The Influence of Institutional Investors on the Volatility and Return of Chinese Stock Market

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Abstract—This study investigated the effect of institutions' shareholding and holding period on the return and volatility of the shares in the Chinese stock market. 3267 stocks in the three boards of the Chinese stock market were chosen. Based on their data from the fourth quarter of 2018 to the third quarter of 2020, this paper researched the effect of the shareholding and holding period on the return and volatility mainly by the Fama-MacBeth regression method. Specifically, it scrolls to calculate the beta using time series data primarily and apply cross-section regression subsequently to perform statistical test. In addition to the population, we generated two-group subsamples depended on the shareholding and different boards, respectively, introduce lag variables to estimate their Inter-temporal impact. Besides, we also use Granger Causal Relation Test to avoid endogenous problem between institutions' shareholding and volatility. Additionally, different kinds of investment portfolios are constructed to derive the rules of institutional behaviors. According to the analysis, increasing institutional shareholdings exacerbated the fluctuations in stock price. Moreover, the institutional shareholding ratio has a significant positive effect on the stock yield. Meanwhile, there is a significant negative correlation between the duration of the holding and the volatility of the stock. A portfolio with higher institutional holding has a higher Sharpe ratio, while possesses a lower Sharpe ratio in a cross-time period. These results shed light for comprehensive understanding the behaviors of institutional investors in Chinese markets.

Keywords- institutional investor; volatility; return; Sharpe ratio; holding period

1 INTRODUCTION

Contemporarily, retail investors have played an important role in the Chinese A-share market. In terms of the data from the first quarter of 2019, the total circulation market value held by a general legal person (53.2%) and individual investors (31.6%) accounted for more than 80 percent of the total market, while institutional investors' shareholding only took up 11.6% [1]. This would lead to a foremost problem that the operation of the Chinese A-share market exists insufficient stability, as private investors are more susceptible to the impact from emotions and

policies compared with institutional investors who are known to be market stabilizers. In addition, two studies on the financial data for the period of 1991-2014 of the 116 economies and the data of 45 European countries from 1995 to 2015 showed that there's a positive relationship between the assets of institutional investors and GDP growth per capita [2, 3]. Hence, it is a trend for regulators to de-retail the A-share market and encourage investment from institutions, which in turn indicates that it is meant to investigate the impact of institutional investors on the stock market.

With the development of institutional investors in the Chinese A-share market nowadays, plenty of scholars have already analyzed their effects on the share market's volatility to explore whether institutions could play a role as a stabilizer. Liu et al. took Shanghai and Shenzhen A-shares from 2003 and 2011 as a sample. The empirical results show that the rise of shareholding of institutional investors intensifies stock volatility and increases the return of the current and next period; shares with higher shareholding owned by institutional investors have a higher sharp ratio in the current period, but lower value for the next period [4]. Additionally, Li et al. used data from the beginning of the first quarter of 2018 to the end of the third quarter of 2019, revealing that the holding period of institutional investors has a significantly positive relationship with corporate performance when only considering shareholders' equity. If only considering social benefits, company performance shows an upward trend and then decreases with the growth of the holding period. There exists an optimal holding period for institutional investors, which maximizes the enterprise performance [5].

Nevertheless, previous research has rarely investigated the impact of institutional investors on different boards. In terms of the above vacancy, it was of interest for this study to investigate how the shareholding and holding period of institutions affect the volatility and return of all the sections in Chinese stock market such as the Main board, Second board, and STAR Market, trying to find the common and different points. Therefore, the contributions of this thesis are presented as follows: firstly, this study has acquired shares data from the fourth quarter of 2018 to the third quarter of 2020 in total 3267 stocks based on the Main board, Second board, and STAR market. Subsequently, the Fama-MacBeth regression method is applied to investigate the impact of institutions shareholding and holding period on return and volatility in three boards market accordingly. Finally, it will also generate two groups of subsamples that relied on shareholding and the three boards market to research their intertemporal impact as well as the sharp ratio, which could make up the gap of the previous studies to some extent.

