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Short selling mechanism and financial fraud——Analysis based on the perspective of earnings management

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Abstract:

This study focuses on the influence of the short-selling mechanism (SEM) on earnings management behavior of listed companies, particularly the change in the earnings management (EM) level of listed companies after the implementation of the margin financing (MF) policy. The research is based on data from China's securities market spanning from 2007 to 2022, and employs the difference-in-differences (DID) model for empirical analysis. The study found that the EM behavior of companies that became subject to both MF and short selling decreased significantly after the implementation of the SEM. The results indicate that the SEM, as a market supervision tool, effectively curtails opportunistic behavior by management and enhances the transparency and quality of accounting information. This study offers a new perspective on the role of SEM in corporate governance and market supervision, and provides a foundation for relevant policy formulation.

Keywords: short selling mechanism, Financial fraud, Margin trading, Earnings management

1. Introduction

Foreign research on SEM is early, mainly focusing on the impact of SEM on market efficiency, including information transmission, price formation, market liquidity and volatility. For example, Miller (1977) discussed the impact of risk, uncertainty and divergence of opinions on the market. Diamond and Verrecchia (1987) analyzed how short selling restrictions affect the adjustment of asset prices to private information. However, the domestic research on SEM started relatively late, but it has gradually increased in recent years. Early studies mostly discussed indirectly from the perspective of the lack of SEM. For example, Zhou Chunsheng et al. (2005) argued that the introduction of SEM could reduce the deviation degree of stock price from fundamentals. With the launch of China's margin trading (MT) pilot in March 2010, it provided an opportunity to directly test the economic consequences of SEM. Yang Yang and Wan Difang (2010) concluded that SEM can stabilize the stock market. Yang Deyong and Wu Qiong (2011) found that MF can improve market liquidity and restrain volatility to a certain extent. However, other studies have pointed out that MF can not fully play the function of price discovery, such as Liao Shiguang (2011).

2. Literature Review

As an important market trading system, SEM has a significant impact on EM,which is the behavior to influence the company's reported earnings level by selecting or adjusting accounting policies. The existence of SEM improves the information efficiency of the market and increases the supervision on the behavior of the company's management, which may inhibit the motivation of the management to carry out EM. However, studying the relationship between SEM and financial fraud can improve the market supervision mechanism and protect the interests of investors. Through the analysis of the impact of SEM on financial fraud, it also helps to reveal how market supervision tools can improve the transparency and efficiency of market information, so as to promote the rational allocation of resources. The research results can provide a new perspective for corporate governance, especially on how to use market mechanism to restrain the opportunistic behavior of management and improve the quality and transparency of corporate decision-making.

3. Research hypothesis

This study explores whether SEM can effectively reduce the EM level of listed companies. Considering that the short-selling mechanism may increase the market's supervision of corporate information, following hypothesis are given:

3.1 Main research hypothesis

Hypothesis 1 (H1) : Compared with control group companies, the EM level of MF companies is reduced after they become the underlying securities.
This hypothesis is based on the following theoretical basis and logical reasoning:
The short-selling mechanism improves makes the EM behavior of the company management more easily discovered by market participants.
Short-selling investors have the motivation to dig up and use company information, including negative information, which increases the risk of EM by management.
The existence of SEM may enhance the attention and supervision of the regulators on EM behavior.

3.2 Research design and model design

To test the above hypothesis, the following study design will be used in this study:
Select the listed companies that have become the target of MT within a certain period of time as the experimental group, and select the listed companies that have not become the target as the control group.
Collect and compare the EM data of the two groups of companies before and after becoming the target of MF and short selling.
The difference difference model (DID) was used to control potential confounding variables and endogenous problems, and the impact of SEM on EM was accurately estimated.

3.3 Expected Results

The results are expected to support hypothesis 1 that firms that are the subject of MF and short selling will significantly reduce their EM under short selling. This will provide a new perspective for understanding the role of SEM in corporate governance and market supervision, and provide a basis for relevant policy formulation.

3.4 Brief summary

This study is expected to reveal the impact of SEM on EM behavior of listed companies, provide a theoretical basis for market regulators to formulate relevant policies, and provide a reference for investors and company management. Through this research, we can further understand the role of SEM in improving market efficiency and promoting corporate transparency.

3.4.1 . Data source and sample selection

The period from 2007 to 2022 is chosen as the time span of the study, including the introduction and development of MT business. The data mainly comes from the CSMAR database, which provides standardized and easy-to-process financial data containing all the financial information needed for the management of enterprises' accrual earnings. Select listed companies as research objects to ensure the representativeness of samples and comparability of data. Eliminate ST stocks as these companies may be facing financial distress or other special problems that may affect the normality of EM practices. Winsorize all continuous variables by up or down 1% to reduce the impact of extreme values and improve the robustness of estimates. Eliminate missing values to ensure complete data on variables used in the analysis and avoid bias due to missing data. Ensure the data continuity and integrity of the selected sample companies during the study period, and eliminate samples with incomplete data or material omissions.

