# Mutual Funds' Investment Strategies and their Preferences: Evidence from China

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## Abstract

This paper categorizes mutual funds based on their past investment behaviors and examines different types of mutual funds' preferences for holding listed firms in China. Our empirical results show that the majority of Chinese mutual funds are quasi-indexers (58.58%), followed by transient mutual funds (31.27%), and dedicated mutual funds (3.38%). In addition, quasi-indexers adopt the buy-and-hold investment strategy and are inclined to invest in listed firms with lower risk, better operating performance, higher market value, and larger size. Transient funds, which prefer diversified portfolios and frequent trading, tend to invest in riskier listed firms and pay more attention to listed firms' profitability, market value, and liquidity. Dedicated funds invest heavily in high systematic risk, less profitable, and smaller listed firms, but they do not hold listed firms as long as quasi-indexers do. Interestingly, all types of mutual funds in China prefer holding state-controlled listed firms to privately-controlled ones.



**JEL Code:** G24

**Key words:** mutual funds, portfolio firms, investment strategy, China

## 1. Introduction

Recent studies on institutional investors argue that institutional investors differ from each other in terms of their investment strategies and that these differing types of institutions impact on listed firms in different ways (e.g., Porter, 1992; Bushee 1998, 2001; Koh 2007). Porter (1992) suggests that only long-term institutional investors with a large stake in a corporation can monitor the management of listed firms. Based on institutional investors' past investment behaviors, Bushee (1998, 2001) empirically categorizes institutional investors in the US into three groups: Dedicated institutions; transient institutions; and quasi-indexers. Bushee (1998) reports that transient institutions force listed firms' managers to reduce the R&D investment to boost the short-term earnings. Koh (2007) suggests that dedicated institutions can mitigate aggressive earnings management among listed firms, whereas the effect of transient institutions on earnings management is fairly weak. Therefore, the classification of institutional investors can help researchers and other investors understand the characteristics of institutional investors and their impact on listed firms.

Institutional investors are relatively new to the Chinese stock markets, but their recent growth has been breathtaking. Mutual funds (MF) are the first and major players among institutional investors in China. According to the Chinese investment fund industry statistic report 2009, the total value of the stock mutual funds' holdings[1] in listed firms accounted for 21.10% of Chinese stock market capitalization[2] (based on

[1] This statistical report only includes the holdings of stock mutual funds, which invest the majority of their money in the stock market.

[2] As reported by Bloomberg News (16 July 2009), the sum of the market capitalization of the Shanghai Stock Exchange (SHSE) and the Shenzhen Stock Exchange (SZSE) has been ranked as the second highest in the world.

tradable A shares) on 30 June 2009. Thus, mutual funds are the focus of this paper. A number of studies have examined the impact of institutional investors, especially mutual funds, on listed firms' performance and corporate governance in China (e.g., Yuan, Xiao and Zou, 2008; Bo and Wu, 2009). To our knowledge, however, no research has considered categorizing institutional investors into different groups based on their different investment strategies. The failure to do so may bias the empirical results and lead to premature research conclusions (Koh, 2007).

This paper first categorizes the mutual funds in China into three groups, following the methodology in Bushee (2001). We adapt Bushee's methodology according to the characteristics of Chinese institutional investors. The results show that most of the mutual funds in China are quasi-indexers, followed by transient mutual funds. There are only a few dedicated mutual funds. This study then examines the determinants of different types of mutual funds' ownership in listed firms. The empirical findings show that different types of mutual funds have different criteria for selecting the portfolio firms, although in general mutual funds prefer listed firms with high tradable share ratios, good operating performance, high market value, low market risk, large size, and state-controlled features.

This study makes two contributions to the literature. First, unlike the previous research that simply studies the aggregated mutual funds' ownership in listed firms in China, this study categorizes mutual funds based on their investment strategies. One main purpose for the Chinese policy maker in setting up and developing mutual funds is to stabilize its stock markets and improve corporate governance. Therefore, understanding the investment strategies of mutual funds is helpful for the Chinese

government to better regulate the markets. Second, instead of investigating how total institutional holdings affect a listed firm's performance, as explored in other existing research, this study examines the investment preferences of different types of mutual funds in order to provide a complete picture of their investment strategies and their market impact.

The remainder of this paper is organized as follows: Section Two presents the background of the institutional investors in China and outlines why this study only focuses on mutual funds among all institutional investors; Section Three reviews the related literature; Section Four classifies the institutional investors in China into three groups; Section Five examines the determinants of institutional ownership in China; and Section Six provides the conclusions and suggestions.

