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Institutional Investors' Shareholding Ratio and Stock Return Volatility

Empirical Findings from the a Share Market

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***Abstract*—This paper uses the non-balanced panel data of A-share listed companies from 2001 to 2017 to conduct an empirical study on the relationship between the shareholding ratio of institutional investors and stock return volatility before and after the split share structure reform . It is found that after the reform , institutional investors stabilize stock return volatility in companies with a high proportion of institutional investors when other conditions are controlled . And companies with a low proportion of institutional investors, institutional investor's shareholding ratio is negatively correlated with stock return volatility. Before the reform and during the reform, companies with a high proportion of institutional investors, institutional investor's shareholding ratio is negatively related to the stock return volatility .Companies with a low proportion of institutional investors,the relationship is not obvious. In this paper, the two-stage least square method is used for further analysis. After eliminating the endogenous of the shareholding ratio of institutional investors and stock return volatility, the conclusion validates the conclusion of this paper.**

Keywords—Institutional investors; Stock return volatility; The split share structure reform; The two-stage least square method

I. INTRODUCTION

Institutional investors play an important role in the capital market .Institutional investors are indispensable participants in the capital market, and are also the intermediary between some institutional and individual investors and the stock market. Therefore, the influence of institutional investors on the stability of the stock market is crucial. The Chinese capital market has been an ultra-regular development institutional investor since 2001. The number of institutional investors and the proportion in the capital market have increased rapidly. A question that comes with it is whether institutional investors have played a role in stabilizing the market. In this paper, stock return volatility is used as the explained variable, and the shareholding ratio of institutional investors is used as the explanatory variable. The correlation between the institutional investors and stock return volatility under different ratios is tested separately. In order to solve the endogenous problem, the two-stage regression analysis method and the construction of simultaneous equations are used to analyze the relationship between institutional investors' shareholding ratio and stock return volatility.

II. LITERATURE REVIEW

Whether the growth of institutional investors can stabilize the stock market, domestic and foreign research on the impact of institutional investors on stock return volatility has three main conclusions: First, it is conducive to market stability. Second, increase market volatility; Third, institutional investors have no definite impact on stock return volatility.

A. Institutional Investors Are Conducive to the Stability of the Stock Market

Lakonishok, Shleifer and Vishny (1992)[1] use the holdings of 769 duty-free funds to assess the potential impact of their trading on stock prices and find that the "herding behavior" of institutional investors does not necessarily lead to an increase in volatility in the market. Liu Guang (2018)[2] used public information to construct the investor trust index, and then established a static panel data model to reveal its impact on stock price fluctuations. The discovery of high-quality information disclosure can reduce the "noise" of the market and the limited rationality of investors, and enhance the stability of stock prices and reduce market risk through investor trust.

B. Institutional Investors Have Increased the Volatility of the Stock Market

Avery, Zemsky (1998)[3] constructed a game model between market makers and insider traders, and found that "herd behavior" generated under information asymmetry will lead to a short-term mispricing that exacerbates stock price volatility. Liu Zhenbiao, He Tian (2016)[4] used the TGARCH model to study the relationship between institutional investors and China's stock index volatility. Research shows that institutional investors have positively affected China's stock market volatility whether or not considering the impact of macroeconomic factors on the stock market. Institutional investors have not played a role in stabilizing the stock price fluctuations of listed companies.

C. Institutional Investors Have no Definite Impact on Stock Return Volatility

Li Yong, Wang Mancang (2011)[5] combined the herd effect and the Fama-MacBeth cross-section regression method to analyze the influencing factors of stock return volatility. The results show that there is a correlation between

herd behavior and institutional variables such as shareholding ratio and scale. At the same time, after considering the variables such as herd behavior and turnover rate, the coefficient of the influence of institutional shareholding ratio on stock price volatility is significantly smaller, and the influence of different institutional investors on stock return volatility is different. Liu Jingjun and Xu Haoping (2012) [6] According to the trading characteristics of China's securities investment funds, institutional investors are divided into long-term investors and short-term investors according to their turnover rate characteristics. It has been found that changes in the trading of short-term institutional investors have led to increased market volatility, while long-term institutional investors have a role in stabilizing the market.

III. Research Design

A. Sample Selection and Data Sources

The data in this paper is from the RESSET and CSMAR database, using stata for data analysis.Since the Chinese capital market has been an ultra-regular development institutional investor since 2001, the sample data before 2001 is very small. The research in this paper mainly selects 2066 listed companies that issued only A shares in 2001-2017, a total of 24,040 observations. The samples were screened mainly according to the following principles:1) Excluding financial listed companies with strong characteristics; 2) Companies that can obtain relevant data for at least 5 consecutive years in 2005-2017; 3) Excluding debt ratios greater than 100% and companies with a net profit margin greater than 100% or less than -100% with singular values; 4) eliminating missing values; 5) in order to control the effects of extreme values, this paper has 1% up and down winsorize processing for all variables Based on the above principles, 2,066 listed companies were selected as the final research objects.

