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## Fund ownership and stock price informativeness of Chinese listed firms



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### ABSTRACT

We examine the impact of mutual fund ownership on stock price informativeness in China. Existing evidence shows that stock price informativeness is low in China, and attributes this to firms' lack of disclosure incentives under the weak investor protection institutional environment. Mutual funds are more sophisticated and influential than individual investors to monitor firms, and thus serve as an external governance mechanism to improve corporate transparency. However, the impact of mutual funds in China can also be moderated by state ownership of listed firms, which reduces firms' dependence on outside investors for capital. Indeed, we find that mutual fund ownership is positively related to share price informativeness, but this effect is less pronounced among state-controlled firms. The main policy implication from our findings is that mutual funds contribute to the corporate information environment of emerging economies but further privatization of listed firms would be needed to realize greater benefit.

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## 1. Introduction

In this study we investigate the impact of mutual fund ownership on stock price informativeness based on a large sample of Chinese listed firms. Roll (1988) suggest that the proportion of variations in stock price which is not explained by market-wide information captures firm-specific information

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available to investors in the stock market. Morck et al. (2000) document that China has one of the lowest stock price informativeness among the 40 countries in their analyses. They attribute this to weak investor protection institutional environment in China. Gul et al. (2010) and Hou et al. (2012) provide evidence that stock price informativeness in China is especially low among listed firms under state control. They attribute this to inefficient corporate governance among firms that are supported by the state. Low stock price informativeness implies weak corporate information environment, which reduces the ability of outside investors in the capital market to forecast firm performance and formulate valuation decisions. This in turn reduces investors' confidence and the ability of the capital market to efficiently allocate financial resources to fund firms with growth opportunities. As China strives to become one of the largest economies in the world, the function of the stock market in supplying capital to firms will become increasingly important. Thus, the improvement of corporate information environment is an important issue to China's further development and has implications to other emerging economies.

Our focus on the effect of mutual fund ownership in improving corporate information environment in China is motivated by two strands of literature. First, previous studies highlight the important role of mutual funds in mitigating the agency problem and promoting better governance (Del Guercio and Hawkins, 1999; Shleifer and Vishny, 1997; Smith, 1996; Tirole, 2001). For example, Chou et al. (2011) show that mutual fund ownership is positively associated with quality governance because they intentionally invest in well-governed firms and they remain active in monitoring firms they invest. Ng et al. (2009) use past firm performance as an indicator of managerial effectiveness and report that mutual fund exhibits weaker support for management proposal in under-performing firms. They conclude that the finding is consistent with mutual fund playing a monitoring role, as mutual funds attach importance to firm's prior performance when casting proxy votes. Second, previous studies also highlight the association between corporate governance and corporate information environment. Information asymmetry resulting from the separation of ownership and control can be prominent because managers have the incentive to withhold information in order to benefit themselves (Jensen and Meckling, 1976; Shleifer and Vishny, 1997). Existing studies indicate that improvements in internal or external governance mechanisms can constrain manager's self-serving behavior and pressure managers to disclose high quality information, which can, in turn, lead to improved corporate information environment (Armstrong et al., 2012; Beasley, 1996; Dimitropoulos and Asteriou, 2010; Hou et al., 2012; Kelton and Yang, 2008; Klein, 2002). Based on the aforementioned literature, we expect mutual fund ownership to strengthen the corporate governance of Chinese listed firms and exert positive influence on the stock price informativeness of Chinese listed firms. This is the first research question we seek to examine empirically.

In 2000, Chinese government made a strategic decision to spur the development of mutual fund industry, as mutual funds were expected to play a central role in enhancing corporate governance in listed companies and balancing the rampant speculation by individual investors (CSRC, 2000). The mutual fund industry in China witnessed rapid growth in the first decade of the 21st century. The number of fund management companies (mutual fund) has increased from 6 (5) in 1998 to 57 (323) in 2006, and the total net asset under management increased from RMB 469 billion in 2005 to RMB 1796.9 billion in 2007 (Firth et al., 2010; Yuan et al., 2008).<sup>1</sup> However, whether the development of mutual funds improved the governance of Chinese listed firm remains an open question, as prior studies provide mixed evidences. For example, Yuan et al. (2008) report a positive association between mutual fund ownership and firm performance. In contrast, Firth et al. (2010) focus on the Split Share Structure Reform and find that mutual fund ownership is negatively related to the compensation given to tradable shareholders, indicating that mutual fund may not necessarily protect the interest of minority shareholders.<sup>2</sup> We expect the external governance role of mutual funds in China to be moderated by state ownership of listed firms. This is because state support reduces the dependence of

<sup>1</sup> Similarly, the considerable growth in the mutual funds industry was also observed in many markets such the US, Greece, Italy, Belgium, Denmark, Finland and Ireland (Klapper et al., 2004).

<sup>2</sup> We suggest that the findings of Firth et al. (2010) should be interpreted with caution, because during the "split share structure reform" CSRC (the Chinese counterpart of SEC) transferred the voting rights from individual fund managers to the investment decision committee of the fund management companies, against which CSRC may impose strong political pressure to refrain

Chinese listed firms on capital market for external funding, which in turn reduces the ability of mutual funds to influence and pressure firms. In other words, we expect the positive relationship between mutual fund ownership and stock price informativeness to be less pronounced among firms with higher state ownership. This is the second research question we seek to examine through empirical analyses.

To test our two aforementioned research questions, we construct stock price informativeness measures following [Fernandes and Ferreira \(2008\)](#) for all the firms listed on the Shanghai and Shenzhen stock exchanges over the period between 2003 and 2008. We conduct a multivariate regression analysis incorporating mutual fund ownership, firm characteristics and fundamental corporate governance variables. Consistent with our expectation, we show that mutual fund ownership (as a ratio to either total shares or freely-traded shares) has a positive effect on stock price informativeness in China. Furthermore, we find the positive impact of mutual fund ownership on price informativeness is less pronounced for state-controlled firms, consistent with the contention that a high concentration of state ownership may reduce the reliance of firms on outside investors for capital and reduce the influence of mutual funds. Our results are robust to different estimation methods (either with or without median regression) and alternative measure of stock price informativeness.

This study contributes to existing academic literature in the following ways. First, our results suggest that, even under weak investor protection institutional environment, mutual fund ownership can serve as an external corporate governance mechanism that exerts positive impact on corporate information environment. Second, we highlight the offsetting role played by mutual fund and state ownership in shaping the corporate information environment in an emerging economy such as China. The main policy implication from our findings is that mutual fund ownership should be further promoted in order to reduce the disadvantage of individual investors in terms of expertise and influence. However, to further realize the benefit of mutual fund ownership in improving corporate governance, it is necessary to promote further privatization of firms.

This paper is structured as follows: Section 2 explains the hypotheses development; Section 3 discusses the methodology adopted in the empirical investigation, the sample selected and the summary statistics of the variables; and finally, our empirical findings are presented in Section 4. Section 5 concludes.

## 2. Literature and hypotheses

### 2.1. Mutual funds and corporate governance

To date, existing studies have increasingly focused on the role of institutional investors in monitoring or influencing corporate managers. This can result from the fact that they are more willing to exert pressure on managers to make decisions in favor of boosting shareholders' wealth, while simultaneously increasing the percentage of their shareholding in firms. Due to the highly concentrated holdings of institutional investors, their monitoring can be more cost effective. Therefore, in the extant studies, there is a consensus that agency problems pertaining to corporate governance can be mitigated by the involvement of institutional investors in the ownership of a firm, since proxy voting has been considered as one of the most cost-effective channels for monitoring activities. In some studies, aggregate institutional holdings was employed as a proxy for corporate monitoring strength ([Gillan and Starks, 2000](#); [Gordon and Pound, 1993](#); [Morgan and Poulsen, 2001](#)). [Cornett et al. \(2007\)](#) provide evidence that both an increase in the number of institutional stockholders and their increased ownership percentage can improve firms' operating performance.

More specifically, the rationale for the role of institutional investors or mutual funds as corporate monitors is that, compared with individual investors, mutual funds or institutional investors present a dramatically larger incentive to monitor managers. This would prompt managers to be more concerned about firms' performance and shareholders, and thus discourage them from opportunism ([Cornett](#)

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funds from bargaining a more favorable compensation plan. The inference of [Firth et al. \(2010\)](#) might not be generalized to other settings where fund managers are less likely to suffer from external pressure that interferes with their investment decisions.

et al., 2007; Grossman and Hart, 1980; Mayer, 1997; Shleifer and Vishny, 1986). In particular, among institutional or block stakeholders, Pound (1988) indicates that mutual funds can play a direct role in corporate monitoring because of their investment expertise in addition to their large shareholding.

Voting is recognized as the most direct and cost-effective channel through which mutual funds can pressure corporate managers into taking account of shareholders' interests in investment decisions. Using the SEC's 2003 mandatory voting disclosure requirement as a governance mechanism for revealing mutual funds' governance activities, a plethora of studies have attempted to shed light on the effect of mutual funds or their voting decisions on corporate governance. Morgan et al. (2011) find that voting given by mutual funds' investors is indeed more supportive of shareholder-initiated proposals. This provides a potential opportunity for increasing shareholders' wealth, especially when portfolio firms manifest weaker corporate governance.<sup>3</sup> Based on data of 100 largest mutual fund families proxy voting records in the US between 2003 and 2006, Duan and Jiao (2011) find that mutual funds are more likely to vote against management when management recommendations on proposals conflict with those of independent proxy advisory firm (Institute Shareholder Services), which is consistent with mutual fund playing an active role in monitoring manager's behavior.

