


Article

# Institutional Investors and Corporate Performance: Insights from China

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**Abstract:** This study uses the annual data of Chinese A-share listed companies held by institutional investors during the period of 2005–2016 for empirical analysis. First, this study uses the panel regression model to explore the relationship between institutional ownership and stock return volatility. Then, the CAPM one-factor model and the Fama–French three-factor model are used to analyze the relationship between institutional ownership and idiosyncratic risks. Finally, we estimate the relationship between institutional ownership and corporate governance. Furthermore, we compare the empirical results before, during, and after the crisis. This study uses the Hausman test and the endogenous test to validate the results. The empirical results show that the management behavior of independent institutional investors is more obvious post-crisis. However, gray institutional investors have no impact on idiosyncratic risks. In the regression of the CAPM one-factor model, domestic institutional investors have effectively reduced the idiosyncratic risks before the financial crisis. Foreign institutions' monitoring performance before, during, and after the crisis is not obvious. All institutional ownership has a significant positive impact on the top 10 shareholders, but independent and domestic institutional ownership has a significant negative impact on senior shareholders. Institutional ownership has little impact on the movement of the first shareholder and CEO.

**Keywords:** institutional investors; financial tsunami; volatility; idiosyncratic risks; corporate governance

## 1. Introduction

The role of institutional investors in corporate governance is becoming increasingly important. Many economists believe that the 2007–2008 global financial crisis was the worst financial crisis since the Great Depression of the 1930s. This crisis raised awareness of the importance of corporate governance. As a major shareholder, these professional institutional investors offer the potential to strengthen oversight of corporate governance [1,2]. McNulty and Nordberg [3] argue that institutional investors play an important role as stewards in corporate governance.

Institutional investors in the Chinese stock market are relatively new, and their stocks have experienced rapid growth. Since China joined the World Trade Organization (WTO) in 2001, the total investment quota of qualified foreign institutional investors (QFII) from June 2003 to September 2010 has increased from US \$425 million to US \$19 billion [4]. However, after seven years of the 2007–2008 global financial crisis, this quota increased significantly to \$81.738 billion at the end of September 2016 [5]. Liu [6] believes that China will speed up its approval of joint ventures for security companies

and fund companies, in which foreign investors have a majority stake, which is a sign that policymakers are pushing for the opening of the national financial system.

The Chinese market has its own particularities. In China, we must seriously consider the impact of national policies on corporate ownership [7]. As reported by Naughton [8], investors need to consider the unique characteristics of China, such as the influence of state-owned enterprises (SOEs) and government policies. At the same time, in recent years, through the reform of the share-trading structure and the listing policies and rules of listed companies, the foundation and supervision of China's stock market have undergone tremendous changes [9].

Continuing our previous research [10,11], this study further explores the role of institutional investors on stock market stability and corporate governance. Most emerging stock markets often have high price volatility because of various uncertainties, such as unexpected market crashes caused by political or financial crises. The recent global financial crisis has demonstrated large stock price volatility and its impact on emerging market investors [12–14].

A large body of literature explores whether institutional investors influence the volatility of stock returns [9,15,16]. Although institutional investors have long been regarded as a financial market, especially in emerging economies, the question of the impact of institutional investors on stock market stability has been questioned. After the recent financial crisis, institutional investors have been subject to increasing public scrutiny because it is widely believed that the use of leverage and short-term financing by institutional investors is the main cause of financial volatility. Policy makers, practitioners, and academic researchers have emphasized that institutional investors may be the cause of stock market volatility [17].

This study focuses on whether institutional ownership affects the risk-taking or corporate governance of Chinese A-share listed companies. This study used the annual data of Chinese A-share listed companies held by institutional investors during the period from 2005 to 2016. The reason for choosing this period for the study period was that this period was a complete period including the financial tsunami before the US–China trade. During this period, QFII has grown in China's financial market. The purpose of this study is to explore whether institutional investors use their regulatory responsibilities as active ownership and compare the diversified management behavior of institutional investors in the three periods of the financial tsunami (i.e., pre-crisis, crisis, and post-crisis).

In order to test the robustness of the empirical results, this study used a panel regression model to explore the relationship between institutional ownership and stock return volatility, idiosyncratic risks, and corporate governance variables using the ordinary least squares (OLS) method. Then, this study further compares the empirical results of the three periods of the financial tsunami (i.e., pre-crisis, crisis, and post-crisis). This study also verified the model's reliability. That is, this study used the Hausman test to determine which model is more appropriate between the fixed effect model and the random effects model. Finally, this study conducted endogenous testing to address endogenous problems.

Through empirical evidence, this study is expected to contribute to the institutional ownership literature. At the same time, from a market perspective, this study seeks to further understand what types of institutional investors have management responsibilities as active ownership [3] and institutional investors' investment behavior during the financial tsunami.

The empirical results show that independent institutional investors exercise their supervisory responsibilities as active ownership, and the management behavior of such independent institutional investors is more obvious post-crisis. However, gray institutional investors have no impact on idiosyncratic risks. On the other hand, in the regression of the CAPM one-factor model, domestic institutional investors have effectively reduced the idiosyncratic risks before the financial crisis. As for foreign institutions, their monitoring performance is not obvious. The empirical results of corporate governance have shown that institutional ownership always has a significant positive impact on the top 10 shareholders, but independent and domestic institutional ownership has a significant negative impact on senior shareholders. Institutional ownership has little impact on the personnel changes of the largest shareholder and CEO.

Therefore, our findings are important because they provide a broader view of institutional investors' motivations and activities. These findings have not only changed corporate governance but have also changed board decisions and operational practices, as well as measures for assessing performance. In addition, the results can be applied to national decision makers to improve the quality of governance at the government level, enabling institutional investors to generate sustainable returns and promote the economic and governance performance of companies in developing countries.

The organization of the project is as follows. In Section 2, we review the literature on the relationship between institutional ownership and corporate stock return volatility and corporate governance. In addition, the hypothesis of this study is presented. Section 3 presents methods, data, and variables for empirical analysis. Section 4 shows the empirical results of fixed model regression and endogenous testing. Section 5 describes the conclusion.

## 2. Literature Review and Hypothesis

Some empirical papers have shown that individual investors usually follow a reversal trading strategy [18,19]. Unlike individual investors, institutional investors are trustees and may be subject to agency conflicts. As a result, they are bound by a number of rules designed to prevent them from using other people's money to speculate. For example, the 'Prudent-Man' rule allows institutional investors to invest most of their holdings in prudent stocks. In past studies, age, low volatility, and stable dividends have been used as indicators of caution [20].

In general, individual investors sell fast and buy slowly, indicating that individual investors trade for non-information reasons [21]. However, institutional investors will choose to manage well-managed companies [8]. In addition, they can improve the quality of information in the domestic stock market in a good corporate governance environment, thereby significantly reducing transaction costs and risk exposure [22].

As a major shareholder, these professional institutional investors can strengthen the monitoring of corporate governance [1]. They play an important stewardship role in corporate governance [3], which aims to promote the company's long-term success and benefit the company, investors, and the economy as a whole. The management of institutional investors is not just about voting but also about supervising and communicating with the company on issues such as strategy, performance, risk, and capital structure [23]. In addition, it is widely believed that institutional investors know more about the situation than individual investors do [24]. West [25] shows that an increase in the price information content will reduce fluctuations in stock returns. Therefore, a higher level of institutional ownership will be associated with prices that are more informative.

In 2002, the China Securities Regulatory Commission (CSRC) issued the Interim Measures for the Administration of Domestic Securities Investment by Qualified Foreign Institutional Investors, allowing QFII to convert a certain amount of foreign capital into RMB and directly invest in China's domestic A-share market. Therefore, the process of opening up China's capital market has taken a big step forward. This process has introduced QFII's advanced investment and management skills to local Chinese investors, enabling them to allocate financial resources more efficiently, as the proportion of domestic and international institutional investors increases. Chinese companies and investors have also introduced modern corporate governance.

On the other hand, according to *China Securities Journal*, Li Chao, vice chairman of the China Securities Regulatory Commission, also said that China must accelerate the opening of its capital market, build a globally competitive bank, and improve the trading links with Hong Kong stocks. As can be seen from the above analysis, the role of financial institutions in China has changed over time due to changes in China's regulations. For this study, institutional investors are expected to contribute to the negative correlation between institutional ownership and volatility.

As shown by Ferreira and Matos [26], institutional owners may be related to the companies they invest in. Institutional investors in China can be divided into independent institutional investors and

gray institutional investors. The relevant theories and knowledge about these institutional investors are shown below.

Independent institutional investors are “active institutions” who like to collect information and have fewer restrictions on investment [26]. There are fewer business relationships with investment companies, and revenue and management costs are largely dependent on performance. Independent institutional investors are more concerned with corporate governance and management practices of their investment companies. Therefore, this study also expects such institutions to reduce the volatility of stock returns. However, grey institutional investors are “passive institutions” that have more business relationships with the companies they invest in [26], hold shares without regard to management practices, and engage in less supervision of the governance of their investment companies. Therefore, this study assumes that gray institutional ownership does not reduce the volatility of stock returns and proposes the following assumptions:

**Hypothesis 1a.** *Independent institution investors have a negative impact on stock return volatility and idiosyncratic risks and improve the efficiency of corporate governance.*

**Hypothesis 1b.** *Grey institution investors have a positive impact on stock return volatility and idiosyncratic risks.*

Institutional investors in China can be classified as domestic institutional investors and QFIIs based on geographic sources. According to previous research, domestic institutional investors in China are mainly composed of mutual funds belonging to independent institutions [10,27]. Domestic institutional investors are more familiar with the local market economy environment and have the advantage of information asymmetry. It is worth noting that QFII plays a more important role in promoting changes in corporate governance practices than domestic counterparts, so they are often considered active institutions [1].