The findings of this paper contribute to the Chinese stock market literature in several ways. Firstly, this study analyzes the effect of institutional investors on the Chinese Main board, Second board, and Star board. Hence, it provides empirical evidence for a significant association between shareholding and holding period of institutions and the level of volatility and return. These results have practical implications for policymakers by emphasizing the importance of restricting the level of participation of institutional investors to make them play a role in stabilizing the stock market to a large extent. In other words, professional institutions are highly recommended to join the stock market. Still, it is not always optimal to have a higher proportion of shares invested because the shareholding should be in line with national and market conditions. For example, the US stock market dominated by institutions has been plagued by insufficient liquidity for a long time, which could cause share prices to fluctuate sharply in a short period. An example of this circumstance was the "flash crash" in 2010 [6]. Additionally, there's a study presented by 2020 that aims to search for a new approach for

institutional investors to optimize their investment strategy based on the current economic situation, which agrees with the research on the impact of the COVID-19 pandemic on total trade value that institutional investors are recommended to trade in stocks with large firms having good governance [7, 8]. Our findings illustrate the impact of institutions' trading activities on the stock market, suggesting that when choosing investment strategies, institutional investors should consider how they can maximize the total payoffs in the current period and the influence on share volatility and return in the next period.

This paper is organized as follows. Section 2 describes definitions of variables, the sample selection process, and the model used to analyze the data. Empirical results, including correlation analysis and the regression results, and the review of the development of institutional investors are presented in section 3. Finally, section 4 summarizes this paper.

2 DATA AND METHOD

2.1 Variables and sample selection

Primarily, the definition of variables utilized here are introduced. As for institutional investor shareholding, the explained variables and explaining variables include IO (investment ratio of the institutional investor at end of the quarter) and Vola (stock volatility calculated as the standard deviation of weekly return ratios in each quarter). Control variables include Price (the log value of stock close price at the end of the quarter), Size (the log value of market value for the stock at the end of the quarter), BM (the log value of book value at the end of the year divided to market value on April 30th of next year, leaving positive values only), Time (the log value of months after listing), Return (stock return in each quarter considering bonus), Return_1 (stock return of last quarter), turnover (the log value of stock turnover in each quarter).

Regarding to institutional investor's holding period, the explained variable is Return (average Return of each quarter), explaining variable is T, the average duration of holding position (Unit: month). Control variables include Size (average Size of each quarter), DAR (debt-to-assets ratio in the session), G (growth capacity in the session), H (shareholding ratio of first shareholder), Price (average price in each quarter), Time (average months after listing), turnover (average stock turnover).

We select samples of all the companies listed on the Main board, second board and star boards. All the data is quarterly collected from the wind database.

2.2 Model

We set Eqs. (1) and (2) to estimate the impact of institutional investors on return volatility as well as Eq. (3) to estimate the impact of volatility on the institutional investment ratio.

$$Vola_{i,t} = \alpha_t + \beta_t IO_{i,t} + r_t X_{i,t} + \varepsilon_{i,t} \tag{1}$$

$$Vola_{i,t+1} = \alpha_t + \lambda_i Vola_{i,t} + \beta_t IO_{i,t} + r_t X_{i,t} + \varepsilon_{i,t} \tag{2}$$

$$IO_{i,t+1} = \alpha_t + \lambda IO_{i,t} + \beta_t Vola_{i,t} + r_t X_{i,t} + \varepsilon_{i,t} \tag{3}$$

Further, we set Eqs. (4) and (5) to estimate the impact of institutional investment ratio on the current period of stock returns, next period of stock returns.

$$Return_{i,t} = \alpha_t + \beta_t IO_{i,t} + r_t X_{i,t} + \varepsilon_{i,t} \tag{4}$$

$$Return_{i,t+1} = \alpha_t + \beta_t IO_{i,t} + r_t X_{i,t} + \varepsilon_{i,t} \tag{5}$$

We also investigate the effect of duration of the shareholding on volatility and stock returns in terms of Eqs. (6) and (7).

$$Vola = \alpha + \beta_1 T + \beta' X_i + \varepsilon \tag{6}$$

$$Return = \alpha + \beta_1 T + \beta' X_i + \varepsilon \tag{7}$$

3 EMPIRICAL RESULTS

3.1 correlation analysis

Table 1 and Table 2 correlate the correlation between the interpreted variable and the explanatory variable, and the control variable is better, and the result is more significant, correspondingly. However, there is a certain correlation between the explanatory variable and the control variable, whereas the correlation is weak. This also shows that the explanatory and control variables sought in this paper are reasonable and can avoid the problem of multilinearity. However, correlation does not represent causation, which needs to be further explored later.