The evidence provided by Davis and Kim (2007) suggest that voting decisions have an impact on the quality of corporate governance in their targeted firms. In particular, the quality of corporate governance of a firm can be further strengthened by mutual fund investment, since their supportive voting can act as an essential determinant of a proposal's passage, as well as of the board implementing such proposals (Ertimur et al., 2010; Thomas and Cotter, 2007). Using the Morningstar stewardship grade and individual governance component grade, Chou et al. (2011) suggest that mutual funds with better quality governance practices are more likely to exercise their shareholder rights and their voting and investment decisions in favor of their fund investors. More importantly, they show that those portfolio firms invested by mutual funds with higher quality governance tend to exhibit correspondingly higher corporate governance standards. This results not only from the tendency to invest in firms with healthier governance, but also the fact that they are more effective corporate monitors.<sup>4</sup>

## 2.2. Corporate governance and firm transparency

A growing number of empirical studies have examined and evidenced that corporate governance practices, such as board structure, ownership structure, and changes in market-wide corporate policy or regulations, are important determining factors for the corporate information environment. By investigating the relationship between earnings manipulation and the internal governance structure, Dechow et al. (1996) show that firms with CEO duality, fewer outside block holders, or boards of directors dominated by management are more likely to attempt to manipulate earnings. This is in support of Beasley's (1996) findings regarding the relationship between corporate governance and financial statement fraud. Greater independence of the board or audit committee can reduce abnormal accruals, and this effect is more prominent if there is a minority of outside directors on the board or audit committee (Klein, 2002). A similar inference is also drawn by Dimitropoulos and Asteriou (2010) for Greek companies. Ajinkya et al. (2005) indicate that management earnings forecasts issued by firms with a higher proportion of outside directors or institutional ownership tend to be more reliable. Evidence in support of the positive relationship between corporate governance mechanisms and corporate transparency is also provided by Kelton and Yang (2008), who adopted Internet financial reporting as the informativeness measure.

Corporate policy or regulation may also have an impact on corporate transparency, as Stefanescu (2011) claims that the level of corporate informativeness is determined by corporate governance requirements under the Common Law regime. For instance, Armstrong et al. (2012) show that the passage of state anti-takeover laws in the US market can simultaneously improve information asymmetry, private information gathering and financial statement informativeness. The unique Split Share

<sup>3</sup> The voting behaviour of mutual funds can vary due to different types of proposal sponsors or voting issues. For details, please see Rothberg and Lilien (2006), Davis and Kim (2007) and Cremers and Romano (2011).

<sup>4</sup> However, mutual funds' voting decisions can be affected by their characteristics and free-rider or liquidity constraints (Bhide, 1993; Matvos and Ostrovsky, 2010; Morgan et al., 2011; Pozen, 2002).

Structure Reform in the Chinese stock market is found to effectively increase share price informativeness through the increase in the proportion of freely tradable shares, and this improvement is more pronounced for firms with greater state control (Hou et al., 2012).

More supportive findings are documented for the Chinese market. Due to the dominant entrenchment effect, Ding et al. (2007) show that Chinese state-owned firms manifest a higher level of earnings management and consequently weakened minority shareholder protection. Moreover, they find that ownership concentration displays an inverted U shape relationship with earnings management. By examining the association between stock returns and earnings in the Chinese market, Firth et al. (2007) indicate that firms with a higher proportion of foreign shareholders and tradable shares tend to have higher levels of earnings informativeness, while the reverse effect can be found for those with a highly concentrated ownership. Greater ownership concentration can weaken corporate transparency for Chinese listed firms, while both auditor quality and foreign ownership show a positive association with corporate transparency (Gul et al., 2010).

### 2.3. Hypotheses development

Based on the discussion in previous sections, we suggest that mutual fund ownership can have a positive impact on stock price informativeness through the following channels. First, high mutual fund ownership may play an active role in strengthening corporate governance and disciplining managers to disclose high quality information, which results in improved corporate information environment. Better information environment helps to mitigate information asymmetry and reduce the monitoring cost against agency problems. Empirically, Velury and Jenkins (2006) find that the quality of reported earnings is positively associated with institutional ownership. Similarly, Chung et al. (2002), Koh (2003), and Hadani et al. (2011) indicate that the large ownership of institutional shareholder can provide effective monitoring and limit managerial expropriation over earnings management. Second, because mutual funds in general have significantly higher ownership than individual investors, fund managers have more incentive and reduced cost to collect firm-specific information (e.g., direct communication with the management), and these information can be subsequently impounded into stock price through trading. For instance, Jiambalvo et al. (2002) provide the evidence that institutional investors can have more information (or even more timely information) and thus can react more quickly than non-sophisticated investors. Maffett (2012) report that more privately informed trading by mutual funds is found in the stocks with lower corporate transparency. Examining the informativeness of trading in the Taiwan stock market, Chiao et al. (2010) show that the informativeness of mutual funds' net trades is better than that of securities dealers. Similarly, Jiang et al. (2011) demonstrate that higher ownership of institutional investors can narrow firms' bid-ask spread and increase market quality index. Based on these arguments, we hypothesize that:

**Hypothesis H1.** Mutual fund ownership increases stock price informativeness among Chinese listed firms.

However, this improvement in the firm's information environment could be mitigated by the dominant state ownership in Chinese listed firms. There are two possible reasons for this. First, firms with higher state ownership receive greater financial support from government, which in turn reduces their dependence on stock market for external capital (e.g. Chen et al., 2011). Among firms with less reliance on stock market for financing, the ability of mutual fund to influence and discipline managers against opportunistic behavior is reduced. Second, the significant concentration of state shareholders leads to an entrenchment effect, since both controlling shareholders and managers with a substantial amount of ownership have greater incentives to pursue their own interests at the expense of minority shareholders (Claessens et al., 2002; Johnson et al., 2000; McConnell and Servaes, 1990; Shleifer and Vishny, 1997; Stulz, 1988). Concentrated state ownership can result in information being withheld, less protection for minority shareholders, as well as lower corporate performance and a reduction in firms' value, because these shareholders are more interested in pursuing their own political ambitions and prospects rather than looking after the interests of other shareholders or maximizing the value of the firm. Existing evidence suggest that there is limited relationship between share prices and

executive pay in state-owned firms (Firth et al., 2006; Wei and Xiao, 2006). Based on the discussion, we propose the following hypothesis:

**Hypothesis H2.** The positive impact of mutual fund ownership on stock price informativeness among Chinese listed firms is moderated by state ownership.

### 3. Methodology and sample

#### 3.1. Measure of stock informativeness

Our principal measure of price informativeness is proposed by Roll (1988). Theoretically speaking, the stock price of a firm is less likely to convey firm-specific information and thus less informative if the stock returns of a firm is strongly correlated with market return.<sup>5</sup> We estimate stock price informativeness using firm-specific regressions of weekly excess returns on market excess returns as follows. As previous research (i.e. Ding and Cheng, 2011) suggests that US market leads the movement of Chinese market, in Eq. (1) we account for the systematic stock return of the US market. In Eq. (2) we only consider the systematic stock return of the Chinese stock market.

$$RET_{it} = \alpha_0 + \alpha_1 CNMKTRET_t + \alpha_2 USMKTRET_t + \varepsilon \quad (1)$$

$$RET_{it} = \alpha_0 + \alpha_1 CNMKTRET_t + \varepsilon \quad (2)$$

where  $RET_{it}$  is the weekly excess return of individual stocks in China;  $CNMKTRET_t$  is the weekly excess return of the Shanghai Composite Index;  $USMKETRET_t$  is the weekly excess return of the US stock markets, which is calculated as the value-weighted return on all NYSE, AMEX, and NASDAQ stocks minus the one-month Treasury bill rate (from Ibbotson Associates). We use the 7-day China interbank offered rate as a proxy for the risk free return in China and we use the one-month Treasury bill rate as the risk free return in the US. Following Fernandes and Ferreira's (2008), we use a logistic transformation of  $1 - R_i^2$  as follows:

$$\psi_i = \log \left( \frac{1 - R_i^2}{R_i^2} \right) \quad (3)$$

where  $1 - R_i^2$  is the ratio of idiosyncratic volatility to total volatility for firm  $i$  and is obtained from the firm-specific weekly return regression. We denote the stock price informativeness measure as  $\Psi_1$  and  $\Psi_2$  respectively for the  $\Psi_i$  calculated based on the  $R_i^2$  of Eqs. (1) and (2). Using the market model, we can decompose total stock return variations into two components. One is the stock return variation relates to the market wide factors, and the other is associated with firm specific factors. As a consequence, we define the share price informativeness measures as the fraction of firm-specific return variation to the market-wide variation. Fernandes and Ferreira (2008) indicate that some firms may be more sensitive to market-wide or economy-wide shocks and thus both firm-specific and market wide return variations are scaled by the total stock return variation. Therefore, we have  $R_i^2$  and  $1 - R_i^2$  in Eq. (3).

#### 3.2. Test of hypothesis

To test our Hypotheses H1 and H2, we use the measure of share price informativeness developed in Section 3.1 as the dependent variable and regress it on the variable of fund-holding percentage and a set of control variables. Following prior studies such as Fernandes and Ferreira (2008) and Cornett

<sup>5</sup> Roll (1988) shows that the measure captures private information because it has little correlation with public news.

et al. (2007), we use the lead–lag approach to test how the fund ownership level at year  $t$  affects the stock informativeness at year  $t + 1$  as follows:

$$\Psi_{i,t+1} = \alpha_0 + \alpha_1 Fund_{i,t} + \alpha_2 SOR_{i,t} + \alpha_3 Fund_{i,t} \times SOR_{i,t} + \sum_{k=1}^k \alpha_{k+3} Control_k + \varepsilon \quad (4)$$

where  $\Psi_{i,t+1}$  is a measure of share price informativeness derived from time-series regressions of firm-specific weekly excess returns on stock market weekly excess returns for firm  $i$  in year  $t$  (i.e. it is calculated using weekly excess return from January to December each year, and thus *yearly* informativeness proxy is constructed). We use  $\Psi_1$  and  $\Psi_2$  specified in Section 3.1 above as dependent variables for the main tests and additional tests respectively. We define *Fund* as the ratio of fund ownership to the number of freely-traded shares. *SOR* is defined as the ratio of state shares relative to the total shares of the listed firm. *SOE* is a dummy variable which is set to 1 for state-owned enterprises and 0 otherwise.

