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Insider Trading and Fraudulent Share Repurchase

Du Wang*, Xiang Li**, Hui Tang*** and Yicheng Sun****

Abstract

Share repurchase conveys information to investors and influences stock price in capital market. Normally when a company announces share buyback, the company's stock price will rise immediately. Thus, some insiders may take advantage of this pattern and create a fake repurchase event. When the stock price rises due to the announcement, the insiders can sell their shares at a higher price, which is insider trading of fraudulent share repurchase. We study short-term reactions around the repurchase event, using a sample of 2,272 repurchase firms in the Chinese stock market from 2013 to 2019. The main finding is that insider trading around the repurchase event is prevalent and insider trading of fraudulent repurchase is most serious. We also find that companies with more serious agency problem and poorer corporate governance are more likely to engage in fraudulent repurchase, and that companies with lower EPS and ROA, larger firm size and higher leverage are more prone to have fraudulent repurchase event. This paper can provide practical guidance in differentiating the normal repurchase from the fraudulent repurchase.

Keywords: Fraudulent Share Repurchase, Insider Trading, Signal Theory, Agency Problem, Corporate Governance

JEL Classification: G14, G30

I. Introduction

Sailun Group Co., Ltd., a listed company in the Chinese stock market, announced stock repurchase as of the February of 2018, but terminated the plan early without buying any share back. Meanwhile, the firm's stock price experienced a surge due to the buyback announcement and afterwards major share-

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holders sold their holdings in a large scale. The year of 2018 alone saw that at least 78 listed companies have terminated early the buyback plan without making any real purchase. This phenomenon not only drew attention from the public but also aroused regulator's concerns. The media called this kind of corporate behavior the "fraudulent share repurchase", implying that insiders manipulate stock prices to sell shares at a higher level when the stock price rises responding to a fake repurchase signal. On October 26th 2018, the Standing Committee of the National People's Congress (NPC) passed the new provisions of the *Company Law*, which requires the firms to mandatorily disclose information on share buybacks to strengthen the regulation on potential misconduct in share repurchase. On account of the prevalence of fraudulent share repurchase and its significant impact on the financial market, this paper examines the causes and consequences of this type of share repurchase in China.

There has been heated discussion over share repurchases in the literature, just as Stefan Selig, Vice-Chairman of Bank of America Securities, puts it: "repurchasing stock is one of the most frequently discussed corporate finance topics in boardrooms today" (Henry, 2004). Although there are a variety of reasons for companies to repurchase stocks, the most frequently cited explanation in the academic literature is the signal theory (Hausch and Seward, 1993; Persons, 1997; D'Mello and Shroff, 2000). According to the signal hypothesis, firms engaging in repurchase tender offers (RTOs) and open market repurchases (OMRs) can express positive signals to the investors when the shares are underpriced (Chen et al., 2018; Miller and Rock, 1985; Brav et al., 2005) and earn positive abnormal returns in the short term (Dann, 1981; Comment and Jarrell, 1991; Peyer and Vermaelen, 2008; Bhattacharya and Jacobsen, 2013).

Apart from the signaling effects, share repurchases also provide managers with an additional opportunity to benefit from insider trading. Qing (2016) finds evidence for insider trading prior to share repurchase announcement. More specifically, the insiders increase shareholdings before the announcement of share repurchase and sell shares at a higher price at the time of the announcement (Fried, 2005; Raad and Wu, 2005; Choi, 1997), indicative of managerial entrenchment. The insiders may even continue to sell the shares after the announcement as long as investors have not responded adequately to OMR's announcement. Accordingly, Fired (2001) illustrates the managerial opportunism hypothesis that suggests OMR announcements can also be incentivized to create overpricing in stock price. Therefore, managers can sell their shares at a higher price. Pettit et al. (1996) show similar results in cases of RTO. Our findings on fraudulent repurchases are consistent with the managerial opportunism hypothesis that managers sell large number of shares after fraudulent repurchase announcements, both in OMR and RTO, and we further show a significantly negative correlation between insider net sales and company operations and stock performance in the 3 years following the announcement, which implies that

managers take advantage of their private information to gain profits from insider trading and the insider trading after fraudulent share repurchases undermines firm performance in the long term.

In China, although share repurchase started late, with the increased maturity of Chinese capital market and the improvement of legal system and enforcement on share repurchase, it is common for listed firms nowadays to use share repurchase to stabilize share price, optimize corporate capital structure and prevent hostile takeover. According to our speculation, the real intention of some Chinese listed firms' share repurchase is to take advantage of overpricing following share repurchase to obtain positive abnormal returns. Specifically, they make a fraudulent share repurchase gimmick to bid up the stock prices so that the insiders can sell their stocks at a higher price. A prominent feature of the fraudulent repurchase is that the firms terminate the plan in advance, resulting in no share or only few shares being repurchased. In other words, insiders make up fake signals about repurchase to gain abnormal returns. In this way, the insiders achieve the purpose of gaining profits in cashing out by fraudulent repurchase. The Chinese media named it "fraudulent share repurchase", and the regulatory authorities introduced corresponding restrictive measures. Although there has been reinforcement of regulatory power over fraudulent repurchases, such as the introduction of new provisions of Company Law, the effectiveness of regulation is still not clear. What is more prevalent in existing literature, based on research samples in developed markets, the insider trading is more significant in quarters when firms are repurchasing non-trivial amounts of stocks and the firms would trade in different direction from the insiders to support share prices or avoid dilution (*Bonaime and Ryngaert, 2013*). This conflict in evidences from developed markets and our findings indicates drawbacks in investor protection of Chinese stock markets.

The main contribution of this paper is to examine the causes and consequences of fraudulent share repurchases in the Chinese stock market, and based on that, we shed lights on the institutional differences between Chinese market and the developed markets. Prior literature has provided direct evidence about the relationship between share repurchase and insider trading. Particularly, *Babenko et al. (2012)* find that announcement returns are positively related to insider purchases prior to repurchasing announcements. *Lee et al. (1992)*, *Pettit et al. (1996)*, and *Louis et al. (2010)* study insider trading around repurchase tender offers. *Louis et al. (2010)* document abnormally high net insider selling after RTO announcements. *Lee et al. (1992)* show that managers increase their purchasing and decrease their selling of the company stocks prior to RTO announcement. As for OMR, *Raad and Wu (1995)* find that firms with net insider purchases before repurchase announcements experience greater 2-day abnormal returns than firms with net insider sales. *Fried (2005)* argues that managers announce open market repurchase programs to artificially inflate stock prices so

that they can sell their shares at a higher price. According to our knowledge, no existing literature addresses the fraudulent share repurchases. Therefore, our paper tries to fill in the literature gap.

Given the increasing worries concerning fraudulent repurchases, the natural questions to ask are: Apart from the general observations by the media, do the fraudulent repurchases really exist? What kind of companies are more likely to engage in fraudulent repurchase?

To answer the research questions, we first obtain samples from CSMAR database during the period from 2013 to 2019 and the observations reach 2,272. Then, we use event study method to measure the impact of repurchase on the stock price of the listed companies by taking the cumulative abnormal returns (CARs) within the event window of share repurchase announcements, as is done by prior researchers (Agrawal and Cooper, 2015; Aktas and Van Oppens, 2008; Betzer and Theissen, 2009; Easley and O'Hara, 2004; Seyhun, 1986; Bou-bacar and Morris, 2011). Furthermore, we set the fraudulent repurchases as treated group to compare with the normal repurchases. We predict that since the insider trading of the fraudulent repurchase is more serious than the normal repurchase, the CARs of the fraudulent repurchase will be significantly higher than the normal repurchase.