Table 1 Correlation for Shareholding

	shareholding	return	volatility	price	size	BM	time	return_1	turnover
shareholding	1								
return	0.0867*	1							
volatility	-0.0458*	0.2974*	1						
price	0.2234*	0.2479*	0.1468*	1					
size	0.4514*	0.1663*	-0.0228*	0.3284*	1				
BM	-0.0845*	-0.2692*	-0.2637*	-0.6449*	-0.1462*	1			
time	0.1117*	-0.0336*	-0.1079*	-0.5114*	0.1657*	0.3641*	1		
Return_1	0.0898*	-0.1192*	0.1745*	0.2038*	0.1449*	-0.2043*	-0.0356*	1	
turnover	-0.1945*	0.2055*	0.5492*	0.2957*	-0.2253*	-0.3701*	-0.4276*	0.1829*	1

Table 2 Correlation for Holding Period

	return	volatility	period	size	DAR	G	H	price	time	turnover
return	1***									
vola	0.43***	1***								
period	-0.1197***	-0.0967***	1***							

size	-0.1853***	0.172***	0.4701***	1***					
DAR	-0.1134***	-0.0478*	0.0774***	0.119**	1***				
G	-0.0452*	-0.2018***	0.0718***	0.1695***	0.0303*	1***			
H	0.0068	0.0257	0.0281	0.0573**	0.0418**	0.0351*	1***		
price	0.4094***	0.1362***	0.1433***	0.289**	-0.2667*	0.1011**	0.0546***	1***	
time	-0.1506***	-0.1705***	0.1065***	0.2138***	0.2703***	-0.071**	-0.0121	0.4826***	1***
turno ver	0.2283***	0.6584***	-0.1629***	-0.3752***	-0.1889***	-0.2713***	0.017	-0.2405***	-0.4582***	1***

3.2 Institutional investor development

Figure 1 shows the development of institutional investors in China from the fourth quarter of 2018 to the third quarter of 2020. The two curves in the figure represent the shareholding ratio and growth rate of institutional shareholding, respectively. Then we can see that the institutional shareholding ratio is stable from 2019 to the first half of 2020. Still, the growth rate has the characteristics of quarterly fluctuations. It is important to note that institutional shareholdings have been on a clear downward trend since the fourth quarter of 2018 and have since levelled off. It is worth noting that in the third quarter of 2020, the proportion of institutional holdings increased significantly, with a shareholding ratio of nearly 30%, a change due to the significant expansion of the Star board, which requires higher demands on investors, and the sector has fewer retail investors, mainly institutional investors. This change in proportion is not a data anomaly but is related to ongoing reformation of the securities market system and the continuous promotion of securities market prosperity for China.
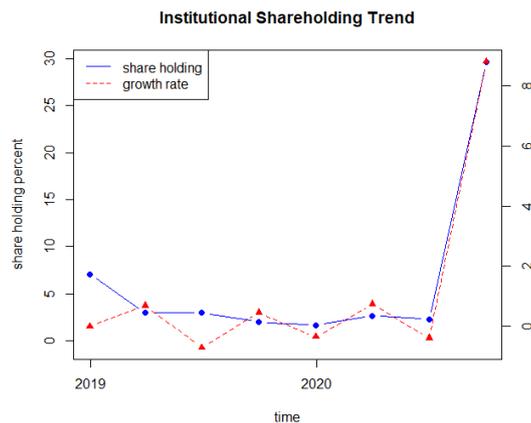

Figure 1 Shareholdings of Chinese institutional investors

Note: The proportion of institutional shareholdings counted in this paper is the situation after excluding financial stocks, so the overall proportion is lower than that of the whole market.

