratio by diving the number of shares pledged and not redeemed by the controlling shareholder of firm prior to the share repurchase by the total number of shares of the firm held by the controlling shareholder in a given year (*Pledge ratio*). In model 2 and model 4, I control for *SOE, Board, Top1, Independent, Dual, Separation, Asset, ROE, LEV, FCF, PB, Growth, Dividend*. All variables are as defined in Table A2. I also control the industry and year fixed effects. The t-values clustered at the firm level are in parentheses. ***, * *, and * denote significance at the 1%, 5%, and 10% levels, respectively.

4.2 Share Pledge on the Completion of the Repurchase

I examine whether the completion of repurchasing is related to share pledge firms. As stated earlier in this thesis, the completion of a share repurchase is contingent upon a confluence of favorable elements (such as safeguarding reputation) and unfavorable aspects (such as financial limitations), I predict that the completion rate of repurchase is not related to share pledges (Xin et al., 2023). To test my hypothesis, I use all samples to run OSL regressions of the completion rate of repurchase on share pledges. The dependent variable is *Completion ratio*. The variables controlled

are the same as in the previous section and I also control the industry and year fixed effects.

Table 3 reports the results of OSL regressions. I find that share pledges are not significantly related to the completion ratio of repurchase in all models, these results are expected.

Table 3: OSL regressions of the completion ratio of repurchase on share pledges.

VARIABLES	Completion ratio			
	(1)	(2)	(3)	(4)
Pledge_dum	-0.813	-0.813		
	(-0.339)	(-0.339)		
Pledge ratio			-2.203	-2.203
			(-0.437)	(-0.437)
Constant	99.312***	99.312***	99.313***	99.313***
	(63.697)	(63.697)	(70.909)	(70.909)
Controls	NO	YES	NO	YES
Year/Ind	YES	YES	YES	YES
Obs	1,227	1,227	1,227	1,227
R^2	0.075	0.075	0.075	0.075

This table presents the impact of share pledge on the completion of a company's share repurchase. The dependent variables is the completion rate of share repurchase by dividing the number of shares actually repurchased by the total number of announced repurchases (*Completion ratio*).The independent variable are a dummy of pledge (*Pledge_dum*), which equals one if the controlling shareholder of firm makes share pledge and it has not been redeemed before the share repurchase in a given year, and zero otherwise (model 1 and model 2), and the share pledge ratio by diving the number of shares pledged and not redeemed by the controlling shareholder of firm prior to the share repurchase by the total number of shares of the firm held by the controlling shareholder in a given year (*Pledge ratio*) (model 3 and model 4). In model 2 and model 4, I control for *SOE*, *Board*, *Top1*, *Independent*, *Dual*, *Separation*, *Asset*, *ROE*, *LEV*, *FCF*, *PB*, *Growth*, *Dividend*. All variables are as defined in Table A2. I also control the industry and year fixed effects. The t-values clustered at the firm level are in parentheses.

4.3 Robustness Checks

4.3.1 Endogeneity Test

Bias within sample selection may result in problems with endogeneity, following the Xie et al. (2018) and Wang et al. (2018), using the propensity score matching

(PSM) to solve this problem. The nearest neighbor matching of one to one with replacement was employed in the share pledge of the controlling shareholder and compare results from PSM to Multiple regression (MR) using the same set of controls variables.

To illustrate the overlap in propensity scores of treated and untreated observations, I plot the density of propensity scores for each treatment group (Shaikh et al., 2009; Shipman et al., 2017). The density is constructed using kernel density estimation. Graph A and Graph C of Figure 3 shows that there was a little overlap between the pledged and unpledged groups before to PSM, indicating that covariates were different. And I observed that there was more overlap when the one-to-one with replacement matching was made (Graph B and Graph D of Figure 3). In light of this, matching that is successful may be able to mitigate the systemic disparities between companies with pledged shares and those without.

I examine shifts in sample composition in Panel A of Table 4, found that the data of share pledge sample of the matched was similar to that of the full sample. Next, I evaluate covariate balance and display the number of balanced covariates between treatment groups in Panel B of Table 4 (p-value, 0.10 for difference in means).[6] In all two settings, 9 of the 15covariates are statistically different between non-Pledge and Pledge treatment groups prior to matching. After matching, 14 of the 15 covariates are no longer statistically different. This means, covariate balance substantially improves in the matched sample.

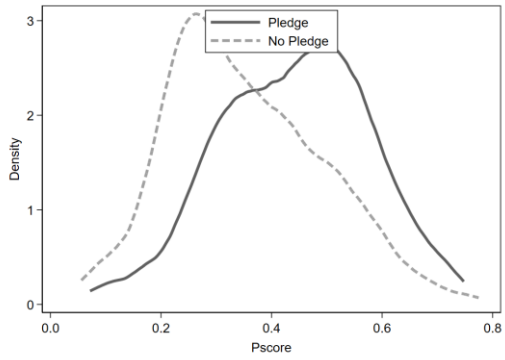
I use the matched sample to run OSL regressions of repurchases on share pledges. Panel B of Table 4 reports the results of OSL regressions. The dependent variable is *Intended ratio* (model 1and model 2) and *Completion ratio* (model 3 and model 4). And I observed that the positive relationship between the share pledge and the *Intended ratio* was still statistically significant at the 5% level.