We first introduce a set of control variables including firm characteristics. These variables have been shown in the literature to have an impact on the level of firm transparency. *SIZE* captures firm size and is defined as the natural log of market capitalization. *PB* captures growth and is measured as market-to-book value. *LEV* captures leverage and is measured as the debt-to-total asset ratio. *IROA* captures profitability and is the industry median adjusted return on assets, measured as operating income divided by total assets. *VOL* is trading volume measured as turnover. *ST* is a dummy variable indicating loss firms and is equal to 1 if firms experience two consecutive years of loss at year  $t$  and  $t-1$  (and therefore labeled as “Special Treatment” by the stock exchange) and 0 otherwise.<sup>6</sup> *SSSR* is a dummy variable indicating Split Share Structure Reform and is equal to 1 if the firm has completed the reform compensation negotiation process and 0 otherwise. *FOR* foreign ownership defined as the ratio of foreign shares relative to total shares.

We also include a number of corporate governance variables to test the marginal/incremental impact of mutual funds on corporate transparency. To capture the impact of the quality of external auditing, *Big4* is auditor quality indicator and is equal to 1 if the firm is audited by one of the Big 4 audit firms (PwC, Deloitte, Ernst & Young or KPMG) and 0 otherwise. *OwnCon* is ownership concentration measured by the Herfindahl index of the ownership from the 10 largest shareholders. *DCEOH* is CEO stock ownership and is set to 1 if the ratio of shares held by the CEO is below 25% or above 75% of the cross-sectional annual observation, which may induce entrenchment. *Duality* is 1 for firms with a CEO who also serves as chairperson of the board, and 0 otherwise. *Dmeet* is board activeness and equal to 1 if the meeting frequency of the firm is equal to or above the median value of cross-sectional annual observation, and 0 otherwise. *Dbsize* is equal to 1 if the number of board members is equal to or above the median value of cross-sectional annual observation, and 0 otherwise. *Dind* is board independence and is equal to 1 if the ratio of independent directors is equal to or above the median value of cross-sectional annual observation, and 0 otherwise. *Dssize* is equal to 1 if the number of the supervisory board members is equal to or above the median of cross-sectional annual observation, and 0 otherwise. These independent variables are given at fiscal year-end report.

In Eq. (4), the relationship between mutual fund ownership and share price informativeness can be evaluated by  $\alpha_1$ , which is the coefficient on *Fund*. Based on Hypothesis H1, we can expect  $\alpha_1$  to have a significantly positive value if the share-holding of mutual funds can improve the quality of corporate governance in their portfolio firms, and if share price informativeness can be improved by higher quality corporate governance. According to Hypothesis 2, we expect a significant and negative coefficient  $\alpha_3$  on the interaction term *Fund*  $\times$  *SOR*, which indicates the incremental relationship between the level of share price informativeness and the interaction between mutual fund ownership and the sensitivity of the abolition of restricted shares. In other words, a negative  $\alpha_3$  implies that a higher proportion of state shares in a firm will moderate the positive relationship between mutual fund and share price informativeness.

<sup>6</sup> The rationale of setting this dummy variable is to capture the delisting risks because listed firms which experience 3-year consecutive loss will be delisted by the regulatory commission (see Liu and Lu, 2007).

To enhance the rigor and robustness of our evidence, we also implement different sets of additional tests using alternative measures of state ownership, mutual fund ownership, and stock price informativeness. We substitute *SOR* with the alternative variable *RSR*, which is measured as number of restricted shares to total shares, and *SOE*, which is equal to 1 for state-controlled firms and 0 otherwise. We substitute *Fund* with the alternative variable *Fundt* measured as the ratio of fund ownership to the number of total shares. We substitute  $\Psi_1$  with  $\Psi_2$  specified in Section 3.1 above as dependent variable. Finally, we also further classify mutual funds into closed end and open end funds to determine whether these two groups differ in effect.

### 3.3. Data and sample statistics

The data used in our study are mainly taken from CSMAR (China Securities Market and Accounting Research) and CCER (China Center for Economic Research). The sample covers a period from 2003 to 2008. Variables on state ownership status, special treatment, industry, and Split Share Structure Reform variables such as *SOE*, *ST*, *SSSR*, and industry classification are from CCER. All other variables are constructed using CSMAR. In order to construct the informativeness measures, the Chinese market returns are taken from DataStream and the US stock market returns are from CRSP (Center for Research in Security Prices).

Table 1 displays the summary statistics of the share price informativeness measures used as the dependent variable in the multivariate regression, the main explanatory variables for testing the proposed two hypotheses, as well as the control variables over the sample period from 2003 to 2008. In total, we obtain 6104 firm-year observations. The two informativeness measures,  $\psi_1$  and  $\psi_2$ , have similar means and medians. We expect to observe a lower average for  $\psi_1$  than  $\psi_2$  as the former has taken into account the impact of the US market while the latter has only accounted for the domestic Chinese market information. These imply that the incorporation of the US market returns does not explain a large proportion of the return variation in the Chinese market. Also, the value of the means is close to and slightly larger than their medians, indicating that the distribution is nearly symmetrical. The mean of *Fund*, the fund ownership to freely traded shares ratio, is 0.069 with a standard deviation of 0.139. However, its median level is 0.001 and the third quartile is 0.057. These figures confirm the intuition that fund ownership tends to be large when fund managers decide to include the firm in their investment portfolios.

The median level of *SOR* is 0.348, with a standard deviation of 0.245. This shows that there is a small deviation in the state ownership across firms in the Chinese market. These figures differ slightly from the observations of Gul et al. (2010) due to the differences in the sample period covered. The average of *SOE* is 0.699 and this indicates that state-owned enterprises constitute the majority of the Chinese listed firms. Among the control variables, due to the rapid growth of the Chinese economy and Chinese stock market investment activities, the median levels of trading volume and market to book ratios are higher than those observed in earlier studies, at 3.923 and 2.457 respectively. The first quartile and third quartile of the leverage ratio in Chinese firms are 0.374 and 0.629 respectively. The proportion of foreign shares compared to total shares is low with an average level of 0.067, and Table 1 also shows a very small number of Chinese firms using the big 4 auditing companies, equivalent to 7.06%. Finally, it is of interest that the average level of CEO duality is only 1%.

From Table 2, it can be seen that the correlation coefficient between the two informativeness measures is up to 0.8976. This confirms the interpretation from Table 1 that a very small proportion of Chinese stock return innovation is contributed by the US market information and provides the explanation that results are robust when these two measures are adopted alternatively. We also observe a negative relationship between the two share price informativeness measures and state ownership, restricted share percentage and the state-controlled enterprises dummy variable. This is consistent with firms under state control having lower corporate disclosure incentives since they are less dependent on capital market for funding. In general, most of the correlations reported in Table 2 are below 0.2 and thus present no concerns about multicollinearity among the explanatory variables.



**Table 1**  
Descriptive statistics.

	Mean	Std.	Median	25%	75%	Obs.
$\Psi_1$	2.0387	1.1474	1.7680	1.2182	2.5784	6104
$\Psi_2$	2.5021	1.5853	2.0908	1.4593	3.0206	6104
<i>Fund</i>	0.0695	0.1394	0.0012	0.0000	0.0574	6104
<i>Fundt</i>	0.0293	0.0633	0.0004	0.0000	0.0225	6104
<i>SOR</i>	0.3224	0.2488	0.3478	0.0262	0.5385	6104
<i>RSR</i>	0.5422	0.1471	0.5661	0.4479	0.6482	6104
<i>SOE</i>	0.6997	0.4584	1.0000	0.0000	1.0000	6104
<i>Size</i>	20.4658	1.0508	20.4197	19.8190	21.0683	6104
<i>PB</i>	3.6599	3.7652	2.4568	1.6628	4.2272	6104
<i>LEV</i>	0.4992	0.1813	0.5118	0.3743	0.6290	6104
<i>IROA</i>	0.0000	0.0629	0.0007	-0.0151	0.0262	6104
<i>VOL</i>	5.2516	3.9116	3.9225	2.2301	7.3312	6104
<i>ST</i>	0.0668	0.2498	0.0000	0.0000	0.0000	6104
<i>SSSR</i>	0.4274	0.4947	0.0000	0.0000	1.0000	6104
<i>FOR</i>	0.0665	0.2492	0.0000	0.0000	0.0000	6104
<i>OwnCon</i>	0.2025	0.1334	0.1670	0.0988	0.2848	6104
<i>Big4</i>	0.0706	0.2562	0.0000	0.0000	0.0000	6104
<i>DCEOH</i>	0.2543	0.4355	0.0000	0.0000	1.0000	6104
<i>Duality</i>	0.0100	0.0995	0.0000	0.0000	0.0000	6104
<i>Dmeet</i>	0.5680	0.4954	1.0000	0.0000	1.0000	6104
<i>Dbsize</i>	0.3625	0.4808	0.0000	0.0000	1.0000	6104
<i>DInd</i>	0.8721	0.3341	1.0000	1.0000	1.0000	6104
<i>Dssize</i>	0.9078	0.2894	1.0000	1.0000	1.0000	6104

