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Research on the Relationship between Short-selling Mechanism and Hollowing-out by Major Shareholders

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Abstract:
This article selects data from all A-share listed companies on the Shanghai and Shenzhen stock exchanges from 2015 to 2023, and uses regression models to test the relationship between short selling mechanisms and major shareholder hollowing out. Assessment of related-party transactions to evaluate the phenomenon of asset stripping by significant shareholders, a series of possible influencing factors are controlled, and under the calculation of regression model, It has been determined that the short-selling mechanism exhibits a negative correlation with major shareholders, which also proves that the short-selling mechanism is negatively correlated with major shareholders out of it the short-selling mechanism restricts the behavior of large shareholders, and to a certain extent, it plays a role in the short-selling mechanism, which plays a role in the short-selling mechanism mutual the effect of inhibition shows that the implementation of short-selling mechanism in China can play a role in protecting the interests of minority shareholders to a certain extent, and it also provides some theoretical and empirical research for regulatory authorities to promote short-selling mechanism.

Keywords: short-selling mechanism, major shareholders hollowing out, corporate governance, external supervision

1. Introduction

“Short selling”, also known as “short selling”, refers to a transaction in which some people sell securities that they do not own and have not reached a purchase agreement at the time of the sale. The stock short-selling mechanism can usually be understood as follows:If you predict certain only stock in future probably will down fall,then sell the stocks you hold at the current high prices,then buy when the stock price falls to a certain level, such that spread generated is your profit. Short selling refers to expecting the future market to fall, selling the stock at the current price, buying it after the market falls, and making a profit from the price difference.Short-selling peculiarity that is the trading behavior of selling first and buying later. At present, most mature markets and some emerging markets allow short selling. China's securities market began to pilot margin financing and securities lending business in March 2010, marking the official start of China's deregulation of short selling. The existing research finds that short selling not only has an impact on the securities market, but also makes the short selling mechanism supervise the behavior of the management and major shareholders to a certain extent, thus becoming one of the external factors affecting the corporate governance [1].

As a market trading system, short-selling mechanism provides a mechanism for external supervision of hollowing out the behavior of major shareholders of the company. If the major shareholder conducts hollowing out behavior in an attempt to obtain greater benefits, investors can choose to short sell the company's stock, so that this negative news will be reflected in the stock price in time, and the decline in the stock price will cause the interests of the major shareholder to suffer certain losses. In this case, if the benefits brought by hollowing out are less than the losses caused by the stock price decline, the major shareholders will reduce hollowing out,the short-selling mechanism can help mitigate the behavior of major shareholders engaging in value extraction to some extent.

Combined with the deregulation of short-selling in China and the important corporate governance problem of hollowing out by major shareholders, this study verifies that deregulation of short-selling will restrain the behavior of hollowing out by major shareholders and the negative correlation between them from the data empirical aspect, which shows that the implementation of deregulation of short-selling in China can play a role in protecting the interests of minority shareholders, and provides data and empirical research for regulatory authorities to further promote deregulation of short-selling.

At present, most of the domestic studies on the relationship between short-selling control and major shareholder hollowing out stay in theory, with few empirical data, and previous studies may pay more attention to the single influence of short-selling mechanism on market pricing efficiency or internal governance of enterprises. However, this study combines short-selling mechanism with major shareholder hollowing out behavior to explore the internal relationship and mutual influence between them, which provides a new research perspective. At the same time, this study also uses a large number of realistic sample data, covering as many time periods and industries as possible, and through strict data processing and statistical analysis, can more accurately reveal the relationship between short-selling mechanism and major shareholder hollowing out.