## 2. Background of the institutional investors in China

Institutional investors are organizations which pool large sums of money and invest those sums in securities markets. They include mutual funds, banks, insurance companies, retirement or pension funds, and hedge funds, and their role in the economy is to act as highly specialized investors on behalf of others. Since the Chinese State Council issued the *Provisional Regulation for the Supervision of Security Investment Fund* on 14$^{th}$ November 1997, mutual funds have been formally introduced to domestic investors and have become one of the earliest and leading institutional investors in Mainland China. The Chinese regulatory bodies expect that through the mutual funds' shareholdings, the Chinese stock market can continue developing in a more stable way. By the end of 2000, a vast majority of funds in the

market were close-ended funds. After the issuance of *Provisional Regulations on Open-end Securities Investment Funds* by the State Council in 2000, a number of open-ended funds emerged in the market, with open-ended funds soon taking the place of close-ended funds and becoming the dominant type of investment funds in China. The Chinese Securities Regulatory Committee (CSRC) enacted the *Security Investment Fund Law* (SIFL) on 1st June 2004. According to the SIFL, mutual funds must be managed and operated by fund management companies (FMC). A major portion of the fund management companies are owned, or controlled, by security companies in China. Chinese security companies are similar to investment banks in the US. Besides carrying out an asset management role, security companies also directly invest in the market and own substantial equity in listed firms themselves. The CSRC issued the *Regulation for the Establishment of Fund Management Company with Participation of Foreign Capital* on 1st June 2002. China's first joint venture fund management company, China Merchants Fund Management Co., Ltd, was then established in January 2003.

As for other institutional investors in China, the major Chinese public pension fund, the National Social Security Fund, was established in 2000 and started to invest in equities in June 2003. Insurance companies have been permitted to hold equity positions in their own account since October 2004 in China. Insurance companies have been able to directly invest up to 10% of their total assets in the A-share market since July 2007. Insurance companies can also indirectly invest another 10% of their total assets in the stock market through subscribing to other investment funds. Commercial banks have been allowed to engage in security investment fund business, through fund management companies, since February 2005. This paper only focuses

on securities investment funds (mutual funds), since these funds are the earliest and principal players in the Chinese stock markets. Another reason for this focus is that other types of institutional investors (i.e. pension funds, insurance companies, and banks) are either of small size, or have only a short history in comparison with mutual funds in China.

## 3. Literature review

### 3.1 Institutional investors' classification

Previous studies argue that not all institutional investors are homogeneous (in terms of their behaviors and incentives) (e.g., Porter, 1992; Bushee, 1998; Bennett, Sias and Starks, 2003; Almazan, Hartzell, Starks, 2005; Chen, Harford and Li, 2007). Porter (1992) argues that institutions with active trading behavior will undermine the long-term earning power of the listed firms in the US. Porter (1992) states that institutions should increase the size of their stakes in the portfolio firms, reduce the portfolio turnover, and carefully select portfolio firms based on their earning power. Porter (1992) also suggests that index funds, which are seen as long-term investors, usually have extreme fragmentation of ownership in their portfolio firms and are incapable of influencing the listed firms. In order to explore the idiosyncratic behaviors between different types of institutional investors, recent studies start to categorize the institutions based on their past investment horizons. Bushee (1998, 2001) empirically classifies institutional investors in the US into three categories: Dedicated institutions; transient institutions; and quasi-indexers. Dedicated institutions, which have low turnover and more concentrated portfolio holdings, prefer large and long-term holdings in a few companies. Transient institutions, which have

high portfolio turnover and diversified portfolios, usually hold small stakes in numerous firms and trade frequently in and out of stocks. Quasi-indexer institutions have low turnover and diversified portfolio holdings, prefer to trace the index, and usually adopt a buy and hold trading strategy. Following Bushee (2001), Koh (2007) examines the impact of dedicated and transient institutional ownership on listed firms' earnings management in the US, and find that dedicated institutions are more capable of constraining the listed firms' earnings management than are transient institutions. Koh (2007) argues that the failure to distinguish institution type may negatively affect the research results. By following Bushee (2001) and considering the character of Chinese institutional investors, this study classifies the mutual funds in China into three categories: Transient mutual funds; dedicated mutual funds; and quasi-index mutual funds. This study will also further classify the fund management companies in China to determine whether there is a difference between mutual funds' characteristics and fund management companies' characteristics.

### 3.2 Mutual funds' preference

Falkenstein (1996) investigates the mutual fund equity holdings in the US from 1991 to 1992 and reports that volatility, liquidity, and information generated by the listed firms can significantly explain mutual fund ownership. Falkenstein (1996) argues that mutual funds show a nonlinear preference towards listed firms with high volatility and show preference towards listed firms with high price, high liquidity, and large size. Gompers and Metrick (2001) examine the institutional investors' demand for stock characteristics in the US during the sample period from 1980 to 1996, and find that institutional investors prefer to invest in stocks that are larger, more liquid, and have had relatively low returns during the previous year. Del Guercio (1996) and Woidtke

(2002) argue that institutional investors in the US are concerned with whether a firm had positive earnings in the previous year in order to justify whether investment decisions are prudent. Nevertheless, Bennett, Sias and Starks (2003) suggest that institutional investors' preference for large capitalization stocks decline over time in favor of small and riskier stocks in the US during the period between March 1983 and December 1997. Prior studies mainly use aggregated institutional ownership, or different classes of institutional ownership (i.e., pension funds' ownership, mutual funds' ownership, banks' ownership, etc.), to investigate the preference of institutions. In this study, we use both aggregated mutual funds' ownership and the ownership of different types' of mutual funds to examine mutual funds' preference in listed firms in China.

## 4. Mutual fund classification in China

### 4.1 Methodology to classify mutual funds

Bushee (2001) constructs eight variables to describe institutional investors' past investment strategies. The eight variables are as follows.