Note: This table presents the summary statistics. Our sample covers Chinese listed firms over 2003–2008.  $\Psi_1$  ( $\Psi_2$ ) is share price informativeness measure derived from residual variances of time-series regressions of firm-specific weekly excess returns on both Chinese and US (Chinese) stock market weekly excess returns. *Fund* (*Fundt*) denotes the ratio of fund ownership to the number of freely-traded shares (total shares). *SOR* (*RSR*) is with the ratio of state shares (restricted shares) relative to the total shares of the listed firm. *SOE* is equal to 1 for state-owned enterprises and 0 otherwise. *SIZE* is natural log of market capitalization. *PB* is market-to-book value. *LEV* is debt-to-total asset ratio. *IROA* is industry median adjusted return on asset measured as operating income divided by total asset. *VOL* is trading volume measured as turnover. *ST* is equal to 1 if the firms experience two-year consecutive loss (therefore specially treated by the stock exchange) and 0 otherwise. *SSSR* is equal to 1 if the firm has finished the Split Share Structure Reform i.e. the consideration scheme has been voted through and 0 otherwise. *FOR* is the ratio of foreign shares relative to total shares. *Big4* is set to 1 if the firm is audited by one of the Big 4 audit firms (PwC, Deloitte, Ernst & Young or KPMG). *OwnCon* is the Herfindahl index of the ownership from the 10 largest shareholders. *DCEOH* is set to be 1 if shares held by CEO holding ratio is below the 25% or above the 75% of the cross-sectional annual observation. *Duality* is 1 for firms with CEO also serving as chairperson of the board, and 0 otherwise. *Dmeet* is equal to 1 if the meeting frequency of the firm is above or equal to the median of cross-sectional annual observation. *Dbsize* is set to 1 if the number of directors on the board is equal to or above the median of cross-sectional annual observation. *DInd* is equal to 1 if the ratio of independent directors is equal to or above the median of cross-sectional annual observation. *Dssize* is set to 1 if the number of supervisory board members is equal to or above the median of cross-sectional annual observation.

## 4. Empirical results

### 4.1. Main tests of hypotheses

Table 3 reports our main test of hypotheses H1 and H2. In Table 3, Regressions 1, 3, and 5 (2, 4, and 6) are estimated without (with) using the bootstrapped median regression approach, which can be applied to control for the influence of outliers. Controls of region, industry, and year effects are applied consistently across these regressions. In Regressions 1 and 2, we analyze the relationship between stock price informativeness and fund ownership, and apply size as the firm characteristics control variable. The coefficient on *Fund* is significantly positive in both cases. This indicates a significantly positive relationship between the level of mutual fund ownership and the stock price informativeness measures, which is consistent with our predictions in hypothesis H1. In other words, we have empirical evidence that firms with higher institutional ownership lead to higher transparency, and this is probably due to the external corporate governance role of such investors. In Regressions 3 and 4, we interact mutual fund ownership with state ownership ratio,

**Table 2**  
Correlation matrix.

		1	2	3	4	5	6	7	8	9	10	11	
1	$\Psi_1$	1											
2	$\Psi_2$	0.8976 <sup>*</sup>	1										
3	<i>Fund</i>	-0.0385 <sup>*</sup>	-0.0571 <sup>*</sup>	1									
4	<i>Fundt</i>	-0.0157	-0.0396 <sup>*</sup>	0.9025 <sup>*</sup>	1								
5	<i>SOR</i>	-0.0637 <sup>*</sup>	-0.0566 <sup>*</sup>	0.0550 <sup>*</sup>	-0.0277	1							
6	<i>RSR</i>	-0.0597 <sup>*</sup>	-0.0217	0.004	-0.1674 <sup>*</sup>	0.3762 <sup>*</sup>	1						
7	<i>SOE</i>	-0.0304 <sup>*</sup>	-0.0353 <sup>*</sup>	0.0551 <sup>*</sup>	0.0371 <sup>*</sup>	0.6642 <sup>*</sup>	0.0448 <sup>*</sup>	1					
8	<i>Lnsiz</i>	-0.1699 <sup>*</sup>	-0.1788 <sup>*</sup>	0.3791 <sup>*</sup>	0.3004 <sup>*</sup>	0.2593 <sup>*</sup>	-0.0392 <sup>*</sup>	0.2609 <sup>*</sup>	1				
9	<i>PB</i>	-0.1201 <sup>*</sup>	-0.0897 <sup>*</sup>	0.1554 <sup>*</sup>	0.1492 <sup>*</sup>	-0.0791 <sup>*</sup>	-0.0269	-0.0871 <sup>*</sup>	-0.2818 <sup>*</sup>	1			
10	<i>Lev</i>	0.0198	0.0528 <sup>*</sup>	-0.0978 <sup>*</sup>	-0.0722 <sup>*</sup>	-0.0879 <sup>*</sup>	-0.0616 <sup>*</sup>	-0.0634 <sup>*</sup>	-0.1961 <sup>*</sup>	-0.0152	1		
11	<i>IROA</i>	-0.0936 <sup>*</sup>	-0.1268 <sup>*</sup>	0.3292 <sup>*</sup>	0.2885 <sup>*</sup>	0.0915 <sup>*</sup>	0.0533 <sup>*</sup>	0.0524 <sup>*</sup>	0.3617 <sup>*</sup>	0.0565 <sup>*</sup>	-0.4628 <sup>*</sup>	1	
12	<i>Vol</i>	-0.1495 <sup>*</sup>	-0.1265 <sup>*</sup>	-0.0583 <sup>*</sup>	-0.0414 <sup>*</sup>	-0.1230 <sup>*</sup>	-0.2410 <sup>*</sup>	-0.0878 <sup>*</sup>	-0.0436 <sup>*</sup>	0.2040 <sup>*</sup>	0.0162	-0.0504 <sup>*</sup>	
13	<i>ST</i>	0.0364 <sup>*</sup>	0.0623 <sup>*</sup>	-0.1520 <sup>*</sup>	-0.1394 <sup>*</sup>	-0.0994 <sup>*</sup>	0.01	-0.1147 <sup>*</sup>	-0.3450 <sup>*</sup>	0.1744 <sup>*</sup>	0.4381 <sup>*</sup>	-0.2426 <sup>*</sup>	
14	<i>SSSR</i>	-0.0503 <sup>*</sup>	-0.1062 <sup>*</sup>	0.1829 <sup>*</sup>	0.2321 <sup>*</sup>	-0.1891 <sup>*</sup>	-0.4217 <sup>*</sup>	-0.0845 <sup>*</sup>	0.1140 <sup>*</sup>	0.1583 <sup>*</sup>	-0.0685 <sup>*</sup>	0.1166 <sup>*</sup>	
15	<i>FOR</i>	-0.0106	-0.0079	0.0444 <sup>*</sup>	0.0178	-0.1281 <sup>*</sup>	0.0868 <sup>*</sup>	-0.0887 <sup>*</sup>	0.0596 <sup>*</sup>	-0.0031	-0.0557 <sup>*</sup>	0.0305 <sup>*</sup>	
16	<i>OwnCon</i>	-0.0154	-0.0241	0.1088 <sup>*</sup>	-0.0238	0.5815 <sup>*</sup>	0.5635 <sup>*</sup>	0.2686 <sup>*</sup>	0.2845 <sup>*</sup>	-0.0585 <sup>*</sup>	-0.1277 <sup>*</sup>	0.1588 <sup>*</sup>	
17	<i>Big4</i>	-0.0417 <sup>*</sup>	-0.0467 <sup>*</sup>	0.1726 <sup>*</sup>	0.0586 <sup>*</sup>	0.0918 <sup>*</sup>	0.0432 <sup>*</sup>	0.0880 <sup>*</sup>	0.3436 <sup>*</sup>	-0.0211	-0.0562 <sup>*</sup>	0.0878 <sup>*</sup>	
18	<i>DCEOH</i>	-0.0034	-0.0032	0.0716 <sup>*</sup>	0.0994 <sup>*</sup>	-0.1051 <sup>*</sup>	-0.0886 <sup>*</sup>	-0.0314 <sup>*</sup>	0.0797 <sup>*</sup>	-0.0447 <sup>*</sup>	-0.0836 <sup>*</sup>	0.0821 <sup>*</sup>	
19	<i>Duality</i>	0.003	0.0074	-0.011	-0.0047	-0.0385 <sup>*</sup>	-0.0253	-0.0446 <sup>*</sup>	-0.0017	0.0057	0.0129	-0.0179	
20	<i>Dmeet</i>	0.0195	0.0189	-0.0186	-0.0247	0.0616 <sup>*</sup>	0.0450 <sup>*</sup>	0.0572 <sup>*</sup>	-0.0055	-0.0352 <sup>*</sup>	-0.0813 <sup>*</sup>	0.0139	
21	<i>Dbsize</i>	-0.0474 <sup>*</sup>	-0.0399 <sup>*</sup>	0.0388 <sup>*</sup>	0.0027	0.1178 <sup>*</sup>	0.1233 <sup>*</sup>	0.1220 <sup>*</sup>	0.1142 <sup>*</sup>	-0.0400 <sup>*</sup>	-0.0202	-0.0128	
22	<i>DInd</i>	-0.0094	-0.0051	0.0411 <sup>*</sup>	0.0550 <sup>*</sup>	-0.0970 <sup>*</sup>	-0.0704 <sup>*</sup>	-0.0807 <sup>*</sup>	0.0239	0.0171	-0.0037	0.0665 <sup>*</sup>	
23	<i>Dssize</i>	0.0094	0.0106	0.0036	0.0073	0.1114 <sup>*</sup>	-0.0364 <sup>*</sup>	0.1284 <sup>*</sup>	0.0701 <sup>*</sup>	-0.0217	-0.0037	0.004	
		12	13	14	15	16	17	18	19	20	21	22	23
12	<i>Vol</i>	1											
13	<i>ST</i>	-0.0402 <sup>*</sup>	1										
14	<i>SSSR</i>	0.5597 <sup>*</sup>	-0.0950 <sup>*</sup>	1									
15	<i>FOR</i>	0.0154	-0.0188	0.0333 <sup>*</sup>	1								
16	<i>OwnCon</i>	-0.1554 <sup>*</sup>	-0.1029 <sup>*</sup>	-0.1847 <sup>*</sup>	-0.0513 <sup>*</sup>	1							