Secondly, we use earnings management to show the differences between normal repurchases and fraudulent ones. Earnings management often goes hand in hand with insider trading (Issaevitch, 2008; Sloan, 1996; Darrough and Rangan, 2005; Aboody et al., 2005; Beneish and Vargus, 2002; Mughal et al., 2021). Darrough and Rangan (2005) indicate that insiders manipulate the earnings at the time of IPO. Sawicki and Shrestha (2008) find strong evidence of insiders managing discretionary accruals downward when buying and managing discretionary accruals upward when selling. As Piotroski and Roulstone (2005) point out, insiders purchasing shares in the current year have an incentive to depress current earnings in order to create improved earnings for future fiscal years, empowering future stock performance in their holding periods. Aboody et al. (2005) also suggest that insider trading is more profitable in companies with lower earnings quality. Therefore, we show differences in earnings management between normal share repurchases and fraudulent ones and we predict the earnings management is more severe in fraudulent repurchases.

Thirdly, we further test the exact timing of cashing out in fraudulent repurchases. Prior literature documents that insiders would sell large number of shares in a strategic manner (Ke et al., 2003; Korczak et al., 2010). For instance, Ke et al. (2003) find that insiders will sell large number of shares three to nine quarters before earnings growth stalled. Korczak et al. (2010) document that insiders trade strategically ahead of upcoming earnings announcement.

Fourthly, we show cross-sectional variations with regard to different levels of corporate governance. Since the key feature of fraudulent repurchase is to create a repurchase gimmick that drives up prices so insiders can sell their shares and gain positive abnormal returns. Therefore, in firms with serious agency problems and poor corporate governance quality, insiders are more likely to carry out such activities. We predict that firms with more serious agency problems and poorer corporate governance are more likely to have fraudulent repurchase events.

At last, we also compare the financial indicators of fraudulent repurchase firms to those of normal repurchase firms, to show the financial indicators of fraudulent repurchases. The empirical findings shall provide guidance to identify the fraudulent repurchases for future investors and for regulatory authorities.

The major findings can be summarized as follows.

First, we find that both fraudulent repurchase and normal repurchase firms have a significantly positive effect on companies' stock returns, which can support the conjecture that the insider trading is widespread in the stock market of China. Then, we find that the insider trading of fraudulent repurchase is more serious than normal repurchase by comparing their abnormal returns (ARs) and cumulative abnormal returns (CARs). Moreover, we use earnings management method to explore the severity of insider trading between fraudulent and normal repurchases. *Sawicki and Shrestha (2008)* document that there is a strong evidence between insider trading and discretion accruals. We usually use accounting accruals as index to measure the earnings management (*Beneish, 2001*). We can find discretionary accruals (DA) among the fraudulent repurchases firms have lower level than the normal ones. Thus, this finding further confirms our expectation that insider trading of fraudulent buybacks is more serious than normal ones. Meanwhile, we find that insider trading in fraudulent buybacks is more serious than in normal ones, by comparing cash out on the shares of executives at special times.

In addition, we find that firms with lower CEO age and more equity incentive are more likely to have fraudulent repurchase events. Lower CEO age and more equity incentive means more serious agency problems (*Cheng and Farber, 2008; Cheng and Warfield, 2005*). In other words, firms of fraudulent repurchase may easily take place because of serious agency problems. Moreover, we can also find that firms with busier board and lower analyst coverage are more likely to create fraudulent repurchase events. In a word, the listed firms with serious agency problem and poor corporate governance are more likely to have fraudulent repurchases. For the investors, this can be used as a criteria of investment and avoid insider risk. Moreover, we find that the firms of lower EPS and ROA are more likely to engage in fraudulent buyback when they repurchase stocks. Likely, the firms of greater firm size and higher lever are more prone to fraudulent

buyback. Although researches about repurchase are numerous in China, there is limited study on fraudulent repurchase, especially studying the relationship between fraudulent repurchase and insider through empirical tests.

Our study makes several contributions to the current literature as follows.

First, this paper focuses on fraudulent repurchase events, which makes up the blank of domestic empirical researches on fraudulent repurchase in China. We distinguish between fraudulent repurchase and normal repurchase, and for the first time in the literature, we find meaningful results consistent with our expectation. On the one hand, our study combines the price and the volume to research the short-term market reaction to share repurchase, measuring the value of repurchase announcement information. We find that share repurchase has positive effects in the short term, which explaining the signal transmission theory in China. In addition, this paper combines the insider trading and the share repurchase to study degree of insider trading, measuring the severity of insider trading about the different types of repurchase of listed companies in the stock of China. We find that the insider trading is common in share repurchase in Chinese capital market.

Second, comparing to prior literature, we distinctively find that firms with certain characteristics are more likely to engage in this kind of insider trading. Serious agency problem and poor corporate governance makes insider trading serious during the share repurchase. Likewise, firms with poor performance, lower ROA and EPS, can easily engage in fraudulent repurchase events. These traits can provide a benchmark for future investors to distinguish true and false repurchase, which helping investors avoid losses. In addition, these findings also can help regulators know the existence of fraudulent repurchase and work out restrictions to prohibit it. Thus, this paper can provide some evidence for those scholars who want to investigate the relevant topic in the future.

The remainder of this paper is organized as follows. In section 2, we present literature review and hypothesis development. In section 3, we outline our data and sample. In section 4, we present our empirical results. In section 5, we conclude our results.

II. Literature Review and Hypothesis Development

According to *Bonaime* and *Ryngaert* (2013), the insider trading can be found around the repurchase announcement by event study methodology. Thus, we adopt this notion that the influence of buyback announcement is reflected in the change of corresponding listed firms' stock price during the buyback events. Much literature uses the daily share prices around the important announcement dates to measure the stock market performance of prior firms (*Gaur et al.*, 2013;

Gubbi et al., 2010; Doukas and Travlos, 1998; Halebian and Finkelstein, 1999; Moeller and Schlingemann, 2005). Moreover, due to the various forms of insider trading, we should use different ways to confirm our expectation. For instance, Lee et al. (1992) find that managers buy their stocks prior to repurchase announcement and sell their holdings after the announcement. Likewise, Korczak et al. (2010) and I et al. (2004) find that insiders trade strategically ahead of upcoming important event announcements. Furthermore, there is a strong relationship between insider trading and earnings management by many researches (Beneish, 1999; Beneish et al., 2005; Darrrough and Rangan, 2005; Udpa, 1996; Aboody et al., 2005). Core et al. (2006) find that managers buy larger number of shares before the buyback announcement by reducing discretionary accruals through earning management. As we argue earlier, there is insider trading among Chinese repurchase events. Particularly, the essence of fraudulent buyback event is to manipulate stock price and gain much illegal profit. Hence, we propose our first hypothesis,

H1: The insider trading of fraudulent repurchase event is more serious than the normal repurchase event.

Agency problems are known to result from information asymmetries. Information asymmetries imply that the firm's manager/agent always has more information than shareholders and they can use this advantage to gain high returns (Boshkoska, 2015). Some studies find that the wealth of equity managers is sensitive to a company's stock price (Cheng and Farber, 2008; Cheng and Warfield, 2004). Although this sensitivity can motivate managers to make decisions to increase the value of the stock, it can also lead to short-termism of managers, resulting in agency problem. In our paper, the managers of fraudulent repurchase firms may manipulate share price through buyback and gain much profit. Thus, we propose our second hypothesis,

H2: Firms with serious agency problems are more likely to engage in fraudulent repurchase events.

Previous research has shown that strong corporate governance can deter malpractice. For instance, earnings management can be effectively constrained by strong board monitoring (Beasley, 1996; Peasnell et al., 2005; Marra et al., 2011). We can infer that firms with poor corporate governance are more likely to allow insiders to profit from insider trading. Thus, we propose our third hypothesis,

H3: Firms with poor governance quality are more likely to engage in fraudulent repurchase events.