However, the research in the literature provides mixed results for the impact of foreign ownership on the volatility of stock returns. On the one hand, these studies suggest that foreign investors have advanced management skills and marketing expertise that can provide better corporate control and improve the corporate governance environment [22,28–30], so QFII can reduce stock return volatility. On the other hand, many authors document the positive effects of fluctuations in foreign ownership and stock returns. They believe that foreign capital may undermine the stability of the domestic stock market, and these capitals are also seen as the main cause of the financial crisis [15,31–34]. Thus, QFII can increase the volatility of stock returns. However, this study expects that QFII will have more incentives to monitor corporate governance and improve corporate governance efficiency. Therefore, this study proposes the following assumptions:

**Hypothesis 2a.** *Benefiting from the advantages of information asymmetry, domestic institutional investors have a negative impact on stock return volatility and idiosyncratic risks and improve the efficiency of corporate governance.*

**Hypothesis 2b.** *As an active institution, QFIIs have a negative impact on stock return volatility and idiosyncratic risks and improve the efficiency of corporate governance.*

In addition, the paper compares the impact of institutional ownership on volatility, idiosyncratic risks, and corporate governance before, during, and after the financial crisis. Therefore, this study proposes the following assumptions:

**Hypothesis 3.** *In the three periods of the financial tsunami (i.e., pre-crisis, crisis, and post-crisis), institutional ownership affected volatility, idiosyncratic risks, and corporate governance.*

### 3. Methodology

In this section, this study describes the variables and methods we used in our study. Our data on institutional holdings were collected from the S&P capital IQ and QFII data from the China Stock Market and Accounting Research (CSMAR) database. This study selects the annual data covering the period of 2005–2016, a period including financial crisis. This study examines all companies held by institutional investors listed in China's A-shares, both in the Shanghai Stock Exchange (SSE) and the Shenzhen Stock Exchange (SZSE) but excludes the special treatment companies.

To make the results more robust, our empirical method is as follows. First, this study uses the Hausman test to determine which model is more suitable between the fixed effects model and the random effects model. Furthermore, this study performs endogenous tests to solve endogenous problems. The data structure of this study that combines the longitudinal of a time series and a cross-section. Furthermore, in order to avoid ignoring the bias or inefficiency estimates of certain variables in the time series or cross-sectional data, we use the panel data estimation to get the best estimate.

Therefore, in order to test the relationship between institutional ownership and firm-level stock return volatility, idiosyncratic risks, and corporate governance, this study applies three regression models to the panel estimation, proposed by Lin et al. [10] and Lu [11], which are

$$Vol_{i,t} = \beta_0 + \beta_1 * IO_{i,t} + \beta_2 * Con_{i,t} + \gamma_2 F2_i + \dots + \gamma_n F_n + \delta_2 Y2_t + \dots + \delta_T YT_t + \varepsilon_{i,t} \quad (1)$$

$$\sigma_{\varepsilon_{i,t}}^2 = \beta_0 + \beta_1 * IO_{i,t} + \beta_2 * Con_{i,t} + \gamma_2 F2_i + \dots + \gamma_n F_n + \delta_2 Y2_t + \dots + \delta_T YT_t + \varepsilon_{i,t} \quad (2)$$

$$CG_{i,t,m} = \beta_0 + \beta_1 * IO_{i,t} + \beta_2 * Con_{i,t} + \gamma_2 F2_i + \dots + \gamma_n F_n + \delta_2 Y2_t + \dots + \delta_T YT_t + \varepsilon_{i,t} \quad (3)$$

where  $Vol_{i,t}$  is the return volatility for the stock  $i$  at time  $t$ ,  $\sigma_{\varepsilon_{i,t}}^2$  is idiosyncratic risks,  $CG_{i,t,m}$  is the corporate governance variables, there  $m = 1, 2, 3, 4, 5$  representing five  $CG_{i,t}$  variables (Top\_ten; Senior; First\_holder; CEO agent and CEO dismissal),  $IO_{i,t}$  is the proportion of shares held by institutional ownership, and  $Con_{i,t}$  are firm-level control variables. Additional where  $\beta_0, \beta_1, \beta_2, \gamma_2, \dots, \gamma_n, \delta_2, \dots, \delta_T$  are unknown coefficients.  $F2_i \dots F_n$  are  $n-1$  firm binary indicators where  $F2_i = 1$  if  $i = 2$  and  $F2_i = 0$  otherwise, and so forth. Similar  $Y2_t \dots YT_t$  are  $T-1$  year binary indicators,  $Y2_t = 1$  if  $t = 2$  and  $Y2_t = 0$  otherwise, and so forth.  $\varepsilon_{i,t}$  is error term.

#### 3.1. Stock Return Volatility and Idiosyncratic Risks

Consistent with Foucault et al. [21], this study uses a proxy of firm-level stock return volatility. The measurement of volatility is the standard deviation of daily stock returns, calculated as

$$Vol_{i,t} = \sqrt{\frac{1}{n-1} \sum_{t=1}^n (return_{i,t} - MEAN_{i,t})^2} \quad (4)$$

where  $MEAN_{i,t}$  is the annual average rate of stock return.

Furthermore, this study follows the methods of Delgado-García et al. [35] to calculate the systematic risk and idiosyncratic risk variables. To test the relationship between the institutional ownership and idiosyncratic risks of stocks, this study uses the beta ( $\beta$ ) of the capital asset pricing model (CAPM) to estimate the systematic risk of a stock.

The market beta of stock  $i$  is given by

$$\beta_{i,m,t} = \frac{Cov(R_{i,t}, R_{m,t})}{\sigma_{R_{m,t}}^2} \quad (5)$$

where  $Cov(R_{i,t}, R_{m,t})$  is the covariance of the return of stock  $i$  and the market return at time  $t$ , and  $\sigma_{R_{m,t}}^2$  is the variance of the market return. In this study, we use the CIS 300 index as the benchmark because

the CSI 300 is a constituent stock index compiled from 300 A-shares in the Shanghai and Shenzhen stock markets. Then, this study uses stock return volatility as the total risk minus systematic risk to approximate the idiosyncratic risk of the stock. The total risk of the stock is calculated as

$$\sigma_{R_{i,t}}^2 = \beta_{i,m,t}^2 \sigma_{R_{m,t}}^2 + \sigma_{\varepsilon_{i,t}}^2 \quad (6)$$

Then the idiosyncratic risk of the stock is calculated as

$$\sigma_{\varepsilon_{i,t}}^2 = \sigma_{R_{i,t}}^2 - \beta_{i,m,t}^2 \sigma_{R_{m,t}}^2 \quad (7)$$

where  $\sigma_{R_{i,t}}^2$  is a measure of the total risk (which, in this paper, is  $Vol_{i,t}$ ), and  $\sigma_{\varepsilon_{i,t}}^2$  is the firm's idiosyncratic risk for stock  $i$  over the estimation period.

At the same time, this study also uses the Fama–French three factors model to measure stock risk:

$$R_{i,t} = R_{f,t} + \beta_{3factor} RiskPremium_t + \beta_s SMB_t + \beta_h HML_t + \alpha_{i,t} \quad (8)$$

where  $R_{i,t}$  is the return of stock  $i$  and the market return at time  $t$ ,  $R_{f,t}$  is the risk-free return rate, and the three factors data are the risk premium, SMB, and HML, which are collected from the China Stock Market and Accounting Research (CSMAR) database. Where  $\alpha_{i,t}$  is risk, in the ideal case, the risk of the portfolio will all be explained by three factors, which  $\alpha_{i,t}$  should be statistically equal to zero.  $\beta_{3factor}$ ,  $\beta_s$ ,  $\beta_h$  refer to the factor coefficients.

### 3.2. Corporate Governance Variables

- Shareholding ratio of the top 10 shareholders:

$$Top\_ten = \frac{\sum_{m=1}^{10} s_m}{shares\ outstanding} \times 100\%, \quad (9)$$

where  $s_m$  is the shares of one shareholder in the top 10;  $m = 1, 2, 3 \dots 10$ .

- Shareholding ratio of the director, supervisor, and executive:

$$Senior = \frac{\sum_{i=1}^3 dse_i}{shares\ outstanding} \times 100\%, \quad (10)$$

where  $dse_1$  is the shares of the directors,  $dse_2$  is the shares of the supervisors, and  $dse_3$  is the shares of executives.

- Whether or not the first major shareholder changes: Whether or not the first major shareholder changes is expressed with dummy variables

$$\{D_0 = 1, \text{ if the first major shareholder changes; otherwise } D_0 = 0\}, \quad (11)$$

- The CEO's change type: There are two types of CEO changes in public corporations in China. The types are expressed as dummy variables, as

$$\{D_1 = 1, \text{ if act as agent; otherwise } D_1 = 0\}, \quad (12)$$

$$\{D_2 = 1, \text{ if dismissal; otherwise } D_2 = 0\}, \quad (13)$$

### 3.3. Institutional Ownership

First, this study defines total institutional ownership (Total\_IO) as the sum of the holdings of all institutions in China's capital market. In China, there is multiple institutional ownership. Following prior studies [26,27,36], this study used two ways to classify all different four types of

institutional ownership in two groups in China's capital market. One way is to identify them by the types of their relationships with the firm and whether they have potential business ties with the firm in which they invest. This group is independent institutional ownership (Indep\_IO) versus grey institutional ownership (Grey\_IO). Another way is to divide them by the geographic origin of institutions. This group is domestic institutional ownership (Domes\_IO) versus qualified foreign institutional ownership (QFII\_IO).