For robustness, I examine my result by using other two PSM methods, the caliper matching within the caliper distance (0.05) and kernel matching within the width

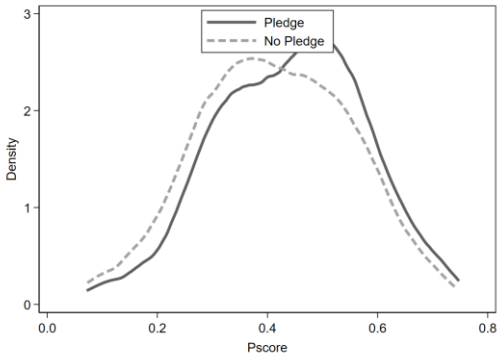
[6] Detailed differences in covariate means for the full and matched samples are provided in Appendix Table A4.

distance (0.05). I run the OSL regressions of repurchases on share pledges again. The Model 1 to 4 of Panel B of Table 5 report of OSL regressions, my results still holding.

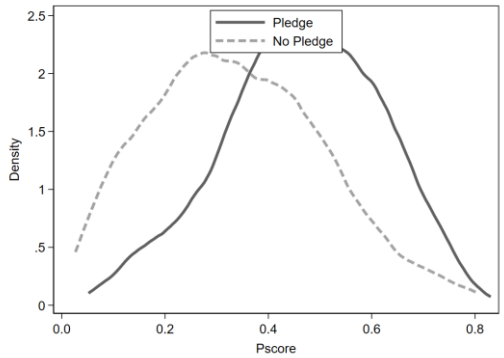
Graph A: The propensity score overlap of share pledge on Intended ratio before matching.



Graph B: The propensity score overlap of share pledge on Intended ratio after matching.



Graph C: The propensity score overlap of share pledge on Completion ratio before matching.



Graph D: The propensity score overlap of share pledge on Completion ratio after matching.

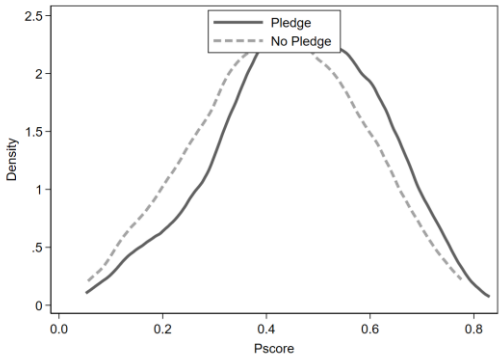


Figure 3: This figure demonstrates the overlap of propensity score.

Table 4: OSL regressions of the completion ratio of repurchase on share pledges.

Pnale A: Shifts in Sample Composition.				
	Full Sample		Matched Sample	
	n	Percent	n	Percent
	Share Pledge on Intended Ratio			
Pledge_dum=1	480	38.71%	480	50.05%
Pledge_dum=0	760	61.79%	755	61.13%
	Share Pledge on Completion Ratio			
Pledge_dum=1	480	38.71%	479	39.07%
Pledge_dum=0	760	61.79%	747	60.93%

Table 4 (continued)

Panel B: OSL regressions of share repurchase on share pledges by using matched samples.				
VARIABLES	Intended ratio		Completion ratio	
	Full sample	Matched sample	Full sample	Matched sample
	(1)	(2)	(3)	(4)
Pledge_dum	0.199**	0.289**	-0.293	-1.182
	(2.372)	(2.545)	(-0.119)	(-0.333)
Constant	5.023***	6.293***	87.364**	61.276
	(5.274)	(3.975)	(2.384)	(1.114)
Controls	YES	YES	YES	YES
Year/Ind	YES	YES	YES	YES
Obs	1,227	549	1,227	549
R^2	0.310	0.365	0.089	0.114
Covariates Balanced	6/15	14/15	6/15	14/15

This table consists of two parts. Panel A presents the effects of PSM on sample composition. Panel B compares the multiple regression results of the matched sample and the full sample of the PSM. The dependent variables the scale of share repurchase by dividing the number of shares scheduled for repurchase by the total share capital (*Intended ratio*) in model 1 and model 2 and the completion rate of share repurchase by dividing the number of shares repurchased by the total number of announced repurchases (*Completion ratio*) in model 3 and model 4. I control for *SOE, Board, Top1, Independent, Dual, Separation, Asset, ROE, LEV, FCF, PB, Growth, Dividend*. All variables are as defined in Table A2. I also control the industry and year fixed effects. The t-values clustered at the firm level are in parentheses. ***, * *, and * denote significance at the 1%, 5%, and 10% levels, respectively.

4.3.2 Other Robustness Checks

For robustness, I use the *lnPlanbuyback* and *Actual amount ratio* as alternative dependent variables and run OSL regressions of the share repurchase activity. [7] Similar to results in Table 2 and Table 3, the OSL results show that the share pledge positively affects the *Intended ratio* (Model 1 and Model 2 of Panel A of Table 5), and no relationship with *Completion ratio* (Model 3 and Model 4 of Panel A of Table 5). And measuring the share pledge ratio by diving the number of shares pledged and not redeemed by the controlling shareholder of firm *i* prior to the share repurchase in year *t* by the total share capital (*Pledge ratio Alter*) as alternative

[7] Following the Chan et al (2018), I define the *lnPlanbuyback as the* natural logarithm of the number of shares to be repurchased, and following the Wang et al (2018), I define the *Actual amount ratio* by dividing the actual amount actually repurchased by the total amount of announced repurchases.

independent variable to test my hypothesis by examining the impact of share pledges on share repurchase. Model 5 and Model 6 of Panel A of Table 5 report the OSL results, my hypotheses remain valid.