The first four variables are used to estimate an institution's portfolio turnover:

**PT1** = Institution's quarterly portfolio turnover percentage (Portfolio turnover using absolute value of change in total equity);

**PT2** = Institution's quarterly portfolio turnover percentage using only sales transactions;

**STAB1** = Percentage of the institution's total holdings held continuously for one year (Percentage of total dollar holdings held for one year); and

**STAB2** = Percentage of the institution's portfolio firms held continuously for one year

(Percentage of number of portfolio firms held for one year).

The other four variables are used to estimate the block size of institutions:

**LBPH** = Percentage of the institution's total holdings held in large blocks (Percentage of total dollar holdings with greater than 2% of listed firms' total number of shares, or 5% of listed firms' tradable shares);

**LBPF** = Percentage of the institution's portfolio firms held in large blocks (Percentage of number of portfolio firms with greater than 2% listed firms' total number of shares, or 5% of listed firms' tradable shares);

**CONC** = Institution's average investment size in its portfolio firms (Average investment per stock, total equity/ number of stocks in portfolio); and

**APH** = Institution's average percentage ownership in its portfolio firms (Average percentage of ownership in portfolio firms, or average percentage of ownership in portfolio firms based on listed firms' tradable shares).

Here we have made some changes to Bushee (2001)'s eight variables according to the characteristics of the Chinese stock markets and the listed companies. In Bushee (2001), STAB1 and STAB2 measure the percentage of an institution's holdings continuously for eight quarters, and LBPH and LBPF measure the percentage of the institution's total shareholdings held in portfolio firms with a greater than 5% stake. As Chinese mutual funds are relatively new to the market, and usually would not hold shares of listed firms as long as institutions in the US do, this study uses four quarters instead of eight quarters to measure STAB1 and STAB2. In addition, since mutual funds can only invest in listed firms' tradable shares[3] in China, the average ownership

[3] The shares of Chinese listed firms are divided into tradable shares and non-tradable shares. Tradable shares are

of mutual funds in listed firms in China would be less than in the US. This study first uses 2% of total shareholding, instead of 5%, to measure LBPF and LBPH and to categorize the mutual funds in the Mutual Fund Classification 1. Then, this study uses 5% of listed firms' tradable shareholding as the criteria to calculate LBPF and LBPH in order to reclassify the mutual funds in the Mutual Fund Classification 2. Also, in the Mutual Fund Classification 2, APH estimates the average percentage of tradable shareholdings in portfolio firms, rather than total shareholdings. The remaining parts of the methodology are as utilized in Bushee (2001). The quarterly values of the eight variables are then averaged to obtain end-of-year average values. A factor analysis is used to identify the common factors from the annual values of the eight variables. Mutual funds are then classified into groups using k-means cluster analysis on the factor scores.

### 4.2 Sample selection

The CSRC enacted the *Regulation of Information Disclosure of Security Investment Funds* on 1st July 2004. The regulation requires security investment funds to announce their quarterly, semi-annual, and annual report publicly (Act 5, Section 2). Thus, the sample period of this research is from September 2004 to December 2009. The data used in this study is obtained from the China Center for Economic Research database (CCERDATA) and the China Stock Market Accounting Research database (CSMAR). The sample contains the mutual fund's top-ten largest ownership in stocks at the end of each quarter during the sample period[4].

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shares listed on the two stock exchanges in China and can be traded by any investors, while non-tradable shares are usually held by the state and/or other legal persons and cannot be traded freely on the exchanges.

[4] The sample only contains mutual fund's top-ten largest ownership in stocks at the end of each quarter during the sample period, not the data on entire ownership due to the limitation of our data. Nonetheless, the mutual fund's

## 4.3 Empirical results

### 4.3.1 Mutual fund classification results

Table 1 reports the descriptive statistics of the mutual funds' ownership and fund management companies' ownership in listed firms. On average, a mutual fund's ownership in a listed firm only accounts for 0.36% of the total number of shares outstanding, although this can be as high as 7.3%. The mutual fund's average ownership of tradable shares in a listed firm is, however, 0.7% and can be as high as 19.81%. The average values of mutual funds' and fund management companies' total shareholdings are around 50% of their tradable shareholdings. This suggests that, on average, a listed firm's total number of tradable shares is around 50% of its total number of outstanding shares. Some studies (such as Yuan, Xiao and Zou, 2008; and Li et al., 2010) report that tradable shares generally represent about one-third of the total number of shares in China before the non-tradable share reform. Since the non-tradable share reform started in April 2005 this ratio has, however, gradually increased. The total number of observations of mutual funds' ownership is 57,200 and the total number of observations of fund management companies' ownership is 32,936. There are 509 mutual funds, including both open-end and close-end funds, and 1,083 stocks in the sample. The 509 mutual funds are operated and managed by 60 fund management companies.

(Insert Table 1 here)

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ownership other than its top-ten largest ownership in stocks is extremely small. The average of the tenth largest mutual fund's quarterly ownership in its portfolio firm is only 0.037%, whereas the average of the largest mutual fund's quarterly ownership in its portfolio firm is 1.1511%. Thus, we believe that the lack of complete data will not strongly bias the mutual fund classification. Nonetheless, future studies could categorize the institutions in China based on the complete institutional ownership in the listed firms if the data becomes available.