As in previous relative studies, independent institutional ownership (Indep\_IO) includes hedge fund managers, investment managers, sovereign wealth funds, and VC/PE Firms. Funds are the major institutional investors in the Chinese stock market. Almazan et al. [37] regarded this type of institution as paying more attention to monitoring corporate governance and the managerial behavior of the firms that they invest in; they called them "active institutions". These institutions are more likely to collect information and face fewer regulatory restrictions on their investments [26]. They also have fewer potential business relationships with the firms in which they invest. Considering the agency problem, that fund managers are under pressure to provide good returns, their income and management fees mainly depend on their performance.

Grey institutional ownership (Grey\_IO) includes banks, insurance companies, family offices/trusts, REIT, corporate pensions, government pensions, union pension sponsors, charitable foundation, educational/cultural endowments, and unclassified. This type of institution pays less attention to monitoring corporate governance. Instead, they hold shares without reacting to management actions. Almazan et al. [37] called them 'passive institutions'. These institutions have more current or prospective business relationships with the firms they invest in [26].

According to the geographic origin of the institutions, this study always classifies domestic institutional ownership (Domes\_IO) versus qualified foreign institutional ownership (QFII\_IO) as an institutional group of ownership.

- Independent institutional ownership (Indep\_IO): Institutional ownership by independent institutions (k1: Hedge fund managers, k2: Investment managers, k3: Sovereign wealth funds, and k4: VC/PE Firms) as a percentage of shares outstanding.

$$Indep\_IO = \frac{\sum_{k=1}^4 I_k}{\text{shares outstanding}}, \quad (14)$$

- Grey institutional ownership (Grey\_IO): Institutional ownership by grey institutions (k1: Banks; k2: Insurance companies; k3: Family offices/trusts; k4: REIT; k5: Corporate pension; k6: Government pension; k7: Union pension sponsors; k8: Charitable foundation; k9: Educational/cultural endowments; and k10: Unclassified) as a percentage of shares outstanding.

$$Grey\_IO = \frac{\sum_{k=1}^{10} G_k}{\text{shares outstanding}}, \quad (15)$$

- Domestic institutional ownership (Domes\_IO): Institutional ownership by domestic institutions as a percentage of shares outstanding.

$$Domes\_IO = \frac{\text{domestic ownership}}{\text{shares outstanding}}, \quad (16)$$

- Qualified foreign institutional ownership (QFII\_IO): Institutional ownership by qualified foreign institutions as a percentage of shares outstanding.

$$QFII\_IO = \frac{\text{foreign ownership}}{\text{shares outstanding}}, \quad (17)$$

### 3.4. Firm-Level Control Variables

Variables that measure firms are included in our studies as follows, according to Chen et al. [9], Nguyen et al. [38], and Rubin and Smith [39]. Firm-level variables include log market capitalization (SIZE), leverage ratio (LEVERAGE), stock return (RET), and turnover (TURN).

- Market capitalization (SIZE): as the logarithm of annual market capitalization.

$$SIZE = \log \text{ market cap}, \quad (18)$$

- Stock return (RET): as the annual (end-of-year) geometric stock rate of return in n periods.

$$RET = \sqrt[n]{\prod_{i=1}^n (1 + r_i)} - 1, \quad (19)$$

- Turnover (TURN): as the annual share volume divided by adjusted shares outstanding.

$$TURN = \frac{\text{share volume}}{\text{shares outstanding}}, \quad (20)$$

- Leverage ratio (LEVERAGE): as the ratio of long-term liability at the end of the fiscal year to total equity.

$$LEV = \frac{\text{long-term liability}}{\text{total equity}}, \quad (21)$$

### 3.5. Descriptive Statistics

The study data comprise the annual data of 2508 firms held by institutional investors and listed in China's A-shares. The above firms are distributed in the Shanghai Stock Exchange (SSE) and the Shenzhen Stock Exchange (SZSE) but exclude the special treatment companies. They cover the period from 2005 to 2016 and are collected from the 'S&P capital IQ' database and the China Stock Market and Accounting Research (CSMAR) database.

Table 1 reports the basic statistical characteristics of the above four types of data. Subsequently, this study will use the mean value of alternative variables to illustrate the phenomena found in China. Regarding the stock return volatility variables, we note that the volatility varies between 0.007 and 0.983, and the mean value is 0.033, indicating a significant variability in the volatility of Chinese firm stocks. The mean value of the proportion of the equity of the top 10 shareholders is 0.563, indicating, on average, that half of the equity is held by the top 10 shareholders in firm.

As shown the institutional ownership variables, the mean value of the total institutions is 0.119, denoting that the firms held by institutional investors have a proportion of 11.90% for all firms that possess the values of all the variables considered in this study. Notably, the above firms are listed in China's A-shares. Among the total institutions, the independent institutions have a proportion of 74.79% (i.e., 0.089/0.119) whereas grey institutions have a proportion of 25.21% (i.e., 0.030/0.119). On the contrary, domestic institutions own a proportion of 98.32% (i.e., 0.117/0.119), whereas QFIIs own a proportion of 1.68% (i.e., 0.002/0.119) for the total institutions. These results indicate that the independent institutions or the domestic institutions are the main types of institutional investors in China.



**Table 1.** Descriptive statistics of all variables.

Symbol		No. of obs.	Minimum	Maximum	Mean	Std. Dev.
<b>Panel A. Stock return volatility variables</b>						
VOL	Volatility	18499	0.007	0.983	0.033	0.021
$\sigma$	Idiosyncratic risk	18499	0.002	0.983	0.027	0.020
$3\sigma$	3 factors idiosyncratic risk	18499	0.001	0.982	0.027	0.021
<b>Panel B. Corporate governance variables</b>						
Top_ten	Top 10 shareholders	18499	0.090	0.980	0.563	0.156
Senior	Senior shareholders	18499	0.000	0.821	0.063	0.144
First_holder	First shareholder	18499	0.000	1.000	0.033	0.177
CEO_agent	CEO act as agent	18499	0.000	1.000	0.015	0.120
CEO_dismissal	CEO is dismissal	18499	0.000	1.000	0.002	0.048
<b>Panel C. Institutional ownership variables</b>						
Total_IO	Total institutions	18499	0.000	0.956	0.119	0.117
Indep_IO	Independent institutions	18499	0.000	0.948	0.089	0.094
	Hedge fund managers	18499	0.000	0.063	0.000	0.003
	Investment managers	18499	0.000	0.948	0.079	0.089
	Sovereign wealth funds	18499	0.000	0.110	0.007	0.011
	VC/PE Firms	18499	0.000	0.158	0.003	0.011
Grey_IO	Grey institutions	18499	0.000	0.768	0.030	0.069
	Banks	18499	0.000	0.596	0.004	0.016
	Charitable foundation	18499	0.000	0.145	0.000	0.002
	Corporate pension	18499	0.000	0.064	0.000	0.001
	Educational/cultural endowments	18499	0.000	0.584	0.002	0.028
	Family offices/Trusts	18499	0.000	0.072	0.000	0.001
	Government pension	18499	0.000	0.029	0.000	0.001
	Insurance companies	18499	0.000	0.383	0.001	0.010
	REIT	18499	0.000	0.533	0.000	0.011
	Unclassified	18499	0.000	0.768	0.022	0.059
	Union pension sponsors	18499	0.000	0.009	0.000	0.000
Domes_IO	Domestic institutions	18499	0.000	0.956	0.117	0.115
QFII_IO	Qualified foreign institutions	18499	0.000	0.273	0.002	0.008
<b>Panel D. Firm-level control variables</b>						
SIZE	Market capitalization (log)	18499	19.177	28.389	22.492	1.092
RET	Stock return	18499	-0.869	16.119	0.360	0.895
TURN	Turnover	18499	0.003	37.122	5.706	3.901
LEV	Leverage ratio	18499	0.000	7.894	0.218	0.201

Note: 1. This table reports the number of observations, minimum, maximum, mean, and standard deviation of variables for the sample of all firms held by institutional investors and listed in China's A-shares. The above firms are distributed in the Shanghai Stock Exchange (SSE) and the Shenzhen Stock Exchange (SZSE) but exclude the special treatment firms. 2. The definitions of all variables are listed in the Methodology. 3. The sample data covers the period of 2005–2016. 4. The 0.000 values in the table do not show that values are equal to zero but denote that the corresponding values are less than 0.0001. 5. This study used unbalanced panel data. After removing the missing data, our observation was 18499.

Table 2 lists the result of Pearson's correlation coefficient (PCC) test for alternative pair-wise variables. This study illustrates the phenomena found in this table based on four groups of comparison. The first group of PCC tests was the relationship between the two stock return volatility variables and the institutional ownership variables. In this group of tests, we were interested in which types of institutional ownership have a negative relationship with volatility. We found that the PCC values between *Indep\_IO* and all stock return volatility variables were significantly negative. The same *Domes\_IO* values have a negative relationship with volatility.