From the data point of view, Chinese securities market institutional investors will become more and more dominant. The impact will be more and more. Many studies on institutional investors that have not yet reached the unity of conclusions, Xu [9], using China's 2,005-2010 data, found that in China, institutional investors sheep effect led to greater market volatility than market stability. Liu et al. [10], based on data from 2,003-2011, have concluded that market volatility will increase as the proportion of institutional holdings increases. Zhao et al. [11] believe that although institutional investors have a herd effect, there is no denying its role in market stability. Shi & Wang [12] believe that institutional investors amplify volatility when the market is on the rise and reduce volatility on the way down. The inconsistencies in these studies may be related to the different stages of development of China's securities market and the inconsistencies in the market environment at that time. Drawing on the experience of the development of foreign mature securities market, China's institutional development still has a lot of room for improvement, and the development of institutional investors often needs reasonable institutional arrangements. The research of this paper will help to perfect the system design of China's securities market, expand the scale of investment of China's securities institutions, and promote the securities market to cultivate a good ecology [13].

3.3 Regression Results

3.3.1 Impact of institutional investors on volatility

The estimated results of Eq. (1) are shown in Table 3. Under the factors of controlling the share price and total market value, the current institutional stock holdings can significantly positively affect stock return volatility. Still, it can be seen that the impact is small. In terms of sub-samples, whether it is the high or low shareholding ratio, or sub-sector, the impact of institutional shareholding ratio on volatility has become less significant. As one can see, the higher the share price and the higher the book value ratio in the control variable, the opposite is not conducive to increasing the volatility. On the contrary, the size of the company and the turnover rate have a significant positive impact on the volatility of the stock. The situation of the star board is different attributed to two reasons. On the one hand, the return volatility is less affected by institutional stock holdings during the same period. On the other hand, the sample quantity is rather small (from the 4th quarter of 2018 to 3rd quarter of 2020) that leads to the lower significant of explanatory variables. The situation of the star board may have something to do with the inconsistent performance of other plates and their different operating rules.

Table 3 The current impact of institutional investors on return volatility

	Full sample	High institutional investors	Low institutional investors	Main board	Second board	Star board
	(1)	(2)	(3)	(4)	(5)	(6)
shareholding	0.0052* (1.81)	0.0051 (1.55)	-0.0351 （-1.00）	0.0048 （1.51）	0.0021 （0.32）	0.0175 (0.41)
price	-0.2248*** (-8.19)	-0.2431*** (-6.79)	-0.1456*** （-3.37）	-0.2147*** 	-0.1406** （-2.03）	0.584** (1.95)

	Full sample	High institutional investors	Low institutional investors	Main board	Second board	Star board
				（-7.10）		
size	0.2883*** (15.30)	0.1481*** (6.21)	0.5459*** （16.20）	0.2487*** （12.23）	0.3837*** （7.55）	0.2797 (0.95)
BM	-0.6311*** (-22.82)	-0.6224*** (-15.54)	-0.6113*** (-15.64)	-0.5907*** （-19.42）	-0.6792*** (-10.00)	-1.143** (-2.29)
time	0.4854*** (24.29)	0.2481*** (8.91)	-0.7086*** (24.36)	0.4647*** （21.81）	0.9245*** (13.81)	0.8741 (1.40)
return_1	0.0055*** (7.58)	0.0050*** (5.33)	0.0036*** (3.21)	0.0054*** （6.51）	0.0032** (2.11)	0.0028 (0.53)
turnover	1.8702*** (99.05)	1.7694*** (68.88)	1.9617*** (70.73)	1.7964*** （86.82）	2.1610*** (45.43)	4.34*** (9.41)

Table 4 Cross-term impact of institutional investors on return volatility

	Full sample	High institutional investors	Low institutional investors	Main board	Second board	Star board
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
volatility	0.1449*** (19.81)	0.1504*** （14.43）	0.1313*** (12.68)	0.1578*** (18.84)	0.1177*** (7.72)	0.0923 (1.15)
shareholding	0.0107*** (3.19)	0.0031 (0.82)	0.0845** （2.04）	0.0079** (2.12)	0.0004 (0.06)	0.0584 (1.10)

Table 4 is the cross-term effect of institutional investors' shareholdings on return volatility using Eq. (2). To save space, we didn't present the estimation results of control variables, also the following tables of estimated results. The shareholding ratio of institutional investors and the volatility of earnings in the next period have a significant positive effect on return volatility in the next period. It indicates that the presence of institutions has the effect of amplifying stock volatility, and volatility has a time correlation, indicating that there is a certain trend in stock prices. In terms of different plates, this effect is universal.

