A Study of stress-resistant institutional investors ' Shareholding and Corporate Risk-Taking Based on Equity Liquidity

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Abstract. This paper analyzes the relationship and impact of stress-resistant institutional investors on institutional investors' shareholding on corporate risk-taking, using a sample of A-share listed companies in Shanghai and Shenzhen from 2011 to 2020. The research shows that the proportion of stress-resistant institutional investors' shareholding is negatively related to the level of corporate risk-taking. On this basis, the paper examines the moderating effect of stock liquidity on the level of stress-resistant institutional investors and corporate risk-taking. The study finds that stock liquidity negatively modifies the relationship between stress-resistant institutional investors and corporate risk-taking levels. This result shows that stock liquidity enables stress-resistant institutional investors to participate in corporate governance more actively, thereby weakening their role in reducing corporate risk-taking levels.

Keywords: Stock Liquidity, Stress-resistant Institutional Investors, Corporate Risk-Taking, Corporate Governance.

1. Introduction

Chinese institutional investors have made steady progress and played a role in supporting and stabilizing the market. Compared with individual investors, they can better supervise corporate governance. However, scholars at home and abroad have found that different institutional investors have different attitudes towards corporate governance and play different roles due to their different environments, industries and preferences, which have different impacts on the level of corporate risk-taking. The mechanism and influence of institutional investors' shareholding on corporate risk-taking are still controversial in academic circles. On the other hand, as China's economic and social development and globalization process continue to advance, China continues to seek rapid and stable development under the market economy model. Opportunities and challenges coexist in corporate business management and corporate governance models. As an important indicator of the healthy and active degree of the market, stock liquidity directly reflects the behaviour of investors (Liu Xiaoxing et al., 2016) [1]. The increase and decrease of stock liquidity can also reflect investors' expectations for the development of corporates over a period of time. Institutional investors and corporate management can get information from stock liquidity to make corresponding responses, The behaviour of institutional investors and corporate management will affect the level of corporate risk-taking. Although academia has begun to pay attention to the role of stock liquidity in corporate governance, there are few studies on the regulatory effect of stock liquidity on institutional investors' shareholding and corporate risk-taking. Therefore, this paper takes the data of Chinese A-share listed companies from 2011 to 2020 as a sample reference to explore the impact of stress-resistant institutional investors' shareholding on the level of corporate risk-taking and introduces the important factor of the capital market, stock liquidity, as a regulatory variable to study its regulatory effect and mechanism on stress-resistant institutional investors' shareholding and corporate risk-taking.

2. Theoretical Analysis and Assumptions

Elyasiani&Jia divide institutional investors into regulatory institutional investors and transactional institutional investors. Regulatory institutional investors generally make long-term investments that incorporate the long-term value of corporates and the dividend income of shareholders. However, transactional institutional investors, because of their preference for short-term shareholding and their pursuit of obtaining dividends in the short-term rise of stock prices, have no strong motivation to monitor corporates, and may even collude with the management in pursuit of information trading. (Cheng Yan, 2020) [2] believes that the principle of risk income matching reflects the importance of measuring corporate risk level, which is related to the core interests of corporates. Due to different institutional investors' investment philosophies, risk acceptance abilities, and expected rate of return, they will play different roles in corporate governance, thus affecting the level of corporate risk-taking. Moreover, different institutional investors have different willingness and methods to supervise corporates, leading to effective or ineffective supervision of corporates (Wang Yao and Guo Zeguang, 2021) [3], which affects the decision-making of the management and leads to different levels of corporate risk-taking.

As an important factor in the capital market, stock liquidity is the basic factor of commercial transactions and one of the indicators to judge the development of the capital market. NorIi et a1. The existing researches generally agree that the method of linking stock liquidity with corporate governance is a voice exit mechanism. On the whole, stock liquidity plays a positive role in corporate governance. At present, the voice mechanism and exit mechanism are the main views of liquidity on corporate governance. The voice mechanism believes that the improvement of liquidity will enable institutional investors to participate more actively in corporate supervision and corporate governance, thereby improving the level of corporate governance. The exit mechanism believes that the improvement of stock liquidity will make it easier for investors to buy and sell stocks, and investors' active trading in the stock market can reflect the value of the corporate, and also enable the management to see the position of the corporate among investors more clearly, to adjust decisions in time and improve the value of the company. It shows that the stock liquidity can not only improve the corporate value through the reform of the internal role of the corporate but also reflect the corporate value through the feedback of external investors' behaviour. The research on the relationship between institutional investors and corporate governance measured by stock liquidity will help to measure the healthy development of Chinese corporates through market changes in different industries in the future.