Another robustness check is to change the sample. As my sample contains a sample of special treatment (ST), which often denotes that the SSE and SZSE thinks the company's financial situations are unusual or the company has had a negative net profit for two years in a row, these companies might have a significant incentive to manage market value by share repurchase, which will affect our result. Thus, I exclude the sample of ST companies, to look at how this changes the regression output. The result from excluding those samples is that the impact of the share pledge on Intended ratio is only statistically significant at the 5% level (Model 5 and Model 6 of Panel B of Table 5). This is still a significant result and shows that limiting the sample yields significant results.

Table 5: Robustness checks.

Panel A: Robustness check with alternate variables.						
VARIABLES	Alternative explained variable				Alternative explanatory variable	
	lnPlanbuyback		Actual amount ratio		Intended ratio	Completion ratio
	(1)	(2)	(3)	(4)	(5)	(6)
Pledge_dum	0.245***		-0.903			
	(3.609)		(-0.583)			
Pledge ratio		0.601***		-2.590		
		(4.399)		(-0.774)		
Pledge ratio Alter					1.863***	10.183
					(2.744)	(0.565)
Constant	1.033	1.018	61.767***	61.909***	5.061***	86.908**
	(1.103)	(1.086)	(2.722)	(2.730)	(5.305)	(2.377)
Controls	YES	YES	YES	YES	YES	YES
Year/Ind	YES	YES	YES	YES	YES	YES
Obs	1,227	1,227	1,227	1,227	1,227	1,227
R^2	0.593	0.595	0.077	0.077	0.313	0.089

Table 5 (continued)

Panel B：Robustness checks with using matched samples by PSM and excluding the sample of ST companies.

VARIABLES	PSM				Exclude the sample of ST companies			
	Intended ratio		Completion ratio		Intended ratio		Completion ratio	
	Caliper Matching	Kernel Matching	Caliper Matching	Kernel Matching				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Pledge_dum	0.195**	0.195**	-0.198	-0.198	0.197**		-0.531	
	(2.320)	(2.320)	(-0.080)	(-0.080)	(2.331)		(-0.216)	
Pledge ratio						0.408**		-0.170
						(2.112)		(-0.033)
Constant	5.037***	5.037***	87.785**	87.785**	5.005***	5.009***	89.978**	89.754**
	(5.286)	(5.286)	(2.385)	(2.385)	(5.218)	(5.221)	(2.452)	(2.448)
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Year/Ind	YES	YES	YES	YES	YES	YES	YES	YES
Obs	1,213	1,213	1,213	1,213	1,214	1,214	1,214	1,214
R^2	0.307	0.307	0.090	0.090	0.313	0.313	0.086	0.086

This table consists of two parts. Panel A presents a robustness check with alternate variables. Panel B other robustness tests, with model 1 to 4 being tested using matched samples by PSM and models 5 to 8 excluding the sample of ST companies.

4.4 Heterogeneous Treatment Effect

As explained in Section 2, the share pledge of controlling shareholder will increase the risk of a transfer of control, and this offer an opportunity to investigate the heterogeneous effects of the risk of control right transfer on share repurchase. Thus, in this subsection, I investigate two group of heterogeneous treatment effects.

4.4.1 Heterogeneous Treatment Effects with the Proportion of the Largest Shareholder's Shareholding

The value of the pledged objective defaulted increases with the controlling shareholder's shareholding ratio and the cost of gaining control increases. Thus, there is less risk of a control right transfer, in turn, the risk of a transfer of control increases with the controlling shareholder's lower shareholding ratio (Wang et al., 2018). Based on the proportion of the largest shareholder's shareholding, I split the sample companies into 10 groups: the largest two groups are the high shareholding group (Hight group), and the remaining eight groups are the low shareholding group (Low group). And I found that a company with share pledging may be more vulnerable to a transfer of control, as evidenced by the grouping difference test, which reveals that the average of the largest shareholder's shareholding ratio is significantly lower in a share pledged company than in one without pledging.

Panel A of Table 6 presents the result of the heterogeneous treatment effects. The significant positive correlation between share pledge and *Intended ratio* only valid in the Low group (model 1 and model 3), indicating that the controlling shareholders with lower shareholding ratios are more motivated to advocate companies to declare a larger scale of repurchase to alleviate the risk of control transfer, and they will not actively complete the repurchase due to the share pledge (model 5 and model 7).

4.4.2 Heterogeneous Treatment Effects with the Nature of Equity

The state-owned enterprise (SOEs) has more negotiating power with the pledgee, when in the event that the stock price drops to the liquidation line of share pledging, the pledgee is more likely to consent to engage in private negotiations with the controlling shareholder under non-market-oriented, (Xie & Chen, 2009), and besides, the SOEs is more likely to secure the necessary funds from the nation-owned banks (NOB) for supplementing the margin (Yu & Pan, 2008).Therefore, I

argue that there is greater risk involved in the transfer of control of non-SOEs and I investigated the heterogeneous treatment effects with the nature of equity (SOEs and Non-SOEs).

Panel B of Table 6 reports the result of the heterogeneous treatment, and I find that there is the significant positive relationship between share pledge and *Intended ratio* in non-SOEs (model 1 and model 3). This suggests that, for mitigate the risk of control transfer, the controlling shareholders of non-SOEs are more inclined to support companies to announce a bigger scale of repurchase. And there is no relationship between the completion of the share repurchase and the share pledge in the non-SOEs (model 5 and model 7).

Table 6 The Heterogeneous Treatment Effect.

Panel A：The heterogeneous treatment effects with the proportion of the largest shareholder's shareholding.