Table 5 Cross-term impact of institutional investors' shareholdings on return volatility

	Full sample	High institutional investors	Low institutional investors	Main board	Second board	Star board
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
volatility	1.4485e-01*** (7.80)	1.5080e-01*** (2.46)	0.1313*** （12.67）	1.5780e-01*** (6.84)	0.1184** (7.76)	0.1436*** (19.52)
shareholding_-1	1.0502e-02*** (3:03)	3.9876e-03 (1.01)	0.0844** （2.04）	6.7531e-03* (1:77)	0.0035 (0.44)	0.0104*** (3.00)

shareholding_delta	1.2318e-04*	-2.4716e-05	0.0008*	1.8149e-04**	-0.0001	0.0001*
	(1:80)	(-0.34)	（1.82）	(2:24)	(-0.93)	(1.77)

Because institutional shareholdings in the market have a weather vane role, its large amount of funds, especially the changes in institutional holdings, easily trigger large fluctuations in stock prices. This part further splits the institutional shareholding ratio, i.e., splits to the last shareholding ratio and the shareholding ratio changes, and carefully examines the impact of the institutional shareholding on the volatility of the stock. Table 5 results from the further splitting of the institutional shareholding ratio, from which the last institutional shareholding ratio and the increase in the shareholding ratio will increase the volatility of the stock. Still, in terms of the size of the impact, the current shareholding ratio will have a greater impact on the volatility of the stock.

Taken together, the increase in institutional shareholdings will be the method of stock volatility, whether institutional holdings in the current period or new holdings have a significant positive impact on stock volatility. In addition, the volatility of stocks also has a cross-period impact, further indicating that the stock price has a certain stickiness.

3.3.2 The impact of Volatility on institutional investors' shareholdings

Considering that institutions are mostly professional investors, it is also possible to choose highly volatile stocks in the choice of investment targets. There may be a two-way causal relationship. This part of the institution's shareholding ratio in the latter period as an attribute variable. According to Eq. (3), the current shareholding ratio and volatility serve as explanatory variables to explore whether the volatility of stocks impacts the shareholding ratio of institutions. Table 6 shows that stock volatility has no significant effect on institutional holdings, indicating that institutions do not tend to prefer highly volatile stocks.

Table 6 Impact of return volatility on institutional investors' shareholdings

	Full sample	High institutional investors	Low institutional investors	Main board	Second board	Star board
	(1)	(2)	(3)	(4)	(5)	(6)
shareholding	0.8734***	0.8714***	0.8533***	0.8879***	0.8137***	0.5813***
	（237.22）	（156.79）	(39.29)	(226.39)	(85.98)	(5.42)
volatility	-0.0037	-0.0112	-0.0057	-0.0074	0.0070	0.0611
	(-0.45)	（-0.71）	(-1.02)	(-0.82)	(0.36)	(0.31)
price_ln	0.1928***	0.1663***	0.1923***	0.1373***	0.4765***	0.3120
	（5.42）	(2.71)	(7.15)	(3.66)	(4.77)	(0.38)
size_ln	0.2351***	0.1995***	0.2422***	0.2145***	0.3616***	0.8655
	（9.59）	(4.87)	(11.34)	(8.48)	(4.88)	(1.06)
BM	0.0361	0.0054	0.0294	0.0483	0.0172	2.0669
	（1.00）	(0.07)	(1.20)	(1.28)	(0.17)	(1.48)

time_ln	-0.0303	-0.0981**	-0.0091	-0.0340	0.1756*	2.4700
	（-1.12）	(-1.97)	(-0.48)	(-1.24)	(1.68)	(0.95)
return_.3.0	-0.0032**	-0.0042**	-0.0001	-0.0025**	-0.0058**	0.0533**
	（-3.15）	(-2.37)	(-0.26)	(-2.20)	(-2.49)	(2.04)
turnover	-0.0959***	-0.1844***	0.0055	-0.0813***	-0.2509***	-0.8176
	（-3.33）	(-3.56)	(0.27)	(-2.68)	(-3.12)	-0.58

3.3.3 The impact on Return

It has been confirmed that institutional holdings amplify the volatility of stocks. Highly volatile stocks correspond to the possibility of high returns, but at the same time, the risk is also increasing. This part will verify the impact of institutional holdings on stock return by using Eq. (4).