III. Data and Methodology

3.1 Sample

Our primary sample consists of data from 2013 to 2019 on all share firms listed on the Shanghai Stock Exchange and the Shenzhen Stock Exchange. We obtain stock return data and turnover rate data in China Stock Market and Accounting Research (CSMAR) database. In addition, data of firm financial characters can be available in Wind database. We delete the samples with missing transaction data in the event window period. Moreover, we keep listed companies that have only undergone a repurchase in one year. Because a listed firm's multiple repurchases a year may have overlapping effects on stock prices. And we delete the firms that have significant events in the 3 months prior to initial announcement of the buyback, such as MandAs company renaming, SEOs, high delivery. Our event estimation period in the event study method is $(-120, -30)$ and this way can remove the impact of other events on a firm's share price. We define the announcement of buyback as day 0 and reserve buyback announcement during the event window $(-20, 20)$. After the screening process, we end up with 2272 samples to study the impact on the repurchase events.

In this paper, we need to study insider trading in fraudulent repurchase. Thus, we have to define the fraudulent repurchase. As discuss previously, the fraudulent repurchase event is just a gimmick to drive up the stock price, so we will use the result of the share repurchase as the classification criterion. To be specific, fraudulent repurchase define as when the result of share repurchase is a termination in advance, or the actual share repurchase less than 20% of the anticipated share repurchase. In the following empirical study, the author makes a comparative analysis of fraudulent repurchase and normal share repurchase. So, we also need to define normal repurchase. Compared with fraudulent repurchase, normal repurchase means that listed companies really hope to conduct capital operations through share repurchase to achieve the purpose of stabilizing the market, enhancing share price, boosting investor confidence or preventing malicious merger and acquisition events. In this paper, normal repurchase is defined as the completion of the share repurchase and the actual number of shares repurchased should be greater than 80% of the pre-purchased shares.

In addition, we can know that share repurchase is divided into open market repurchase (OMR) and repurchase tender offer (RTO). In OMR, managers only announce their intention to buy back shares in a long future period and they need not disclose in advance about the specific time, number of shares, and exact price each time they actually buy back shares from the market. And in RTO, managers need to announce these specific terms in repurchase tender offers and have to complete the plan before the deadline. Considering the difference, we

choose the firms that prematurely terminates the buyback without buy any share or have repurchased only a small number of shares in the open market repurchase. From the repurchase tender offer, we select companies that terminate the repurchase early and buy back no share.

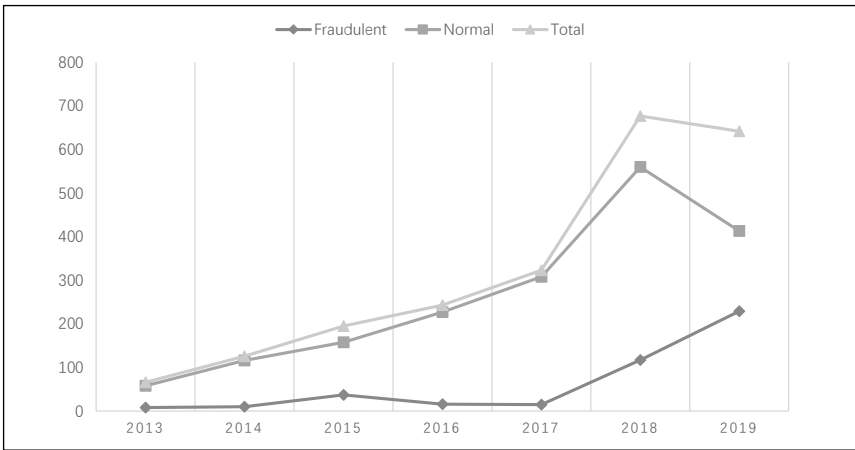
Table 1 and Figure 1 show the descriptive statistics for the repurchase. We can see from table and figure that repurchase event has increased each year from 2013 to 2019, especially in the years 2018 and 2019.

Table 1
Descriptive Statistics for the Number of Repurchase Companies

<i>Panel A: Number of Repurchase events by Calendar Year</i>						
	Fraudulent	%	Normal	%	Obs.	%
2013	8	0.35 %	58	2.55 %	66	2.9 %
2014	10	0.44 %	116	5.11 %	126	5.55 %
2015	37	1.62 %	158	6.95 %	195	8.57 %
2016	16	0.70 %	227	9.99 %	243	10.69 %
2017	15	0.66 %	308	13.56 %	323	14.22 %
2018	117	5.15 %	560	24.65 %	677	29.71 %
2019	229	10.09 %	413	18.18 %	642	28.27 %
Obs.	432	19.01 %	1,840	80.09 %	2,272	100 %

<i>Panel B: Number of Repurchase Events by Category</i>				
	Fraudulent	Normal	Obs.	%
OMR	135	523	658	28.96 %
RTO	297	1,317	1,614	71.04 %
Obs.	432	1,840	2,272	
%	19.01 %	80.99 %		

Note(s): This table shows the descriptive statistics for the number of repurchase. In the table, we divide the research sample into two forms of repurchase, namely fraudulent repurchase (Fraudulent) and normal repurchase (Normal), sorted by the repurchase year. In the Panel A, we describe the sample by Calendar Year. In the Panel B, we describe the sample by Category. OMR is open market repurchase and RTO is repurchase tender offer.



Note(s): This figure shows the descriptive statistics for the number of repurchase.

Figure 1: Descriptive Statistics of Repurchase Companies

3.2 Methodology

Event Study

Much research concludes that insiders can obtain positive abnormal returns (ARs) through trading shares of their own companies (Aktas et al., 2008; Jaffe, 1974; Kolasinski and Li, 2010; Seyhun, 1986). Seyhun (1986) finds that insiders obtain an average 3% abnormal returns on their trades. The main purpose of our paper is to study the insider trading from a different perspective, so we calculate the ARs (abnormal returns), CARs (cumulative abnormal returns) and CAAT (cumulative average abnormal return) during the event window (Ball and Brown, 1968; Keown and Pinkerton, 1981; MacKinlay, 1997). We compare variables with different types of repurchase, including fraudulent buyback and normal buyback. We use event study to examine the stock price reaction to repurchase announcement. We compute the abnormal returns for stock i on day t as:

$$(1) \quad R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}$$

$$(2) \quad AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i * R_{mt}$$

$$(t = -31, -32, \dots -120)$$

where R_{mt} and R_{it} are the stock returns for market and company i , respectively. α_i and β_i are the estimated coefficients of the equation and their estimation are $\hat{\alpha}_i$ and $\hat{\beta}_i$. ε_{it} is the residual.

The cumulative abnormal return for company i over days (t_1, t_2) is measured as :

$$(3) \quad CAR_{it} = \sum_{t=t_1}^{t_2} AR_{it}$$

Table 2 shows CARs for the full samples of repurchase firms and its subsamples over four event windows covering trading days $(-1,+1)$, $(-1,+20)$, $(-20,+1)$ and $(-20,+20)$ around the announcement date (day 0).

Repurchase announcements have large impact on stock prices. In Panel A, for the full samples of repurchase firms, the value of CARs ranges from 1.253% over days $(-1,+1)$ to 2.344% over days $(-20,+20)$ and the CARs for all four event windows are significantly different from zero at 1% level or at 5% level. We can find that the CARs of all samples are positive and the results suggest existence of insider trading further. Moreover, we can see that the values of fraudulent buyback are all higher than normal buyback respectively. We compare the difference of CARs between fraudulent buyback and normal buyback. We can find that the CARs of fraudulent buyback are significantly higher than the normal buyback at 1% or 5% level covering four event windows.

In Panel B, we can get the CAAT of the full samples and subsamples over the same event windows. The results also show that the CAAT of fraudulent repurchase is higher than normal one over the four event windows. During the event window $(-1,20)$, we can see that the CAAT of fraudulent is significantly different from zero at 1% level, which value is 0.175%. And the value of fraudulent repurchase is significantly greater than normal one at 5% level. We can infer that there is abnormal transactions after the repurchase announcement among the fraudulent buyback events. Likewise, during the event window $(-20,1)$ and $(-20,20)$, the fraudulent buyback firms' CAAT is significantly higher than normal one.