	Intended ratio				Completion ratio			
VARIABLES	Low	High	Low	High	Low	High	Low	High
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Pledge_dum	0.201**	0.054			-3.438	12.972**		
	(2.113)	(0.367)			(-1.272)	(2.093)		
Pledge ratio			0.424**	-0.060			-6.377	31.446**
			(1.993)	(-0.190)			(-1.111)	(2.423)
Constant	4.923***	2.450	4.943***	2.517	70.177*	65.965	69.790*	54.940
	(4.646)	(1.088)	(4.665)	(1.125)	(1.835)	(0.581)	(1.823)	(0.485)
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Year/Ind	YES	YES	YES	YES	YES	YES	YES	YES
Obs	976	234	976	234	976	234	976	234
R^2	0.332	0.437	0.332	0.437	0.102	0.254	0.101	0.255

Table 6 (continued)

Panel B：The heterogeneous treatment effects with the nature of equity.

	Intended ratio				Completion ratio			
VARIABLES	Non-SOEs	SOEs	Non-SOEs	SOEs	Non-SOEs	SOEs	Non-SOEs	SOEs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Pledge_dum	0.157*	-0.183			-0.359	14.551		
	(1.865)	(-0.423)			(-0.138)	(1.319)		
Pledge ratio			0.340*	-0.210			-1.433	59.853**
			(1.798)	(-0.150)			(-0.265)	(2.525)
Constant	4.490***	3.106	4.481***	3.246	69.518*	200.199*	69.663*	189.216*
	(4.470)	(0.734)	(4.458)	(0.769)	(1.660)	(1.904)	(1.663)	(1.847)
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Year/Ind	YES	YES	YES	YES	YES	YES	YES	YES
Obs	1,095	116	1,095	116	1,095	116	1,095	116
R^2	0.306	0.592	0.307	0.591	0.090	0.527	0.090	0.544

This table consists of two parts. Panel A presents the heterogeneous treatment effects with the proportion of the largest shareholder's shareholding. Grouping based on the proportion of shares that the largest shareholder owns. Ten groups are formed based on the largest shareholder's shareholding ratio size; the largest two groups belong to the high shareholding ratio group, while the remaining eight groups belong to the low shareholding proportion group. Panel B presents the heterogeneous treatment effects with the nature of equity. Grouping based on whether it is SOEs or not (Non-SOEs). We controlled for the same variables as the full-sample regression and also control the industry and year fixed effects. The t-values clustered at the firm level are in parentheses. ***, * *, and * denote significance at the 1%, 5%, and 10% levels, respectively.

4.5 Short-term Market Reaction

The next question is how the market reacts to share repurchases of share pledge. To answer this question, I estimate the influence of share repurchase on stock return, which is measured by the cumulative abnormal return of firm relative the day stock return of A share market of China ($CAR_{i,\mathrm{d}}$), and construct the following regression model:

$$CAR_{i,\mathrm{d}} = a_0 + a_1 Repurchase_{i,t} + a_2 Controls + FE_t + FE_j + \varepsilon_{i,t} \quad \text{Eq. (2)}$$

Where $CAR_{i,\mathrm{d}}$ in Eq. (2) denotes the cumulative abnormal return for firm *i* in the d days before and after the share repurchase, and $Repurchase_{i,t}$ in Eq. (2) denotes the scale of share repurchase for firm *i* in year *t*, measuring by dividing the number of shares scheduled for repurchase by the total share capital (*Intended ratio*). All other controls variables are the same as in Eq. (1).

In Panel A of Table 7, I present the regression results using the cumulative abnormal return on the first and second days before and after the share repurchase (CAR (-1,1) and CAR (-2,2)) as the dependent variables in Eq. (2). In model 1 and model 2, the coefficients on the *Intended ratio* are significantly positive, regardless of whether I use CAR (-1,1) or CAR (-2,2) for market performance. This positive market reaction to share repurchase is similar to most findings in the existing literature (Comment & Jarrell, 1991; Ikenberry et al., 1995; Barth & Kasznik, 1999; Oded et al., 2011; Dittmar & Field, 2015). Overall, knowing that share repurchases could serve as a positive signal to the market, companies can use share repurchases to boost their stock prices to alleviate the pressure from share pledge.

From the result from the effect of heterogeneous treatment in the previous section. Share pledge firms with a higher risk of control right transfer prefer to announce larger scale of repurchases, however, no statistically significant positive correlate with the completion of share repurchases. Thus, to examine if the market notices opportunistic intentions from the pressure of share pledge, I add an interaction term with the Intended ratio in Eq. (2), and construct the following regression model:

$$CAR_{i,\mathrm{d}} = a_0 + a_1 Z_{i,t} + a_2 Repurchase_{i,t} \times Interaction_{i,t} + + a_3 Interaction_{i,t} + a_4 Controls + FE_t + FE_j + \varepsilon_{i,t}$$

Eq. (3)

Where $Interaction_{i,\mathrm{t}}$ in Eq(3) is one of the following variables: 1）a dummy (*Pledge_dum*), if the controlling shareholder of firm *i* has a share pledge before the share repurchase in year *t* and it has not been redeemed, the Pledge is equal to 1, otherwise it is equal to zero, 2) the share pledge ratio by diving the number of shares pledged and not redeemed by the controlling shareholder of firm *i* prior to the share repurchase in year *t* by the total number of shares of the firm held by the controlling shareholder (*Pledge ratio*). All other variables are the same as in Eq. (2).

The coefficients on interaction term for all the regressions have the opposite signs compared to *Intended ratio* (Model 3 to 6 of Panel A of Table 7), the market reaction is less favorable, especially when the share pledge ratio is higher, the coefficients are significantly and negatively related to short-term market reactions (Model 4 and Model 6 of Panel A of Table 7).