In our sample, there are only 3 stocks having more than 5% of their total shares held by 3 different mutual funds. There are 384 stocks having more than 2% of their total shares held by 220 mutual funds, and 281 stocks having more than 5% of their total number of tradable shares held by 161 mutual funds. As for the holding period, there are 370 stocks having shares held by 370 mutual funds continuously for four or more quarters, and there are only 127 stocks having shares held by 239 mutual funds continuously for eight or more quarters. The eight variables used to categorize mutual funds are constructed based on the mutual funds' quarterly ownership in listed firms. The quarterly values of the eight variables are then averaged to obtain end-of-year average values. There are a total of 1,714 annual mutual fund-year observations.

Table 2a reports the results of the Mutual Fund Classification 1, which is based on mutual funds' total shareholding in listed companies. Factor 1, factor 2, and factor 3 are identified by the factor analysis. Factor 1 primarily measures the variables that describe the block size of the mutual funds' investment in listed firms. Mutual fund with a higher (lower) factor1 score would have less (more) diversified portfolios. Factor 2 mainly measures the variables that describe the stability (the holding period) of the mutual funds' ownership in listed firms. Mutual funds with a higher (lower) factor2 score would be more (less) likely to hold any given firm in their portfolio continuously for four quarters. Factor 3 primarily measures the variables that describe the portfolio turnover of the mutual funds. Mutual funds with a higher (lower) factor3 score would trade more (less) frequently. Therefore, transient mutual funds should have low factor1 scores, low factor2 scores, and high factor3 scores; dedicated mutual funds should have high factor1 scores, high factor2 scores, and low factor3 scores;

and quasi-index mutual funds should have low factor1 scores, high factor2 scores, and low factor3 scores. Table 2a shows that the factor scores of transient funds and quasi-index funds are consistent with the expectation. Nevertheless, Chinese dedicated mutual funds' factor2 scores, which are negative[5], are not consistent with the expectation. This suggests that, though the dedicated mutual funds in China have less diversified portfolios and have lower portfolio turnover than the other funds, they do not usually hold portfolio firms for a long period. Mutual Fund Classification 1 shows that the dominant mutual funds in the Chinese equity market are transient funds (71.76%), followed by the quasi-index funds (19.6%). Only a few mutual funds (2.04%) are classified as dedicated funds by the Mutual Fund Classification 1.

(Insert Table 2 here)

As Chinese mutual funds can only invest in listed firms' tradable shares, this study then categorizes the mutual funds again, based on mutual funds' tradable shareholding in listed firms in the Mutual Fund Classification 2. The results of the Mutual Fund Classification 2 are reported in Table 2b. Of the mutual funds, 536 (31.27%) are classified as transient mutual funds, 58 (3.38%) are classified as dedicated mutual funds, and 1,004 (58.58%) are classified as quasi-indexers. Different from the results in classification 1, the quasi-indexers become the dominant funds, and the number of dedicated mutual funds also increases from 35 to 58. The characteristics of the three types of mutual funds classified by classification 2 are quite similar to those classified by classification 1. The results of the Factor 2 scores in classification 2 show, however that, although the dedicated mutual funds do not hold the portfolio firms as long as the

[5] The negative factor score is below the mean of zero, as all factor scores have been standardized before entering the *k*-mean cluster analysis.

quasi-indexers, they hold the firms longer than the transient funds, which makes more sense.

As mentioned before, Mutual Fund Classification 1 categorizes the mutual funds based on the mutual funds' ownership of listed firms' total number of shares, whereas Mutual Fund Classification 2 categorizes the mutual funds based on the mutual funds' ownership of listed firms' tradable shares. It is noteworthy that Mutual Fund Classification 2 yields more accurate results than does Mutual Fund Classification 1, since Chinese mutual funds are only allowed to invest in tradable shares. This is why we focus on the methodology and results in regards to classification 2 from this point in the study.

4.3.2 FMC classification results

In order to obtain a complete picture of the mutual funds' trading behaviors in China, this study further classifies the fund management companies. On average, each fund management company operates more than eight mutual funds in China. Different mutual funds managed by one FMC may hold shares in the same listed firms at the same time. As reported in Table 1, the average FMC's quarterly ownership is 0.63%. There are 101 listed firms that have more than 5% of their total shares held by 35 FMCs, and 385 listed firms have more than 5% of their total number of tradable shares held by 56 FMCs. Furthermore, 394 listed firms have shares held by 60 FMCs continuously for four quarters or longer, and 147 listed firms have shares held by 52 FMCs continuously for eight quarters or longer.

Table 3 reports the results of the FMC classification, based on FMC's tradable

shareholdings. The FMC classification yields similar results to Mutual Fund Classification 2. The only difference is that more fund management companies have been classified as quasi-indexers. This is because when a mutual fund operated by certain FMC sells the shares of a listed firm, another mutual fund operated by the same FMC may still hold shares in this listed firm at that time. This allows fund management companies to have more stable portfolios. There are 25 fund management companies (8.04%), which are classified as transient FMCs, and 282 FMCs (90.68%) classified as quasi-indexers. Only 4 fund management companies (1.29%) are classified as dedicated FMCs.