2. Literature review

2.1 *Related research on short-selling mechanism*

Short-selling operation and all related systems are collectively referred to as short-selling mechanism, and its realization methods include futures, options, securities lending, etc. In China, at present, the main means of short selling are the operation of related financial derivatives such as stock index futures and the securities lending trading behavior of securities firms. Compared with western capitalist society, China's capital market has a short history of development and various mechanisms are not perfect. The short-selling mechanism started late. Since 2010, three short-selling mechanisms, namely margin financing and securities lending, stock index futures and ETF options, have emerged one after another. Hu Jialong et al. (2021) pointed out that overall, the short-selling mechanism in my country remains in its nascent stage, with significant potential for growth in market share. With the continuous smooth operation of the stock market and the "loosening" of the regulatory authorities, the short-selling mechanism is gradually improving [2].

Currently, both domestic and international research on the short-selling mechanism predominantly emphasizes its impact on the efficiency of the stock market, However, in recent years, with the maturity and perfection of short-selling mechanism, the influence scope of short-selling mechanism has become wider and wider. Many scholars at home and abroad have gradually focused on the influence of short-selling mechanism on the behavior of listed companies, and more and more scholars have begun to discuss how short-selling mechanism strategy affects the behavior pattern of companies and the decision-making of some stakeholders from multiple angles. Hou Qingchuan et al. (2016) used quasi-natural experiments to study A-share listed companies, and found that reducing the restrictions on short-selling transactions may impede the actions of significant shareholders potentially impacting the interests of small and medium-sized shareholders to some degree, and improve the company's cash value. At the same time, they also found that The short-selling mechanism exerts a more pronounced inhibitory effect on major shareholders of publicly listed companies characterized by high ownership concentration [3].

2.2 *Relevant research on hollowing out of major shareholders*

Listed companies constitute the core pillar of the capital market. Efforts to enhance the operational quality of publicly listed companies are crucial for ensuring the long-term, healthy, and stable growth of the capital market, but also reserve the necessary strength to promote the development of China's economy in a high-quality direction. Existing studies have shown that due to the high concentration of equity, weak corporate governance mechanism and insufficient awareness of investor protection of listed companies in China, the hollowing out of major shareholders is particularly prominent in corporate governance issues in China (Jiang et al., 2010; Liu and Tian, 2012; Jin Qinglu et al., 2017). In this regard, many scholars have examined the role of the company's internal and external governance mechanisms on the hollowing out of major shareholders from the perspective of the "encroached party": such as the ownership structure (La Porta et al., 1999; Wei Minghai et al., 2013) , management characteristics (Liu Shaobo and Ma Chao, 2016), board structure (Ye Kangtao et al., 2007) and other internal governance factors, as well as external governance factors such as legal protection (Atanasov et al., 2010), audit supervision (Zhou Zhongsheng and Chen Hanwen, 2006), media supervision (Kong Dongmin et al., 2013), capital market opening (Chen Xiaoyun et al., 2023).

3 Study design

3.1 *Sample selection and data sources*

For this study, A-share companies listed on the Shanghai and Shenzhen stock exchanges between 2015 and 2023 were chosen as the sample for data analysis, and the original data of all data indicators in the model were sourced from CSMAR database, and the samples with missing relevant variables were further eliminated.

3.2 *Model setting and variable definition*

The research model set in this study is as follows:

RT = β0 + β1MK + β2PreROA + β3LogMA + β4Lev + β5Age + β6Institution + β7BoardSize

The explained variable RT is transactions involving related parties, and the ratio of annual related-party transactions to total assets at the beginning of the period(adjusted by the industry median). Drawing lessons from existing research, this study uses related party transactions to measure the hollowing out of the company's major shareholders. According to the different types of related party transactions selected, it is divided into three indicators: First, the sum of all related party transactions (RPT1); The second is excluding the sum of five categories of related party transactions: Collaborative initiatives, licensing arrangements, and research and development outcomes, remuneration of key management personnel and other matters(RPT2); The third is the sum of two related party transactions of goods and services (RPT3).

The key explanatory variable MK is short selling, and this study adopts the ratio of securities lending balance (securities lending amount-securities lending repayment amount) to the market value of circulating stocks (SSP) is used as a measure of short-selling power. The larger the SSP, the greater the short-selling power.