Based on above situation, we suggest that there is information of buyback leaked before the announcement and the degree of leakage among fraudulent buyback firms is more serious than normal ones (Qing, 2016). At this point, we can preliminarily speculate that the insider trading of fraudulent buyback firms is more serious than normal ones.

Table 2

Event Study on the Short-Term Repurchase Announcement Effect

<i>Panel A: CAR around the Repurchase announcement</i>					
	<i>All firms</i>	<i>Fraudulent</i>	<i>Normal</i>	<i>Mean diff</i>	<i>Two sample t-test</i>
<i>Event window</i>					
(-1,+1)	1.253*** (6.85)	2.209*** (2.74)	0.187*** (6.33)	0.912	2.09**
(-1,+20)	1.258*** (6.82)	2.221*** (2.72)	1.191*** (6.30)	1.237	5.67***
(-20,+1)	2.351*** (4.66)	5.318** (2.63)	2.140*** (4.11)	1.220	4.18***
(-20,+20)	2.344*** (4.60)	5.304** (4.02)	2.133*** (4.06)	2.818	8.581***
<i>Panel B: CAAT around the Repurchase announcement</i>					
	<i>All firms</i>	<i>Fraudulent</i>	<i>Normal</i>	<i>Mean diff</i>	<i>Two sample t-test</i>
<i>Event window</i>					
(-1,+1)	1.169** (2.12)	1.133* (1.81)	1.322 (1.16)	0.012	0.146
(-1,+20)	0.173*** (3.00)	0.175*** (2.70)	0.158 (1.30)	0.056	1.977**
(-20,+1)	0.014 (0.33)	0.036 (0.44)	0.009 (0.18)	0.045	1.70*
(-20,+20)	0.035 (0.80)	0.035 (0.43)	0.034 (0.69)	0.039	2.046**

Note(s): This table shows the short-term repurchase announcement effect, based on event study. In the Panel A, we report CARs over the windows (-1,+1), (-1,+20), (-20,+1), (20,+20) for the full sample, t-test results and the difference between two repurchase events by test the mean CAR through two sample t-test. Similarly, we report the CAAT in the same way from the Panel A. The definitions of the variables are provided in the appendix. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Earning Management

A vast body of literature focuses on the relationship between insider trading and earnings management (Beneish, 1999; Beneish et al., 2005; Sloan, 1996; Core et al., 2006; Darrrough and Rangan, 2005; Mughal et al., 2021). Abnoody et al. (2005) find insider trading usually takes place in firms with poorer quality earn-

ings management. Accounting accruals are usually used to measure earnings management (*Beneish, 2001*). Total accruals are considered to consist of two components: non-discretionary and discretionary. Discretionary is used to infer the quality of earnings management.

$$(4) \quad \frac{TA_{i,t}}{A_{i,t-1}} = NDA_{i,t} + DA_{i,t}$$

Where:

$NDA_{i,t}$: Firm i non-discretionary accruals during year t .

$DA_{i,t}$: Firm i discretionary accruals during year t .

$TA_{i,t}$: Firm i total accruals during year t . TA is calculated as change in current assets plus change in debt included in current liabilities, less change in cash, change in current liabilities, and depreciation and amortization expense.

The expected (non-discretionary) accruals are estimated based on the process by which accruals are generated. *Jones (1991)* proposes to control the change of enterprise economic environment. The modified model based on *Jones (1991)* and *Dechow et al. (1995)* has been widely used in the study of earnings management. In our paper, we use both the Jones and modifies-Jones models to calculate non-discretionary accruals.

$$(5) \quad NDA_t = \alpha_0 + \alpha_1 \left(\frac{1}{A_{t-1}} \right) + \alpha_2 \left(\frac{\Delta REV_t - \Delta REC_t}{A_{t-1}} \right) + \alpha_3 \left(\frac{PPE_t}{A_{t-1}} \right)$$

Where:

A_{t-1} : Total assets at time $t-1$.

ΔREV_t : Revenues in year t less revenues in year $t-1$.

PPE_t : Gross property, plant and equipment in year t .

ΔREC_t : Net receivables in year t less net receivables in year $t-1$.

$\alpha_1, \alpha_2, \alpha_3$: Firm-specific parameters, estimated with the following model using OLS regression and cross-sectional data for all firms in a given SIC industry and year:

$$(6) \quad \frac{TA_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \alpha_2 \left(\frac{\Delta REV_t}{A_{i,t-1}} \right) + \alpha_3 \left(\frac{PPE_t}{A_{i,t-1}} \right) + \varepsilon_t$$

Cash out of Insiders

A growing body of literature finds that insiders purchase their firms' shares prior to good events of their firms and decrease their shares prior to bad events (Lee et al., 1992; Karpoff and Lee, 1991). Particularly, Bonaimé and Ryngaert (2013) document that managers trade opportunistically prior to the buyback announcement by increasing their net purchase prior to the announcement. Based on above situation, we explore whether managers of fraudulent repurchase increase purchases shares prior to repurchase announcements and sell their shares after the announcement. Due to the increasingly perfect repurchase law, the fact that managers trade opportunistically is easy to attract the attention of the regulatory authorities. Therefore, insiders may not buy shares on a large scale before repurchase events, but avoid the attention of regulatory authorities by using equity incentives on the eve of repurchase. In our paper, we follow Lakonishok and Lee (2001) and define insiders as managers and directors (CEOs, CFOs, board chairman and executives).

Hence, to test H1, we study investigate the insiders of fraudulent and normal repurchase events purchase shares prior to the buyback announcement and sell shares post announcement by *two-sample T-test*. Moreover, we also use the equity incentive before the buyback announcement as an indicator to determine whether the degree of insider trading in fraudulent repurchase is more serious than that in normal repurchase.

3.3 Agency Problems

It is well known that agency problems are resulting from information asymmetry. In general, managers or agents always have more information than shareholders (Nwidobie, 2013). Thus, managers of companies with more serious agency problems are more likely to trade their shares opportunistic when their companies are ready to merger. To test Hypothesis 2, we use two proxies to measure the severity of agency problems. The first proxy is insider equity-based incentives. The wealth of managers who accept equity is sensitive to a firm's share price (Cheng and Farber, 2008; Cheng and Warfield, 2005). Although this sensitivity can motivate managers to make value-adding decisions, it can also lead to short-termism of managers, resulting in agency problems. The second proxy is CEOs age. Previous literature highlights the relationship between managers and agency problems. For instance, Huang et al. (2012) document that older managers are relevant to higher-quality financial reporting. But Li et al. (2017) find that younger managers take on bolder investments.

3.4 Corporate Governance

Prior literature has shown that strong corporate governance can deter malpractice. In our paper, we use two proxies to measure corporate governance. The first proxy is analyst coverage. *He and Tian (2013)* find that firms with low analyst coverage are less subject to external monitoring. And the second proxy is board busyness. Some literature provides evidence that a busy board of directors, with directors concurrently serving as multiple directors, may not be able to supervise and manage effectively, indicating poor governance (*Core et al., 1999*).

IV. Empirical Results

In this part, to verify our hypotheses, we use event study method to obtain sample and study the announcement effect of repurchase further. Besides, we also use earnings management method and cashing out of insiders to verify H1. In addition, we investigate which firms are more likely to lead to fraudulent repurchase.

4.1 Insider Trading

At the beginning of our empirical investigation, we employ event study method to verify existence of insider trading among fraudulent repurchase events. First, we calculate abnormal returns (ARs) and cumulative abnormal returns (CARs). In panel A of Table 2, we find that the main CARs are positive during the window of $(-1,+1)$, $(-1,+20)$, $(-20,+1)$, $(-20,+20)$. These results can confirm the signal theory about repurchase events (*Persons, 1997; D'Mello and Shroff, 2000*). The CARs of fraudulent repurchase firms are significantly higher than normal ones. We speculate that insiders trade their shares strategically in fraudulent repurchase firms.