Table 2 (Continued)

		12	13	14	15	16	17	18	19	20	21	22	23
17	<i>Big4</i>	−0.0568*	−0.0695*	−0.004	0.0645*	0.1476*	1						
18	<i>DCEOH</i>	−0.0304*	−0.1277*	0.0345*	−0.0153	−0.1216*	−0.0157	1					
19	<i>Duality</i>	−0.0005	0.0264	0.0015	0.0295*	−0.0440*	0.0067	0.0111	1				
20	<i>Dmeet</i>	−0.0158	−0.0440*	−0.0421*	0.0155	0.0379*	−0.0450*	0.0534*	−0.0189	1			
21	<i>Dbsize</i>	−0.0886*	−0.0624*	−0.0933*	0.0452*	0.0368*	0.0690*	−0.0124	−0.0072	0.0447*	1		
22	<i>DInd</i>	0.1294*	−0.0415*	0.1562*	0.0271	−0.0413*	0.0061	0.0144	0.014	−0.0297*	−0.1665*	1	
23	<i>Dssize</i>	−0.0827*	−0.0540*	−0.1097*	−0.0312*	0.0445*	0.028	0.0303*	0.0049	−0.0214	−0.0032	−0.0209	1

Note: This table presents the correlation matrix. Our sample covers Chinese listed firms over 2003–2008.  $\psi_1$  ( $\psi_2$ ) is share price informativeness measure derived from residual variances of time-series regressions of firm-specific weekly excess returns on both Chinese and US (Chinese) stock market weekly excess returns. *Fund* (*Fundt*) denotes the ratio of fund ownership to the number of freely-traded shares (total shares). *SOR* (*RSR*) is with the ratio of state shares (restricted shares) relative to the total shares of the listed firm. *SOE* is equal to 1 for state-owned enterprises and 0 otherwise. *SIZE* is natural log of market capitalization. *PB* is market-to-book value. *LEV* is debt-to-total asset ratio. *IROA* is industry median adjusted return on asset measured as operating income divided by total asset. *VOL* is trading volume measured as turnover. *ST* is equal to 1 if the firms experience two-year consecutive loss (therefore specially treated by the stock exchange) and 0 otherwise. *SSSR* is equal to 1 if the firm has finished the Split Share Structure Reform i.e. the consideration scheme has been voted through and 0 otherwise. *FOR* is the ratio of foreign shares relative to total shares. *Big4* is set to 1 if the firm is audited by one of the Big 4 audit firms (PwC, Deloitte, Ernst & Young or KPMG). *OwnCon* is the Herfindahl index of the ownership from the 10 largest shareholders. *DCEOH* is set to be 1 if shares held by CEO holding ratio is below the 25% or above the 75% of the cross-sectional annual observation. *Duality* is 1 for firms with CEO also serving as chairperson of the board, and 0 otherwise. *Dmeet* is equal to 1 if the meeting frequency of the firm is above or equal to the median of cross-sectional annual observation. *Dbsize* is set to 1 if the number of directors on the board is equal to or above the median of cross-sectional annual observation. *DInd* is equal to 1 if the ratio of independent directors is equal to or above the median of cross-sectional annual observation. *Dssize* is set to 1 if the number of supervisory board members is equal to or above the median of cross-sectional annual observation.

\* Indicates 5% significance level.

**Table 3**

The impact of fund ownership and state ownership ratio on share price informativeness.

	Regression 1		Regression 2		Regression 3		Regression 4		Regression 5		Regression 6	
<i>Fund</i>	0.161	(1.920) <sup>*</sup>	0.123	(1.650) <sup>*</sup>	0.390	(2.810) <sup>***</sup>	0.481	(2.940) <sup>***</sup>	0.508	(3.500) <sup>***</sup>	0.648	(4.680) <sup>***</sup>
<i>SOR</i>					0.129	(2.360) <sup>**</sup>	0.155	(2.620) <sup>***</sup>	0.047	(0.710)	0.083	(1.360)
<i>Fund</i> × <i>SOR</i>					-0.652	(-2.160) <sup>**</sup>	-0.928	(-2.710) <sup>***</sup>	-0.768	(-2.560) <sup>**</sup>	-1.013	(-4.440) <sup>***</sup>
<i>Insize</i>	-0.150	(-12.650) <sup>***</sup>	-0.137	(-11.430) <sup>***</sup>	-0.154	(-12.570) <sup>***</sup>	-0.144	(-14.260) <sup>***</sup>	-0.137	(-8.950) <sup>***</sup>	-0.127	(-8.830) <sup>***</sup>
<i>PB</i>									0.002	(0.400)	-0.003	(-0.730)
<i>Lev</i>									-0.224	(-3.220) <sup>***</sup>	-0.129	(-2.150) <sup>**</sup>
<i>IROA</i>									-1.357	(-5.760) <sup>***</sup>	-1.362	(-7.650) <sup>***</sup>
<i>Vol</i>									-0.019	(-3.970) <sup>***</sup>	-0.010	(-2.420) <sup>**</sup>
<i>ST</i>									0.126	(2.320) <sup>**</sup>	0.190	(5.140) <sup>***</sup>
<i>SSSR</i>									-0.040	(-0.700)	-0.048	(-0.810)
<i>FOR</i>									-0.039	(-0.930)	0.018	(0.390)
<i>OwnCon</i>									0.224	(1.920) <sup>*</sup>	0.194	(2.430) <sup>**</sup>
<i>Big4</i>									0.028	(0.610)	0.047	(0.710)
<i>DCEOH</i>									-0.036	(-1.430)	-0.042	(-2.130) <sup>**</sup>
<i>Duality</i>									0.000	(0.000)	0.102	(0.900)
<i>Dmeet</i>									-0.012	(-0.520)	-0.005	(-0.240)
<i>Dbsize</i>									0.031	(1.320)	-0.001	(-0.050)
<i>Dind</i>									-0.037	(-1.040)	-0.035	(-1.450)
<i>Dssize</i>									0.074	(2.080) <sup>**</sup>	0.074	(1.860) <sup>*</sup>
<i>Constant</i>	5.398	(21.100) <sup>***</sup>	4.292	(17.030) <sup>***</sup>	5.441	(21.010) <sup>***</sup>	4.396	(20.440) <sup>***</sup>	5.134	(13.560) <sup>***</sup>	4.792	(10.770) <sup>***</sup>
<i>Region</i>		Yes		Yes		Yes		Yes		Yes		Yes
<i>Industry</i>		Yes		Yes		Yes		Yes		Yes		Yes
<i>Year</i>		Yes		Yes		Yes		Yes		Yes		Yes
<i>BSQREG</i>		No		Yes		No		Yes		No		Yes
<i>Adj R<sup>2</sup></i>		0.465				0.466				0.4739		
<i>Pseudo R<sup>2</sup></i>				0.294				0.295				0.302
<i>Obs.</i>		6104		6104		6104		6104		6104		6104

Note: This table presents the results of the following regression model:  $\psi_{1,t+1} = \alpha_0 + \alpha_1 Fund_{i,t} + \alpha_2 SOR_{i,t} + \alpha_3 Fund_{i,t} \times SOR_{i,t} + \sum_{k=1}^k \alpha_{k+3} Control_k + \varepsilon$

The dependent variable  $\Psi_1$  is share price informativeness measure derived from residual variances of time-series regressions of firm-specific weekly excess returns on both Chinese and US stock market weekly excess returns. *Fund* denotes the ratio of fund ownership relative to the number of freely-traded shares. *SOR* denotes the ratio of state ownership relative to total number of shares of the firm. *SIZE* is natural log of market capitalization. *PB* is market-to-book value. *LEV* is debt-to-total asset ratio. *IROA* is industry median adjusted return on asset measured as operating income divided by total asset. *VOL* is trading volume measured as turnover. *ST* is equal to 1 if the firms experience two-year consecutive loss (therefore specially treated by the stock exchange) and 0 otherwise. *SSSR* is equal to 1 if the firm has finished the Split Share Structure Reform i.e. the consideration scheme has been voted through and 0 otherwise. *FOR* is the ratio of foreign shares relative to total shares. *Big4* is set to 1 if the firm is audited by one of the Big 4 audit firms (PwC, Deloitte, Ernst & Young or KPMG). *OwnCon* is the Herfindahl index of the ownership from the 10 largest shareholders. *DCEOH* is set to be 1 if shares held by CEO holding ratio is below the 25% or above the 75% of the cross-sectional annual observation. *Duality* is 1 for firms with CEO also serving as chairperson of the board, and 0 otherwise. *Dmeet* is equal to 1 if the meeting frequency of the firm is above or equal to the median of cross-sectional annual observation. *Dbsize* is set to 1 if the number of directors on the board is equal to or above the median of cross-sectional annual observation. *Dind* is equal to 1 if the ratio of independent directors is equal to or above the median of cross-sectional annual observation. *Dssize* is set to 1 if the number of supervisory board members is equal to or above the median of cross-sectional annual observation. The sample period covers 2003–2008.

<sup>\*</sup> Indicates 10% significance level.

<sup>\*\*</sup> Indicates 5% significance level.