Based on research on stock liquidity in corporate governance, shows that stock liquidity has the following analysis on the role of institutional investors in corporate governance: First, stock liquidity can enhance the voice intervention of major shareholders. The increase in stock liquidity will improve the opportunity for institutional investors to acquire shares, thus forming large shareholders, enhancing the possibility of large shareholders' voice supervision, improving the level of corporate governance, and improving the level of corporate risk-taking. Second, The increase in stock liquidity reduces the exit cost of investors. High stock liquidity is conducive to institutional investors' selling shares and shareholders' entering the market so that executives with equity incentives can strive to enhance the company's value and play a role in corporate governance.

Through the above theoretical analysis, we speculate that when the stock liquidity is high, institutional investors can improve the corporate governance role of institutional investors and improve the level of corporate risk-taking of companies. The pressure-suppressed institutional investors prefer the steady investment of corporates. Based on the above analysis, the following assumptions are proposed:

H1a: Stock liquidity negatively modifies the relationship between institutional investors and corporate risk-taking level.

H1b: Under the condition of the high sensitivity of the market value of top management compensation companies, the shareholding ratio of stress-resistant institutional investors and the transfer items of stock liquidity is significantly negatively related to the level of corporate risk-taking.

3. Research design

3.1. Sample selection and data source

This paper uses the research sample of Shanghai and Shenzhen A-share listed companies from 2011 to 2020. Eliminate companies with insufficient information disclosure; Companies excluding st and * st; Excluding listed companies in the financial industry; The data shall be shrunk by 1%; Remove samples with missing data. Finally, 17487 observation samples were obtained for research. The data are from the CSMAR database.

3.2. Variable definition and description

3.2.1 Corporate risk-taking level

Use the research indicators of Yu Minggui et al. (2013) [4] for reference to measure the level of risk-taking. It is measured by the volatility of the corporate's profitability, that is, the standard deviation (EBITDA/total assets at the end of the period) adjusted by the industry average value from year t-1 to year t+1 is calculated on a rolling basis.

3.2.2 Shares held by stress-resistant institutional investors

This paper focuses on the practice of Brickley (1988) [5], making the proportion of shares held by stress-resistant institutional investors (SEN) equal to the sum of shares held by three types of institutional investors among the top ten shareholders.

3.2.3 Stock liquidity

Bid-ask spread is an important indicator of stock liquidity. In the secondary securities trading market, the buying and selling quotations of securities are generated and traded at all times. Delivery and trading of securities or stocks will only occur if the bid price matches the offer price. Therefore, the smaller the bid-ask spread of stocks, the smaller the cost of executing transactions immediately, the faster the delivery speed, and the higher the liquidity of stocks. Because the price levels of different stocks vary greatly, this paper introduces the concept of "relatively effective bid-ask spread" to make them more referential and comparable. On this basis, the daily trading data and the quarterly average of the relative effective margin are used as indicators to measure stock liquidity. In other words, when the relative effective price difference is large, the stock liquidity is low. The specific calculation formula is as follows:

$$Liquidy = \frac{1}{D}\sum_{d=1}^{D}[2\times\frac{|Price-(Ask+Bid)/2|}{(Ask+Bid)/2} \tag{1}$$

$Price$ is the closing price on the stock trading day; Ask is the highest price of the stock on the trading day; Bid is the lowest price for stock trading on the trading day; D refers to the number of days in a quarter when the trading volume of a single stock is not zero; *d* means a certain day.