B. Model Design and Variable Definition

In this paper,the model for examining the correlation between institutional investors'shareholding ratio and stock return volatility is:

$$Vol_{it}=\alpha_0+\alpha_1 Inst_{it}+\alpha_2 Size_{it}+\alpha_3 Lev_{it}+\alpha_4 BM_{it}+\alpha_4 Turnover_{it}+\alpha_5 Age_{it}+\varepsilon$$

The stock return volatility (Vol) of the interpreted variable is calculated as the standard deviation of the stock's daily return rate during the year.The interpret variable the institutional investor's shareholding ratio (Inst) is the ratio of stock market value to total market value of funds, qualified foreign investors, brokers, insurance social security funds, trusts, financial companies, banks, and non-financial listed companies. Referring to Xuan Vinh Vo (2016)[7], Xu Chaojin (2011)[8], Liu Jingdong and Xu Haoping (2012) on the relationship between institutional shareholding and stock return volatility, we also define other control variables. Variables asset size and asset- liability ratio which is mainly consider the complany's characteristics.Variables turnover rate, book-to-market ratio and age of listed companies mainly consider the stock characteristics.The asset size(Size) is expressed by the logarithm of the company's total market capitalization. The asset-liability ratio (Lev) is the quotient of the company's total liabilities and total assets. The turnover rate (Turnover) reflects the liquidity of the stock,the paper uses annual turnover rate data. The higher the turnover rate, the more people pay attention to the company. The book-to-market ratio (BM) is measured by the book value of the company divided by the market value. The book-to-market ratio can measure the growth of the company. The smaller the book-to-market ratio, the higher the growth. The listed company's age (Age) is the time of initial public offerings.

IV. Empirical Result And Analysis

A. Descriptive Statistics

1) Full sample descriptive statistic: Table I shows the descriptive statistics for the main variables. The mean value of Vol is 0.028, the median is 0.027, and the standard deviation is 0.011. The distribution is relatively uniform. The average value of Inst is 8.931%, which occupies a important location in the listed companies, and the span of institutional investors' shareholding ratio is relatively large, the minimum value is 0%, and the maximum value is 64.781%. Explain that the investment of institutional investors can have a certain impact on the volatility of markets.

TABLE I. FULL SAMPLE DESCRIPTIVE STATISTIC（2001- 2017, N=2066 , T=17 , NT=24040）

Var	mean	median	min	max	sd	skewness	kurtosis
Vol	0.028	0.027	0.015	0.095	0.011	3.316	19.005
Inst	8.931	6.886	0	64.781	11.665	2.638	10.922
Size	22.165	22.195	20.139	25.148	0.912	0.282	3.678
Lev	0.416	0.418	0.009	0.882	0.211	0.04	2.193
BM	0.762	0.603	0.136	3.119	0.545	1.634	6.799
Turnover	322.768	244.665	17.785	1249.88	274.137	1.255	4.191
Age	16.665	18	7	26	5.688	-0.349	1.875

2) Sub sample descriptive statistic: It can be seen from the Table II that in (1) and (4), the companies with low proportion of institutional investors are more volatile; at the same time, the size is smaller, the asset-liability ratio is lower,book-to-market ratio is lower, and the company's market age is shorter. It shows that institutional investors prefer to invest more in companies with lower stock return volatility, larger scale, higher asset-liability ratio, larger book-to-market ratio and higher listing age.There is little difference in stock return volatility between companies with low institutional shareholding and high proportion of institutional investors in (2) and (3), and institutional investors prefer companies with lower asset-liability ratio, higher growth and shorter listing age, which is the opposite of the preference after the stock reform.

TABLE II. SUB SAMPLE DESCRIPTIVE STATISTIC

	2001-2017		2001-2004		2005-2006		(4) 2007-2017	
Var	***Linst mean***	***Hinst mean***	***Linst mean***	***Hinst mean***	***Linst mean***	***Hinst mean***	***Linst mean***	***Hinst mean***
Vol	0.030	0.027	0.023	0.021	0.029	0.030	0.033	0.026
Inst	1.883	15.879	0.304	13.748	0.792	24.277	2.656	14.759
Size	21.866	22.459	21.350	21.811	20.781	21.367	22.161	22.697
Lev	0.413	0.418	0.483	0.422	0.523	0.491	0.370	0.419
BM	0.686	0.837	0.722	0.701	1.540	1.337	0.536	0.829
Turnover	310.232	335.127	92.203	86.270	193.732	220.83	405.904	376.596
Age	16.377	16.948	20.735	19.917	19.827	19.050	13.830	17.016

[a.] Note: the sample is divided into three intervals before the split share structure reform (2001-2004),during the split share structure reform (2005-2006) and after the split share structure reform (2007-2017), and the Sample Firms is divided into two groups with the fiftieth percentile of the institutional investor's shareholding ratio, and the group with lower institutional shareholding is lower than the 50 percentile were expressed in Linst, the group with higher institutional shareholding is higher than the 50 percentile were expressed in Hinst.