<sup>\*\*\*</sup> Indicates 1% significance level.

and again apply size as the firm characteristics control variable. The coefficient on *Fund* is significantly positive, which indicates that mutual fund ownership is positively related to stock price informativeness among low state ownership firms. This is evidence that the transparency of firms with greater dependence on stock market for funding is more influenced by mutual fund ownership. The coefficient pertaining to  $Fund \times SOR$  is significantly negative, which indicates that the positive relationship between mutual fund ownership and stock price informativeness is moderated in the presence of state ownership. In other words, we have evidence consistent with our hypothesis H2. In Regressions 1 to 4, we apply size as the only firm characteristics control variable to demonstrate that findings consistent with our hypotheses are not affected by potential multicollinearity issue among the control variables we apply later on in the rest of our empirical analyses. In Regressions 5 and 6, we strengthen the rigor of our inference by incorporating all firm characteristics and corporate governance control variables. The coefficient on *Fund* is significantly positive while the coefficient on the interaction term  $Fund \times SOR$  is significantly negative. This suggests our previous findings are not driven by confounding effects associated with growth, leverage, profitability, liquidity, distress, institutional reform, foreign ownership, ownership concentration, auditor quality, as well as corporate governance mechanisms captured by various CEO and board characteristics.

This positive coefficient on *Fund* in our regression analyses in Table 3 is different from the results in the correlation matrix of Table 2, which shows a negative relationship between fund ownership and share price informativeness measures. This may result from the fact that bivariate correlation analysis cannot control possible confounding factors which we control in multivariate regression analyses. However, our results in Table 3 are consistent even when we include one control variable only. We also test the sum of the coefficients *SOR* and the interaction term ( $Fund \times SOR$ ) for Regressions 3 and 5 in Table 3, and we obtain the coefficient as  $-0.523$  ( $t\text{-stat} = -1.86$ ) and  $-0.7017$  ( $t\text{-stat} = -2.48$ ), which further shows that the state ownership has significant negative impact on the stock informativeness. Turning to the control variables, Table 3 suggest that stock price informativeness is lower among larger, more profitable, and higher trading volume firms, which is probably due to greater influence of such firms to the movement of market portfolio returns. Firms that are more levered also have lower stock price informativeness possibly because such firms have greater dependence on debt capital and therefore have less incentive to communicate with equity investors. Firms with larger supervisor board have higher price informativeness, and this implies that internal governance plays a role in corporate transparency. Finally, in the untabulated robustness checks, we also adjust for firm clustering effect in our analyses and obtain results with consistent inference to our main findings.

#### 4.2. Robustness checks

In Tables 4–7 we present analyses where we apply alternative state ownership, fund ownership, and stock price informativeness measures. The overall purpose is to ensure that our main findings are not specific to the way we compute these measures in Table 3. In Table 4 we substitute state ownership ratio (*SOR*) by restricted share ratio (*RSR*) to capture state influence. Under the split share structure, state owners are required to hold restricted shares. After the Split Share Structure Reform which is announced in 2005, firms go through a gradual process of reduction in restricted shares. In our sample latter sample period, i.e. 2006–2008, restricted shares are still in existence across many firms. Firms with higher restricted shares have more shareholders that cannot trade their shares and therefore less interested in stock return performance of their firms, which in turn may reduce firm incentives to communicate with outside investors. Throughout Table 4, the coefficient on *Fund* is significantly positive while the coefficient on the interaction term  $Fund \times RSR$  is significantly negative. This implies that mutual fund ownership improves transparency of firms that have less restricted shareholders. Since restricted shares are mainly held by state shareholders as confirmed by the significantly positive correlation between *SOR* and *RSR* in Table 2, this is also consistent with our main results.

In Table 5 we substitute state ownership ratio (*SOR*) with state-owned enterprise dummy variable (*SOE*). This alternative measure captures whether state shareholders are the controlling shareholder.

**Table 4**

Alternative state ownership measure based on restricted share ratio.

	Regression 1		Regression 2		Regression 3		Regression 4	
<i>Fund</i>	0.742	(2.590)***	0.537	(2.140)**	0.721	(2.450)**	0.761	(2.820)***
<i>RSR</i>	0.233	(2.620)***	0.165	(1.950)*	0.124	(1.130)	0.100	(1.100)
<i>Fund</i> × <i>RSR</i>	-1.106	(-2.170)**	-0.772	(-1.790)*	-0.900	(-1.750)*	-0.861	(-1.800)*
<i>Lnsiz</i>	-0.148	(-12.480)***	-0.137	(-16.090)***	-0.136	(-8.830)***	-0.127	(-9.540)***
<i>PB</i>					0.001	(0.280)	-0.005	(-1.030)
<i>Lev</i>					-0.222	(-3.180)***	-0.133	(-1.780)*
<i>IROA</i>					-1.352	(-5.730)***	-1.381	(-6.100)***
<i>Vol</i>					-0.019	(-3.930)***	-0.008	(-1.540)
<i>ST</i>					0.125	(2.290)**	0.191	(4.670)***
<i>SSSR</i>					-0.032	(-0.550)	-0.043	(-0.700)
<i>FOR</i>					-0.041	(-0.960)	0.001	(0.030)
<i>OwnCon</i>					0.188	(1.580)	0.217	(2.470)**
<i>Big4</i>					0.027	(0.580)	0.051	(0.990)
<i>DCEOH</i>					-0.032	(-1.260)	-0.034	(-1.340)
<i>Duality</i>					0.002	(0.020)	0.091	(0.940)
<i>Dmeet</i>					-0.012	(-0.520)	-0.006	(-0.260)
<i>Dbsize</i>					0.028	(1.210)	-0.002	(-0.100)
<i>Dlnd</i>					-0.038	(-1.070)	-0.038	(-1.060)
<i>Dssize</i>					0.073	(2.050)**	0.073	(3.080)***
<i>Constant</i>	5.224	(19.850)***	4.180	(19.530)***	4.283	(10.470)***	4.711	(13.490)***
<i>Region</i>		Yes		Yes		Yes		Yes
<i>Industry</i>		Yes		Yes		Yes		Yes
<i>Year</i>		Yes		Yes		Yes		Yes
<i>BSQREG</i>		No		Yes		No		Yes
<i>Adj R<sup>2</sup></i>		0.466				0.474		
<i>Pseudo R<sup>2</sup></i>				0.294				0.302
<i>Obs.</i>		6104		6104		6104		6104

Note: This table presents the results of the following regression model:  $\psi_{1,t+1} = \alpha_0 + \alpha_1 Fund_{i,t} + \alpha_2 RSR_{i,t} + \alpha_3 Fund_{i,t} \times RSR_{i,t} +$

$$\sum_{k=1}^k \alpha_{k+3} Control_k + \varepsilon$$

The dependent variable  $\psi_1$  is share price informativeness measure derived from residual variances of time-series regressions of firm-specific weekly excess returns on both Chinese and US stock market weekly excess returns. *RSR* denotes the ratio of restricted shares relative to total shares of the firm. *SIZE* is natural log of market capitalization. *PB* is market-to-book value. *LEV* is debt-to-total asset ratio. *IROA* is industry median adjusted return on asset measured as operating income divided by total asset. *VOL* is trading volume measured as turnover. *ST* is equal to 1 if the firms experience two-year consecutive loss (therefore specially treated by the stock exchange) and 0 otherwise. *SSSR* is equal to 1 if the firm has finished the Split Share Structure Reform i.e. the consideration scheme has been voted through and 0 otherwise. *FOR* is the ratio of foreign shares relative to total shares. *Big4* is set to 1 if the firm is audited by one of the Big 4 audit firms (PwC, Deloitte, Ernst & Young or KPMG). *OwnCon* is the Herfindahl index of the ownership from the 10 largest shareholders. *DCEOH* is set to 1 if shares held by CEO holding ratio is below the 25% or above the 75% of the cross-sectional annual observation. *Duality* is 1 for firms with CEO also serving as chairperson of the board, and 0 otherwise. *Dmeet* is equal to 1 if the meeting frequency of the firm is above or equal to the median of cross-sectional annual observation. *Dbsize* is set to 1 if the number of directors on the board is equal to or above the median of cross-sectional annual observation. *Dlnd* is equal to 1 if the ratio of independent directors is equal to or above the median of cross-sectional annual observation. *Dssize* is set to 1 if the number of supervisory board members is equal to or above the median of cross-sectional annual observation. The sample period covers 2003–008.

\* Indicates 10% significance level.

\*\* Indicates 5% significance level.

\*\*\* Indicates 1% significance level.

Controlling shareholder have more influence on firm decision making and firms dominated by state shareholders are expected to be less dependent on capital market, which reduces incentives to communicate with outside investors. In Table 5 we also scale the fund ownership measure by total number of shares (*Fundt*) instead. The fund ownership measure we applied in Table 3 is scaled by the number of freely tradable shares. The alternative measure we use incorporates restricted shares mainly held by state shareholders. In other words, the differences between these two measures are likely to be greater in firms with higher restricted shares. Across Table 5, the coefficient pertaining to *Fundt* is significantly positive while that of the interaction term *Fund* × *SOE* is significantly negative. This suggests that firms with higher institutional investor ownership relative to total