3.2.4 Sensitivity of management compensation to corporate market value

With reference to Liu Min (2015) [6]'s WPS, a sensitive indicator of management compensation to corporate market value, the detailed calculation formula is as follows:

$$WPS_{i,t}=\frac{INPAY_{i,t}}{TOBIN_{i,t}} \tag{2}$$

$INPAY_{i,t}$refers to the natural logarithm of the top three salaries of management personnel in the sample study corporate i in year t, $TOBIN_{i,t}$ refers to the market value of sample study corporate i in year t. According to the results of WPS calculation formula, corporates are again divided into high sensitivity group and low sensitivity group. The high sensitivity group is when WPS results are

higher than the median of total WPS values, and the low sensitivity group is when WPS results are lower than the median of total WPS values.

3.2.5 Control variables

With reference to previous research on this subject by Wang Yuting and Liu Yu (2019) [7], Ji Marie and Du Xiaorong (2017) [8], Xu Tianyun (2019) [9] and Li Sen (2021) [10], control variables as shown in Table 1 are selected.

Table 1. Variable Definition

Variable type	Variable name	Variable Symbolic	Variable Description
dependent variable	corporate risk-taking level	RISK	Measure the level of corporate risk-taking based on the volatility of annual profits within the three-year observation period
independent variables	heterogeneity of institutional investors	RES	The sum of the shares held by the fund, QFII (Qualified Foreign Institutional Investor) and social security fund among the top ten shareholders
		SEN	The sum of shareholding proportions of five categories of institutional investors among the top ten shareholders: securities companies, insurance companies, trust companies, financial companies and banks
control variables	heterogeneity variable of institutional investors	SIZE	corporate scale, measured by the natural logarithm of the total assets of the corporate in the current year
		LEV	asset-liability ratio, measured by the ratio of total liabilities to total assets of the corporate in the current year
		CFO	free cash flow, the ratio of total cash flow to total assets of the corporate in the current year
		PPE	fixed assets, the ratio of fixed assets to total assets of the corporate in the current year
		TOBINQ	Tobin Q, the ratio of listed market value to total assets
		ROA	Return on total assets, the ratio of quarterly net income to total assets
		DUAL	Two positions are held concurrently, including the general manager and the chairman of the board. The value is 1 for part-time jobs and 0 for non-part-time job
		TOP1	the shareholding ratio of the largest shareholder, and the proportion of the largest shareholder in the total shares of the corporate

INPAY	The remuneration of senior managers is measured by the natural logarithm of the top three
CHOLD	Management shareholding ratio, the sum of management shareholding ratio
SOE	Property right nature: when the property right nature of the corporate is state-owned corporate, the value is 1; when the property right nature of the corporate is private corporate, the value is 0
AGE	Number of years listed
YEAR	control year factors
INDUSTRY	control industry factors

3.3. Model design

To test hypothesis H1a: stock liquidity has a negative moderating effect on the relationship between institutional investors and corporate risk-taking level; H1b: under the condition of high management compensation - company market value sensitivity, the shareholding ratio of stress-resistant institutional investors and the transmission item of stock liquidity have a significantly negative correlation with corporate risk-taking level. This article uses the pooled model to establish a model 1-1 for hypothesis testing.

$$Risk = \beta_0 + \beta_1 RES_{i,t} + \beta_2 RES_{i,t} * LIQ_{i,t} + \beta_3 LIQ_{i,t} + \beta' Control_{i,t} + \sum Industy + \sum Year + \varepsilon_{i,t} \quad (3)$$

We predict β_2 is significant and negative in models 1-1.

In order to test H1b's use of model 1-2 and carry out two-group regression, that is, the research sample is divided into two groups based on the sensitivity of senior managers' compensation to the company's market value. Assuming that the results of the two groups of regression show that stock liquidity has a significant moderating effect on the level of stress-resistant institutional investors and corporate risk-taking, then the moderating effect of senior managers' compensation on stock liquidity exists, the β_2 were significant and positive in both groups; if there is a significant relationship between the shareholding ratio of stress-resistant institutional investors and the transfer item of stock liquidity and the level of corporate risk-taking under the condition of sensitivity of senior management compensation to the company's market value, and the adjustment effect is not significant under the condition of low sensitivity of senior management compensation to the company's market value, β_2 was significantly positive only in the highly sensitive group.

$$Risk = \beta_0 + \beta_1 LIQ_{i,t} + \beta' Control_{i,t} + \sum Industy + \sum Year + \varepsilon_{i,t} \quad (4)$$