**Table 2.** Pearson's correlation coefficient test for pair-wise variables.

	VOL	$\sigma$	$3\sigma$	Top_ten	Senior	First_Holder	CEO_Agen	CEO_Dismissal	Total_IO	Indep_IO	Grey_IO	Domes_IO	QFII_IO	SIZE	RET	TURN	LEV
VOL	1																
$\sigma$	0.982 **	1															
$3\sigma$	0.983 **	0.993 **	1														
Top_ten	-0.017 *	-0.003	-0.011	1													
Senior	-0.004	0.025 **	0.024 **	0.185 **	1												
First_holder	0.021 **	0.027 **	0.028 **	-0.049 **	-0.048 **	1											
CEO_agent	0.004	0.004	0.004	-0.016 *	0.004	0.021 **	1										
CEO_dismissal	-0.003	0.000	0.000	-0.002	-0.014	0.017 *	0.032 **	1									
Total_IO	-0.020 **	-0.022 **	-0.021 **	0.084 **	-0.079 **	-0.007	-0.013	-0.012	1								
Indep_IO	-0.022 **	-0.025 **	-0.025 **	0.069 **	-0.050 **	-0.024 **	-0.011	-0.019 **	0.808 **	1							
Grey_IO	-0.003	-0.002	0.000	0.049 **	-0.066 **	0.020 **	-0.007	0.005	0.589 **	0.007	1						
Domes_IO	-0.019 **	-0.021 **	-0.020 **	0.081 **	-0.077 **	-0.007	-0.012	-0.012	0.997 **	0.804 **	0.591 **	1					
QFII_IO	-0.013	-0.014	-0.013	0.047 **	-0.039 **	-0.003	-0.015 *	-0.001	0.163 **	0.166 **	0.047 **	0.091 **	1				
SIZE	-0.033 **	-0.035 **	-0.054 **	0.253 **	-0.037 **	-0.035 **	0.012	-0.012	0.247 **	0.321 **	-0.022 **	0.243 **	0.094 **	1			
RET	0.329 **	0.363 **	0.371 **	-0.010	-0.039 **	0.048 **	0.003	-0.004	0.051 **	0.068 **	-0.007	0.047 **	0.057 **	0.076 **	1		
TURN	0.233 **	0.213 **	0.235 **	-0.162 **	0.183 **	-0.020 **	0.019 **	-0.005	-0.140 **	-0.152 **	-0.029 **	-0.139 **	-0.034 **	-0.203 **	0.331 **	1	
LEV	0.009	-0.006	-0.005	-0.111 **	-0.229 **	0.017 *	-0.005	0.010	-0.033 **	-0.047 **	0.010	-0.032 **	-0.020 **	-0.063 **	0.004	-0.054 **	1

Note: \*\*, \* indicate significance at the 1% and 5% levels (two-tailed), respectively.

The second group of PCC tests is the relation between the stock return volatility variables and firm-level control variables. In this group of tests, this study found that PCC values between the SIZE and stock return volatility variables were almost significantly negative. This means that the larger the company, the lower the volatility of its returns [9,22,34,40]. Turnover is one of the most important factors to affect return volatility. The values between that TURN and stock return volatility variables were almost significantly positive. This means that the higher the turnover, the higher the volatility of return [9,22]. In addition, the values between RET and idiosyncratic risk were significantly positive.

The third group of PCC tests is the relation between corporate governance variables and institutional ownership variables. In this group of tests, we found that the PCC values between the top 10 and institutional ownership variables were all significantly positive, but the PCC values between the senior and institutional ownership variables were all significantly negative.

The fourth group of PCC tests is the relation between the corporate governance variables and firm-level control variables. In this group of tests, we found that the top 10 shareholders vs. senior shareholders have a different relationship with SIZE and TURN, but both have the same relationship with LEV, where the PCC values were significantly negative.

#### 4. Empirical Results

The models use both a fixed effects and random effects panel estimator to analyze the data. Then, this study uses the Hausman test to estimate which effect is preferred. We use Hausman [41] to determine whether the random effect model is more suitable than the fixed effect model.

The null hypothesis and alternative hypothesis of the Hausman test are set as follows:

$H_0 : E(\mu_i, x_{it}) = 0$  indicates that  $\mu_i$  is not related to  $x_{it}$ .

If  $H_0$  is accepted, it is recommended to use a random effects model estimate.

$H_1 : E(\mu_i, x_{it}) \neq 0$  indicates that  $\mu_i$  is related to  $x_{it}$ .

If  $H_0$  is rejected, that is, if  $H_1$  is true, then a fixed effect model estimate is recommended.

$$m = (\hat{\beta}_{fixed} - \hat{\beta}_{random}) \left[ \sum_{fixed} - \sum_{random} \right]^{-1} (\hat{\beta}_{fixed} - \hat{\beta}_{random}), \quad (22)$$

where  $m$  represents the chi-square allocation with a degree of freedom of  $k$ .  $\hat{\beta}_{fixed}$  is the coefficient estimate for the fixed effect model.  $\hat{\beta}_{random}$  is the coefficient estimate for the random effect model.  $\sum_{fixed}$  is the covariation matrix of the fixed effect model.  $\sum_{random}$  is the covariation matrix of the random effect model.

For the above verification and statistical analysis, this study uses EVIEWS software for estimation. The value of the chi-square is 130.68, and the  $p$ -value (0.000) is significant. Thus, the results of the Hausman test suggest the preference for the fixed effects estimation in our data set. For that estimation, this study reports only the fixed effects estimation results as it is recommended by the Hausman test results.

##### 4.1. Effect of Institutional Ownership on Stock Return Volatility

Table 3 reports the fixed effects estimation results where the dependent variable is stock return volatility. The sample data covers the period of 2005–2016, which includes the financial crisis 2008–2009. Since 2002, the Chinese Securities Regulatory Commission (CSRC) has permitted QFIIs to convert a certain amount of foreign capital into Chinese currency and to invest directly in the Chinese domestic A-share market. In this period, the coefficients of *Indep\_IO* are significantly negative. Conversely, the coefficients of *Gery\_IO* are not significant. The coefficients of *Domes\_IO* are negatively and significantly correlated with stock return volatility variables, but the coefficients of *QFII* are not significant, which indicates that a higher proportion of shares held by *Indep\_IO* and *Domes\_IO* contribute to a lower risk of the corresponding company's stock returns. The results also provide some further information about the firm level stock return volatility of Chinese firms. The coefficients of firm size are negative and significant. The negative relationship suggests that the stock prices of

larger firms are less risky. The coefficients of turnover and stock return are positive and significant. This means that the higher the turnover, the higher the volatility of return. This also confirms that companies with high stock returns have greater risks.

Then, this study separates the sample data into three periods, the pre-crisis from 2005 to 2007, the crisis from 2008 to 2009, and the post-crisis from 2010 to 2016. During the crisis, models (7–9) show that *Indep\_IO* is negatively and significantly correlated with the stock return volatility variables, which indicates that a higher proportion of shares held by independent institutional investment contribute to a lower risk for the corresponding company's stock returns, which is consistent with our expectation. Finally, the post-crisis period models (10–12) show that the coefficients of *Indep\_IO* and *Domes\_IO* are negative and significant. This negative relationship suggests that the stock prices of firms held by *Indep\_IO* and *Domes\_IO* are less risky. Therefore, independent and domestic institutional investments play a stabilizing role in the Chinese share markets.

#### 4.2. Effect of Institutional Ownership on Stock Return Volatility

Table 4 reports the fixed effects estimation results where the dependent variable is the idiosyncratic risk of the CAPM one factor model. In the period of 2005–2016, models (1–3) show that the coefficients of *Indep\_IO* are significantly negative. In another group, the coefficients of *Domes\_IO* are significantly negative. The coefficients of *Gery\_IO* and *QFII\_IO* are not significantly correlated with the one-factor idiosyncratic risk. In the models (1–3) of Table 5, the results are the same as the results of Table 4. This indicates that the higher proportion of shares held by *Indep\_IO* and *Domes\_IO* contribute to a lower idiosyncratic risk of the corresponding company's stock returns.

The results also provide some further information about the firm-level idiosyncratic risk of Chinese firms. Tables 4 and 5 show that in models (1–3), the coefficients of size are negative and significant. This negative relationship suggests that the stock prices of larger firms have fewer idiosyncratic risks. The coefficients of stock returns are positive and significant. This positive relationship suggests that firms with high stock returns have relatively high idiosyncratic risks. The coefficients of *TURN* are positive and significant, which confirms that the larger the turnover, the higher the idiosyncratic risk.

Furthermore, during the crisis, models (7–9) of Tables 4 and 5 show that the coefficients of *Indep\_IO* are significantly negative, which indicates that during the crisis, the higher proportion of shares held by *Indep\_IO* contribute to a lower idiosyncratic risk for corresponding company stock returns. However, *Grey\_IO*, *Domes\_IO*, and *QFII\_IO* have no significant effects on the idiosyncratic risks of firms during the crisis period.

In addition, the coefficients of the leverage show different results between pre-crisis and post-crisis. In Tables 4 and 5, models (4–6) show that the coefficients of *LEV* are significantly negative in pre-crisis. Conversely, the results of models (10–12) show that the coefficients of *LEV* are positive and significant in post-crisis. These results confirm that financial leverage can increase returns and can also increase investment losses. In pre-crisis, this negative relationship suggests that firms with a high leverage ratio have relatively fewer idiosyncratic risks, but in post-crisis, this positive relationship suggests that firms with a high leverage ratio have higher idiosyncratic risks.