**Table 5**  
Alternative mutual fund ownership measure scaled by total shares.

	Regression 1		Regression 2	
<i>Fundt</i>	1.210	(3.300) <sup>***</sup>	0.898	(3.230) <sup>***</sup>
<i>SOE</i>	0.074	(2.640) <sup>***</sup>	0.059	(2.740) <sup>***</sup>
<i>Fundt</i> × <i>SOE</i>	-0.973	(-2.440) <sup>**</sup>	-1.204	(-2.170) <sup>**</sup>
<i>Lnsiz</i>	-0.139	(-9.210) <sup>***</sup>	-0.127	(-7.250) <sup>***</sup>
<i>PB</i>	0.002	(0.530)	-0.002	(-0.440)
<i>Lev</i>	-0.222	(-3.190) <sup>***</sup>	-0.123	(-1.650) <sup>*</sup>
<i>IROA</i>	-1.330	(-5.650) <sup>***</sup>	-1.307	(-4.690) <sup>***</sup>
<i>Vol</i>	-0.019	(-3.950) <sup>***</sup>	-0.010	(-2.030) <sup>**</sup>
<i>ST</i>	0.127	(2.340) <sup>**</sup>	0.181	(5.610) <sup>***</sup>
<i>SSSR</i>	-0.029	(-0.700)	0.012	(0.220)
<i>FOR</i>	-0.035	(-0.610)	-0.042	(-0.630)
<i>OwnCon</i>	0.199	(2.060) <sup>**</sup>	0.229	(2.700) <sup>***</sup>
<i>Big4</i>	0.035	(0.760)	0.046	(0.810)
<i>DCEOH</i>	-0.036	(-1.440)	-0.039	(-1.460)
<i>Duality</i>	0.013	(0.140)	0.097	(0.980)
<i>Dmeet</i>	-0.015	(-0.670)	-0.010	(-0.550)
<i>Dbsize</i>	0.026	(1.120)	-0.006	(-0.290)
<i>Dind</i>	-0.033	(-0.940)	-0.022	(-0.610)
<i>Dssize</i>	0.070	(1.970) <sup>**</sup>	0.069	(2.160) <sup>**</sup>
Constant	4.344	(11.040) <sup>***</sup>	3.964	(8.200) <sup>***</sup>
Region		Yes		Yes
Industry		Yes		Yes
Year		Yes		Yes
BSQREG		No		Yes
Adj R <sup>2</sup>		0.474		
Pseudo R <sup>2</sup>				0.302
Obs.		6104		6104

Note: This table presents the results of the following regression model:  $\psi_{i,t+1} = \alpha_0 + \alpha_1 Fundt_{i,t} + \alpha_2 SOE_{i,t} + \alpha_3 Fundt_{i,t} \times SOE_{i,t} +$

$$\sum_{k=1}^k \alpha_{k+3} Control_k + \varepsilon$$

The dependent variable  $\Psi_1$  is share price informativeness measure derived from residual variances of time-series regressions of firm-specific weekly excess returns on both Chinese and US stock market weekly excess returns. *SOE* is equal to 1 if the firm is a state-owned enterprise (*SOE*) and 0 otherwise. *Fundt* is the ratio of fund ownership relative to the total number of shares. *SIZE* is natural log of market capitalization. *PB* is market-to-book value. *LEV* is debt-to-total asset ratio. *IROA* is industry median adjusted return on asset measured as operating income divided by total asset. *VOL* is trading volume measured as turnover. *ST* is equal to 1 if the firms experience two-year consecutive loss (therefore specially treated by the stock exchange) and 0 otherwise. *SSSR* is equal to 1 if the firm has finished the Split Share Structure Reform i.e. the consideration scheme has been voted through and 0 otherwise. *FOR* is the ratio of foreign shares relative to total shares. *Big4* is set to 1 if the firm is audited by one of the Big 4 audit firms (PwC, Deloitte, Ernst & Young or KPMG). *OwnCon* is the Herfindahl index of the ownership from the 10 largest shareholders. *DCEOH* is set to be 1 if shares held by CEO holding ratio is below the 25% or above the 75% of the cross-sectional annual observation. *Duality* is 1 for firms with CEO also serving as chairperson of the board, and 0 otherwise. *Dmeet* is equal to 1 if the meeting frequency of the firm is above or equal to the median of cross-sectional annual observation. *Dbsize* is set to 1 if the number of directors on the board is equal to or above the median of cross-sectional annual observation. *Dind* is equal to 1 if the ratio of independent directors is equal to or above the median of cross-sectional annual observation. *Dssize* is set to 1 if the number of supervisory board members is equal to or above the median of cross-sectional annual observation. The sample period covers 2003–008.

\* Indicates 10% significance level.

\*\* Indicates 5% significance level.

\*\*\* Indicates 1% significance level.

share ownership improves transparency of firms that have are not controlled by state shareholders.

Table 6 substitutes the dependent variable with alternative stock price informativeness measure estimated only using Chinese stock market portfolio returns. The objective is to evaluate if our main findings in Table 3 is sensitive to the exclusion of US stock market portfolio returns from our estimation of stock price informativeness. In this set of analyses, we apply mutual fund ownership scaled by the number of freely tradable shares (*Fund*) and state controlled listed firm dummy variable (*SOE*). In both Regressions 1 and 2, we observe that the coefficient on *Fund* is significantly

**Table 6**

Alternative share price informativeness measure excluding US market influence.

	Regression 1		Regression 2	
<i>Fund</i>	0.430	(2.130)**	0.719	(3.580)***
<i>SOE</i>	0.074	(0.820)	0.110	(1.560)
<i>Fund</i> × <i>SOE</i>	-0.733	(-1.700)*	-1.171	(-3.180)***
<i>Lnsiz</i>	-0.193	(-8.740)***	-0.179	(-9.620)***
<i>PB</i>	0.004	(0.670)	-0.001	(-0.230)
<i>Lev</i>	-0.217	(-2.140)**	-0.024	(-0.450)
<i>IROA</i>	-2.146	(-5.910)***	-1.800	(-5.990)***
<i>Vol</i>	-0.022	(-3.270)***	-0.004	(-1.010)
<i>ST</i>	0.204	(2.720)***	0.279	(4.420)***
<i>SSSR</i>	-0.109	(-1.250)	-0.112	(-1.530)
<i>FOR</i>	-0.028	(-0.450)	-0.013	(-0.210)
<i>OwnCon</i>	0.122	(0.780)	0.163	(1.320)
<i>Big4</i>	0.046	(0.720)	0.061	(1.000)
<i>DCEOH</i>	-0.032	(-0.900)	-0.033	(-1.340)
<i>Duality</i>	0.015	(0.120)	0.215	(1.590)
<i>Dmeet</i>	-0.002	(-0.080)	-0.009	(-0.330)
<i>Dbsize</i>	0.057	(1.710)*	0.023	(1.130)
<i>DInd</i>	-0.013	(-0.260)	0.000	(0.000)
<i>Dssize</i>	0.068	(1.350)	0.065	(1.480)
Constant	5.986	(10.980)***	5.555	(12.040)***
Region		Yes		Yes
Industry		Yes		Yes
Year		Yes		Yes
BSQREG		No		Yes
Adj R <sup>2</sup>		0.449		
Pseudo R <sup>2</sup>				0.279
Obs.		6104		6104

Note: This table presents the results of the following regression model:  $\psi_{2,t+1} = \alpha_0 + \alpha_1 Fund_{i,t} + \alpha_2 SOE_{i,t} + \alpha_3 Fund_{i,t} \times SOE_{i,t} +$

$$\sum_{k=1}^k \alpha_{k+3} Control_k + \varepsilon$$

The dependent variable  $\psi_2$  denotes share price informativeness measure derived from residual variances of time-series regressions of firm-specific weekly excess returns on Chinese market weekly excess returns. *Fund* denotes the ratio of fund ownership relative to the number of freely-traded shares. *SOE* is equal to 1 if the firm is a state-owned enterprise (SOE) and 0 otherwise. *SIZE* is natural log of market capitalization. *PB* is market-to-book value. *LEV* is debt-to-total asset ratio. *IROA* is industry median adjusted return on asset measured as operating income divided by total asset. *VOL* is trading volume measured as turnover. *ST* is equal to 1 if the firms experience two-year consecutive loss (therefore specially treated by the stock exchange) and 0 otherwise. *SSSR* is equal to 1 if the firm has finished the Split Share Structure Reform i.e. the consideration scheme has been voted through and 0 otherwise. *FOR* is the ratio of foreign shares relative to total shares. *Big4* is set to 1 if the firm is audited by one of the Big 4 audit firms (PwC, Deloitte, Ernst & Young or KPMG). *OwnCon* is the Herfindahl index of the ownership from the 10 largest shareholders. *DCEOH* is set to be 1 if shares held by CEO holding ratio is below the 25% or above the 75% of the cross-sectional annual observation. *Duality* is 1 for firms with CEO also serving as chairperson of the board, and 0 otherwise. *Dmeet* is equal to 1 if the meeting frequency of the firm is above or equal to the median of cross-sectional annual observation. *Dbsize* is set to 1 if the number of directors on the board is equal to or above the median of cross-sectional annual observation. *DInd* is equal to 1 if the ratio of independent directors is equal to or above the median of cross-sectional annual observation. *Dssize* is set to 1 if the number of supervisory board members is equal to or above the median of cross-sectional annual observation. The sample period covers 2003–2008.

\* Indicates 10% significance level.

\*\* Indicates 5% significance level.

\*\*\* Indicates 1% significance level.

positive and the coefficient on *Fund* × *SOE* is also significantly negative, which is similar to our main findings.

Table 7 partitions fund ownership into open and close ended fund separately. If the underlying assumption that institutional investors influence corporate transparency holds, then we should observe this effect in both groups of funds. Indeed, the coefficient on *OCFund* is significantly positive and the coefficient on *OCFund* × *SOE* is also significantly negative, irrespective of whether the *OCFund* is based on open or close ended fund ownership.