4. Empirical analysis

4.1. Holding shares of stress-resistant institutional investors and corporate risk-taking: the adjustment effect of stock liquidity

The regression results are shown in column (1) of Table 2. The regression coefficient between the cross factor ($c.Res\#c.Liq$) of the shareholding ratio and stock liquidity of the stress-resistant institutional investors and the corporate risk-taking water ($Risk$) is negative, and significant at the level of 5%. This shows that the relationship between stock liquidity and the level of corporate risk-taking of stress-resistant institutional investors has a negative moderating effect. Moreover, the regression coefficient of stock liquidity (Liq) to corporate risk is not significant. Therefore, stock liquidity is a fully regulated variable. To sum up, stock liquidity will affect the inhibitory effect of

stress-resistant institutional investors on the level of corporate risk-taking. The enhancement of stock liquidity makes stress-resistant institutional investors play a more active governance role in corporate operation and management, thereby inhibiting the negative effect of stress-resistant institutional investors on the level of corporate risk-taking.

4.2. Action path of stress-resistant institutional investors influencing the corporate risk-taking level

The sample is grouped according to the sensitivity level of management compensation to company market value and divided into two sub-samples: low sensitivity and high sensitivity. Through grouping regression analysis, we will further test the specific action path of the stress-resistant institutional investors to the corporate risk-taking level, that is, through the occurrence of an intervention mechanism or exit threat mechanism. The results are shown in column (2) (3) of Table 2.

It can be observed from the (2) (3) column of Table 2 that under the condition of low management compensation - company market value sensitivity, the correlation coefficient between the cross factor ($RES_{i,t} * LIQ_{i,t}$) of the shareholding ratio of stress-resistant institutional investors and stock liquidity and the corporate risk-taking level (Risk) is -0.0449, which is not significant. On the contrary, under the condition of high management compensation - company market value sensitivity, The correlation coefficient between the cross factor ($RES_{i,t} * LIQ_{i,t}$) of the shareholding ratio and stock liquidity of the stress-resistant institutional investors and the risk level of corporates is -0.1470, which is significant at the level of 5%. It can be seen that stock liquidity can play a more significant role in regulating the sensitivity of management compensation to the company's market value. Therefore, this section verifies the mechanism analysis of this action path. Higher stock liquidity will enable stress-resistant institutional investors to participate in corporate governance more actively and play a governance role; And it will reduce its exit cost, thereby weakening the "herd effect" brought by institutional investors, and ultimately weakening the role of institutional investors in reducing the level of corporate risk-taking.

Table 2. Adjustment Effect of Stock Liquidity and Grouping Regression to Differentiate Salary Sensitivity

	(1)	(2)	(3)
	Moderating	Lower management	Higher management compensation
VARIABLES	Risk	Risk	Risk
RES	-0.0432***	-0.0246***	-0.0424***
	(-3.86)	(-2.72)	(-3.43)
LIQ	0.0134	0.0124	-0.0074
	(1.41)	(1.01)	(-0.37)
c.Res#c.Liq	-0.1745**	-0.0449	-0.1470**
	(-2.48)	(-1.44)	(-2.39)
Constant	0.1105***	0.1457***	0.1086***
	(4.77)	(3.35)	(3.71)
Controls	YES	YES	YES
Observations	17,487	8,744	8,743
R-squared	0.063	0.074	0.089

The value in the bracket is t-statistics; "*", "* *" and "* * *" indicate that the correlation coefficient is significant at the significant level of 10%, 5% and 1% respectively (double-tailed).