3.4.2 . Model design

This paper verifies whether the introduction of margin lending market can effectively reduce the behavior of corporate management to manipulate profits, thereby improving financial transparency and market efficiency. The differential method is used to analyze the changes of corporate EM behavior before and after the introduction of

margin market. The model is created as follows:

$$NonDisAcc_{it} = \alpha_i + \beta_1 DID_{it} + \sum \beta_n control_{it} + FixedEffects + \epsilon_{ij}$$

Dependent variable: Non-manipulative accruals, which measure the company's EM behavior. This is calculated by modifying the Jones model and excluding the manipulative accruals.

Independent variable: virtual variable of MF, in which the interaction term of "whether to borrow" and "time to borrow". This is used to capture the direct impact of margin lending policy on EM behavior.

Table 1 Definitions of major variables

Variables	Definitions
$Y_{i,t}$	Explained variable, NonDisAcc, EM behavior, non-manipulative accruals References Chen Hui Li, Liu Feng (2014)
$X1_{i,t}$	Core explanatory variable, DID, interaction between whether or not margin lending and margin lending time, margin lending and borrowing list, pseudo variable, target company of margin lending and borrowing, this variable is 1; otherwise, this variable is 0; dummy variable, the year after the company enters the margin lending and borrowing list, this variable is 1, and the previous year is 0
$X2_{i,t}$	Control variable, SIZE Company size
$X3_{i,t}$	Control variable, LEV asset-liability ratio
$X4_{i,t}$	Control variable, TobinQ
$X5_{i,t}$	Control variable, Cashflow cash flow ratio
$X6_{i,t}$	Control variable, Growth Growth Rate of operating revenue
$X7_{i,t}$	Control variable, ROA1 Return on assets

Fixed effects are used to control for firm specific factors that do not change over time and time factors experienced by all firms.

Error term: represents random variation that the model fails to account for.

3.4.3 Descriptive analysis

Descriptive statistics on the data are shown in Table 2:

Table 2 Descriptive statistics

Variable	N	Mean	p50	SD	Min	Max
NonDisAcc	34606	-1.147	-1.100	4.755	-15.04	21.31
did	34606	0.314	0	0.464	0	1
Size	34606	22.19	22.00	1.271	19.97	26.01
Lev	34606	0.432	0.428	0.201	0.0610	0.868
TobinQ	34606	2.022	1.629	1.214	0.854	7.491
Cashflow	34606	0.0490	0.0470	0.0680	-0.144	0.233
Growth	34606	0.162	0.110	0.350	-0.510	1.824
ROA1	34606	0.0420	0.0390	0.0600	-0.179	0.210

3.4.4 Relevance test

Correlation statistics on the data are shown in Table 3:

Table 3 Correlation analysis

NonDis~c	did	Size	Lev	TobinQ	Cashflow	Growth	
NonDisAcc	1						
did	0.027 * * *	1					

Size	0.073 * * *	0.534 * * *	1				
Lev	0.090 * * *	0.087 * * *	0.460 * * *	1			
TobinQ	0.085 * * *	-0.00500	0.378 * * *	0.282 * * *	1		
Cashflow	0.090 * * *	0.077 * * *	0.063 * * *	0.158 * * *	0.118 * * *	1	
Growth	0.203 * * *	0.039 * * *	0.042 * * *	0.037 * * *	0.068 * * *	0.037 * * *	1
ROA1	0.086 * * *	0.047 * * *	0.018 * * *	0.353 * * *	0.216 * * *	0.412 * * *	0.298 * * *
ROA1							
ROA1	1						

It can be found that variables are strongly correlated. Perform regression on the panel data are shown in Table 4

3.4.5 . Empirical regression

Table 4 Regression results of panel data

	(1)	(2)
VARIABLES	NonDisAcc	NonDisAcc
did	0.655 * * *	0.396 * * *
	(-7.24)	(-4.47)
Size		0.294 * * *
		(-4.38)
Lev		0.674 * *
		(-2.40)
TobinQ		-0.003
		(-0.09)
Cashflow		3.838 * * *
		(-8.07)
Growth		2.732 * * *
		(23.55)
ROA1		4.327 * * *
		(6.90)
Constant	0.941 * * *	5.371 * * *
	(-24.96)	(3.67)
Observations	34,600	34,600
R-squared	0.317	0.357
codeFE	YES	YES
yearFE	YES	YES
r2_a	0.234	0.279
F	52.46	127.2

The regression results show the effect of margin lending and other control variables on non-manipulative accruals. The did coefficient of model (1) is -0.655, which is significant at the significance level of 1%, indicating that the opening of margin lending significantly reduces non-manipulative accruals, which means that the company reduces EM behavior after the opening of margin lending. The did coefficient of model (2) was -0.396, and it was signifi-

cant at the significance level of 1%, which was consistent with the result of model (1), which showed that the opening of margin lending reduced non-manipulative accruals.