**Table 7**  
Open and close-end fund ownership.

	OCFund = Open fund ownership ratio				OCFund = Close-end fund ownership ratio			
	Regression 1		Regression 2		Regression 3		Regression 4	
<i>OCFund</i>	0.505	(2.880)***	0.773	(4.950)***	1.801	(3.680)***	1.672	(3.210)***
<i>SOE</i>	0.033	(0.490)	0.075	(1.270)	0.048	(0.750)	0.060	(0.940)
<i>OCFund</i> × <i>SOE</i>	-0.774	(-2.080)**	-1.274	(-4.190)***	-2.803	(-2.920)***	-2.270	(-3.180)***
<i>Lnsize</i>	-0.135	(-8.830)***	-0.126	(-10.890)***	-0.136	(-9.090)***	-0.122	(-8.590)***
<i>PB</i>	0.002	(0.550)	-0.003	(-0.640)	0.002	(0.520)	-0.003	(-0.670)
<i>Lev</i>	-0.222	(-3.180)***	-0.125	(-1.580)	-0.218	(-3.150)***	-0.120	(-1.570)
<i>IROA</i>	-1.320	(-5.640)***	-1.332	(-7.080)***	-1.356	(-5.780)***	-1.389	(-5.300)***
<i>Vol</i>	-0.019	(-3.970)***	-0.009	(-2.680)***	-0.021	(-4.630)***	-0.013	(-3.790)***
<i>ST</i>	0.123	(2.260)**	0.187	(3.330)**	0.121	(2.230)**	0.186	(4.010)***
<i>SSSR</i>	-0.036	(-0.630)	-0.038	(-0.700)	-0.039	(-0.680)	-0.061	(-0.940)
<i>FOR</i>	-0.035	(-0.850)	0.019	(0.560)	-0.043	(-1.030)	0.005	(0.140)
<i>OwnCon</i>	0.225	(1.930)*	0.206	(2.280)**	0.225	(1.940)*	0.190	(2.130)**
<i>Big4</i>	0.030	(0.650)	0.055	(0.820)	0.030	(0.640)	0.026	(0.430)
<i>DCEOH</i>	-0.034	(-1.350)	-0.040	(-1.880)*	-0.037	(-1.460)	-0.041	(-1.740)*
<i>Duality</i>	0.000	(0.000)	0.104	(0.790)	0.003	(0.030)	0.085	(1.180)
<i>Dmeet</i>	-0.012	(-0.530)	-0.006	(-0.240)	-0.012	(-0.540)	-0.006	(-0.290)
<i>Dbsize</i>	0.031	(1.310)	0.000	(-0.030)	0.031	(1.330)	-0.003	(-0.140)
<i>Dind</i>	-0.036	(-1.020)	-0.036	(-1.160)	-0.038	(-1.090)	-0.039	(-1.000)
<i>Dssize</i>	0.073	(2.040)**	0.068	(2.770)***	0.076	(2.160)**	0.080	(2.860)***
<i>Constant</i>	5.086	(13.460)***	4.767	(18.200)***	5.123	(13.810)***	4.684	(13.370)***
<i>Region</i>		Yes		Yes		Yes		Yes
<i>Industry</i>		Yes		Yes		Yes		Yes
<i>Year</i>		Yes		Yes		Yes		Yes
<i>BSQREG</i>		No		Yes		No		Yes
<i>Adj R<sup>2</sup></i>		0.474				0.473		
<i>Pseudo R<sup>2</sup></i>				0.302				0.301
<i>Obs.</i>		6104		6104		6104		6104

Note: This table presents the results of the following regression model:  $\psi_{i,t+1} = \alpha_0 + \alpha_1 OCFund_{i,t} + \alpha_2 SOE_{i,t} + \alpha_3 OCFund_{i,t} \times SOE_{i,t} + \sum_{k=1}^k \alpha_{k+3} Control_k + \varepsilon$

The dependent variable  $\psi_1$  is share price informativeness measure derived from residual variances of time-series regressions of firm-specific weekly excess returns on both Chinese and US stock market weekly excess returns. *SOE* is equal to 1 if the firm is a state-owned enterprise (SOE) and 0 otherwise. *OCFund* is represents the ratio of open fund ownership relative to the total number of shares in Regression I and II, and represents the ratio of close-end fund ownership relative to the total number of shares in Regression III and IV. *SIZE* is natural log of market capitalization. *PB* is market-to-book value. *LEV* is debt-to-total asset ratio. *IROA* is industry median adjusted return on asset measured as operating income divided by total asset. *VOL* is trading volume measured as turnover. *ST* is equal to 1 if the firms experience two-year consecutive loss (therefore specially treated by the stock exchange) and 0 otherwise. *SSSR* is equal to 1 if the firm has finished the Split Share Structure Reform i.e. the consideration scheme has been voted through and 0 otherwise. *FOR* is the ratio of foreign shares relative to total shares. *Big4* is set to 1 if the firm is audited by one of the Big 4 audit firms (PwC, Deloitte, Ernst & Young or KPMG). *OwnCon* is the Herfindahl index of the ownership from the 10 largest shareholders. *DCEOH* is set to be 1 if shares held by CEO holding ratio is below the 25% or above the 75% of the cross-sectional annual observation. *Duality* is 1 for firms with CEO also serving as chairperson of the board, and 0 otherwise. *Dmeet* is equal to 1 if the meeting frequency of the firm is above or equal to the median of cross-sectional annual observation. *Dbsize* is set to 1 if the number of directors on the board is equal to or above the median of cross-sectional annual observation. *Dind* is equal to 1 if the ratio of independent directors is equal to or above the median of cross-sectional annual observation. *Dssize* is set to 1 if the number of supervisory board members is equal to or above the median of cross-sectional annual observation. The sample period covers 2003–2008.

\* Indicates 10% significance level.

\*\* Indicates 5% significance level.

\*\*\* Indicates 1% significance level.

## 5. Conclusion

We predict and find evidence that mutual fund ownership increases stock price informativeness in China. We argue that the underlying mechanism of this influence is as follows. Institutional investors have more expertise and incentives to monitor firm than individual investors. As such, institutional investors can serve an external corporate governance role to reduce agency problem that arise from the separation of ownership and control. When managers have less incentive to expropriate shareholders

or behave opportunistically, firms are less likely to withhold information and/or window dress their performance. As a result, the quality and quantity of firm-specific information released to outside investors are expected to improve as corporate governance improves. As a result, investors are able to formulate valuation decisions based on firm-specific instead of market-wide information. In other words, the stock return variations of firms are less likely to be attributed to systematic market-wide variations. Thus, this is reflected in the greater stock price informativeness that we measure.

We also predict and find that state ownership moderates the positive influence of mutual fund ownership on stock price informativeness in China. We argue that the underlying rationale of this effect is as follows. Firms with higher state ownership in China receive government financial support. Such firms have less dependence on stock market for external capital to fund their investment projects. When firms are less reliant on stock market for funding, there is less need for them to communicate with investors in order to reduce information uncertainty and decrease cost of equity capital. Among firms with greater state ownership and control, the ability of institutional investors to monitor and influence is also likely to reduce since managers in such firms answer more to the state than to the stock market.

The main policy implication from our study is that institutional investors should be further encouraged in weak investor protection environments that are common in emerging economies such as China. However, at the same time, in order to further realize the benefit of institutional investors as external governance mechanism, it is necessarily to expand the process of privatization.

## Appendix A. Definition of variables

$\Psi_{1,t+1}$	Share price informativeness measure derived from residual variances of time-series regressions of firm-specific weekly excess returns on both Chinese and US stock market weekly excess returns for firm $i$ in year $t$ (i.e. it is calculated using weekly excess return from January to December each year, and thus yearly informativeness proxy is constructed).
$\Psi_{2,t+1}$	Share price informativeness measure derived from residual variances of time-series regressions of firm-specific weekly excess returns on Chinese stock market weekly excess returns.
<i>Fund (Fundt)</i>	Ratio of fund ownership to the number of freely-traded shares (total shares)
<i>SOR</i>	Ratio of state shares relative to the total shares of the listed firm
<i>RSR</i>	Ratio of restricted shares relative to the total shares of the listed firm
<i>SOE</i>	Dummy variable set to 1 for state-owned enterprises and 0 otherwise.
Control variables:	
<i>Size</i>	The natural logarithm of market capitalization
<i>PB</i>	Price-to-book ratio
<i>Lev</i>	Debt-to-total asset ratio
<i>IROA</i>	Industry median adjusted return on asset measured as operating income divided by total asset
<i>Vol</i>	Trading volume measured as turnover
<i>ST</i>	Dummy variable indicating loss firms and is equal to 1 if firms experience two consecutive years of loss at year $t$ and $t-1$ (and therefore labeled as "Special Treatment" by the stock exchange) and 0 otherwise.
<i>SSSR</i>	Dummy variable set to 1 if the firm has finished the Split Share Structure Reform requirement
<i>For</i>	Number of foreign shares relative to the total number of shares
<i>OwnCon</i>	The Herfindahl index of the top 10 largest blockholders of the firm
<i>Big4</i>	Dummy variable assigned to 1 if the audit firm is one of the big 4 (i.e. PwC, Deloitte, Ernst & Young, and KPMG); and 0 otherwise
<i>DCEO</i>	Dummy variable set to be 1 if shares held by CEO holding ratio is below the 25% or above the 75% of the cross-sectional annual observation which may induce entrenchment
<i>Duality</i>	Dummy variable equal to 1 if the CEO also holds the position of board chair; and 0 otherwise
<i>Dmeet</i>	Dummy variable equal to 1 if the number of board meetings is equal to or above the median value of the yearly observations, and 0 otherwise
<i>Dbsize</i>	Dummy variable equal to 1 if the number of board members is equal to or above the median value of the yearly observations, and 0 otherwise
<i>Drind</i>	Dummy variable equal to 1 if the ratio of independent directors is equal to or above the median value of the yearly observations, and 0 otherwise
<i>Dssize</i>	Dummy variable equal to 1 if the number of supervisory board members is equal to or above the median value of the yearly observations, and 0 otherwise

Industry and region dummies are definition:

The industry dummies are constructed based on the first two digits of the GICS (Global Industry Classification Standard) codes. The region dummies are constructed by following Firth et al. (2006), in which the firms are grouped into four different regions by the levels of economic development: (1) Shanghai and Shenzhen; (2) the more developed areas including the open cities and provinces along the coast; (3) the inland provinces; and (4) the least developed area in the north-western part of the country.

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