Panel B of Table 7 shows the univariate analysis of the abnormal announcement returns. For the entire repurchase sample, the short-term market reactions are positive. I then divide the sample based on the share pledge ratio. For companies with severe pressure from share pledges (Under pledge pressure group), unobtainable excess stock returns, which is significantly lower than that of the None pledge group.[8] This result is consistent with the output of regression in Panel A of Table7, that a much stronger negative impact of share pledges on repurchase announcement returns when there has been recent price pressure.

[8] Under pledge pressure group refers to a sample of stock prices that have fallen to the level required for loan maintenance.

Table 7: Analyses of repurchase announcement returns on share pledges.

Panel A：OSL regression of share repurchase on cumulative abnormal returns (CAR).						
VARIABLES	CAR(-1,1)	CAR(-2,2)	CAR(-1,1)		CAR(-2,2)	
	(1)	(2)	(3)	(4)	(5)	(6)
Intended ratio	0.004***	0.004***	0.005***	0.006***	0.007***	0.007***
	(2.597)	(2.615)	(2.588)	(3.216)	(3.078)	(3.553)
Intended ratio × Pledge_dum			-0.002		-0.004	
			(-0.736)		(-1.414)	
Pledge_dum			-0.001		0.000	
			(-0.137)		(0.041)	
Intended ratio × Pledge ratio				-0.007*		-0.010**
				(-1.713)		(-2.199)
Pledge ratio				0.009		0.010
				(0.966)		(0.987)
Constant	0.021	0.034	0.018	0.017	0.028	0.028
	(0.501)	(0.663)	(0.428)	(0.395)	(0.542)	(0.550)
Controls	YES	YES	YES	YES	YES	YES
Year/Ind	YES	YES	YES	YES	YES	YES
Obs	1,220	1,220	1,220	1,220	1,220	1,220
R^2	0.064	0.066	0.065	0.067	0.070	0.071

Table 7 (continued)

Panel B：Univariate analysis of repurchase announcement returns.

	CAR (-1,1)	CAR (-2,2)	CAR (-3,3)	CAR (-4,4)	CAR (-5,5)	CAR (-6,6)	CAR (-7,7)	CAR (-8,8)	CAR (-9,9)	CAR (-10,10)
Overall sample	0.015***	0.016***	0.016***	0.016***	0.016***	0.017***	0.016***	0.017***	0.015***	0.014***
(N=1233)	(12.244)	(10.119)	(8.670)	(7.326)	(6.861)	(6.660)	(5.786)	(5.692)	(4.782)	(4.113)
None pledge group	0.016***	0.018***	0.018***	0.018***	0.019***	0.020***	0.020***	0.021***	0.020***	0.018***
(N=756)	(10.207)	(8.821)	(7.574)	(6.451)	(6.278)	(6.147)	(5.732)	(5.572)	(4.853)	(4.220)
Pledge group	0.014***	0.014***	0.015***	0.015***	0.013***	0.014***	0.012**	0.014***	0.013**	0.011*
(N=378)	(6.425)	(5.219)	(4.539)	(3.946)	(3.146)	(3.219)	(2.509)	(2.792)	(2.406)	(1.950)
Under pledge pressure group (N=99)	0.011**	0.007	0.006	0.003	0.006	0.003	-0.003	-0.007	-0.013	-0.011
	(2.460)	(1.180)	(0.854)	(0.393)	(0.717)	(0.268)	(-0.282)	(-0.668)	(-1.112)	(-0.864)
Difference between None pledge group and Pledge under pressure group	0.005	0.011	0.012	0.015	0.013	0.018*	0.023**	0.029**	0.033***	0.029**
	(0.815)	(1.458)	(1.444)	(1.620)	(1.315)	(1.719)	(2.106)	(2.393)	(2.615)	(2.203)

This table reports short-term market reaction in our sample. Panel A reports the regressions of short-run returns around repurchase announcements on share Pledges. The announcement return is measured by the cumulative abnormal return of firm relative the day stock return of A share market of China. I controlled for the same variables as the full-sample regression and also control the industry and year fixed effects. The t-values clustered at the firm level are in parentheses. Panel B The repurchase sample is sorted by share pledge into four subgroups. None pledge group includes all observations with zero pledges. Under pledge pressure group includes all observations of stock prices that have fallen to the level required for loan maintenance. ***, * *, and * denote significance at the 1%, 5%, and 10% levels, respectively.

5 Conclusion

Corporate insiders in China are frequently found to put up shares as collateral for personal loans in recent years (Xie & Liao, 2018). Share pledge companies can now legitimately and fairly repurchase shares on the open market with an excuse of managing market value and relieving part of the pressure brought on by share pledge, following China's 2018 share repurchase regulation revision (He et al., 2021). Investors should be advised, nonetheless, that they might not be able to carry out the repurchase plan because of the funding constraints enforced by the share pledge (Xin et al., 2023).

This study has provided a nuanced perspective on the behavior of Chinese listed companies with regard to share repurchases, that is in the context of share pledging by controlling shareholders. The findings of this study reveal that share pledge firms are indeed more inclined to announce larger-scale share repurchases initially, suggesting that companies do use share repurchase as a corporate resource that can be used to alleviate the pressure from share pledge. However, even only the repurchase plan's implementation can foster the expansion of the performance of company in the future (Lie, 2005), the completion of the repurchase is not significantly related to share pledge, reveals an element of opportunistic behavior where some companies may exploit positive market reactions to their share repurchase announcements without necessarily following through with actual repurchases.

These findings are valid in both companies where the largest shareholder had a low shareholding and non-state-owned enterprises. These two types of companies have a greater risk of control transfer if they pledge shares, thus there is a stronger incentive to proclaim a larger repurchase scale in order to ensure control.