**Table 3.** Fixed effects estimation results where the dependent variable is stock return volatility.

	VOL											
		2005–2016			2005–2007			2008–2009			2010–2016	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>C</i>	0.0578 *** (0.008)	0.0561 *** (0.008)	0.0578 *** (0.008)	0.0497 (0.026)	0.0501 (0.026)	0.0487 (0.026)	0.0977 (0.053)	0.0933 (0.053)	0.0964 (0.053)	0.0230 *** (0.008)	0.0216 ** (0.008)	0.0230 ** (0.008)
<i>Total_IO</i>	−0.0068 *** (0.002)			−0.0096 (0.005)			−0.0182 (0.011)			−0.0045 * (0.002)		
<i>Indep_IO</i>		−0.0085 *** (0.002)			−0.0083 (0.007)			−0.0370 ** (0.014)			−0.0060 ** (0.002)	
<i>Grey_IO</i>		−0.0029 (0.003)			−0.0113 (0.008)			0.0198 (0.020)			−0.0006 (0.003)	
<i>Domes_IO</i>			−0.0066 *** (0.002)			−0.0101 (0.005)			−0.0180 (0.011)			−0.0046 * (0.002)
<i>QFII_IO</i>			−0.0215 (0.020)			0.0079 (0.027)			−0.0441 (0.081)			0.0013 (0.024)
<i>SIZE</i>	−0.0013 *** (0.000)	−0.0012 *** (0.000)	−0.0013 *** (0.000)	−0.0003 (0.001)	−0.0003 (0.001)	−0.0002 (0.001)	−0.0025 (0.002)	−0.0023 (0.002)	−0.0025 (0.002)	0.0001 (0.000)	0.0002 (0.000)	0.0001 (0.000)
<i>RET</i>	0.0102 *** (0.000)	0.0102 *** (0.000)	0.0102 *** (0.000)	0.0035 *** (0.000)	0.0035 *** (0.000)	0.0035 *** (0.000)	0.0073 *** (0.001)	0.0078 *** (0.001)	0.0073 *** (0.001)	0.0084 *** (0.000)	0.0084 *** (0.000)	0.0084 *** (0.000)
<i>TURN</i>	0.0002 *** (0.000)	0.0002 *** (0.000)	0.0002 *** (0.000)	0.0002 (0.000)	0.0002 (0.000)	0.0001 (0.000)	−0.0003 (0.000)	−0.0003 (0.000)	−0.0003 (0.000)	0.0005 *** (0.000)	0.0005 *** (0.000)	0.0005 *** (0.000)
<i>LEV</i>	0.0010 (0.001)	0.0010 (0.001)	0.0009 (0.001)	−0.0411 *** (0.004)	−0.0410 *** (0.004)	−0.0410 *** (0.004)	−0.0004 (0.007)	−0.0004 (0.007)	−0.0004 (0.007)	0.0043 *** (0.002)	0.0044 *** (0.001)	0.0043 *** (0.001)
Firms	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Number of firms	2508	2508	2508	1076	1076	1076	1270	1270	1270	2508	2508	2508
Obs.	18499	18499	18499	2897	2897	2897	2379	2379	2379	13223	13223	13223
Adjusted R <sup>2</sup>	0.306	0.306	0.306	0.680	0.680	0.680	0.679	0.680	0.679	0.466	0.466	0.465

Note: 1. This table presents the results of the panel regression for stock return volatility. 2. *Total\_IO*, *Indep\_IO*, *Grey\_IO*, *Domes\_IO*, and *QFII\_IO* denote the total institutional ownership, independent institutional ownership, grey institutional ownership, domestic institutional ownership, and qualified foreign institutional ownership, respectively. 3. The definitions of all independent variables are listed at the section of Methodology. 4. The sample data cover the period of 2005–2016; separations of the period present the values pre-crisis (2005–2007), during the crisis (2008–2009), and post-crisis (2010–2016), respectively. 5. The superscripts \*\*\*, \*\*, and \* indicate that the coefficient is significant at 0.1%, 1%, and 5% levels, respectively. 6. The value of the robust standard error corresponding to each coefficient is listed in the parentheses below that coefficient.

**Table 4.** Fixed effects estimation results where the dependent variable is the idiosyncratic risk of the CAMP one-factor model.

	$\sigma$											
		2005–2016			2005–2007			2008–2009			2010–2016	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>C</i>	0.0447 *** (0.008)	0.0437 *** (0.008)	0.0447 *** (0.008)	0.0403 (0.026)	0.0397 (0.026)	0.0392 (0.026)	0.0812 (0.053)	0.0773 (0.053)	0.0795 (0.054)	0.0081 (0.008)	0.0068 (0.008)	0.0080 (0.008)
<i>Total_IO</i>	−0.0058 ** (0.002)			−0.0119 * (0.005)			−0.0174 (0.011)			−0.0034 (0.002)		
<i>Indep_IO</i>		−0.0068 ** (0.002)			−0.0126 (0.007)			−0.0339 * (0.014)			−0.0048 * (0.002)	
<i>Grey_IO</i>		−0.0032 (0.003)			−0.0103 (0.008)			0.0162 (0.020)			0.0003 (0.003)	
<i>Domes_IO</i>			−0.0056 ** (0.002)			−0.0124 * (0.005)			−0.0171 (0.011)			−0.0035 (0.002)
<i>QFII_IO</i>			−0.0205 (0.020)			0.0081 (0.027)			−0.0513 (0.081)			0.0044 (0.024)
<i>SIZE</i>	−0.0010 ** (0.000)	−0.0010 * (0.000)	−0.0010 ** (0.000)	−0.0001 (0.001)	0.0000 (0.001)	0.0000 (0.001)	−0.0023 (0.002)	−0.0021 (0.002)	−0.0022 (0.002)	0.0006 (0.000)	0.0006 (0.000)	0.0006 (0.000)
<i>RET</i>	0.0110 *** (0.000)	0.0110 *** (0.000)	0.0110 *** (0.000)	0.0038 *** (0.000)	0.0038 *** (0.000)	0.0038 *** (0.000)	0.0080 *** (0.001)	0.0084 *** (0.001)	0.0080 *** (0.001)	0.0097 *** (0.000)	0.0097 *** (0.000)	0.0097 *** (0.000)
<i>TURN</i>	0.0001 * (0.000)	0.0001 * (0.000)	0.0001 * (0.000)	0.0000 (0.000)	0.0000 (0.000)	0.0000 (0.000)	−0.0004 (0.000)	−0.0004 (0.000)	−0.0004 (0.000)	0.0004*** (0.000)	0.0004 *** (0.000)	0.0004 *** (0.000)
<i>LEV</i>	0.0013 (0.001)	0.0013 (0.001)	0.0013 (0.001)	−0.0414 *** (0.004)	−0.0414 *** (0.004)	−0.0413 *** (0.004)	−0.0019 (0.007)	−0.0019 (0.007)	−0.0019 (0.007)	0.0045 *** (0.001)	0.0046*** (0.001)	0.0045 *** (0.001)
Firms	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Number of firms	2508	2508	2508	1076	1076	1076	1270	1270	1270	2508	2508	2508
Obs.	18499	18499	18499	2897	2897	2897	2379	2379	2379	13223	13223	13223
Adjusted R <sup>2</sup>	0.273	0.273	0.273	0.677	0.677	0.677	0.667	0.668	0.667	0.436	0.436	0.436

Note: 1. This table presents the results of panel regression for the idiosyncratic risk of the CAMP one-factor model. 2. *Total\_IO*, *Indep\_IO*, *Grey\_IO*, *Domes\_IO*, and *QFII\_IO* denote the total institutional ownership, independent institutional ownership, grey institutional ownership, domestic institutional ownership, and qualified foreign institutional ownership, respectively. 3. The definitions of all independent variables are listed in the Methodology. 4. The sample data cover the period of 2005–2016; separations of the periods include pre-crisis (2005–2007), during the crisis (2008–2009), and post-crisis (2010–2016), respectively. 5. The superscripts \*\*\*, \*\*, and \* indicate the coefficient is significant at 0.1%, 1%, and 5% levels, respectively. 6. The value of the robust standard error corresponding to each coefficient is listed in the parentheses below that coefficient.

**Table 5.** Fixed effects estimation results where the dependent variable is the idiosyncratic risk of the Fama–French three factors model.

	$3\sigma$											
		2005–2016			2005–2007			2008–2009			2010–2016	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>C</i>	0.0492 *** (0.008)	0.0485 *** (0.008)	0.0491 *** (0.008)	0.0510 (0.026)	0.0511 (0.026)	0.0500 (0.026)	0.0860 (0.053)	0.0820 (0.053)	0.0841 (0.054)	0.0179 * (0.008)	0.0168 * (0.008)	0.0178 * (0.008)
<i>Total_IO</i>	−0.0049 * (0.002)			−0.0093 (0.005)			−0.0168 (0.011)			−0.0026 (0.002)		
<i>Indep_IO</i>		−0.0055 * (0.002)			−0.0083 (0.007)			−0.0340 * (0.014)			−0.0038 (0.002)	
<i>Grey_IO</i>		−0.0030 (0.003)			−0.0104 (0.008)			0.0183 (0.020)			0.0006 (0.003)	
<i>Domes_IO</i>			−0.0047 * (0.002)			−0.0097 (0.005)			−0.0165 (0.011)			−0.0026 (0.002)
<i>QFII_IO</i>			−0.0164 (0.020)			0.0069 (0.027)			−0.0554 (0.081)			0.0086 (0.024)
<i>SIZE</i>	−0.0012 ** (0.000)	−0.0012 ** (0.000)	−0.0012 ** (0.000)	−0.0005 (0.001)	−0.0005 (0.001)	−0.0004 (0.001)	−0.0025 (0.002)	−0.0023 (0.002)	−0.0024 (0.002)	0.0001 (0.000)	0.0002 (0.000)	0.0001 (0.000)
<i>RET</i>	0.0109 *** (0.000)	0.0109 *** (0.000)	0.0109 *** (0.000)	0.0036 *** (0.000)	0.0036 *** (0.000)	0.0036 *** (0.000)	0.0082 *** (0.001)	0.0086 *** (0.001)	0.0082 *** (0.001)	0.0094 *** (0.000)	0.0095 *** (0.000)	0.0094 *** (0.000)
<i>TURN</i>	0.0002 *** (0.000)	0.0002 *** (0.000)	0.0002 *** (0.000)	0.0001 (0.000)	0.0001 (0.000)	0.0001 (0.000)	−0.0004 (0.000)	−0.0004 (0.000)	−0.0004 (0.000)	0.0005 *** (0.000)	0.0005 *** (0.000)	0.0005 *** (0.000)
<i>LEV</i>	0.0010 (0.001)	0.0010 (0.001)	0.0010 (0.001)	−0.0410 *** (0.004)	−0.0410 *** (0.004)	−0.0409 *** (0.004)	−0.0027 (0.007)	−0.0027 (0.007)	−0.0027 (0.007)	0.0047 *** (0.001)	0.0047 *** (0.001)	0.0047 *** (0.001)
Firms	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Number of firms	2508	2508	2508	1076	1076	1076	1270	1270	1270	2508	2508	2508
Obs.	18499	18499	18499	2897	2897	2897	2379	2379	2379	13223	13223	13223
Adjusted R <sup>2</sup>	0.295	0.295	0.207	0.684	0.684	0.855	0.671	0.672	0.769	0.458	0.458	0.212

