

Analysis of the Impact of Short Selling Mechanisms on Corporate Finance Constraints

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Abstract:

This study empirically examines the influence of short selling mechanism (SSM) on corporate financing constraints using multi-temporal double-difference method against the background of short selling system in China's capital market, utilizing non-financial firms listed in A-share companies from 2010-2023 as the research sample. The study shows that SSM can effectively alleviate corporate financing constraints. The analysis by nature of property rights finds that the SSM has a more obvious role in alleviating the financing constraints of state-owned enterprises. This study provides policy ideas and countermeasure suggestions to alleviate corporate financing constraints from the dimensions of market regulation, enterprises themselves, and fair competition, in order to promote the healthy and efficient operation of the capital market.

Keywords: short selling mechanism, financing constraints, information asymmetry, nature of property rights

1. Introduction

In a market environment where information asymmetry and agency problems are prevalent, financing constraints have become pain points and blockages in the production and operation of enterprises, with a particular impact on small and medium-sized enterprises (SMEs), private enterprises and high-tech enterprises. The report of the 20th CPC National Congress puts forward policy measures such as improving the function of the capital market, optimizing the financing environment, and improving the financial support mechanism, which points out

the direction for enterprises to alleviate their financing constraints. As an important key institutional arrangement of the capital market, the SSM has a dual impact: it can not only improve the efficiency of price discovery, increase market liquidity, provide risk hedging, reveal corporate problems, and reduce the risk of market collapse; it may also exacerbate market volatility, manipulate market risks, and trigger panic in the market. These characteristics have made the SSM a focus of attention for academics, businesses and regulators. Therefore, the government needs to strengthen macro-regulation, while enter-

prises need to strengthen internal governance in order to fully utilize the positive factors of the SSM, while curbing its potential negative impacts, so as to provide support and motivation for the healthy development of enterprises.

2. Literature review and research hypotheses

In economic activities, information asymmetry is a common phenomenon, the two sides of the transaction on the same object of the transaction often do not have the same information, Akerlof (1970) put forward the “lemon model” pointed out that the information asymmetry will lead to adverse selection and moral hazard, the agent may take advantage of the information advantage of self-interested behavior, thereby damaging the interests of the principal, and the agent may take advantage of the information advantage of self-serving behavior, and the agent may use the information advantage of the information advantage of self-interest. and thus damage the interests of the principal. Such information differences have a profound impact on market behavior and resource allocation efficiency.

The SSM, as an important market tool, can effectively alleviate the problem of information asymmetry. Short sellers usually conduct in-depth research on enterprises and look for overvalued or problematic enterprises. When short sellers find negative information (e.g., financial fraud, operational difficulties, etc.) about a company, they will reflect this information in the stock price through short selling behavior. This mechanism enables the market to more fully reflect the true value of the firm and promotes the release of negative information. Research suggests that the SSM enhances information efficiency and enables stock prices to reflect both positive and negative information, thus more accurately reflecting firms’ fundamentals. The improvement of information efficiency helps to reduce the deviation of stock prices from fundamentals, reduce market bubbles, and improve market pricing efficiency.

In addition, the short-selling mechanism increases the supervisory pressure on management, constrains management behavior, and forces it to be more transparent and accountable. Researchers such as Xuan Zhang (2016) point out that when listed companies can be short-sold

on a securities financing basis, they attract more attention from information miners examples (e.g., analysts). The continuous tracking and attention of analysts can enhance the transparency of the firm’s information to the outside world and reduce information asymmetry. Studies by Saffi and Lou (2010) and Fang et al (2013) further show that the SSM leads to more stringent regulation, which leads to a higher probability of the discovery of errors in the firm’s financial reports, thus inhibiting the stock price increase when financial statements misstate earnings.

Based on above, hypothesis 1 is proposed: SSM can significantly alleviate corporate financing constraints.

State-owned enterprises (SOEs) and private enterprises (POEs) are important components of China’s national economy, and there are significant differences between them in terms of the nature of property rights, management systems, information disclosure, internal governance, etc., which have led to the degree of attention and the impact of financing constraints on them in the capital market. State-owned enterprises (SOEs) usually enjoy government support and have diversified financing channels, but their information transparency is relatively low. Xu Feng and Lv Jian (2024) found that SOEs are more advantageous in terms of information transparency and policy support, and that the short-selling mechanism can effectively reduce firms’ financing costs. As SOEs are more likely to receive market attention, they tend to be the key target of short selling traders. In addition, the short-selling mechanism further alleviates the financing constraints of state-owned enterprises by reducing lowering the financial risks of enterprises.