According to the existing research (Hou Qingchuan et al., 2017), this study selects the following control variables volume (Controls): Return on Total Assets in the First Half of the Year (P re ROA), corporate debt level (Lev) ,Natural logarithm of enterprise circulating market value (Log MV), company listing years (AGE), institutional shareholding ratio (Institution) , natural logarithm of board size (Board Size). Refer to Table 1 for comprehensive definitions of the specified variables.

Table 1 Variable definition

Type	Symbols	Definition Description
Explained variable	RPT1	Sum of all related party transactions
	RPT2	Excluding the aggregate amount of transactions involving related parties across five specified categories: Collaborative initiatives, licensing arrangements, and outcomes of research and development efforts, remuneration of key management personnel and other matters
	RPT3	The sum of two related transactions of goods and services

Key explanatory variables	MK	The ratio of securities lending balance (securities lending amount-securities lending repayment amount) to the market value of circulating stocks (SSP)
Control variable	P re ROA	The return on total assets in the first half of the year,Equal to the net profit at the conclusion of the previous year divided by the total assets at the end of the period
	L e v	Corporate debt level,Equal to the asset-liability ratio as of the period's conclusion
	Log MV	Natural logarithm of enterprise circulating market value
	Age	Company listing years
	Institution	Institutional shareholding ratio
	Board Size	Natural logarithm of board size

4. Empirical research and analysis

4.1 *Descriptive analysis*

Descriptive statistics were performed on all selected data in this study, and the results are as follows:

Table 2 Descriptive statistics table

Variable	Obs	Mean	Std. Dev.	Min	Max
lnPRT1	35332	20.070	2.517	14.324	25.555
lnPRT2	35332	19.156	5.056	0.000	25.551
lnPRT3	35332	13.698	7.700	0.000	24.058
MK	35332	0.000	0.000	0.000	0.003
P re ROA	35332	0.043	0.079	-0.297	0.268
LEV	35332	0.428	0.218	0.056	0.966
Log MV	35332	9.864	0.436	9.145	11.265
Age	35332	11.515	8.347	1.000	30.000
Institution	35332	0.371	0.237	0.000	0.883
Board Size	35332	2.108	0.205	1.609	2.708

Through the descriptive statistical analysis of the financial and governance characteristics of enterprises, it can be seen that there are significant differences in the variables such as related party transactions, financial performance, company size and governance structure of enterprises in the sample. The extent of related-party transactions (lnPRT1, lnPRT2, lnPRT3) showed great variability, and the amount of related party transactions in some enterprises was higher. For lnPRT1, the average value is 20.070 and the standard deviation is 2.517, which indicates that the size of related party transactions of most enterprises is concentrated near the middle level . The average value of lnPRT2 is 19.156, and the standard deviation is 5.056, which indicates that the amount of related party transactions after excluding specific items changes greatly, and has higher variability compared with lnPRT1. The average value of lnPRT3 is 13.698, and the standard deviation is 7.700, which shows that the variability of related party transactions of goods and services is very large. In addition, the return on assets (P re The average value of ROA) is 0.043, reflecting the relatively low profitability of most enterprises .The average debt ratio (LEV) is 0.428, indicating that most firms have moderate debt levels .Company market capitalization (log MV) and years of listing (Age) are relatively concentrated, indicating that most companies are similar in size, and the sample includes both emerging companies and established companies that have been listed for many years. In terms of corporate governance, institutional shareholding ratios (Institutions) vary greatly. Some companies have almost no institutional investors, while others have institutional shareholding ratios close to 90%, which may be related to the market attractiveness and governance level of companies. Board size (Board Size) has a concentrated natural logarithmic distribution, indicating that most companies have similar board sizes.