Table 7 The current impact of institutionaL SHAREHOLDING AND VOLATILITY on return

	Full sample	High institutional investors	Low institutional investors	Main board	Second board	Star board
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
sharehol ding	0.1899***	0.1714***	0.7090***	0.1826***	0.1702**	0.9015*
	(8.60)	(6.08)	(2.93)	(7.71)	(3.18)	(1.81)
volatility	3.0976***	3.1420***	3.0125***	3.0009***	3.2604***	2.6488***
	(64.54)	(41.08)	(49.84)	(56.34)	(30.91)	(3.51)

From Table 7, the increase of institutional shareholding and the increase of volatility have a significant positive impact on stock return. Volatility has a greater impact on stock yield, confirming the stock market's classic saying: high returns mean high risk, and high risk behind the corresponding is high volatility. "From other control variables, share prices, asset size, and company life have a positive impact on yield, while book value ratio, return on equity in the first three months, and change rate of change is negative.

Table 8 The current impact on return of Institutional SHAREHOLDING, last VOLATILITY and its change

	Full sample	High institutional investors	Low institutional investors	Main board	Second board	Star board
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
sharehold ing	0.8734***	0.8716***	0.8523***	0.8879***	0.8138**	0.8739***
	(237.16)	(156.79)	(39.24)	(226.30)	(85.96)	(237.28)
volatility_.1	-0.0027	0.0073	-0.0176**	-0.0086	0.0207	-0.0020
	(-0.23)	(0.34)	(-2.23)	(-0.69)	(0.76)	(-0.17)
volatility_delta	-0.0037	-0.0128	-0.0060	-0.0073	0.0071	-0.0035
	(-0.45)	(-0.81)	(-1.09)	(-0.81)	(0.36)	(-0.43)

Table 9 The cross-term impact of Institutional SHAREHOLDING AND VOLATILITY on returns

	Full sample	**High institutional investors**	**Low institutional investors**	**Main board**	**Second board**	**Star board**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
volatility	-0.0686 （-1.08）	-0.1628* (-1.66)	0.0023 (0.02）	-0.0468 （-0.67）	0.0050 (0.03)	-0.1271 (-0.13)
shareholding	0.1644*** (5.91)	0.0478 (1.39)	1.4456*** （4.47）	0.1581*** （5.31）	0.0747 (1.07)	-0.0448 (-0.07)

The regression results of the regression for splitting the volatility based on Eq. (4) are summarized in Table 8. It is obvious that the shareholding possesses the significant effects, while impacts of other factors can be neglected. Similarly, there may be a cross-term impact on this issue, with the next issue of return on equity as an attributive variable to further examine whether the institutional shareholding ratio has a cross-term impact on stock return. Using Eq. (5), Table 9 summarizes the results from the current impact of the shareholding ratio on the return. In terms of volatility, the higher the volatility is less favorable to the institution's return ratio, but the less significant the impact, and the higher the institutional shareholding in the current period, the higher the rate of return. From the Table 10, the last institutional shareholding ratio has a significant positive cross-term effect on the stock return, while the volatility of the stock has a non-significant impact. This is still the case in different securities sectors, indicating the robustness and applicability of this result. Institutions as professional investors pay more attention to stock income, but the impact of the yield of more factors and how to affect this section will be explored. For control variables, the effects vary, and there are differences for different plates.