Note: 1. This table presents the results of the panel regression for the idiosyncratic risk of the Fama–French three factors model. 2. *Total\_IO*, *Indep\_IO*, *Grey\_IO*, *Domes\_IO*, and *QFII\_IO* denote the total institutional ownership, independent institutional ownership, grey institutional ownership, domestic institutional ownership, and qualified foreign institutional ownership, respectively. 3. The definitions of all independent variables are listed in the Methodology. 4. The sample data cover the period of 2005–2016; separations of the periods include pre-crisis (2005–2007), during the crisis (2008–2009), and post-crisis (2010–2016), respectively. 5. The superscripts \*\*\*, \*\*, and \* indicate that the coefficient is significant at 0.1%, 1%, and 5% levels, respectively. 6. The value of the robust standard error corresponding to each coefficient is listed in the parentheses below that coefficient.

#### 4.3. Effect of Institutional Ownership on CG

Next, this study investigates the effect of institutional investment on corporate governance. In this study, we had an interest in whether institutional investment affects the proportion of equity held by the top 10 shareholders and the senior management (directors, supervisors, and executives) of the firm that institutional ownership invest in. Furthermore, we were interested in the effect on the personnel change of the first shareholder and the CEO (as agent or dismissal).

Table 6 reports the regression results when the dependent variable is the proportion of the equity of the top 10 shareholders. This study finds that in the period of 2005–2016, models (1–3) show that the coefficients of all institutional ownerships are significantly positive. In the three sub-periods, the results are also positively significant. These results also provide some further information about the firm-level. This study finds that SIZE and TURN have different effects on the top 10 shareholders. The coefficients of SIZE are significantly positive in all models (1–12), but the coefficients of TURN are all significantly negative in all models (1–12). These results indicate that the bigger the firm, the more equity held by the top 10 shareholders, but the larger the turnover, the less equity held by the top 10 shareholders.

Table 7 reports the regression results when the dependent variable is the proportion of the director, supervisor, and executive. This study finds that in the period from 2005 to 2016, the results are different than those for the top 10 shareholders. In Table 7, models (1–3) show that the coefficients of *Indep\_IO* and *Domes\_IO* are significantly negative. Then this study separates the sample data into three periods, the pre-crisis from 2005 to 2007, the crisis from 2008 to 2009, and the post-crisis from 2010 to 2016. In the period from 2008 to 2009, as models (7–9) show, all institutional ownerships have no significant effects on the senior shareholders. Furthermore, Table 7 shows some information about the firm-level. This study finds that in the two periods pre- and post-crisis, the coefficients of SIZE, TURN, and LEV are reversed. For instance, the coefficients of SIZE in models (1–3) are significantly positive, but in models (10–12), the coefficients of SIZE are significantly negative. This means that after the financial crisis, the larger the firm, the less equity held by the director, supervisor, and executives.

On the other hand, for the effects on personnel change, the results show that the relationship of institutional ownership with a personnel change of the first shareholder and CEO is negative and insignificant. This result indicates that institutional investors, as major shareholders, are not involved in personnel changes and maintain the independence of corporate governance. This effect is the same for the whole period or for three segment periods. Therefore, we show only the results for the entire period in Table 8. Because this regression is a binary logic panel model, we used the STATA program to generate the results of Table 8.

These results for corporate governance prove as a large professional ownership that institutional investors improve the quality of corporate governance. Institutional investors are one of the company's most important shareholders, suppressing the equity of senior shareholders after the financial crisis, while maintaining the neutrality of supervision.



**Table 6.** Fixed effects estimation results where the dependent variable is the top 10 shareholders.

	<i>Top_ten</i>											
		2005–2016			2005–2007			2008–2009			2010–2016	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>C</i>	7.9066 (4.932)	1.6366 (4.936)	7.9114 (4.931)	−20.6476 * (8.989)	−17.2858 (8.956)	−20.7676 * (9.001)	12.4391 (12.612)	12.1961 (12.594)	13.0904 (12.644)	2.3148 (6.072)	−4.8282 (6.037)	2.2211 (6.072)
<i>Total_IO</i>	21.4487 *** (1.115)			15.9995 *** (1.864)			32.4755 *** (2.632)			23.2735 *** (1.383)		
<i>Indep_IO</i>		15.0483 *** (1.354)			23.1198 *** (2.474)			30.7743 *** (3.271)			15.3945 *** (1.646)	
<i>Grey_IO</i>		34.6733 *** (1.941)			4.7618 (2.976)			36.9025 *** (4.698)			42.6954 *** (2.489)	
<i>Domes_IO</i>			21.4238 *** (1.118)			15.9304 *** (1.883)			32.3663 *** (2.636)			23.1679 *** (1.387)
<i>QFII_IO</i>			23.7207 ** (9.067)			18.2242 * (9.252)			45.7090 * (19.209)			40.1867 ** (14.812)
<i>SIZE</i>	2.1148 *** (0.220)	2.4037 *** (0.221)	2.1146 *** (0.220)	3.5281 *** (0.411)	3.3547 *** (0.410)	3.5339 *** (0.412)	1.7572 ** (0.570)	1.7696 ** (0.569)	1.7276 ** (0.571)	2.3551 *** (0.269)	2.6760 *** (0.268)	2.3589 *** (0.269)
<i>RET</i>	0.1118 (0.088)	0.1628 (0.088)	0.1112 (0.088)	0.0733 (0.128)	0.0407 (0.128)	0.0709 (0.129)	0.1272 (0.214)	0.1757 (0.219)	0.1251 (0.214)	0.0433 (0.127)	0.1418 (0.127)	0.0450 (0.127)
<i>TURN</i>	−0.1918 *** (0.023)	−0.2035 *** (0.023)	−0.1919 *** (0.023)	−0.2396 *** (0.054)	−0.2042 *** (0.054)	−0.2407 *** (0.054)	−0.1949 *** (0.049)	−0.1990 *** (0.049)	−0.1949 *** (0.049)	−0.1117 *** (0.027)	−0.1186 *** (0.027)	−0.1120 *** (0.027)
<i>LEV</i>	−3.1378 *** (0.671)	−3.1577 *** (0.667)	−0.1335 *** (0.671)	−2.6727 (1.470)	−2.4346 (1.464)	−2.6634 (1.470)	−0.4405 (1.558)	−0.3993 (1.554)	−0.4489 (1.557)	−6.0577 *** (0.837)	−5.9149 *** (0.830)	−6.0435 *** (0.837)
Firms	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Number of firms	2508	2508	2508	1076	1076	1076	1270	1270	1270	2508	2508	2508
Obs.	18499	18499	18499	2897	2897	2897	2379	2379	2379	13223	13223	13223
Adjusted R <sup>2</sup>	0.775	0.777	0.775	0.865	0.866	0.865	0.928	0.928	0.928	0.819	0.821	0.819

Note: 1. This table presents the results of panel regression for the top 10 shareholders. 2. *Total\_IO*, *Indep\_IO*, *Grey\_IO*, *Domes\_IO*, and *QFII\_IO* denote the total institutional ownership, independent institutional ownership, grey institutional ownership, domestic institutional ownership, and qualified foreign institutional ownership, respectively. 3. The definitions of all independent variables are listed in Methodology. 4. The sample data cover the period of 2005–2016, separations of the period represent pre-crisis (2005–2007), during the crisis (2008–2009), and post-crisis (2010–2016), respectively. 5. The superscripts \*\*\*, \*\*, and \* indicate that the coefficient is significant at 0.1%, 1%, and 5% levels, respectively. 6. The value of the robust standard error corresponding to each coefficient is listed in the parentheses below that coefficient.