From the event period -12 days in Table 3, the CARs of fraudulent repurchase of listed companies before the release of information on repurchase is always higher than the normal repurchase and the increase is also higher than the normal-style repurchase. Table 3 shows that the CARs of fraudulent repurchase are significantly higher than normal one at the -5 day and also from the -1 days by *two-sample T-test*. This indicates that fraudulent repurchase of listed companies may have more purchasing power before the event, which means that insider trading in fraudulent repurchase is more serious than normal repurchase listed companies (H1).

Table 3
Repurchase Announcement Abnormal Returns for Repurchase Firms over Days
 (−20,+20)

	<i>All style repurchases</i> (<i>N</i> = 2,272)		<i>Fraudulent repurchases</i> (<i>N</i> 242 = 242432)		<i>Normal repurchase</i> (<i>N</i> 242 = 1,840)		<i>Two sample t-test</i>	
	<i>CARs (%)</i>	<i>t</i>	<i>CARs (%)</i>	<i>t</i>	<i>CARs (%)</i>	<i>t</i>	<i>Mean diff</i>	<i>t</i>
−15	0.020	(0.10)	0.546	(0.73)	−0.017	(−0.08)	0.006	(0.67)
−14	0.085	(0.38)	0.269	(0.32)	0.072	(0.31)	0.002	(0.21)
−13	0.147	(0.60)	−0.021	(−0.02)	0.159	(0.63)	−0.001	(−0.18)
−12	0.201	(0.77)	0.294	(0.29)	0.195	(0.72)	0.001	(0.10)
−11	0.274	(0.97)	0.740	(0.63)	0.241	(0.83)	0.005	(0.44)
−10	0.294	(0.95)	0.978	(0.78)	0.246	(0.77)	0.007	(0.59)
−9	0.414	(1.24)	1.280	(0.94)	0.353	(1.02)	0.009	(0.68)
−8	0.557	(1.58)	1.280	(0.87)	0.505	(1.39)	0.007	(0.54)
−7	0.623	(1.67)	2.050	(1.38)	0.521	(1.35)	0.015	(1.02)
−6	0.527	(1.34)	2.500	(1.65)	0.387	(0.95)	0.021*	(1.34)
−5	0.602	(1.46)	2.410	(1.56)	0.473	(1.11)	0.019	(1.17)
−4	0.607	(1.41)	2.350	(1.51)	0.483	(1.08)	0.019	(1.08)
−3	0.795	(1.76)	2.540	(1.55)	0.671	(1.43)	0.019	(1.03)
−2	1.090*	(2.28)	3.080	(1.73)	0.943	(1.91)	0.021	(1.12)
−1	1.650***	(3.35)	4.050*	(2.08)	1.480**	(2.90)	0.025*	(1.30)
0	2.340***	(4.60)	5.300*	(2.58)	2.130***	(4.06)	0.032*	(1.55)
1	2.460***	(4.62)	5.650*	(2.51)	2.230***	(4.08)	0.034*	(1.60)
2	2.660***	(4.82)	6.150*	(2.45)	2.410***	(4.28)	0.037**	(1.69)
3	2.680***	(4.72)	6.920*	(2.52)	2.370***	(4.14)	0.045**	(2.00)
4	2.750***	(4.72)	7.520*	(2.60)	2.410***	(4.10)	0.051**	(2.18)
5	2.920***	(4.86)	7.350*	(2.42)	2.610***	(4.30)	0.047**	(1.97)
6	3.010***	(4.91)	7.870*	(2.46)	2.660***	(4.33)	0.052**	(2.11)
7	2.970***	(4.73)	7.620*	(2.34)	2.640***	(4.19)	0.050**	(1.97)
8	2.990***	(4.65)	7.950*	(2.34)	2.630***	(4.09)	0.053**	(2.06)
9	2.990***	(4.57)	8.480*	(2.38)	2.600***	(3.99)	0.059**	(2.24)
10	2.960***	(4.43)	8.470*	(2.36)	2.570***	(3.84)	0.059**	(2.20)
11	2.890***	(4.23)	7.850*	(2.16)	2.540***	(3.71)	0.053**	(1.93)
12	2.930***	(4.23)	7.350*	(2.06)	2.620***	(3.76)	0.047*	(1.70)
13	2.960***	(4.22)	7.260*	(2.02)	2.650***	(3.76)	0.046	(1.64)
14	3.030***	(4.26)	7.330*	(2.01)	2.720***	(3.81)	0.046	(1.61)
15	3.030***	(4.20)	7.290*	(1.98)	2.730***	(3.76)	0.045	(1.57)

Note(s): This table shows the cumulative abnormal returns (CARs, %) of repurchase firms from 15 trading days before to 15 days after the announcement date. For each firm, the cumulative abnormal returns (CARs) for trading day *t* is computed by subtracting the return on the CSMAR database from the return on a stock on day *t*. All returns include dividends. The definitions of the variables are provided in the appendix. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

The Panel B of table 2, during the event window $(-1,+20)$, also shows that the CAAT of fraudulent repurchase is significant and also significantly higher than the normal one, at 1% level and 5% level respectively, which implies unusual turnover after the buyback announcement in the fraudulent repurchase listed firms. It suggests that more people were involved in stock trading before the announcement of event and we can also conclude that insider trading in fraudulent repurchase listed firms is more serious than normal repurchase (H1).

Earnings Management

In this section, to further test H1, we use earnings management method to study the relationship between insider trading and earnings management during the repurchase events. *Sawicki and Shrestha* (2008) find strong evidence of insiders managing discretionary accruals downward when buying and managing discretionary accruals upward when selling. As *Piotroski and Roulstone* (2005) point out, insiders purchasing shares in the current year have an incentive to depress current earnings in order to create improved earnings, leading to strong stock performance in the future. According to equation (4), accounting accruals are usually used to measure earnings management (*Beneish*, 2001). Especially, discretionary accrual (DA) is commonly used to infer the level of earnings management.

Table 4 shows the firms in each style buyback and the average and the standard deviation of discretionary accruals (DA) estimated with the *Jones Model* and the *Modified Jones Model* for the buyback events. DA is calculated by from the annual data of the year prior to the repurchase announcement and equation 4. From the Table 4, we can see that the fraudulent buyback's mean DA of *Jones Model* and *Modified Jones Model* are both less than normal one. Although the difference of values are not both significant, we can still see that the DA of fraudulent buyback is lower than normal one in one year before the buyback announcement. We preliminarily speculate that insiders of fraudulent buyback firms have incentive to downward the discretionary accruals and depress current earnings before the repurchase events. Meanwhile, insiders buy the shares before the repurchase event and the results are consistent with Tables 2 and 3. According to signal theory, the firms' share price rise in the short term after the buyback announcement and insiders may sell their holdings later.

Thus, we believe that insiders in the fraudulent buyback firms may intentionally downward the profit by means of earnings management before the buyback announcement, and then give the public a false impression of poor management, leading to a decline in stock price. Then, they announce the repurchase events that boost the share prices through signaling theory and sell their holdings for profits later (*Piotroski and Roulstone*, 2005; *Sawicki and Shrestha*, 2008). The results can also confirm H1.

Table 4
Average Discretionary Accruals for Different Repurchases

<i>Panel A : Descriptive Statistics</i>					
<i>Repurchase styles</i>	<i>Jones Model</i>		<i>Modified Jones Model</i>		
	<i>Mean</i>	<i>Std.Dev.</i>	<i>Mean</i>	<i>Std.Dev.</i>	<i>N</i>
All repurchases	0.0252	0.0057	0.0120	0.0019	2272
Fraudulent	0.0156	0.0034	0.0059	0.0029	432
Normal	0.0271	0.0025	0.0132	0.0022	1840

<i>Panel B: Test of Fraudulent DA Minus Normal DA</i>			
<i>DA Model</i>	<i>Difference in Mean</i>	<i>T-Value</i>	<i>p-value</i>
Jones Model	-0.0115	-2.02**	0.044
Modified Jones Model	-0.0073	-1.39	0.163

Note(s): This table shows the descriptive statistics of discretionary accruals of different forms repurchase. Panel A shows the discretionary accruals between Jones Model and Modified Jones Model of different style repurchases. Panel B shows the difference of discretionary accruals between fraudulent repurchase and normal repurchase.