B. Correlation Analysis

Table III shows the person correlation coefficient between the variables, and there is a significant positive correlation between institutional investor's shareholding ratio and stock return volatility, which indicates that the increase in institutional investor's shareholding ratio is not conducive to stabilizing the stock return volatility. At the same time, the stock return volatility is significantly positively correlated with the size, asset-liability ratio and turnover ratio, and is significantly negatively correlated with the book-to-market ratio and listing age.

In addition, the correlation coefficient between institutional investors and other variables in the table also indicates some characteristics of institutional investors' preference for companies. Institutional investors are more inclined to invest in larger scale, higher leverage, higher book-to-market ratio and longer listed age. That is, institutional investors tend to invest in companies with specific attributes to determine the value of their holdings.

C. Regression Analysis

Table IV is the result of full sample regression.It shows that before the split share structure reform the coefficient of Inst is significantly negative at the level of 1%. During the reform the coefficient of Inst is also negative,but the coefficient is smaller and not significant.However the Inst coefficient after the reform is significantly positive.Showing that with the promotion of the split share structure reform, the stabilizing effect of institutional investors on the stock return volatility has gradually weakened, and after the reform the institutional inves tors has intensified the volatility of the stock price.

Table V divides the whole sample into companies with a low proportion of institutional investors and companies with a high proportion of institutional investors. It can be seen that before and during the reform, the Inst coefficient of the companies with high shareholding ratio are all negative and significant, but the Inst coefficient of the companies with low shareholding ratio is not significant, that is to say, the company's share price with high proportion of institutional investors is more stable before and during the split share structure reform. After the reform, the Inst coefficient of the companies with low institutional shareholding ratio is significantly negative, and the Inst coefficient of the companies with high institutional shareholding ratio is significantly positive in the 1% level.Which indicates that for the companies with low institutional shareholding ratio the institutional investors are beneficial to the stability of the stock price,but for the companies with high institutional shareholding ratio the institutional investors will aggravate the fluctuation of the stock price.

TABLE III. CORRELATION COEFFICIENT OF MAIN VARIABLES

	Vol	**Inst**	**Size**	**Lev**	**BM**	**Turnover**	**Age**
Vol	1						
Inst	0.062***	1					
Size	0.137***	0.115***	1				
Lev	0.028***	0.070***	-0.140***	1			
BM	-0.120***	0.035***	-0.093***	0.401***	1		
Turnover	0.194***	0.002	0.074***	0.022***	-0.051***	1	
Age	-0.070***	0.076***	-0.142***	0.329***	0.348***	-0.048***	1

[b.] Note: ***, **, * indicate significant at the 1%, 5%, 10% levels, respectively (two-tailed)

TABLE IV. FULL SAMPLE REGRESSION ANALYSIS

	2001-2017	**2001-2004**	**2005-2006**	**2007-2017**
Vol	***Coef.***	***Coef.***	***Coef.***	***Coef.***
Intercept	-0.0052162 (-1.29)	0.0378138*** (16.22)	0.025452*** （6.46）	-0.0331472*** （-5.18）
Inst	0.0000471*** (5.83)	-0.0000239*** (-4.23)	-9.60E-06 （-1.2）	0.0000617*** （5.13）
Size	0.0014393*** (7.73)	-0.0009454*** (-8.79)	-0.0000817 （-0.42）	0.002729*** (9.36)
Lev	0.0054154*** (14.81)	0.0035981*** (7.26)	0.0068271*** （8.62）	0.0060277*** (14.22)
BM	-0.0027114*** (-21.1)	-0.001711*** (-9.39)	-0.0022412*** （-10.9）	-0.0069025*** （-26.77）
Turnover	7.25E-06*** (27.05)	0.00004*** (26.09)	0.0000213*** （20.78）	4.97E-06*** （14.77）
Age	-0.0000739*** (-7.69)	0.0000361 (1.51）	0.0000929** （2.39）	0.0000932*** (7.23)
R-squared	0.0736	0.3051	0.2543	0.0856
Root MSE	0.01096	0.00399	0.00546	0.01186
No of Obs	24040	4045	2262	17733

[c.] Note:To prevent the effects of heteroscedasticity, a robust test is used in the regression and the values inparentheses are t statistic. The following tables are the same.