**Table 7.** Fixed effects estimation results where the dependent variable is the senior shareholders.

	<i>Senior</i>											
		2005–2016			2005–2007			2008–2009			2010–2016	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>C</i>	7.3783 ** (2.736)	7.3160 ** (2.763)	7.3775 ** (2.736)	−2.7139 * (1.250)	−2.5482 * (1.250)	−2.7237 * (1.251)	−8.5891 (6.831)	−8.4044 (6.834)	−7.6651 (6.841)	20.7478 *** (4.748)	20.6074 *** (4.765)	20.7687 *** (4.748)
<i>Total_IO</i>	−1.7516 ** (0.624)			0.3233 (0.255)			0.1156 (1.426)			−3.9805 *** (1.082)		
<i>Indep_IO</i>		−1.8097 * (0.785)			0.6996 * (0.341)			0.9040 (1.775)			−4.1209 ** (1.288)	
<i>Grey_IO</i>		−1.5407 (1.045)			−0.2668 (0.405)			−1.4731 (2.549)			−3.4739 (2.004)	
<i>Domes_IO</i>			−1.7467 ** (0.627)			0.3183 (0.258)			−0.0392 (1.426)			−3.9570 *** (1.084)
<i>QFII_IO</i>			−2.1899 (4.312)			0.5005 (1.292)			18.8919 (10.392)			−7.7434 (11.813)
<i>SIZE</i>	−0.0597 (0.122)	−0.0570 (0.123)	−0.0596 (0.122)	0.1291 * (0.057)	0.1205 * (0.057)	0.1295 * (0.057)	0.4382 (0.309)	0.4284 (0.309)	0.3962 (0.309)	−0.5451 ** (0.210)	−0.5390 * (0.211)	−0.5459 ** (0.210)
<i>RET</i>	−0.1514 ** (0.051)	−0.1512 ** (0.052)	−0.1513 ** (0.051)	−0.0296 (0.020)	−0.0317 (0.020)	−0.0298 (0.020)	−0.0349 (0.116)	−0.0540 (0.119)	−0.0380 (0.116)	−0.2260 * (0.101)	−0.2243 * (0.101)	−0.2263 * (0.101)
<i>TURN</i>	0.1385 *** (0.016)	0.1385 *** (0.016)	0.1386 *** (0.016)	−0.0166 * (0.008)	−0.0147 (0.008)	−0.0167 * (0.008)	−0.0030 (0.026)	−0.0015 (0.027)	−0.0030 (0.026)	0.2111 *** (0.022)	0.2111 *** (0.022)	0.2111 *** (0.022)
<i>LEV</i>	−1.3711 *** (0.375)	−1.3689 *** (0.375)	−1.3719 *** (0.375)	0.3892 (0.202)	0.4019 * (0.202)	0.3899 (0.202)	−0.3707 (0.844)	−0.3732 (0.844)	−0.3826 (0.843)	−2.3251 *** (0.609)	−2.3199 *** (0.609)	−2.3282 *** (0.609)
Firms	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Number of firms	2508	2508	2508	1076	1076	1076	1270	1270	1270	2508	2508	2508
Obs.	18499	18499	18499	2897	2897	2897	2379	2379	2379	13223	13223	13223
Adjusted R <sup>2</sup>	0.878	0.878	0.878	0.739	0.739	0.738	0.824	0.824	0.825	0.883	0.883	0.883

Note: 1. This table presents the results of panel regression for senior shareholders. 2. *Total\_IO*, *Indep\_IO*, *Grey\_IO*, *Domes\_IO*, and *QFII\_IO* denote the total institutional ownership, independent institutional ownership, grey institutional ownership, domestic institutional ownership, and qualified foreign institutional ownership, respectively. 3. The definitions of all independent variables are listed in Methodology. 4. The sample data cover the period of 2005–2016, separations of the period represent pre-crisis (2005–2007), during the crisis (2008–2009), and post-crisis (2010–2016), respectively. 5. The superscripts \*\*\*, \*\*, and \* indicate the coefficient is significant at 0.1%, 1%, and 5% levels, respectively. 6. The value of robust standard error corresponding to each coefficient is listed in the parentheses below that coefficient.

**Table 8.** Estimated results of the binary logit for the panel fixed effects model where the dependent variables are the dummy variables of the change of the first shareholder, the CEO acting as an agent, and CEO being dismissed from 2005 to 2016.

	<i>First_holder</i>			<i>CEO_agent</i>			<i>CEO_dismissal</i>		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
<i>Total_IO</i>	−0.5041 (0.541)			−0.7441 (0.943)			−0.3674 (2.585)		
<i>Indep_IO</i>		−0.6236 (0.709)			−0.4653 (1.220)			−4.5224 (3.570)	
<i>Grey_IO</i>		−0.6493 (0.794)			−1.3501 (1.533)			5.1970 (3.762)	
<i>Domes_IO</i>			−0.5309 (0.546)			−0.5988 (0.944)			−0.3565 (2.585)
<i>QFII_IO</i>			2.2309 (6.159)			−45.0863 (23.546)			−2.9303 (28.306)
<i>SIZE</i>	−0.0600 (0.066)	−0.0579 (0.067)	−0.0594 (0.066)	0.3963 *** (0.102)	0.3871 *** (0.105)	0.3989 *** (0.102)	−0.3621 (0.271)	−0.2768 (0.278)	−0.3599 (0.272)
<i>RET</i>	0.3260*** (0.045)	0.3263 *** (0.045)	0.3248 *** (0.045)	−0.0654 (0.080)	−0.0667 (0.080)	−0.0612 (0.079)	−0.1398 (0.211)	−0.1290 (0.212)	−0.1397 (0.211)
<i>TURN</i>	−0.0834 *** (0.016)	−0.0835 *** (0.016)	−0.0836 *** (0.016)	0.0239 (0.019)	0.0239 (0.019)	0.0241 (0.019)	0.0098 (0.058)	0.0156 (0.058)	0.0099 (0.058)
<i>LEV</i>	0.3011 (0.275)	0.3016 (0.275)	0.3031 (0.275)	0.5364 (0.632)	0.5276 (0.634)	0.4597 (0.635)	−0.4411 (1.580)	−0.9659 (1.613)	−0.4466 (1.580)
Firms	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES	YES	YES	YES	YES
Number of firms	492	492	492	235	235	235	40	40	40
Obs.	4828	4828	4828	2115	2115	2115	404	404	404
Pseudo R <sup>2</sup>	0.023	0.023	0.023	0.016	0.016	0.021	0.015	0.033	0.015

Note: 1. This table presents the results of the binary logit of the panel for the change of the first shareholder, the CEO acting as an agent, and CEO being dismissed, respectively. 2. *Total\_IO*, *Indep\_IO*, *Grey\_IO*, *Domes\_IO*, and *QFII\_IO* denote the total institutional ownership, independent institutional ownership, grey institutional ownership, domestic institutional ownership, and qualified foreign institutional ownership, respectively. 3. The definitions of all independent variables are listed in Methodology. 4. The sample data covers the period of 2005–2016. 5. The superscripts \*\*\*, \*\*, and \* indicate that the coefficient is significant at 0.1%, 1%, and 5% levels, respectively. 6. The value of the robust standard error corresponding to each coefficient is listed in the parentheses below that coefficient.

#### 4.4. Endogeneity Test

This study uses the first stage F-statistic to check whether the estimators are not biased. Alternatively, if endogeneity exists in the panel regression model, this study uses an instrumental variable (IV) regression to obtain a consistent estimation. However, a valid instrumental variable must satisfy two conditions: instrumental relevance and instrument validity. If the instrument  $Z_{it}$  satisfies the conditions of instrument relevance and instrument validity, then the coefficient  $\beta_1$  can be estimated using an IV estimator called the two stage least squares (2SLS). The two stage least squares estimator is calculated in two stages. In this study, we assume that only one endogenous regressor  $X_{1,it}$  exists in the model, and this study also uses only one instrumental variable  $Z_{it}$ . The instrument we use in this test is INDEP/DIREC, representing the percentage of independent directors on the board of directors.

This study uses the first-stage F-statistic to check for weak instruments when there is a single endogenous regressor. Because there is a single endogenous regressor, a first stage F-statistic lower than 8.96 indicates that the instruments are weak, in which case, the 2SLS estimator is biased. A value larger than 10 indicates that the model is well specified [42,43].

Table 9 lists the empirical results of the panel two-stage least squares (2SLS) model of one endogenous variable with one instrumental variable and control variables. The results of all 2SLS estimators are consistent with the results of OLS listed in Table 3 (Model 1). In the first stage, this study finds that all coefficient values of the instrument  $Z_{it}$  are significant. Moreover, all values of the first stage F-statistic are greater than 8.96, indicating that a weak instrument does not exist. In other words, the 2SLS estimator is not biased. Subsequently, this study executes the second stage regression of 2SLS. The value of the adjusted  $R^2$  for the second stage regression of 2SLS is equal to 0.305, which is almost the same as that for Model 1 (i.e.,  $R^2 = 0.306$ ). In the same way, this study also tested the endogenous problem of the dependent variable of the top 10 shareholder and senior shareholder. In the results shown in Tables 10 and 11,  $R^2$  for the second stage regression of 2SLS is less than our results for the panel regression. Hence, this study concludes that all empirical results listed in the above sequential tables deserve to be believed.

**Table 9.** Empirical results of the two-stage least squares model with one endogenous variable and one instrumental variable for volatility.