Additionally, the findings of further study shows that while share pledge firms may use share repurchases as a tool to signal undervaluation or attract investment prospects, the short-term market reaction to these firms is not as favorable as none share pledge firms, especially when the controlling shareholder has a higher share pledge ratio and the price of stock has fallen to a level that violates the requirements of the share pledge. This suggests that investors have become cautious of using

repurchase as a predictor of future stock returns if they come to believe that a repurchase program is being used only to support prices (or to mislead them).

This thesis's primary contribution lies in its examination of the relationship between share pledge and share repurchases. Prior literature has shown that large shareholders can utilize share repurchases to bolster stock prices, alleviate margin call pressures, and prevent share price crashes. However, this research extends those insights by highlighting how such practices can be influenced by the risk of control transfer, which is exacerbated by share pledging.

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Appendix

A1: The laws of share repurchase of China

Date Issued	Law	Regulations
05-15-1992	Opinions on Standards for the Companies Limited by Shares	**Article 32.** Except for capital reduction, a company shall not purchase its own stocks, nor may it reserve the stocks it has issued. If a company needs to purchase or reserve the stocks it has issued due to a special circumstance, it shall first give a report to the people's bank and the commission for restructuring the economic systems for approval.
12-29-1993	Company Law of the People's Republic of China	**Article 149.** A joint stock company limited may not buy shares issued by itself, except in order to decrease its capital by cancelling its shares or when it merges with other companies that hold its shares.
12-16-1997	Notice of the China Securities Regulatory Commission on the issuance of the Guidelines for the Articles of Association of Listed Companies	**Article 24.** The company may repurchase the company's shares under the following circumstances, after being approved by the procedures stipulated in the articles of association of the company and approved by the relevant competent authorities of the state: (1) To decrease the registered capital of the company; (2) To merge with another company holding shares of the company.
06-16-2005	Notice on the Release of the Measures on Administration of Listed Companies' buying back the shares held by the public (for trial implementation)	**Article 9.** A listed company may take one of the following forms to buy back shares: (1) Centralized price competition presided over by securities exchange; (2) Offer; (3) Other means that CSRC allows to be adopted.

Date Issued	Law	Regulations
10-27-2005	Company Law of the People's Republic of China (2005 Revision)	**Article 143.** A company shall not purchase its own shares except under any of the following circumstances: (1) To decrease the registered capital of the company; (2) To merge with another company holding shares of the company; (3) To award the employees of the company with its shares; or (4) It is requested by any shareholder to purchase his shares because this shareholder objects to the company's resolution on the merger or split-up of the company made by the shareholders' assembly.
10-09-2008	Supplementary Provisions on the Share Repurchase by Listed Companies by Means of Centralized Bidding	**XII.** These Supplementary Provisions shall come into force on October 9, 2008. The provisions related to the share repurchase by means of centralized bidding in the Measures for the Administration of Repurchase of Public Shares by Listed Companies (for Trial Implementation) (No.51 [2005] of China Securities Regulatory Commission) shall be abolished at the same time, which require a listed company shall submit relevant archive-filing materials to the China Securities Regulatory Commission (hereinafter referred to as CSRC) in accordance with provisions these Measures in To buy back shares in Article 3.
04-09-2013	SSE Business Guidelines for Shares Repurchase by Listed Companies through Auction Trading (Revised in 2013)	To guide and rationalize shares repurchase by listed companies through auction trading, safeguard the securities market order, and protect legal rights and interests of investors and listed companies
08-31-2015	Notice of the China Securities Regulatory Commission, the Ministry of Finance, the State-Owned Assets Supervision and Administration	**III.** Vigorously supporting the repurchase of shares by listed companies

Date Issued	Law	Regulations
	Commission and the China Banking Regulatory Commission on Encouraging Mergers, Acquisitions and Restructuring, Cash Dividends and Share Repurchase of Listed Companies	
10-26-2018	Company Law of the People's Republic of China (2018 Amendment)	**Article 142**. A company shall not purchase its own shares except under any of the following circumstances: (1) To reduce the registered capital of the company. (2) To merge with another company that holds its shares. (3) To use shares for employee stock ownership plan or equity incentives. (4) A shareholder requests the company to purchase the shares held by him since he objects to a resolution of the shareholders' meeting on the combination or division of the company. (5) To use shares for converting convertible corporate bonds issued by the listed company. (6) It is necessary for a listed company to protect the corporate value and the rights and interests of shareholders. A company purchasing its own shares under any of the circumstances set forth in items (1) and (2) of the preceding paragraph shall be subject to a resolution of the shareholders' meeting; and a company purchasing its own shares under any of the circumstances set forth in items (3), (5) and (6) of the preceding paragraph may, pursuant to the bylaws or the authorization of the shareholders' meeting, be subject to a resolution of a meeting of the board of directors at which more than two-thirds of directors are present.