The opening of margin lending reduced non-manipulative accruals, which means that the company's EM behavior decreased after the introduction of margin lending market. Specifically, non-manipulative accruals refer to the portion of profits generated in a company's normal operating activities, excluding the portion adjusted through EM means. A decrease in non-manipulative accruals indicates a decrease in the company's efforts to manage earnings through the manipulation of accruals. The introduction of the short selling market may have increased the transparency of the market and the supervision of investors, making the management of the company more prudent in EM.

The results show that the opening of margin lending has reduced EM behavior. The regulator should further promote the development of the margin lending market and encourage more companies to participate in MT to improve the transparency of the market and the level of corporate governance. Large companies have less non-manipulative accrued profits, and the regulator should continue to strengthen supervision over large companies to ensure the authenticity and transparency of their financial reports. Companies with sufficient cash flow show less EM behavior, and regulators should require companies to improve financial transparency, especially by making detailed disclosures on cash flow, to reduce EM behavior. Companies with high growth rates and high yields have more EM incentives, and regulators should focus on these companies and strengthen auditing and supervision to prevent them from misleading investors through EM. In order to reduce EM behavior, companies should further improve their governance structure, enhance the independence and professionalism of the board of directors and audit committee, and reduce the motivation and opportunities for EM from within.

3.4.6 . Parallel trends

By looking at trends in the treatment and control groups before and after policy implementation, the validity of the model can be judged. The parallel trend test results are shown in Figure 1.

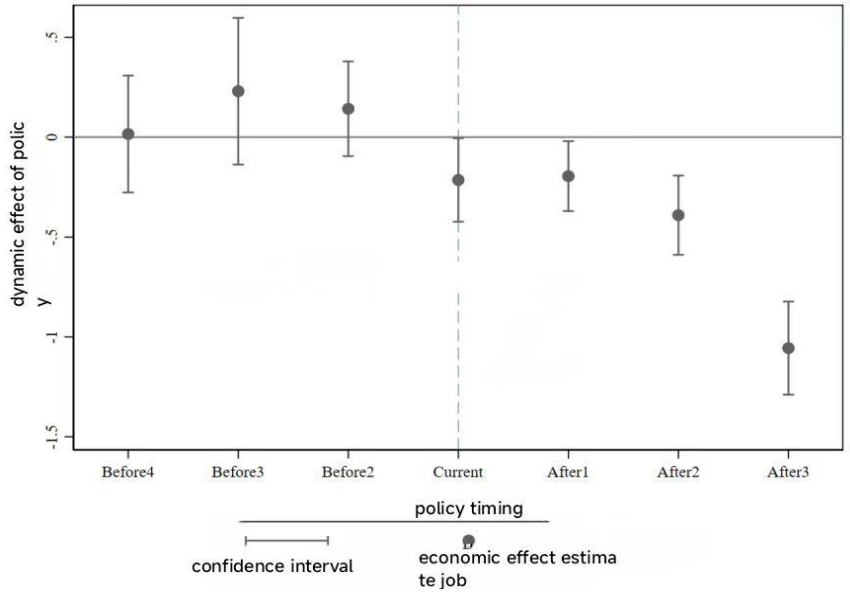

Figure 1 Parallel trends

Before the policy, most of the estimates were close to zero and the confidence interval included zero. This is consistent with the parallel trend hypothesis. Starting from Current, the estimate gradually becomes negative and the confidence interval no longer contains zero, indicating that the non-manipulative accruals of the post-policy implementation group and the control group are significantly reduced, which means that the policy (opening of margin lending) begins to exert a restraining effect on EM. This negative effect continues and becomes more significant in After2 and After3, which further supports the effectiveness of the policy in reducing EM behavior.

The parallel trend test graph conforms to the parallel trend hypothesis. After the implementation of the policy, the non-manipulative accruals of the treatment group decreased significantly, indicating that the opening of margin lending had a significant effect on reducing EM behavior.

4. Conclusion

Through empirical analysis, the inhibition effect of SEM on EM behavior of listed companies. The results show that the EM level of listed companies decreases significantly after the implementation of margin selling policy. This finding is consistent with the following theoretical basis and logical reasoning: the short-selling mechanism enhances the information efficiency of the market, making the EM behavior of the management easier to be recognized by market participants; The participation of short selling investors increases the risk of EM, because they have the motivation to dig up and use corporate information, especially negative information; In addition, the existence of SEM may increase the regulatory authority's supervision of EM behavior. The conclusion of this study emphasizes the important role of SEM as an effective market supervision tool to improve the quality of accounting information and market efficiency. The findings provide a theoretical basis for regulators to formulate relevant policies, especially in terms of how to use market mechanisms to curb management's opportunistic behavior and improve the quality and transparency of corporate decisions. In addition, the study results also provide an important reference for investors and corporate management on market behavior, help investors better understand market dynamics, and provide strategic directions for corporate management to reduce EM motivation. Overall, this study provides new empirical evidence for the role of SEM in corporate governance and market supervision, and provides support for promoting rational allocation of resources and healthy development of the market.

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