In contrast, private firms are more market-oriented and have relatively limited financing channels, but have higher information transparency. Chen, Yun-Sen, Huang, J. (2018) and Allen, F., Qian, J., & Qian, M. (2005) found that the SSM promotes innovation investment in private firms, while private firms face more pressure from financing constraints. This suggests that the SSM may play different roles in firms with different ownership properties.

Hypothesis 2 is proposed: the mitigating effect of SSM on corporate financing constraints is significantly different between state-owned and private enterprises.

3. Study design

3.1 Data sources and sample selection

In this study, we select the sample financial data of A-share companies from 2010 to 2023, and in order to reduce the error of the empirical results, we treat the sample as follows:

3.1.1 The data of firms in the sample that are ST and *ST are excluded;

3.1.2 The sample of firms belonging to the financial sector is excluded;

3.1.3 The annual sample of firms with missing data on the main variables is excluded;

3.1.4 Exclude the sample of firms that were transferred to the list of empty bids during the sample period;

3.1.5 Reducing extreme heterogeneity by shrinking the tails (winsorize) of the main variables at the 1% level.

The effect of constant values on empirical results.

The sample of this study comes from the database of Cathay Pacific (CSMAR), and the list of the underlying securities for financing and bond financing comes from the official websites of Shanghai and Shenzhen stock exchanges, and STATA17.0 software is used to analyze and process the data and construct the model.

3.2 Variable Settings

3.2.1 Explained variables:

FC (Financing constraints) refers to the various constraints that firms face in obtaining external funds, usually due to information asymmetry, agency problems, market imperfections, etc. These constraints make it difficult for firms to obtain the required funds at a reasonable cost, thus affecting their investment and operational decisions.
$$FC\ index = \beta_0 + \beta_1 * ratio_1 + \beta_2 * ratio_2 + \dots + \beta_6 * Ratio_6$$

3.2.2 Explanatory variables:

Treat_i is a treatment group dummy variable indicating whether the firm is affected by the short-selling mechanism (1 indicates that it is affected by the short-selling mechanism and 0 indicates that it is not affected).

Time dummy variable (Post_t): i.e., time effect, represents the dummy variable before and after becoming the subject

of financing and financing, the year before not being selected as the subject of financing and financing is assigned a value of 0, while the year of becoming the subject of financing and financing and the year after are assigned a value of 1.

Treat_i* Post_t is the core interaction term that captures the causal effect of the introduction of the SSM on firms' financing constraints.

3.2.3 Control variables:

Firm size (Size), Gearing ratio (Lev), Profitability (Roa), Net Fixed Assets Ratio (Fixed), Company growth (Growth), Shareholding Concentration (Top1), Nature of ownership (Soe): state-owned listed companies Soe= 1, private listed companies Soe= 0.

3.3 Research model

In this study, the double difference DID model is used. This model has a wide range of applications in medical research, economic research, financial research, etc., and is able to better control for systematic differences between the treatment and control groups, and is used to study the changes that occur in the treatment group before and after a particular experiment. Its model is:

$$FC = \alpha + \beta_1 Treat_i + \beta_2 Post_t + \beta_3 (Treat_i \times Post_t) + \beta_4 X_{it} + \varepsilon_{it}$$

It is used to test the impact of the use of SSM on corporate financing constraints, the core of the examination is the coefficient β_3 of the cross-multiplier term (Treat_i × Post_t), if $\beta_3 < 0$, then it means that the implementation of the SSM can effectively alleviate the financing constraints of the enterprise, i.e., Hypothesis 1 in this study has been verified. For the industry characteristics of state-owned enterprises and private enterprises we conduct group regression to analyze the heterogeneity of the impact.