TABLE V. SUB SAMPLE REGRESSION ANALYSIS

	2001-2004		2005-2006		2007-2017	
Vol	***Linst***	***Hinst***	***Linst***	***Hinst***	***Linst***	***Hinst***
Intercept	0.048083 (11.36)	0.028828 (10.56)	0.0304529 (4.89)	0.0243066 (4.49)	-0.17146 (-24.86)	0.090823 (19.89)
Inst	-8.99e-07 (-0)	-0.000022 (-3.48)	-0.000104 (-0.62)	-0.000018 (-1.64)	-0.00097 (-13.36)	0.000334 (25.92)
Size	-0.001493 (-7.49)	-0.0004633 (-3.85)	-0.0003194 (-1.03)	-0.000053 (-0.21)	0.009053 (28.74)	-0.00299 (-15.12)
Lev	0.00355 (4.78)	0.003456 (5.96)	0.0038192 (3.92)	0.0107057 (8.33)	0.001856 (2.80)	0.004936 (14.88)
BM	-0.001629 (-5.76)	-0.001825 (-9.10)	-0.0014866 (-5.65)	-0.003152 (-9.55)	0.001099 (2.51)	-0.00669 (-23.09)
Turnover	0.000043 (19.21)	0.0000367 (17.58)	0.0000222 (14.47)	0.0000207 (14.02)	4.17e-06 (9.51)	1.97e-06 (7.65)
Age	0.000097 (2.67)	-0.000027 (-0.88)	0.000104 （1.95)	0.0001042 (1.91)	0.000253 (11.14)	0.000082 (5.72)
R2	0.3095	0.2763	0.2860	0.2437	0.3360	0.4650
Root MSE	0 .00436	0.00353	0.00484	0.00598	0.01168	0.00673
No of Obs	2024	2021	1131	1131	8575	9158

V. ENDOGENOUS PROBLEM

In order to solve the endogeneity between stock return volatility and institutional investor's shareholding ratio, this paper uses two-stage least squares estimation (2SLS) to obtain consistent estimators. In this paper, the institutional investor's shareholding ratio is taken as the explanatory variable of the first stage, and the instrument variable regression is added to the right side of the equation to obtain the coefficients of each explanatory variable in the first stage, and then the coefficient of each explanatory variable is used to calculate the fitting value of the institutional investors; The fitted value is used as the explanatory variable of the second-stage regression, and the explanatory variable is the stock return volatility; finally, the second-stage regression result is analyzed.

Before the regression, it is first necessary to determine the appropriate instrumental variables. It is best to choose variables that are not related to the interpreted variables and that are highly correlated with the endogenous explanatory variables as [instrumental variables. We can use the person correlation coefficient test to find that the company's market share (MS) has little correlation with stock return volatility and is not significant, and the correlation coefficient with the investment investors is large and significant. Therefore, we use market share as a tool variable for two-stage regression of unbalanced panel data.

Table VI shows the results of the two-stage regression of fixed effects. The results are the same as those in Table V. After the split share structure reform, the institutional investors of the group with low institutional shareholdings ratio are negatively correlated with stock return volatility, the institutional investors of the group with high institutional shareholdings ratio are positively and significant correlated with stock return volatility .This shows that for a company with a low proportion of institutional investors, the greater the institutional equity, the smaller the stock return volatility; for companies with a high proportion of institutional ownership, the greater the institutional equity, the greater the stock return volatility.This result provides further support for the previous conclusions.

TABLE VI. TWO-STAGE REGRESSION RESULTS OF FIXED-EFFECT

	2001-2004		2005-2006		2007-2017	
Vol	***Linst***	***Hinst***	***Linst***	***Hinst***	***Linst***	***Hinst***
Intercept	0.1542671 (1.16)	0.0667327 (0.65)	0.031851 (0.3)	-0.285012 (-1.1)	-0.112261 (-22.25)	0.0533792 (6.16)
Inst	0.0166014 (0.67)	0.0000576 (0.24)	0.0041384 (0.95)	0.0005688 (0.18)	-0.004036 (-4.92)	0.0011018 (17.24)
Size	-0.006698 (-1.02)	-0.00224 (-0.47)	-0.0004438 (-0.09)	0.0139895 (1.78)	0.0069179 (31.05)	-0.0019334 (-5.68)
Lev	0.0074796 (1.64)	0.0020946 (0.67)	0.0077507 (1.27)	-0.00573 (-0.19)	0.0043094 (4.57)	-0.0022341 (-2.33)
BM	-0.002272 (-1.33)	-0.002553 (-0.61)	-0.0029087 (-2.34)	0.0017346 (0.09)	0.0017563 (3.88)	0.0016642 (2.41)
Turnover	0.0000477 (6.11)	0.0000401 (9.38)	0.0000223 (3.85)	0.0000141 (0.44)	5.23E-07 (1.36)	0.00000068 (1.81)
F	0.41	2.05	0.79	0.39	9.42	2.17
No of Obs	2024	2021	1131	1131	8575	9158

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