Instrumented	Table 3 OLS			2SLS		
	Model 1	Total_IO	SIZE	RET	TURN	LEV
C	0.0578 *** (0.008)	0.0635 (0.273)	0.0690 (0.517)	0.0543 (0.144)	0.0572 * (0.025)	0.0540 (0.155)
Total_IO	−0.0068 *** (0.002)	−0.0012 (0.268)	−0.0065 (0.030)	−0.0071 (0.006)	−0.0068 (0.018)	−0.0072 * (0.003)
SIZE	−0.0013 *** (0.000)	−0.0016 (0.014)	−0.0018 (0.023)	−0.0011 (0.007)	−0.0013 (0.001)	−0.0012 (0.005)
RET	0.0102 *** (0.000)	0.0102 *** (0.002)	0.0103 * (0.005)	0.0099 (0.016)	0.0102 *** (0.002)	0.0103 *** (0.002)
TURN	0.0002 *** (0.000)	0.0002 (0.001)	0.0002 (0.000)	0.0002 (0.000)	0.0003 (0.004)	0.0002 (0.000)
LEV	0.0010 (0.001)	0.0009 (0.003)	0.0007 (0.008)	0.0009 (0.003)	0.0009 (0.003)	0.0045 (0.164)
Firms	YES	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES	YES
Number of firms	2508	2508	2508	2508	2508	2508
Number of observations	18499	18385	18385	18385	18385	18385
Instrumental variable (INDEP/DIREC) Z <sub>i</sub>		−0.0809 *** (0.015)	1.7765 *** (0.153)	−0.6482 *** (0.110)	3.3281 *** (0.502)	−0.0754 ** (0.025)
First stage F		29.4	134.4	34.50	44.01	9.39
Adjusted R <sup>2</sup>	0.306	0.305	0.305	0.305	0.305	0.305

Note: All the coefficient values of Model 1 in Table 9 are obtained from those of Model 1 in Table 3. First stage F denotes the first stage F-statistic, and its degree of freedom is (1, 18379) for all cases in this table. The Instrumental variable Z<sub>i</sub> in this table is INDEP/DIREC, representing the percentage of independent directors on the board of directors. The superscripts \*\*\*, \*\*, and \* indicate that the coefficient is significant at 0.1%, 1%, and 5% levels, respectively.

**Table 10.** Empirical results of the two-stage least squares model with one endogenous variable and one instrumental variable for the top 10 shareholders.

Instrumented	Table 6 OLS			2SLS		
	Model 1	Total_IO	SIZE	RET	TURN	LEV
C	7.9066 (4.932)	−450.9543 (597.120)	−884.3250 (574.785)	281.5907 (212.998)	50.4623 (34.906)	301.5776 (379.053)
Total_IO	21.4487 *** (1.115)	−454.5208 (618.169)	−31.9854 (34.516)	11.7107 (8.034)	−11.9596 (26.688)	22.1733 *** (5.741)
SIZE	2.1148 *** (0.220)	25.3604 (30.243)	42.0413 (25.722)	−10.2840 (9.648)	2.1718 *** (0.504)	−8.0765 (13.126)
RET	0.1118 (0.088)	2.2683 (2.836)	−6.0519 (4.006)	29.5252 (22.978)	3.8303 (2.962)	0.1263 (0.668)
TURN	−0.1918 *** (0.023)	−1.6272 *** (1.872)	−0.1964 (0.050)	−0.9226 (0.578)	−7.3126 (5.644)	−0.4057 (0.307)
LEV	−3.1378 *** (0.671)	−2.8897 (3.235)	9.2044 (8.091)	−3.1883 (1.642)	−5.8533 * (2.663)	−292.7931 (376.821)
Firms	YES	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES	YES
Number of firms	2508	2508	2508	2508	2508	2508
Number of observations	18499	18385	18385	18385	18385	18385
Instrumental variable (INDEP/DIREC) Z <sub>i</sub>		−0.0809 *** (0.015)	1.7765 *** (0.153)	−0.6482 *** (0.110)	3.3281 *** (0.502)	−0.0754 ** (0.025)
First stage F		29.4	134.4	34.50	44.01	9.39
Adjusted R <sup>2</sup>	0.775	−3.621	−0.075	−0.480	−0.761	−4.286

Note: All the coefficient values of Model 1 in Table 10 are obtained from those of Model 1 in Table 6. First stage F denotes the first stage F-statistic, and its degree of freedom is (1, 18379) for all cases in this table. The Instrumental variable Z<sub>i</sub> in this table is INDEP/DIREC, representing the percentage of independent directors on the board of directors. The superscripts \*\*\*, \*\*, and \* indicate that the coefficient is significant at 0.1%, 1%, and 5% levels, respectively.

**Table 11.** Empirical results of the two-stage least squares model with one endogenous variable and one instrumental variable for the senior shareholders.

Instrumented	Table 7 OLS			2SLS		
	Model 1	Total_IO	SIZE	RET	TURN	LEV
C	7.3783 ** (2.736)	198.8518 (257.506)	379.0918 (281.160)	−105.8159 (96.548)	−9.6889 (15.489)	−114.1284 (163.911)
Total_IO	−1.7516 ** (0.624)	196.2991 (266.559)	20.5654 (16.901)	2.3920 (3.625)	12.2366 (11.872)	−1.9594 (2.364)
SIZE	−0.0597 (0.122)	−9.7558 (13.042)	−16.6934 (12.582)	5.0689 (4.373)	−0.1115 (0.222)	4.1508 (5.678)
RET	−0.1514 ** (0.051)	−1.0510 (1.223)	2.4093 (1.955)	−12.3873 (10.405)	−1.7007 (1.316)	−0.1602 (0.277)
TURN	0.1385 *** (0.016)	0.7372 (0.807)	0.1422 *** (0.026)	0.4442 (0.262)	3.1018 (2.509)	0.2292 (0.133)
LEV	−1.3711 *** (0.375)	−1.4856 (1.211)	−6.5156 (3.998)	−1.3614 (0.771)	−0.2531 (1.150)	119.0860 (162.768)
Firms	YES	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES	YES
Number of firms	2508	2508	2508	2508	2508	2508
Number of observations	18499	18385	18385	18385	18385	18385
Instrumental variable (INDEP/DIREC) Z <sub>i</sub>		−0.0809 *** (0.015)	1.7765 *** (0.153)	−0.6482 *** (0.110)	3.3281 *** (0.502)	−0.0754** (0.025)
First stage F		29.4	134.4	34.50	44.01	9.39
Adjusted R <sup>2</sup>	0.878	−0.014	0.706	0.624	0.567	−0.149

Note: All the coefficient values of Model 1 in Table 11 are obtained from those of Model 1 in Table 7. First stage F denotes the first stage F-statistic, and its degree of freedom is (1, 18379) for all cases in this table. The Instrumental variable Z<sub>i</sub> in this table is INDEP/DIREC, representing the percentage of independent directors on the board of directors. The superscripts \*\*\*, \*\*, and \* indicate that the coefficient is significant at 0.1%, 1%, and 5% levels, respectively.

## 5. Conclusions

This study used annual data to investigate the impact of institutional ownership on stock return volatility, idiosyncratic risks, and corporate governance in China. In order to identify this effect, We employed the panel regression model by using the ordinary least squares (OLS) to first explore the relationship between institutional ownership and stock return volatility. Then, this study used the CAPM one-factor model and the Fama–French three-factor model to analyze the relationship between institutional ownership and idiosyncratic risks and the binary logic panel model to estimate the relationship between institutional ownership and corporate governance. Furthermore, this study compared the empirical results during the pre-crisis, during crisis, and post-crisis periods. We were interested in whether institutional investors have a different effect on the volatility of stock returns, idiosyncratic risks, and corporate governance in the Chinese market. We tried to determine what type of institutional investors help stabilize the individual market effectively. Moreover, this study was interested in which type of institutional ownership has the role of stewardship.

The empirical results show that independent institutions and domestic institutions reduce stock return volatility. The results are consistent with hypothesis 1a and 2a. However, grey institutions and foreign institutions have no significant effects on stock return volatility, so hypotheses 1b and 2b could not be confirmed.

For the effect on the idiosyncratic risks of stock, the empirical results of the CAPM one factor and the Fama–French three-factors models show that independent institutions reduce the idiosyncratic risks of stocks in the periods during the crisis. However, grey institutions and foreign institutions have no significant effect on the idiosyncratic risk in all three periods.

The empirical results of the effects on corporate governance show different effects on the top 10 shareholders, senior shareholders, and the personnel change of the first shareholder and CEO. For the top 10 shareholders, all institutional ownerships have a significantly positive effect, but for senior shareholders, this effect is reversed, and independent and domestic institutional ownerships have a significantly negative effect. The effects on the personnel change of first shareholder and CEO are not significant.

With this research, we have a clearer understanding of the behavior of institutional investors in the Chinese market. Independent institutional investors have exercised their supervisory responsibilities as active ownership, and this kind of stewardship behavior of independent institutional investors was more obvious during post-crisis. On the other hand, in the regression of the CAPM one-factor models, domestic institutional investors effectively reduce the idiosyncratic risks before the financial crisis. As for foreign institutions, the performance of their supervision in the periods of pre-crisis, during crisis, and post-crisis is not obvious. On the other hand, for corporate governance, institutional ownership, as a form of large professional ownership, improves the quality of corporate governance. Institutional investors are one of the company's most important shareholders, suppressing the equity of senior shareholders after the financial crisis, while maintaining the neutrality of supervision.

We sought to explore the sustainability of institutional investors and stable economic growth in developing countries from a holistic perspective. Continuing the previous research, from the perspective of sustainable development, Lin et al. [10] studied the behavior of institutional investors from the external market environment. This study explores the contribution of institutional investors in the market environment. Both parts of this study have effectively proven that, in independent institutions, the role of stewardship in both the external market environments supports national policies and the internal market environment for financial stability and corporate governance.

However, foreign institutional investors who are active in both institutions have no obvious effect on the role of housekeepers in China, which is inconsistent with previous scholars' research [26,36]. This study believes that the reason for this result is related to the degree of China's openness to foreign investment. Although the amount of investment in foreign institutions has increased significantly during the study period (2005–2016), its proportion among the total institutional investors is still small (1.68%). Therefore, in order for foreign institutional investors to play the role of stewards, it will



be necessary for developing countries to be open to foreign investment institutions. The continued clarity of national policies is also an indispensable factor for attracting foreign institutional investors. The increase in active institutional investors will have a sustainable effect on national policy and market stability, as well as investor profitability.

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