4. Empirical analysis

4.1 Descriptive statistical results for the main variables

Table 1 presents the descriptive statistics of the main variables of the study sample. As can be seen from this table, the mean value of the dummy variable (Treat) for the treatment group is 0.60, which corresponds to the fact that nearly half of all A-shares become financing constraints

underlying stocks at the end of 2023. In the study sample, the financing constraint index

Table 1 Descriptive statistics of the main variables

variant	observed value	average value	(statistics) standard deviation	minimum value	upper quartile	maximum values
FC	37635	0.49	0.28	0.00	0.52	1.00
Treat	37635	0.60	0.49	0.00	1.00	1.00
Post	37635	0.36	0.48	0.00	0.00	1.00
Size	37635	22.27	1.33	14.94	22.07	28.70
Lev	37635	0.43	0.20	0.00	0.42	1.00
Roa	37635	0.03	0.08	-3.99	0.04	0.79
Fixed	37635	0.21	0.16	0.00	0.18	0.97
Growth	37635	0.14	0.49	-0.93	0.08	41.46
Top1	37634	34.37	14.90	1.84	32.03	89.99
Soe	37625	0.37	0.48	0.00	0.00	1.00

That there is a big difference in the level of financing constraints among different companies, and the standard deviation of FC is 0.28, which indicates big fluctuation in the level of financing constraints. The mean value of enterprise size (Size) shows that the size of different enterprises varies greatly. The fluctuation of the gearing ratio (Lev) indicates that there is a big difference in the gearing ratio of different enterprises. That there is a large gap between the profit and loss of different enterprises is also shown by the variance assets (Roa). The mean value of the proportion of net fixed assets (Fixed) is 0.21, with a median of 0.18, and the mean value of enterprise growth

is 0.14, with a median of 0.08, indicating that most of the enterprises in the sample are in good operating condition. The values of the proportion of shares held by the first largest shareholder (Top1) indicates that the proportion of shares held by the first largest shareholder in the enterprises varies greatly.

4.2 Relevance analysis

As can be seen from Table 2, the correlation values of most variables are less than 0.5, indicating that the regression model does not have serious multicollinearity problems, and the model construction and variable design are more reasonable.

Table 2 Table of correlation coefficients of explained variables, explanatory variables, and control variables

correlation coefficient	FC	Treat	Post	Size	Lev	Roa	Fixed	Growth	Top1	Soe
FC	1									
Treat	-0.2938*	1								
Post	-0.3576*	0.6029*	1							
Size	-0.8326*	0.3335*	0.4431*	1						
Lev	-0.6114*	0.0179*	0.0338*	0.4709*	1					
Roa	0.0078*	0.1428*	0.0853*	0.0546*	-0.2831*	1				
Fixed	-0.1578*	0.0246*	-0.0344*	0.1059*	0.0901*	-0.0338*	1			
Growth	-0.0194*	0.0347*	-0.0231*	0.0364*	0.0103*	0.1433*	-0.0814*	1		
Top1	-0.1642*	0.0701*	0.0348*	0.2158*	0.0516*	0.1318*	0.0936*	-0.0223*	1	
Soe	-0.3814*	0.0948*	0.1163*	0.3547*	0.2853*	-0.0344*	0.01796*	-0.0663*	0.2318*	1

4.3 Analysis of regression results

From the perspective of SSM implementation which is a quasi-natural experiment, this study applies the double difference method to examine the impact of SSM implementation on corporate financing constraints, focusing on the introduction of two explanatory variables of Treat and Post in the treatment group, and the ordinary OLS

regression model with industry characteristics is not considered for the time being, and its results are shown in Table 3. The results show that the implementation of the SSM makes the coefficient of the core interaction term (Treat*Post) negative at the 1% level and thus Hypothesis 1 of this study is verified.

Figure 3 Analysis of the impact of SSM on corporate finance constraints

Source SS df MS Number of obs = 37,614					
Model 2305.26918 10 230.526918 Prob > F = 0.0000					
Residual 701.029991 37,603 .018642927 R-squared = 0.7668					
-----+----- Adj R-squared = 0.7668					
Total 3006.29917 37,613 .079927131 Root MSE = .13654					
-----+-----					
FC Coefficient Std. err. t P> t [95% conf. interval]					
-----+-----					
Treat -.0311674 .0018509 -16.84 0.000 -.0347953 -.0275395					
Post -.0115308 .0021006 -5.49 0.000 -.015648 -.0074135					
Core Interaction Terms -.0066309 .0017193 -3.86 0.000 -.0100009 -.003261					
Size -.1394387 .0007353 -189.63 0.000 -.1408799 -.1379974					
Lev -.3712294 .0043073 -86.19 0.000 -.3796718 -.3627869					
Roa .149351 .0093213 16.02 0.000 .131081 .1676211					
Fixed -.0952437 .0045211 -21.07 0.000 -.1041052 -.0863823					
Growth -.0031089 .0014597 -2.13 0.033 -.0059699 -.0002479					
Top1 .0001552 .0000499 3.11 0.002 .0000574 .000253					
Soe -.0322382 .0016253 -19.84 0.000 -.0354237 -.0290526					
_cons 3.800749 .0148558 255.84 0.000 3.771631 3.829866					
-----+-----					