4.3. Robust test

4.3.1 Endogenous test

In the empirical research part of this paper, there are mainly endogenous problems of "two-way causality". Influenced by the industry type and the development of listed companies, institutional investors have convenient information in the capital market, so they may exit or enter the corporate

through "foot voting" due to corporate governance and management inaction. At the same time, in the case of low risk-taking capacity and easy collusion between management and institutional investors, stress-resistant institutional investors may be more active in investing in this type of corporates. Under the above conditions, the level of corporate risk-taking is the "cause", while institutional investors' shareholding is the "result", which is a "two-way causal" phenomenon. In this paper, the variables are treated with a lag period to test the robustness of the conclusions. The regression coefficient between the cross factor ($RES_{i,t} * LIQ_{i,t}$) of the shareholding ratio and stock liquidity of the stress-resistant institutional investors and the corporate risk-taking level ($Risk$) is still significantly negative. It supports the conclusion that stock liquidity negatively modifies the relationship between the shareholding of stress-resistant institutional investors and the level of corporate risk-taking. In addition, after testing the grouped regression analysis of differentiated remuneration sensitivity, the results are as shown in the (1) (2) column of Table 3. The regression coefficient between the cross factor ($RES_{i,t} * LIQ_{i,t}$) of the shareholding ratio of stress-resistant institutional investors and stock liquidity and the corporate risk-taking level ($Risk$) is -0.1187, which is significant at the level of 5%, supporting the analysis of the regulatory effect path of stock liquidity in this paper.

4.3.2 Variable substitution

This paper uses the earnings volatility index to measure the level of corporate risk-taking, and the observation period is 3 years. To further investigate the interest volatility of corporates in the longer term and the relationship between institutional investor shareholding and corporate risk-taking level in the longer term, we replace the corporate risk-taking level variable with the volatility of annual earnings in the 5-year observation period.

Through variable replacement operation, we observed that the correlation coefficient between the shareholding ratio (RES) of stress-resistant institutional investors and the risk level of corporates is still negative, and significant at the level of 10%. The regression coefficient between the cross factor ($c.Res\#c.Liq$) of the shareholding ratio and stock liquidity of the stress-resistant institutional investors and the corporate risk-taking level ($Risk1$) is -0.5048, which is significant at the level of 5%. The specific results are shown in column (3) (4) of Table 3. This result supports the original conclusion and increases its robustness.

Table 3. Endogeneity and variable substitution results of grouped regression analysis on differentiation of salary sensitivity

	(1)	(2)	(3)	(4)
	Low sensitivity	High sensitivity	Low sensitivity	High sensitivity
VARIABLES	Risk	Risk	Risk1	Risk1
RES	-0.0284**	-0.0322***	-0.0383*	-0.1229**
	(-2.19)	(-2.91)	(-1.95)	(-2.07)
LIQ	-0.0164	-0.0030	0.0175	0.1061
	(-1.18)	(-0.41)	(1.20)	(1.06)
c.Res#c.Liq	0.0526	-0.1187**	-0.2128	-0.5048**
	(0.65)	(-2.27)	(-0.77)	(-2.95)
Constant	0.0369	0.0935***	0.2840***	0.2836*
	(1.01)	(4.48)	(5.46)	(1.93)
Controls	YES	YES	YES	YES
Observations	7,444	7,455	8,744	8,743
R-squared	0.066	0.072	0.045	0.085

The value in the bracket is t-statistics; "*", "* *" and "* * *" indicate that the correlation coefficient is significant at the significant level of 10%, 5% and 1% respectively (double-tailed).

5. Conclusion

This paper selects Shanghai and Shenzhen A-share listed companies from 2011 to 2020 as the research sample and uses stock liquidity as the adjusting variable to analyze the relationship and impact of stress-resistant institutional investors on institutional investors' shareholding on corporate risk-taking. The research results are consistent with the previous theoretical analysis and research hypothesis: the relationship between the stock liquidity and the level of risk-taking of corporates has a negative moderating effect.

As an adjusting variable, stock liquidity has brought a negative adjustment to the relationship between stress-resistant institutional investors and the level of corporate risk-taking. This negative adjustment is a positive effect on the negative correlation between the shareholding ratio of stress-resistant institutional investors and the level of corporate risk-taking. That is, under the condition of high stock liquidity, the inhibition of stress-resistant institutional investors on the level of corporate risk-taking will be weakened. As mentioned above, stock liquidity can improve the level of corporate governance. Its mechanism is that high stock liquidity helps the regulatory role of stress-resistant institutional investors, so the inhibition of corporate risk-taking will be weakened. However, this paper has shortcomings and limitations, which are reflected in the lack of further research on the influencing factors and action path of the negative regulatory effect of stock liquidity on the relationship between stress-resistant institutional investors and corporate risk-taking levels.

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