(Insert Table 3 here)

## 5. The characteristics of listed firms preferred by different types of mutual funds in China

After the classification of mutual funds, this paper further examines the characteristics of listed firms preferred by mutual funds in general, as well as by different types of mutual funds. There are two significant aspects to this test. First, the results can be helpful to regulatory bodies and individual investors in understanding the strategies adopted by various mutual funds in selecting their portfolio firms. Second, the results of this test can also testify to the robustness of the mutual fund classifications. If the mutual fund classifications accurately show the distribution of various mutual funds in China, the distinguished mutual funds should have different preferences in the characteristics of listed firms. In the regression analysis, the mutual funds' shareholdings at the end of the first quarter in each year are used as the dependent variables and all independent variables are previous year-end data. Since the listed

firms' financial reports are usually announced between 1 January and 30 April every year, when we use the end of the first quarter mutual funds' shareholdings as dependent variables, some firms' financial information might not be available to the market. Therefore, this study uses the mutual funds' shareholdings at the end of the second quarter as the dependent variables in the robustness check. As mutual funds only start to announce the quarterly report from July 2004, the sample period of this test is from 2005 to 2009.

5.1 Sample selection

The sample selected must satisfy the following criteria:

(a) A firm must have shares held by any mutual fund at the end of the first quarter during the sample period from 2005 to 2009;

(b) A firm must not be a financial company (e.g., banks, insurance companies, and investment trusts), as financial firms usually have different characteristics from other listed firms; and

(c) There is no missing data on any variable in the regression.

The above criteria yield a usable sample of 1,384 observations.

5.2 Hypotheses development

Transient mutual funds, which prefer current and short-term earnings to long-term earnings, will not usually hold the shares of listed firms as long as other types of institutions do, and they sell shares of firms whose current earnings are under-performing (Bushee, 1998, 2001; Porter 1992; Koh 2007). Thus, transient mutual funds will pay more attention to listed firms' operating performance and market value than to the firms' risk levels, corporate governance (state-controlled or

non-state-controlled), or size. As the short-term-oriented transient funds frequently change their investment positions in listed firms, they also prefer to invest in listed firms with high liquidity, as it will be easier for the transient funds to trade these shares. Therefore, we propose the following hypotheses:

H1a. Transient mutual funds' ownership is positively associated with listed firms' operating performance.

H1b. Transient mutual funds' ownership is positively associated with listed firms' market value.

H1c. Transient mutual funds' ownership is positively associated with listed firms' liquidity.

According to Bushee (1998, 2001) and Porter (1992), dedicated institutions usually have low turnover and more concentrated portfolio holdings, preferring large and long-term holdings in a few companies. Thus, the dedicated funds would prefer to select listed firms with high liquidity in order to accomplish this investment goal. Moreover, Porter (1992) states that dedicated funds' investment style should provide incentives for them to monitor management of listed firms and to rely on information other than just profitability to assess the performance of listed firms. Koh (2007) also concludes that dedicated funds are less likely than transient funds to penalize listed firms solely based on current underperforming earnings that are not a result of poor management. Therefore, dedicated mutual funds will not pay as much attention to listed firms' earnings and market value as do transient funds. Finally, since dedicated funds will focus more on listed firms' corporate governance and studies usually report that listed firms' poor corporate governance and performance are associated with substantial state ownership (Gul, 1999; Xu and Wang, 1999; Dewenter and Malatesta,

2001; Lin, Ma and Su, 2009), we believe that dedicated funds will prefer to invest in non-state-controlled listed firms in China. Therefore, we develop the following hypotheses regarding dedicated funds:

H2a. Dedicated mutual funds' ownership is positively associated with listed firms' liquidity.

H2b. Dedicated mutual funds' ownership is positively associated with listed firms' non-state-controlled dummy variable.

Bushee (1998, 2001) states that quasi-index institutions have low turnover and diversified portfolio holdings, which is consistent with many index-holder strategies. Porter (1992) also documents that the fragmented ownership of quasi-indexers often leads them to gather little information on the listed companies. The main purpose of quasi-index mutual funds is to trace the index and minimize the risk of their portfolios. Therefore, the quasi-index mutual funds would prefer to invest in listed firms with low risk and good operating performance. We propose the following hypotheses with regard to quasi-index funds:

H3a. Quasi-index mutual funds' ownership is positively associated with listed firms' operating performance.

H3b. Quasi-index mutual funds' ownership is negatively associated with listed firms' risk measurements.

5.3 Dependent variables

We have four dependent variables in the regression analysis. ALL stands for total mutual funds' ownership, including all types of mutual funds' ownership[6]. T stands

[6] As ALL includes various types of mutual funds' ownership, this study does not form specific hypotheses about

for transient mutual funds' ownership; D for dedicated mutual funds' ownership; and Q for quasi-index mutual funds' ownership. ALL, T, D, and Q are constructed based on the number of listed firms' tradable shares, as mutual funds can only invest in listed firms' tradable shares.

5.4 Explanatory variables

1) Risk

We use two risk measurements in this paper. Listed firms' beta (BETA[7]) is employed to measure the market risk, while firms' debt ratio (ratio of total debt to its total equity, DE) is used to measure the financial risk. A high beta, or a high debt ratio, indicates high risk in a listed company. According to Hypothesis H3c, BETA and DE are expected to be negatively associated with quasi-index mutual funds' ownership (Q). This study does not have any specific expectation about the relation between BETA or DE and transient mutual funds' ownership (T) or dedicated mutual funds' ownership (D).