Date Issued	Law	Regulations
11-09-2018	Announcement No. 35 [2018] of the China Securities Regulatory Commission—Opinions on Supporting the Repurchase of Shares by Listed Companies	**I.** The repurchase of shares by listed companies, as an internationally-accepted necessary means for implementing mergers and acquisitions, optimizing the governance structure, and stabilizing the stock prices, has become a basic institutional arrangement for the capital market. Listed companies shall effectively enhance their awareness of investor return, sufficiently and effectively utilize the methods for the repurchase of shares prescribed by law, and actively reward investors. Listed companies shall be encouraged to improve the shares repurchase mechanism in their bylaws or other governance documents, and specify the trigger conditions, repurchase process, and other specific arrangements for repurchase of shares. A listed company's repurchase of shares by offer or centralized price bidding with consideration of cash shall be deemed cash dividends of the listed company and be included in the relevant proportion of cash dividends for calculation.
01-11-2019	SSE Promulgates Detailed Rules for Implementation of Share Repurchase	**III.** Intensifying the shareholding lessening restrictions and disclosure obligations during the repurchase period for special market participants, and preventing profit-making with the opportunity
01-05-2022	Announcement No. 4 [2022] of the China Securities Regulatory Commission—Announcement on Issuing the Rules for Repurchase of Shares by Listed Companies	**Article 3.** Repurchase of shares by a listed company shall be conducive to the sustainable development of the company, without damaging the lawful rights and interests of its shareholders and creditors.

Date Issued	Law	Regulations
12-15-2023	Rules for Repurchase of Shares by Listed Companies (2023 Revision)	**Article 3.** Repurchase of shares by a listed company shall be conducive to the sustainable development of the company, without damaging the lawful rights and interests of its shareholders and creditors. Directors, supervisors and senior executives of a listed company shall act in good faith with due diligence in repurchase of shares.

A2: The definition of variables

Variable	Definition
	Explained variables
Intended ratio	The proportion of the number of shares planned for repurchase to total share capital for firm i in year t.
lnPlanbuyback	The natural logarithm of one plus the number of shares planned for repurchase for firm i in year t.
Completion ratio	The proportion of actual repurchased shares to planned repurchase shares for firm i in year t.
Actual amount ratio	The proportion of actual amount of repurchase shares to the planned repurchase amount for firm i in year t.
	Explanatory variables
Pledge_dum	Equals to one if the controlling shareholder of firm i has a share pledge before the share repurchase in year t and it has not been redeemed year t, and equals zero otherwise.
Pledge ratio	The proportion of the number of shares pledged and not redeemed by the controlling shareholder of firm i prior to the share repurchase in year t by the total number of shares of the firm held by the controlling shareholder.
Pledge ratio Alter	The proportion of the number of shares pledged and not redeemed by the controlling shareholder of firm i prior to the share repurchase in year t by the total share capital.
	Control variables
SOE	Equal to one if firm i is a state-owned enterprise in year t, and equal to zero otherwise.
Board	The natural logarithm of one plus the total number of directors on the board for firm i at the end of year t.
Top1	The shareholding ratio of the largest shareholder for firm i at the end of year t.
Independent	The proportion of independent directors to the total number of directors on the board for firm i at the end of year t.
Dual	Equal to one if the chairman and the CEO are the same person for firm i at the end of year t, and equal to zero otherwise.
Separation	The separation rate of the two powers of the chairman and the general manager for firm i at the end of year t.
Asset	The natural logarithm of total asset for firm i at the end of year t.
ROE	The proportion of net profit to shareholders' equity for firm i at the end of year t.
LEV	The proportion of total liabilities to total assets for firm i at the end of year t.

A2 (continued)

Variable	Definition
FCF	The proportion of free cash flow to the operating income for firm i at the end of year t.
PB	The proportion of the closing price per share to the net asset value per share for firm i at the end of year t.
Growth	The proportion of sales revenue at the end of year t minus sales revenue at the end of year (t-1) to sales revenue at the end of year (t-1) for firm i.
Dividend	After-tax cash dividend per share for firm i at the end of year t.

A3: Correlation Matrix

VARIABLES	Explained variable				Explanatory variable		Control variable	
	Intended ratio	lnPlanbuyback	Completion ratio	Actual amount ratio	Pledge_dum	Pledge ratio	SOE	Board
Intended ratio	1	0.527***	-0.245***	-0.173***	0.090***	0.090***	0.117***	0.0220
lnPlanbuyback	0.527***	1	-0.177***	-0.093***	0.186***	0.195***	0.278***	0.171***
Completion ratio	-0.245***	-0.177***	1	0.851***	-0.0390	-0.0350	0.0110	0.0130
Actual amount ratio	-0.173***	-0.093***	0.851***	1	-0.0390	-0.050*	0.067**	0.0270
Pledge_dum	0.090***	0.186***	-0.0390	-0.0390	1	0.771***	-0.139***	-0.082***
Pledge ratio	0.117***	0.195***	-0.0350	-0.050*	0.771***	1	-0.116***	-0.00900
SOE	0.076***	0.278***	0.0110	0.067**	-0.139***	-0.116***	1	0.209***
Board	0.0220	0.171***	0.0130	0.0270	-0.082***	-0.00900	0.209***	1
Top1	-0.056**	0	0.00700	0.0390	-0.052*	-0.111***	0.076***	-0.080***
Independent	-0.0300	0.0120	-0.0170	-0.0120	0.0370	-0.0170	0.0150	-0.561***
Dual	-0.079***	-0.216***	-0.00100	-0.0240	-0.0120	-0.054*	-0.220***	-0.192***
Separation	0.0180	0.0290	-0.0180	-0.0150	0.0230	0.0420	-0.0260	0.102***
Asset	-0.091***	0.561***	0.0260	0.050*	0.111***	0.059**	0.294***	0.197***
ROE	-0.104***	0.00500	0.079***	0.101***	-0.0380	-0.110***	0.0100	0.0100
LEV	-0.0230	0.331***	-0.00400	0.0230	0.209***	0.170***	0.147***	0.050*
FCF	0.070**	0.239***	-0.050*	0.0140	0.125***	0.111***	0.090***	0.00900
PB	-0.308***	-0.322***	0.099***	0.071**	-0.00800	-0.054*	-0.154***	-0.062**
Growth	-0.136***	-0.119***	0.053*	0.052*	-0.052*	-0.061**	-0.055*	-0.0320
Dividend	-0.105***	-0.176***	0.0280	0.0140	-0.130***	-0.161***	-0.0160	-0.0220