4.2 *Correlation analysis*

The analytical results of related party transactions are shown in Table 3.First, lnPRT1 shows a significant positive correlation with the firms debt ratio (LEV), It shows that enterprises with higher debt are more inclined to conduct large-scale related party transactions. At the same time, lnPRT1 is related to the enterprises circulating market cap and corporate years on the market also showed a moderate positive correlation .However, lnPRT1 is associated with firm profitability (P re ROA)Significant negative correlation .lnPRT2 also shows a similar positive correlation with debt ratio and company size, which indicates that the amount of related party transactions after excluding specific items is still closely related to the financial structure of the enterprise. The negative correlation with profitability is relatively weak, indicating that the elimination of some related party transactions may mitigate the negative impact of these transactions on the overall performance of enterprises. lnPRT3ThenExhibit different patterns of correlation, And institutional shareholding ratio (Institution), Both company size and debt ratio show a positive correlation. Nevertheless, the negative correlation between lnPRT3 and profitability is weak, which may indicate that the direct impact of goods and services transactions on firm profitability is more limited.

Table 3 Correlation Analysis Table

Variables	lnPRT1	lnPRT2	lnPRT3	MK	PreROA	LEV	logMV	Age	Institution	BoardSize
lnPRT1	1.000									
lnPRT2	0.824***	1.000								
lnPRT3	0.477***	0.515***	1.000							
MK	0.044***	0.026***	0.056***	1.000						
PreROA	-0.200***	-0.185***	-0.069***	0.073***	1.000					
LEV	0.581***	0.444***	0.240***	-0.018***	-0.415***	1.000				
logMV	0.430***	0.288***	0.322***	0.223***	0.202***	0.147***	1.000			
Age	0.379***	0.302***	0.309***	-0.016***	-0.282***	0.333***	0.132***	1.000		
Institution	0.347***	0.265***	0.351***	0.062***	-0.012**	0.209***	0.438***	0.357***	1.000	
BoardSize	0.228***	0.170***	0.204***	0.068***	-0.015***	0.171***	0.252***	0.147***	0.230***	1.000
* * * *p < 0.01*, * * *p < 0.05*, * *p < 0.1*										

4.3 *Regression analysis*

The regression results are shown in Table 4 below. In model (1), short selling showed a significant negative effect on the sum of all related party transactions (lnPRT1) (β =-33.618, $p < 0.1$). The results show that with the expansion of short-selling power of enterprises, the overall scale of related party transactions tends to decrease. Among the selected control variables, except the company's listing years, the regression p values of other variables are all less than 0.01, which also shows that the selected control variables have a very significant impact on related party transactions, and they all show a very significant positive correlation.

In model (2), the effect of short-selling mechanism on related party transactions (lnPRT2) after excluding specific items is more significant (β =-95.472, $p < 0.05$). The significant negative relationship reflects that with the expansion of short-selling power, the number of related party transactions after excluding specific items is decreasing. Among the selected control variables, except the company's listing years, all other variables show a very significant positive correlation. It also shows that the control variables such as debt ratio and company size are obviously related to the related party transactions of the company.

In model (3), the short-selling mechanism also shows a significant negative impact on related transactions of goods and services (lnPRT3) (β =-123.026, $p < 0.1$). The results show that the transaction of goods and services is usually the core content of the internal transaction of enterprises, which involves the production and operation activities of enterprises. Although the β value is lower than that of the first two types of related party transactions, the regression p value is still less than 0.1, so for the third type of related party transaction, short selling still forms a significant negative correlation with it, which also shows that the short selling mechanism still has an inhibitory effect on related party transactions with the above two results.

Table 4 Regression analysis

	(1)	(2)	(3)
VARIABLES	lnPRT1	lnPRT2	lnPRT3
MK	-33.618*	-95.472**	-123.026*
	(-1.89)	(-1.98)	(-1.80)
P re ROA	0.332***	0.165	-0.844*
	(2.84)	(0.52)	(-1.88)
LEV	2.926***	4.448***	1.778***
	(42.42)	(23.72)	(6.71)
Log MV	1.112***	1.586***	2.149***
	(26.78)	(14.05)	(13.47)
Age	0.080	0.135	-0.139
	(1.36)	(0.84)	(-0.61)
Institution	0.179***	0.417***	1.214***
	(3.44)	(2.95)	(6.08)
Board Size	0.304***	0.735***	0.989***
	(4.44)	(3.95)	(3.76)
Constant	6.099***	-1.830	-12.080***
	(10.36)	(-1.14)	(-5.35)
Firm control	Yes	Yes	Yes
Year control	Yes	Yes	Yes
Observations	35,332	35,332	35,332
R-squared	0.093	0.033	0.062
Number of stkcd	5,241	5,241	5,241
R2 _ a	-0.0654	-0.136	-0.102
F	205.8***	68.42***	131.7***