Based on the previous descriptive statistics of DA, we can preliminarily know that fraudulent buyback events have more serious insider trading. To further test H1, we investigate the relationship between the insider trading and earnings management by calculating the parameters of the following multiple regression model:

$$(7) \quad DA_{i,t-1} = \alpha_1 + \alpha_2 fail_{i,t} + \alpha_3 OCF_{i,t-1} + \alpha_4 LEV_{i,t-1} + \alpha_5 S_{zi,t-1} \\ + \alpha_6 Gr_{i,t-1} + \alpha_7 Lit_{i,t-1} + e_i$$

DA (discretionary accruals) uses to measure the earnings management and is calculated by from the annual data of the year prior to the repurchase announcement, fail is dummy variables that equal to 1 if repurchase is fraudulent buyback, and 0 normal repurchase. OCF is the operating cash flow (Dechow et al., 1998). Firm size, capital growth, leverage and litigation also affect the discretionary accruals (Cheng and Warfield, 2005). Equation (7) is estimated with OLS regression and the results reported in Table 5 to support H1.

From the Table 5, the significantly negative coefficient for fail indicates that discretionary accruals of fraudulent buyback firms is lower. Consistent with prior literature, Aboody et al. (2005) document that insiders can easily gain more profits in firms with lower earnings quality. In other words, firms with insider trading are managing earnings downwards with discretionary accruals and depressing the current firm performance to the public. Thus, the insiders can gain

abnormal returns through buying the shares by downward the earnings and selling the holdings after some important events, such as repurchase. The results can support H1 further. We can find that the negative relationship between accruals and operating cash flows are significant (*Dechow et al., 1998*). And the relationship between firm size and accruals are significantly negative, indicating that as firm size (measured by market value) increases, discretionary accruals decreases. Since our sample is insufficient, this may be one reason why other variables are not significant.

These results are consistent with prior literature, including *Sawicki and Shrestha (2008)* who find that managers downward the current earnings when buying shares, depressing the current earnings and creating future earnings improvements and rising stock prices to gain abnormal profits. Our findings are the insiders of fraudulent buybacks firms also downward the current earnings when buying shares and engage in fraudulent buybacks when selling. We can confirm H1 further.

Table 5
Regression of Discretionary Accruals on Fraudulent Repurchase

<i>Variables</i>	<i>DA</i>	
	<i>Jones model</i>	<i>Mjones model</i>
fail	-0.0083** (-2.03)	-0.0079** (-2.13)
OCF	-0.0013*** (-11.17)	-0.0079*** (-6.39)
LEV	-0.0403** (-2.28)	0.0008 (0.58)
Sz	0.0038 (1.49)	0.0009 (0.40)
Gr	0.0114 (1.51)	0.0008 (0.25)
Lit	-0.0001 (-1.44)	-0.0001 (-1.55)
Cons	-0.0369 (-0.69)	0.0256 (0.54)
YEAR	control	control
INDUSTRY	control	control
N	2272	2272
F	24.88	8.15
Adj R ²	0.0696	0.0202

Note(s): This table reports estimates of coefficients using OLS. The independent variables are fail (dummy variable, equal to 1 if repurchase is failure, and 0 normal), OCF (operating cash flow, calculate as: net income – total accruals), Sz (firm size, total market value of equity at the beginning of the year in logarithmic form), LEV (leverage calculated as: long term debt divided by total assets) and Lit (the number of lawsuits). The definitions of the variables are provided in the appendix. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Cash out of Insiders

Previous literature finds that shareholders can obtain significantly positive abnormal returns from share repurchases in short term (*Bhattacharya and Jacobsen, 2013*). Moreover, prior literature documents that insiders trade opportunistically prior to the buyback announcement by increasing their net purchase prior to buyback (*Lee et al., 1992*). Thus, in this section, we test H1 by whether managers purchase shares before the share repurchase announcement and sell shares the announcement. In addition, we also use the equity incentive before the buyback announcement as an indicator to test H1. Results are reported in Table 6 by two-sample *T*-test. Event window 1 is the time period on year prior to the repurchase announcement. Event window 2 is the time period between the initial repurchase announcement and the announcement of the termination or completion of repurchase. The Panel A shows variation of shares, calculated by the variation of shares divided by the total shares of firms. In our paper, executives refer to CEO, CFO, chairman, secretary of the Board of Directors and directors. Panel B is the firms' equity incentive to the executives and the change of equity incentive exercise, calculated by the equity incentive and equity incentive exercise of shares divided by the total shares of firms respectively.

From the panel A of Table 6, we can find that the behavior of executives in fraudulent buybacks firms that increase their holdings is significantly higher than normal ones during event window 1, at the 1% level and the *T*-value is 2.58. From the event window 2, we can see that the variation of managers of fraudulent buybacks firms is significantly less than normal ones at 1% level, which *t* value is -2.60. Consistent with Table 2, the CAAT of fraudulent buyback firms is higher than normal ones after during the repurchase announcement period. In a word, we can find that managers of fraudulent buyback firms are selling their shares during the period between initial repurchase announcement and the announcement of the termination or completion of repurchase. As we discuss previously, insiders manipulate stock prices and sell shares when the stock prices rise. Consistent with previous literature, *Ke et al. (2004)* find that insiders sell a large number of shares in three to nine quarters ahead of a break in a series of earning growth and *Korczak et al. (2010)* find that insiders trade strategically ahead of upcoming important event announcements. Thus, the results of Panel A show that executives of fraudulent buyback firms increase their shareholdings before the initial repurchase announcement, and then stock price rise with the announcement of buyback. Next, they sell shares after the announcement when the stock price at a higher level. Finally, they announce the repurchase plan terminated early or repurchase only few shares and then hastily ended the plan. Thus, we believe that fraudulent buyback is a gimmick to benefit insiders through insider trading. The findings can confirm H1.

Table 6
Cash out of Insiders

<i>Panel A: The variation of shares</i>					
<i>Event window</i>	<i>Fail</i>	<i>Successful</i>	<i>N</i>	<i>Mean diff</i>	<i>Two-sample t-test</i>
Event window 1	0.0004747 (3153)	0.0000427 (15414)	18,567	0.0004704	2.58***
Event window 2	-0.0010095 (670)	-0.0006426 (3455)	4,125	0.0003668	-2.60***
<i>Panel B: Equity incentive</i>					
<i>Event window</i>	<i>Fail</i>	<i>Successful</i>	<i>N</i>	<i>Mean diff</i>	<i>Two-sample t-test</i>
Event window 1	0.0006513 (4635)	0.0006214 (22271)	26,906	0.000299	2.17**
Event window 2	0.0005808 (1175)	0.0005249 (9394)	10,569	0.000221	2.53**

Note(s): This table shows the variation of share and equity incentives of different period between fraudulent repurchase and normal repurchase. Event window 1 represents one year before repurchase announcement. Event window 2 represents between the repurchase announcement and fail repurchase announcement. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Due to the increasingly perfect share repurchase law, the fact that managers trade opportunistically is easy to attract the attention of the regulatory authorities. Therefore, insiders may not buy shares on a large scale before repurchase event, but avoid the attention of regulatory authorities by using equity incentives on the eve of repurchase event. In the Panel B, we find that the equity incentive of managers of fraudulent repurchase firms is significantly greater than normal one during event window 1, at 5% level. Also, we find that the equity incentive exercise of managers of fraudulent is significantly greater than normal ones during event window 2, at 5% level. Based on above facts, we can conclude that the insider trading of fraudulent buyback is more serious (H1).