4.4 Heterogeneity analysis

The research sample according to the nature of property rights screening out state-owned enterprises, private enterprises, respectively, set the variable Soe = 1, 0, with STATA computing the value of the explanatory variables FC_1 , FC_0 value, and then STATA computing the introduction of short-selling mechanism after the introduction of the two kinds of enterprises of the results of the main variables in Figure 4. through the analysis of the found that the state-owned enterprises financing constraints index FC_1 the average value is 0.35, private enterprises financing con-

straints index FC_0 average value is 0.57, indicating that the state-owned enterprises relative to private enterprises face a relatively lower degree of financing constraints. The mean value of $FC(1)$ for state-owned enterprises is 0.35, and the mean value of FC_0 for private enterprises is 0.57, indicating that state-owned enterprises face relatively lower financing constraints than private enterprises. After the introduction of SSM, the values of the core interaction term (Treat*Post) coefficients of state-owned and private enterprises are negative at the 1% level, respectively -0.011 and -0.003, and the absolute value of the former is larger, indicating that the short-selling mechanism has a

stronger mitigating effect on the financing constraints of state-owned enterprises than that of private enterprises.

Figure 4 Table of regression results of SSM on financing constraints of SOEs and private firms

State-owned enterprises (Soe=1)	FC ₁ mean value 0.35		Private enterprise (Soe=0)	FC ₀ mean 0.57
Treat	-0.031***		Treat	-0.024***
	(0.003)			(0.002)
Post	-0.011***		Post	-0.013***
	(0.003)			(0.003)
Treat*Post	-0.011***		Treat*Post	-0.003***
	(0.003)			(0.002)
Size	-0.119***		Size	-0.161***
	(0.001)			(0.001)
Lev	-0.392***		Lev	-0.342***
	(0.007)			(0.006)
Roa	0.068**		Roa	0.186***
	(0.023)			(0.001)
Fixed	-0.112***		Fixed	-0.084***
	(0.006)			(0.007)
Growth	-0.012**		Growth	-0.0001
	(0.004)			(0.002)
Top1	-0.0003***		Top1	0.0002*
	(0.0001)			(0.0001)
_cons	3.327***		_cons	4.264***
	(0.021)			(0.022)

5. Conclusions and recommendations

The study which explores the SSM's influences on the financing constraints finds that: 1.the implementation of the SSM can effectively alleviate the financing constraints of enterprises. 2.according to the industry characteristics of the study shows that the implementation of the mechanism on different types of enterprises (state-owned, private) financing constraints there are large differences in the alleviation of the role of state-owned enterprises is relatively more pronounced alleviation of the role of state-owned enterprises.

The above conclusions can give the following recommendations:ss

5.1 Suggestions to Regulators The Third Plenary Session of the 20th CPC Central Committee emphasized the need to improve the function of the capital market, which is coordinated with investment and financing, to strengthen the regulation of trading, and to seriously investigate and

deal with market manipulation, malicious short-selling, and other violations of the law. From the macro level, the regulatory system of SSM should be improved to prevent malicious short selling and maintain market stability. For example, a sound risk warning mechanism for short-selling transactions can be established to increase the crack-down on malicious short-selling.

5.2 Suggestions for the enterprises themselves In 2024, private enterprises contributed more than 60% of tax revenue and more than 80% of employment. However, private enterprises still face large constraints in the financing process. Therefore, the information transparency of private enterprises can be improved through the introduction of SSM, which can restrain the behavior of management and optimize the allocation of resources, so as to effectively alleviate the financing constraints of private enterprises, promote private enterprises to become bigger and stronger, and better serve the economic and social develop-

ment.

5.3 Suggestions for Fair Competition Currently, the coverage ratio of the SSM for state-owned enterprises and private enterprises is low. In the future, the role of the SSM should be deepened in conjunction with the mixed ownership reform to enhance its coverage and fairness to different types of enterprises and to promote a healthier and more efficient operation of the capital market.

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