2) Liquidity

Falkenstein (1996) and Gompers and Metrick (2001) argue that listed firms' liquidity is one of the major determinants of mutual fund's investment. In this paper, TV is used to estimate the liquidity of listed firms in China. TV[8] is defined as a firm's trading volume divided by the number of its tradable shares at the end of each year. Firms with high liquidity will, in general, be preferred by mutual funds and, according

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the relation between ALL and the independent variables.

[7] BETA is estimated using daily returns.

[8] The trading volume equals the sum of the listed firm's daily trading volume of each year, rather than just the year-end data.

to our Hypotheses 1c and 2a, T and D are both expected to have positive relations with TV. We do not have any specific expectation about the relation between TV and Q.

3) Profitability

Woidtke (2002) argues that institutional investors prefer to invest in firms with positive prior earnings due to the prudence consideration in the US. Our study uses listed firm's return on assets (ROA) to measure the profitability and operating performance of listed firms. As our Hypotheses 1a and 3a suggest, ROA will be expected to have positive relations with T and Q. This study does not have any specific expectation about the relation between ROA and D.

4) Stock market performance

PE and TQ are included to measure listed firms' price level and market performance. PE[9] is the price to earnings ratio at the end of the year (the last trading day of the year), and TQ is the listed firms' Tobin's Q ratio[10], which has been widely employed as a measure of firm market performance in the literature (e.g., Morck, Shleifer and Vishny, 1988; Woidtke, 2002). Xu and Xiao (2006) report that Chinese institutional investors act as momentum traders when setting up their portfolios, or buying stocks. Thus, mutual funds will prefer to choose a firm with high PE and TQ to invest in. According to Hypothesis 1b, PE and TQ are expected to have positive relations with T. This study does not have any specific expectation about the relations between PE, TQ

[9] On the other hand, the PE ratio is also regarded as a risk measurement. A higher PE ratio indicates that investors are paying more for each unit of net income. Listed firms with higher PE may have higher investment risk.

[10] TQ = (the market value of tradable shares + the book value of non-tradable shares + the book value of long-term liability + the book value of short-term liability) / the firm's book value of total assets.

and D, Q.

5) State-controlled, or non-state-controlled, listed firms

A binary dummy variable, CTR, is used to measure the type of the largest shareholder of a listed firm. CTR[11] takes the value of one if the ultimate controller of the listed firm's largest shareholder is a private entity, or a foreign entity, and zero otherwise. Based on Hypothesis 2b, we expect that CTR is positively associated with D. In addition, we also use the variable STATE to measure the effect of the state-owned shares. STATE stands for the proportion of state-owned shares and state-owned legal person shares, which is expected to be negatively associated with D.

6) Firm Size

SIZE is the logarithm of a listed firm's total assets. It controls for a firm's size effect.

5.5 The model

This study uses Ordinary Least Square (OLS) regression to test the determinants of mutual funds' ownership. The OLS regression model is as follows:

$$ALL_{i,t}/T_{i,t}/D_{i,t}/Q_{i,t}=\beta_1+\beta_2 BETA_{i,t-1}+\beta_3 DE_{i,t-1}+\beta_4 TV_{i,t-1}+\beta_5 ROA_{i,t-1}+\beta_6 TQ_{i,t-1}+\beta_7 PE_{i,t-1}+\beta_8 CTR_{i,t-1}+\beta_9 STATE_{i,t-1}+\beta_{10} SIZE_{i,t-1}+\varepsilon_{i,t-1}$$

where βi represents regression coefficients and ε is the error term.

[11] The CCERDATA database categorizes the controllers of the largest shareholder of listed firms into six groups: State; Private entity; Foreigners; Community or social groupings; Employees; and Other. This paper treats the listed firms controlled by the private entity, employees and foreigners as non-state-controlled listed firms, and treats the other types as state-controlled listed firms. In our sample, 72.33% of total observations are controlled by the State, 24.13% controlled by private entities, 1% controlled by foreigners, 1.3% controlled by the community or social groupings, 0.43% controlled by employees, and 0.36% of the total observations have unclear ultimate controllers.

5.6 Empirical results

Table 4 shows the descriptive statistics of mutual funds' ownership at the end of each first quarter from 2005 to 2009 and one year lagged (2004 to 2008) listed firms' characteristics (independent variables in the regression analysis). T, D, and Q (transient mutual funds' ownership, dedicated funds' ownership, and quasi-index funds' ownership) are identified using Mutual Fund Classification 2 (based on listed firms' tradable shares). The average total mutual funds' ownership in a listed firm (based on listed firms' total number of tradable shares) at the end of the first quarter from 2005 to 2009 is 5.77%. The average T, D, and Q are 2.47%, 3.6%, and 4.4%, respectively.

(Insert Table 4 here)

Table 5 shows the results of Pearson Correlation testing. Among the explanatory variables, most of the correlations between two variables are less than 0.5. The highest correlation, which is -0.654, is between STATE and CTR. Thus, the correlations are not high enough to cause multicollinearity. To be cautious, however, the variables CTR and STATE will be used separately in the regressions.