In the Panel A of Table 7, the data shows that descriptive statistics among the shares change of executives in the fraudulent repurchase firms during the event window 1 and event window 2. In the Panel A, the second column is the number of executives in fraudulent repurchase companies who buy shares in the year before the announcement. The third column is the number of executives who sell shares in event window 2. The fourth column is the number of executives who simultaneously buy shares in the event window 1 and sell shares in the event window 2. OMR is the number of executives of fraudulent repurchase firms in open market repurchase and TOR is the number of executives of fraud-

ulent repurchase firms in tender offer repurchase. Likewise, in the Panel B, the second column is the number of executives in fraudulent repurchase companies who have equity incentive in the year before the announcement. The third column is the number of executives who exercising equity incentive in event window 2.

From the table, we can find the fact that executives in fraudulent repurchase firms are cashing out at a high share price by creating a fraudulent repurchase event. In the Panel A, we can see that the result is small. We speculate that it may be due to the gradual improvement of the law on repurchase. In addition, we believe that the insider information about the fraudulent buyback events may be passed on not only by senior executives, but also among their friends and relatives. However, due to the lack of relevant data in the existing database, this is one of the shortcomings of this article.

In short, we find serious insider trading in fraudulent buyback events (H1).

Table 7

Descriptive Statistics of the Changes in Shareholding and Equity Incentives among Executives of Fraudulent Repurchase Companies around the Repurchase Announcement

<i>Panel A: The number of executives in share changes</i>			
	<i>Event window 1</i>	<i>Event window 2</i>	<i>match</i>
OMR	1,146	292	123
TOR	249	191	47
match			170
<i>Panel B: The number of executives in equity incentive</i>			
	<i>Event window 1</i>	<i>Event window 2</i>	<i>match</i>
OMR	1,640	436	460
TOR	2,995	739	527
match			987

Note(s): Panel A shows in the second column the number of executives in fraudulent repurchase companies who buy shares in the year before the announcement. The third column is the number of executives who sell shares in event window 2. The fourth column is the number of executives who simultaneously buy shares in the event window 1 and sell shares in the event window 2. OMR is the number of executives of fraudulent repurchase firms in open market repurchase and TOR is the number of executives of fraudulent repurchase firms in tender offer repurchase. In Panel B, the second column is the number of executives in fraudulent repurchase companies who have equity incentive in the year before the announcement. The third column is the number of executives who exercising equity incentive in event window 2.

4.2 Agency Problems

In this section, we examine whether serious agency problems firms are more likely to have fraudulent buyback events. As we discuss previously, the agency problems are resulting from information asymmetry and managers always have more information than shareholders. The essence of fraudulent buyback events is managers manipulate stock price and illegally obtain high returns. Thus, we can infer that managers of companies with more serious agency problems are more likely to trade their shares opportunistic when their companies are ready to repurchase (H2).

To test H2, we use logit regression to explore relationship between fraudulent buyback and agency problems:

$$(8) \quad \text{Fail_DUM} = \alpha_0 + \alpha_1 \text{CEOage} + \alpha_2 \text{equity} + \varepsilon$$

We report the results in Table 8. The independent variables are CEO age (age of CEO) and equity incentive (the number of share under equity incentives divide by the firms total share value of 100000 times, because the value of share under equity incentives divide by the firms total share is too small). From the table, we can know that the relationship between CEO age and fail_DUM is negative significantly at 1 % level. Consistent with *Li et al. (2017)*, younger CEOs may undertake bolder investment projects and lead to serious agency problems. This result can support H2. Moreover, we find that the coefficient of equity incentive is different from zero significantly at 1 % level. Also, from the Panel B of Table 6, we can find that the equity incentive of executives with fraudulent buyback is significantly greater than that with normal one through two-sample *T*-test. Since the wealth of managers who have equity incentives is sensitive to the firm's stock price, the greater the equity incentives, the more likely it is to cause agency problems. In a word, these findings can support H2 that firms with serious agency problems are more likely to have fraudulent buyback events.

Table 8
Agency Problem

Variables	Fail_DUM		
	(A)	(B)	I
CEO age	-0.042*** (-19.43)		-0.041*** (-19.03)
Equity		0.063*** (5.42)	0.064*** (5.45)
Cons	0.366 (0.69)	-2.653*** (-4.82)	-0.532 (-0.69)
YEAR	control	control	control
INDUSTRY	control	control	control
N	2,272	26,906	26,906
Pseudo R ²	0.167	0.1576	0.167
Log Likelihood	-16377	-16303	-16120

Note(s): This table reports estimates of coefficients using the Logit model. The dependent variable is Fail_DUM, equal to 1 if repurchase is failure, and 0 normal. The independent variables are CEO age (age of CEO) and equity incentive (number of share under equity incentives). The definitions of the variables are provided in the appendix. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

4.3 Corporate Governance

As we discuss previously, firms with serious agency problems are more likely to create fraudulent buyback events. We further investigate this phenomenon through other facts. Previous literature documents that strong corporate governance can deter mismanagement. Thus, we speculate that there is a greater probability of fraudulent buyback events in firms with poor corporate governance. Insiders can opportunistically trade their shares and easily gain abnormal returns in poor corporate governance. We therefore expect the relationship between fraudulent buyback events and insider trading to be stronger for firms with poorer corporate governance. To test H3, we use logit regression to explore relationship between fraudulent buyback events and corporate governance:

$$(9) \quad \text{Fail_DUM} = \alpha_0 + \alpha_1 \text{analyst} + \alpha_2 \text{boardbusy} + \varepsilon$$

The first proxy is analyst coverage which can represent corporate governance degree. Some literature documents that firms with lower analyst coverage receive less external attention and scrutiny (He and Tian, 2013). The second proxy is board busyness. Board monitoring has been shown to constrain earnings

management effectively (Beasley, 1996; Peasnell et al., 2005; Marra et al., 2011). Thus, firms without effective board monitoring are more likely to give insiders an opportunity to engage in insider trading. In our paper, board busyness measures by directors who take on multiple directorships. We report the results in Table 9.

In Table 9, we can find that firms with fraudulent buyback are less subject to analyst coverage significantly. Also, we can see that the busier boards of directors are more prone to fraudulent buyback events. This result shows that the board of directors with fraudulent buyback firms is more busy and less supervised. As we discuss previously, firms with less analyst coverage are subject to less external attention and supervision and managers can be bolder in their works. These results indicate that due to the lack of external supervision and internal regulatory chaos, this phenomenon creates external and internal conditions for the emergence of fraudulent buyback events. To sum up, we can conclude that fraudulent buyback events are more likely to take place in firms with poor corporate governance (H3).