t-statistics in parentheses
* * * p < 0.01, * * p < 0.05, * p < 0.1

4.4 *Robustness analysis*

For guarantee the robustness of the model, this study selected one stage behind Short Selling Mechanism(L. MK) as an explanatory variable,And carried on it Re Of regression analysis, the results are as follows Down as shown in Table. In the regression model with a lag of one stage,Short Selling None of the effects on lnPRT1, lnPRT2, and lnPRT3 were significant, Description Short Selling the lag effect of related party transactions has a limited impact. Despite Short Selling the hysteresis effect of is not significant, but the effects of other control variables remain robust. This shows that the control variables still have stable explanatory power for related party transactions in the lag model, which verifies the robustness of the model. Overall, it lags behind by one period short selling the direct impact on related party transactions is not significant, but the performance of control variables in each model verifies the robustness of the model and supports the long-term explanatory effectiveness of the core variables on related party transactions.

Table 5 Robustness analysis

	(1)	(2)	(3)
VARIABLES	lnPRT1	lnPRT2	lnPRT3
L.MK	27.590	-26.834	12.988
	(1.53)	(-0.57)	(0.19)
PreROA	0.532***	0.770**	0.411
	(4.32)	(2.39)	(0.88)
LEV	2.778***	4.196***	1.175***
	(36.61)	(21.16)	(4.08)
logMV	1.059***	1.509***	2.301***
	(22.95)	(12.51)	(13.13)
Age	0.070	0.119	-0.277
	(1.20)	(0.78)	(-1.26)
Institution	0.139**	0.389**	0.833***
	(2.14)	(2.29)	(3.38)
BoardSize	0.283***	0.607***	0.946***
	(3.83)	(3.14)	(3.37)
Constant	7.038***	-0.192	-10.870***
	(10.41)	(-0.11)	(-4.24)
Firm control	Yes	Yes	Yes
Year control	Yes	Yes	Yes
Observations	30,091	30,091	30,091
R-squared	0.073	0.026	0.044
Number of stkcd	5,002	5,002	5,002
R2 _ a	-0.112	-0.169	-0.147
F	141.1***	48.21***	82.23***

5. Research conclusions and enlightenment

The high concentration of ownership has always been a remarkable feature of listed companies in China, and the behavior of hollowing out by major shareholders in listed companies in China is also very common. However, the investors in short selling are contrary to the interests of hollowing out by major shareholders. This study plans to use data model to empirically prove the relationship between short selling and hollowing out by major shareholders. This article selects all A-share listed companies on the Shanghai and Shenzhen stock exchanges from 2015 to 2023 as research samples.Systematically analyzed short selling mechanism(MK) Impact on Related Party Transactions of Enterprises .Pass empirical research, We find that the short-selling mechanism can effectively mitigate the practice of major shareholders of listed companies engaging in asset stripping , thus reducing the damage to the rights and interests of minority shareholders to a certain extent.In addition, the study also found that debt ratio (LEV), company size (log MV), institutional shareholding ratio (Institution) and Board size (Board Size) and other control variables have a significant positive impact on related party transactions, and these factors play an important role in the internal governance of enterprises. Short-selling mechanism is regarded as an external supervision mechanism, which can effectively curb the hollowing-out behavior of major shareholders of listed companies in China. Therefore, relevant departments need to further improve the trading rules and laws related to short-selling mechanism, strengthen the scope and depth of short-selling mechanism, aiming at minimizing the hollowing-out behavior of major shareholders of listed companies in China and ensuring the real protection of the rights and interests of minority shareholders.

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