(Insert Table 5 here)

We employ heteroskedasticity-consistent standard error (HCSE) estimators, which are robust to the unknown heteroskedasticity, in our OLS regressions due to concern regarding heteroskedasticity. All the p-values are based on heteroskedasticity-consistent standard errors. Table 6 shows the OLS regression results, most of which are consistent with our expectations. First, in Regressions 1 and

2, the coefficients of TV, ROA, TQ, and PE are all significantly positive at either the 1%, or 5% level, which supports Hypotheses 1a, 1b, and 1c. The results suggest that transient mutual funds choose listed firms with higher liquidity, better operating performance, and higher market value. In addition, DE is significantly positive at the 10% level. This surprising result suggests that transient funds prefer to invest in risky firms. Second, for dedicated mutual funds, the coefficient of TV is significantly positive at the 1% level, indicating that dedicated funds prefer listed firms with higher liquidity. This supports Hypothesis 2a, however, the coefficient of CTR is significantly and negatively associated with D, which rejects Hypothesis 2b and suggests that dedicated funds prefer state-owned listed firms to non-state-owned listed firms. The coefficient of STATE is also significantly positive, which indicates that dedicated funds prefer to invest in listed firms with high state ownership. Furthermore, we find that dedicated funds choose to invest in listed firms with smaller size (SIZE). This suggests that the large investment sizes of dedicated funds in small-sized listed firms could help them gain substantial control of these firms. Finally, in Regressions 5 and 6, the coefficients of ROA and TQ are significantly positive, whereas the coefficients of BETA and PE are significantly negative. The results support Hypotheses 3a and 3b, and indicate that the quasi-index mutual funds prefer listed firms with better operating and market performance, and lower risk. In comparison with the other two types of funds, quasi-index mutual funds are more risk averse, and usually invest in listed firms with low risk and large size.

(Insert Table 6 here)

We then run the regression with ALL as the dependent variable to see what kind of listed firms, in general, are preferred by Chinese mutual funds. In addition, we

separate our sample into two groups, non-state-owned and state-owned firms. We run the regressions again with the same independent variables, using each sub-sample group to test whether mutual funds pay attention to different firm characteristics when they deal with non-state vs. state owned firms. These regression results are shown in Table 7. With ALL as the dependent variable, the results indicate that Chinese mutual funds generally prefer to invest in listed firms with better operating performance, high market value, high state ownership, low share price to earnings ratios, and large size. The coefficients of TR, ROA, TQ, PE, CTR, STATE, and SIZE are all statistically significant. When the regressions are run using non-state-owned and state-owned samples, we find slight differences in mutual funds' preferences between these two groups. When mutual funds invest in state-owned firms, they pay more attention to sound operating performance (ROA) and low share price to earnings ratios (PE). Other than that, mutual funds' preference for high market value and large size is the same between these two groups of sub-samples.

(Insert Table 7 here)

Previous studies relating to mutual funds in China mainly construct mutual funds' ownership based on the listed firms' total number of shares (including both tradable and non-tradable shares). Thus, we employ mutual funds' ownership based on the listed firms' total number of shares to reexamine mutual fund preferences. We also use a new liquidity measurement (TVA) to take the place of TV. TVA[12] is defined as the logarithm of a firm's trading value (firm's trading volume multiplied by its share price). Trading value is usually regarded as a substitute for the trading volume when measuring the listed firm's liquidity. As mutual funds can only invest in tradable shares, we also include another variable (TR) to control for the listed firms' tradable

[12] TVA equals the sum of the listed firm's daily trading value in each year, rather than just the year-end data.

share ratios. TR is defined as the ratio of a firm's total number of tradable shares to its total number of shares at the end of each year.

(Insert Table 8 here)

As shown in Table 8, the average ALL1, T1, D1, and Q1 (mutual funds' ownership based on the listed firms' total number of shares) are 2.92%, 1.28%, 1.76%, and 2.2%, respectively. The average ALL1, T1, D1, and Q1 are approximately 50% of the average ALL, T, D, and Q (mutual funds' ownership based on the listed firms' tradable shares; see Table 4).

(Insert Table 9 and Table 10 here)

The regression results are shown in Table 9 and Table 10, and are quite similar to the ones reported in Table 6 and Table 7. There is, however, a slight difference. In Regressions 1 and 2 of Table 9, the coefficients of DE and PE are statistically insignificant, but the coefficient of DE is approaching significance (the *p-values* are 0.105 and 0.109). Thus, there is still a likelihood that transient mutual funds prefer to invest in riskier listed firms. In Regressions 3 and 4 of Table 9, the coefficient of BETA is significantly positive, whereas the coefficient of ROA is significantly negative[13]. These surprising results indicate that dedicated funds are likely to invest in listed firms with high risk and low operating performance. In Regressions 5 and 6 of Table 9, the coefficient of PE is not statistically significant, however, the coefficient of BETA is significantly negative at the 1% level, and the coefficient of TQ is significantly positive at the 1% level. Therefore, quasi-indexers' preference for low risk and high market value is robust when using mutual funds' ownership based on the listed firms' total number of shares as the dependent variables. In addition, we find

[13] The coefficient of BETA is positive and the coefficient of ROA is negative, as reported in the Table 6, though neither of them are statistically significant.

that all types of mutual funds prefer to invest in listed firms with high tradable share ratios. This is not surprising, as it is easier for mutual funds to invest in listed firms that have a greater proportion of tradable shares.