A3 (continued)

VARIABLES	Control variable										
	Top1	Independent	Dual	Separation	Asset	ROE	LEV	FCF	PB	Growth	Dividend
Intended ratio	-0.056**	-0.0300	-0.079***	0.018	-0.091***	-0.104***	-0.023	0.070**	-0.308***	-0.136***	-0.105***
lnPlanbuyback	0	0.0120	-0.216***	0.029	0.561***	0.005	0.331***	0.239***	-0.322***	-0.119***	-0.176***
Completion ratio	0.007	-0.0170	-0.00100	-0.018	0.026	0.079***	-0.004	-0.050*	0.099***	0.053*	0.028
Actual amount ratio	0.0390	-0.0120	-0.0240	-0.015	0.050*	0.101***	0.023	0.014	0.071**	0.052*	0.014
Pledge dum	-0.052*	0.0370	-0.0120	0.023	0.111***	-0.038	0.209***	0.125***	-0.008	-0.052*	-0.130***
Pledge ratio	-0.111***	-0.0170	-0.054*	0.042	0.059**	-0.110***	0.170***	0.111***	-0.054*	-0.061**	-0.161***
SOE	0.076***	0.0150	-0.220***	-0.026	0.294***	0.01	0.147***	0.090***	-0.154***	-0.055*	-0.016
Board	-0.080***	-0.561***	-0.192***	0.102***	0.197***	0.01	0.050*	0.009	-0.062**	-0.032	-0.022
Top1	1	0.089***	0.0320	0.168***	0.044	0.086***	0.006	0.078***	0.002	-0.069**	0.082***
Indep	0.089***	1	0.103***	-0.130***	0.045	0.016	0.069**	0.044	0.035	-0.002	0.023
Dual	0.0320	0.103***	1	-0.093***	-0.156***	-0.014	-0.081***	-0.120***	0.089***	0.032	0.104***
Separation	0.168***	-0.130***	-0.093***	1	0.056**	-0.003	0.012	-0.014	-0.029	-0.048*	0.015
Asset	0.0440	0.0450	-0.156***	0.056**	1	0.199***	0.545***	0.127***	-0.094***	0.097***	0.142***
ROE	0.086***	0.0160	-0.0140	-0.00300	0.199***	1	-0.013	0.118***	0.304***	0.394***	0.405***
LEV	0.00600	0.069**	-0.081***	0.0120	0.545***	-0.0130	1	0.217***	-0.037	0.137***	-0.128***
FCF	0.078***	0.0440	-0.120***	-0.0140	0.127***	0.118***	0.217***	1	-0.078***	-0.060**	-0.085***
PB	0.00200	0.0350	0.089***	-0.0290	-0.094***	0.304***	-0.0370	-0.078***	1	0.312***	0.199***
Growth	-0.069**	-0.00200	0.0320	-0.048*	0.097***	0.394***	0.137***	-0.060**	0.312***	1	0.194***
Dividend	0.082***	0.0230	0.104***	0.0150	0.142***	0.405***	-0.128***	-0.085***	0.199***	0.194***	1

A4: Balance test of covariates before and after PSM

Variable	Unmatched	Mean		%bias	% reduct	t-test	
	Matched	Treated	Control		bias	t	P > t
SOE	U	0.050	0.137	-30.2	95.2	-4.94	0.000
	M	0.050	0.046	1.4		0.30	0.763
Board	U	2.192	2.220	-16.9	83.1	-2.90	0.004
	M	2.192	2.197	-2.8		-0.43	0.667
Top1	U	28.701	30.101	-10.9	45.3	-1.84	0.067
	M	28.710	27.944	6		0.97	0.334
Independent	U	0.384	0.380	7.6	72.9	1.29	0.197
	M	0.384	0.385	-2.1		-0.31	0.754
Dual	U	0.388	0.4	-2.6	-100.4	-0.44	0.661
	M	0.388	0.363	5.1		0.80	0.424
Separation	U	4.656	4.335	4.6	-142.2	0.80	0.423
	M	4.666	3.888	11.2		1.76	0.078
Asset	U	22.777	22.488	23.3	70.4	3.94	0.000
	M	22.773	22.688	6.9		1.02	0.307
ROE	U	0.085	0.093	-7.8	69.3	-1.35	0.178
	M	0.085	0.088	-2.4		-0.36	0.720
LEV	U	0.413	0.334	44.3	93.4	7.52	0.000
	M	0.412	0.407	2.9		0.45	0.654
FCF	U	-0.011	-0.285	27.9	86.1	4.43	0.000
	M	-0.013	-0.051	3.9		0.97	0.335
PB	U	3.445	3.489	-1.6	-433.9	-0.28	0.778
	M	3.451	3.689	-8.8		-1.23	0.217
Growth	U	0.174	0.213	-10.9	69.8	-1.82	0.069
	M	0.174	0.162	3.3		0.55	0.584
Dividend	U	0.238	0.360	-27.6	85.7	-4.61	0.000
	M	0.238	0.221	3.9		0.80	0.426
Year	U	2021.9	2022.1	-17.5	84.7	-3.04	0.002
	M	2021.9	2021.8	2.7		0.38	0.705
Industry	U	30.994	32.221	-9.4	62.6	-1.61	0.107
	M	30.946	30.486	3.5		0.53	0.596