Table 10 The cross-term impact of VOLATILITY, institutional, last SHAREHOLDING and its change

	Full sample	**High institutional investors**	**Low institutional investors**	**Main board**	**Second board**	**Star board**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
volatility	-0.0666 (-1.05)	-0.1560 (-1.59)	-0.0062 (-0.07)	-4.5451e-02 (-0.65)	0.0121 （0.08）	-0.0567 (-0.89)
shareholding_-1	0.1918*** (6.64)	0.0691* (1.94)	1.4856*** (4.59)	1.7928e-01*** (5:83)	0.1236* （1.65）	0.1925*** (6.68)
shareholding_delta	-0.0001 (-0.2085)	-0.0008 (-1.24)	0.0098*** (2.67)	-8.6752e-05 (-0.13)	-0.0009 （-0.83）	-0.0001 (-0.30)
turnover	-1.4291*** (-6.57)	-0.3641 (--1.14)	-1.9449*** (-6.54)	-1.3573*** （-）	-3.4166** (-5.85)	-1.4343*** (-6.61)

The previous section has verified that volatility has a significant positive impact on returns. This section will consolidate the statement and obtain variation based on differentiation. It can be seen that for the institutional rate of return or the latter institutional shareholding ratio, the higher the current institutional shareholding ratio of the institution's yield may be higher. The change of the institutional shareholding ratio has no significant impact on this. It indicates that the impact of the institutional shareholding ratio on them mainly comes from the institutional shareholding ratio rather than the change in the shareholding ratio. The results show that volatility has no significant cross-period effect on yield.

3.3.4 Sharpe Ratio Analysis for different institutional shareholding ratio

Table 11 Portfolio Return, Standard Deviation, and Sharp Ratio based on Institutional Shareholding Ratio

	low									high
	1	2	3	4	5	6	7	8	9	10
Part I (Combined Current Return, Standard Deviation, Sharpe Ratio)										
return	2.1152	2.1116	2.1276	2.1191	2.1187	2.1052	2.1134	2.1153	2.1061	2.118
standard deviation	19.2252	19.2222	19.2313	19.2223	19.2221	19.2278	19.2215	19.2213	19.2266	19.2218
Sharpe ratio	0.1092	0.1091	0.1099	0.1095	0.1094	0.1087	0.1092	0.1093	0.1088	0.1094
adjusted return	-8.8811	-8.8782	-8.8603	-8.8707	-8.8691	-8.8838	-8.8766	-8.8816	-8.8817	-8.87
standard deviation	25.3419	25.3372	25.358	25.3421	25.3438	25.3372	25.3378	25.3368	25.3368	25.3429
Sharpe ratio	-0.351	-0.351	-0.35	-0.3506	-0.3505	-0.3512	-0.3509	-0.3511	-0.3511	-0.3506
	low									high
Part II (Combination Next Return, Standard Deviation, Sharpe Ratio)										
return	5.1125	5.1286	5.1157	5.112	5.1066	5.1066	5.1038	5.1193	5.116	5.1125
standard deviation	23.4128	23.4194	23.4079	23.4074	23.409	23.409	23.4109	23.4096	23.408	23.4128
Sharpe ratio	0.2177	0.2183	0.2179	0.2178	0.2175	0.2175	0.2174	0.218	0.2179	0.2177
adjusted return	-11.6002	-11.5959	-11.5873	-11.5891	-11.5891	-11.5972	-11.5807	-11.5927	-11.5893	-11.6002
standard deviation	25.2225	25.2175	25.2238	25.222	25.222	25.2171	25.2332	25.2191	25.2218	25.2225
Sharpe ratio	-0.4605	-0.4604	-0.46	-0.4601	-0.4601	-0.4605	-0.4595	-0.4603	-0.4601	-0.4605

Here, the size factor and book value ratio factor adjusted returns are chose the second and sixth quarter of the data. First the circulation market value and he book market value ratio are divided into five equal points. Subsequently, we calculate the market rate of return (equal investment) for each portfolio in the current quarter. Then, we utilize the original quarterly return of each stock minus the market rate of return of the corresponding portfolio to obtain the scale factor and book value ratio factor adjusted rate of return. As listed in Table. 11, there are almost no differences among all ratios including return, standard deviation, sharp ratios. These results indicate that the institutional shareholding ratio has almost no effects on portfolio, at least in the time period we selected.