Table 9
Governance Quality

Variables	Fail_DUM		
	(A)	(B)	(C)
Boardbusy	0.864*** (4.11)		0.898*** (4.26)
Analyst		-0.010** (-2.09)	-0.011** (-2.35)
Cons	-1.489** (-2.27)	-1.152* (-1.75)	-1.367** (-2.081)
YEAR	control	control	control
INDUSTRY	control	control	control
N	2,272	2,272	2,272
Pseudo R ²	0.103	0.097	0.105
Log Likelihood	-1021	-1027	-1018

Note(s): This table shows the relation between governance quality and fraudulent repurchase. Table reports estimates of coefficients using the Logit model. The dependent variable is Fail_DUM, equal to 1 if repurchase is failure, and 0 normal. The independent variables are Boardbusy (the proportion of outside directors who are directors of other listed companies) and analyst (the number of firms watched by the analyst team). The definitions of the variables are provided in the appendix. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

4.4 Financial Indicators

In this part, our paper studies the relationship between financial factors and fraudulent buyback firms, finding the answer for the question: what kind of firms are prone to engage in fraudulent buyback event? We use logit regression to test whether ROA, EPS, firm size (Sz) and leverage (LEV) have an impact on fraudulent buyback events. Table 10 shows the correlation coefficients among the variables and the descriptive statistical analysis of each variable is shown in Table 11. As we discuss before, fail is dummy variables that equal to 1 if repurchase is fraudulent buyback, and 0 normal repurchase. We use the following regression model to test the relationship between these financial factors and fraudulent buyback firms.

$$(10) \quad \begin{aligned} Fail_{DUM_{i,t}} = & \alpha_1 + \alpha_2 EPS_{i,t-1} + \alpha_3 ROA_{i,t-1} + \alpha_4 Sz_{i,t-1} + \alpha_5 LEV_{i,t-1} \\ & + \alpha_6 MB_{i,t-1} + \alpha_7 TobinQ_{i,t-1} + e_i \end{aligned}$$

We add the four explanatory variables (ROA, EPS, Sz, LEV) in order to observe whether the explanatory ability of the model is significantly improved. The results are reported in Table 12, and show that all the financial factors of the firms are associated with the action of fraudulent buyback significantly and respectively. The higher are firm size and asset-liability ration, the stronger is a company's willingness to fraudulent buyback. The lower are the ROA and the EPS, the more likely a company is to engage in fraudulent buyback events. Therefore, companies with high debt ratios and big firm size, low EPS and ROA, and managers are more likely to have fraudulent buyback events.

Table 10
Correlation Coefficients between Variables

	ROA	EPS	Sz	LEV	MB	Tobin Q
ROA	1.000					
EPS	0.705***	1.000				
Sz	0.051**	0.244***	1.000			
LEV	-0.341***	-0.143***	0.446***	1.000		
MB	-0.341***	-0.038	0.477***	0.386***	1.000	
Tobin Q	-0.341***	0.029	-0.353***	-0.313***	-0.840***	1.000

Note(s): This table displays all the Repurchase correlation coefficients between the variables. The variable definitions are provided in the appendix. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Table 11
Descriptive Statistics of Financial Factors, for Fraudulent and Normal Repurchase Companies

<i>Panel A: Fraudulent Repurchase Companies</i>					
<i>Variable</i>	<i>MEAN</i>	<i>SD</i>	<i>MIN</i>	<i>MAX</i>	<i>N</i>
ROA	0.001	0.232	-2.870	0.211	432
EPS	0.185	0.952	-6.708	3.158	432
Sz	22.597	1.281	19.700	27.546	432
LEV	0.463	.276	0.041	2.829	432
MB	0.661	.233	0.118	1.179	432
Tobin Q	1.837	1.081	0.847	8.446	432
<i>Panel B: Normal Repurchase Companies</i>					
<i>Variable</i>	<i>MEAN</i>	<i>SD</i>	<i>MIN</i>	<i>MAX</i>	<i>N</i>
ROA	0.044	0.107	-2.834	0.372	1,840
EPS	0.431	0.736	-7.485	8.991	1,840
Sz	22.221	1.142	19.715	29.683	1,840
LEV	0.387	0.178	0.021	0.983	1,840
MB	0.586	0.231	0.098	1.254	1,840
Tobin Q	2.099	1.195	0.797	10.124	1,840

Note(s): This table shows the descriptive statistics for the financial factors. Panel A shows those for the companies that engage in fraudulent repurchase companies and Panel B those for the normal repurchase companies. We can conclude that the fraudulent repurchase companies usually have higher leverage (LEV), MB and firm size (Sz), poorer EPS, Tobin Q and ROA.

Table 12
Logit Regression on the Determinants of Repurchase Failures

Variables	Fail_Dum					
	(A)	(I(C)	(D)	(E)	(F)	
EPS	-0.387*** (-4.56)				-0.421*** (-4.37)	
ROA		-1.528*** (-3.24)				-1.364** (-2.56)
Sz			0.151** (2.09)		0.231*** (2.74)	0.139* (1.76)
LEV				1.384*** (3.43)	0.412 (0.87)	0.611 (1.26)
MB	0.870 (1.44)	0.961 (1.59)	0.548 (0.86)	0.657 (1.08)	0.043 (0.07)	0.379 (0.58)
Tobin Q	-0.061 (-0.48)	-0.049 (-0.38)	-0.052 (-0.42)	-0.027 (-0.22)	-0.079 (-0.61)	-0.056 (-0.43)
Cons	-1.560 (-1.57)	-2.061** (-2.09)	-5.611*** (-2.91)	-2.931*** (-2.89)	-6.914*** (-3.40)	-5.595*** (-2.80)
YEAR						
INDUSTRY	control	control	control	control	control	control
N	2,272	2,272	2,272	2,272	2,272	2,272
Pseudo R ²	0.084	0.077	0.071	0.076	0.092	0.083
Log Likelihood	-657	-661	-666	-662	-651	-658

Note(s): This table shows the financial factors in repurchase, based on logit regression. We report *Fail_DUM* for all listed companies. We add the four explanatory variables (LEV: asset-liability ratio of the listed company, firm size, EPS, TOBIN'S Q) in order, from column (A) to column (F). The definitions of the variables are provided in the appendix. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

V. Conclusion

Using data on 2,272 repurchases of Chinese listed firms on the SZSE and SHSE over the period from 2013 to 2019, our study verifies existence of the fraudulent share repurchases and the related severe insider trading in the Chinese stock market. We find that firms with fraudulent buyback tend to have more serious insider trading. Further, we find that fraudulent buyback are more likely to occur in firms with serious agency problems and poor corporate governance. Besides, we unveil that companies with fraudulent share buyback are related to higher debt ratios and larger firm size, lower EPS and ROA.

To sum up, our study has made incremental contribution both academically and practically. We compare the severity of insider trading between two types of buyback, and find that the insider trading in fraudulent repurchase is more serious than that in normal ones, which can extend the existing literature on insider trading of fraudulent buybacks. We also contribute to the literature by highlighting the institutional differences between the Chinese stock market and the more developed capital markets in the world. Due to the lack of investor protection in the Chinese stock market, insider trading powered by fraudulent repurchases is conducted in a ruthless way. The insiders are not afraid that the abnormal drop in stock prices following their insider trading will induce litigations from investors as well as scrutiny from regulators. This indicates a desperate need for refining the current legal system regarding the misconduct of managerial entrenchment prevailing in the Chinese capital markets (Tao et al., 2018).

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Appendix: Variable Definitions and Data Sources

<i>Notation</i>	<i>Definition</i>	<i>Data source</i>
<i>CAR</i>	Explained variable, cumulative abnormal returns during the event window, calculated by equation (3)	CSMAR and Wind
<i>FAIL_DUM</i>	Explained variable, 1 if repurchase is failure, and 0 normal	CSMAR
<i>TA</i>	TA is calculated as change in current assets plus change in debt included in current liabilities, less change in cash, change in current liabilities, and depreciation and amortization expense	CSMAR
<i>A</i>	Total assets	CSMAR
$\Delta RECT$	Net receivables in year t less net receivables in year $t-1$.	CSMAR
<i>PPEt:</i>	Gross property, plant and equipment in year t .	CSMAR
<i>CEO age</i>	The age of CEO	CSMAR
<i>Sz</i>	Natural logarithm of companies' total assets	CSMAR
<i>LEV</i>	Explanatory variable, asset-liability ratio of the listed company	CSMAR
<i>Equity incentive</i>	The number of share under equity incentives	CSMAR
<i>Analyst</i>	The number of firms watched by the analyst team	CSMAR
<i>Boardbusy</i>	The proportion of outside directors who are directors of other listed companies	CSMAR
<i>Tobin Q</i>	Explanatory variable, Tobin's Q of listed company, which is equal to (Market value of equity + Book value of debt) / Book value of assets	CSMAR
<i>ROA</i>	Control variable, return on assets	CSMAR