3.3.5 Study of the Duration of the Shareholding

Institutions as professional investors, the amount of funds is larger that is unable to switch the positions due to the limited liquidity in Chinese market, i.e., often hold a longer period, which requires institutions to choose stocks to pay attention to more factors. This section explores the relationship between the duration of the holding and the volatility of the stock. Table 12 shows the effect of the institutional holding period on stock volatility using Eq. (6). As a result, it can be seen that the longer the institutional holding period, the lower the volatility of the stock tends to decrease, and the impact is greater. This also indirectly represents the institutional holding style, the institution's long-term holding helps to calm the volatility of the stock.

Table 12 Impact of institutional holding terms on stock volatility

	Full sample	Main board	Second board
	（1）	（2）	（3）
period	-0.0124**	-0.0148***	-0.0078
	(-2.45)	(-2.68)	(-0.66)
size_ln	0.1318***	0.1038***	0.2585***
	(4.53)	(3.315)	(3.55)
DAR	0.4099***	0.3340***	1.2691***
	(3.69)	(2.72)	(5.04)
G	0.0073	0.1987	0.3312
	(0.05)	(1.23)	(0.88)
H	0.0090	0.0180	-0.4471***
	(0.56)	(1.14)	(-2.61)
price_ln	0.0542	0.0886**	0.1089
	(1.55)	(2.32)	(1.19)
time_ln	0.2939***	0.3055***	0.6650***
	(9.42)	(9.38)	(6.07)
turnover	1.5130***	1.4428***	1.5838***
	(45.44)	(39.73)	(18.49)

As confirmed above, the institutional holding period significant positive affect stock volatility. This section will use Eq. (7) to explore the relationship between the institutional holding period and the return on equity, the longer the institutional holding period of the stock return is higher. Table 13 answers this question and shows that the longer an institution holds shares, the higher the return on equity both for the Main board and the second board.

Table 13 Impact of institutional holding terms on return on equity

	Full sample	Main board	SECOND BOARD
	（1）	（2）	（3）
period	0.0535*	0.0596*	-0.0550
	(1.88)	(1.95)	(-0.772)
size_ln	1.0974***	1.0930	1.1554***
	(6.71)	(6.32)	(2.60)
DAR	-0.6876	-0.5065	-0.0626
	(-1.10)	(-0.74)	(-0.041)

G	-1.7692**	-1.6224*	3.4438
	(-2.13)	(-1.82)	(1.513)
H	-0.1260	-0.1341	2.5037**
	(-1.40)	(-1.55)	(2.40)
price_ln	3.2206***	3.1349***	3.6111***
	(16.46)	(14.92)	(6.49)
time_ln	0.7788***	0.8350***	2.6851***
	(4.44)	(4.64)	(4.03)
turnover	2.1590***	1.9434***	2.0625***
	(11.54)	(9.69)	（3.95）

4 CONCLUSION

In summary, this paper demonstrates the effects of the shareholdings and holding period of institutions on the volatility and return of all the sections in the Chinese stock market, e.g., Main-board, second- board, and STAR market, based on the Fama-MacBeth regression method.

In summary, this paper concludes,

(1) Increasing institutional shareholder in the current period or new holdings exacerbated the fluctuations in stock price. And the volatility also has a cross-period impact due to the stickiness of stock price.

(2) The institutional shareholding ratio has a significant positive effect on the stock yield, including cross-time impact on yield.

(3) There is a significant negative correlation between the duration of the holding and the volatility of the stock. The longer an institution holds shares, the higher the return on equity for the main board and the second board.

(4) A portfolio with higher institutional holding has a higher Sharpe ratio, but it also has a lower Sharpe ratio in a cross-time period

These findings are meaningful. The idea of stratification is used to investigate based on the cross-time period and current period. Meanwhile, collecting, processing, and analyzing a total of 3267 stocks on the Main-board, Second-board, and STAR market, which is to explore the influence of institutional investors' shareholding ratio and duration of institutional investors on market volatility and yield rate. Despite institutional investors play an important role in the market, acquiring excess returns is uncertain. There are many different factors such as research cost, the pressure of price, and risk.

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