### 5.7 Robustness Checks

We have performed the following robustness checks in our paper. First, the mutual funds' ownerships at the end of the second quarter from 2005 to 2009 are used as the dependent variables, since the annual reports are released between 1 January and 30 April each year. Second, since earnings per share (EPS) is another important measure of a listed firm's profitability, we use EPS instead of ROA in our OLS regressions. Third, besides testing the determinants of the three types of mutual funds' ownership, we also test the determinants of different types of fund management companies' ownership. All of the three robustness tests outlined above show similar results to those whose results are shown in Table 6 and Table 9.

### 5.8 Discussion

Before drawing any conclusions on mutual funds' preference, we need to discuss a potential issue in our OLS regression test. Woidtke (2002) finds that ownership by private funds has a significantly positive impact on Fortune 500 firms' Tobin's Q. Yuan, Xiao and Zou (2008) report that mutual funds can increase listed firms' market performance (measured by Tobin's Q) in China. The regression results of our study show that transient and quasi-index mutual funds prefer to invest in listed firms with high Tobin's Q. Thus, an endogeneity problem[14] may exist between the mutual

[14] This study uses the one-year lagged listed firms' Tobin's Q as the independent variable and mutual funds' ownership at the end of the first quarter of the following year as the dependent variable in the regressions. This

funds' ownership and listed firms' Tobin's Q. We hold, however, that this is not a serious issue in our study. Yuan, Xiao and Zou (2008) report that the level of mutual funds' equity holding in a firm, rather than the mere existence of mutual funds' ownership, will impact on listed firms' market performance (Tobin's Q), as only a large equity stake may justify the cost of monitoring and, hence, provide mutual funds with enough incentives for active monitoring. Among various types of mutual funds, it is more likely that dedicated mutual funds will affect the listed firms' Tobin's Q than will transient and quasi-index funds. This is because dedicated funds usually more heavily invest in listed firms than do the other two types of mutual funds. Hence, if the endogeneity problem exists in our test, it would first be shown between the dedicated mutual funds' ownership and listed firms' Tobin's Q. Nonetheless, our results show that quasi-index and transient funds' ownership, rather than dedicated funds' ownership, is significantly and positively associated with listed firms' Tobin's Q.

So far, we can draw the following conclusions on Chinese mutual funds' preferences:

1) Due to the small investment size and short holding period, transient mutual funds pay more attention to listed firms' liquidity, operating and stock market performance, and prefer to invest in riskier listed firms;
2) Dedicated mutual funds prefer to invest in listed firms with high liquidity and small size, as well as low operating performance and high systematic risk;
3) Quasi-index mutual funds with buy-and-hold trading strategies prefer to invest in listed firms with low risk, good operating performance, high market value, and

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cannot, however, completely avoid the potential endogeneity between the firms' Tobin's Q and mutual funds' ownership, as some mutual funds may have been holding the shares of certain firms longer than one quarter.

large size; and

4) Interestingly, we find that state-controlled listed firms are preferred by all types of mutual funds in China. Although some studies argue that the state ownership causes listed firms' to have poor corporate governance, poor performance, and inefficiencies, Chen, Firth and Xu (2009) state that commercialized state ownership has its advantages in transitional economies in which the institutional environment is undeveloped and law enforcement is capricious and weak, as they find that listed firms affiliated to the Chinese central government and local governments perform better than listed firms controlled by private entities. Another possible reason for this finding will be that due to the poor corporate governance in the Chinese stock market, meaning that it is easier for mutual funds to align with the managers of state-controlled listed firms to reach inside arrangements[15]. As the state cannot directly participate in firms' operations and management, listed firms controlled by the state could have more severe agency problems than might firms controlled by the private entities, or foreigners (Yuan, Xiao and Zou, 2008). Hence, there would be a bigger chance for mutual funds to reach inside arrangements with managers of state-controlled listed firms than with managers of non-state-controlled listed firms in order to make abnormal returns.

## 6. Conclusions and Suggestions

[15] The alignment between institutional investors and listed firms (or listed firms' management) has been reported in China, however, the empirical evidence in this field is slight. A few studies report strategic alignments between institutional investors and listed firms during the non-tradable shares reform. Fu and Tan (2008) argue that listed firms trade inside information with institutional investors in exchange for low-level compensation to tradable shareholders during the non-tradable share reform. Qiu and Yao (2009) suggest that the reason that institutional investors agree with less compensation in non-tradable share reform might be that they can gain inside information from listed firms, or they can gain financially through other avenues, such as influencing the firm's strategy.

This paper examines the investment behaviors of mutual funds in China. The empirical evidence shows that the majority of mutual funds in China (58.58%) are quasi-index funds, which use buy-and-hold investment strategies; and that 31.27% of mutual funds are transient funds, with only a few (3.38%) being dedicated mutual funds[16]. It is also noteworthy that the dedicated institutions do not hold the shares of their portfolio firms as long as do quasi-indexers in China. The classification of fund management companies yields similar results, but with more than 90% of FMCs being categorized as quasi-indexers. On average, each FMC operates more than eight mutual funds in China. When one of an FMC's mutual funds sells the shares of a listed firm, other mutual funds of this FMC may still hold shares in the firm, which allows FMCs to maintain more stable portfolios than can mutual funds.

When selecting portfolio firms, Chinese mutual funds, in general, prefer listed firms with high profitability and market value, low share price to earnings ratios, and large size. Mutual funds also favor state-controlled listed firms. One possible explanation for this is that state-controlled listed firms have more severe agency problems and, therefore, mutual funds may have a greater chance of aligning with the state-controlled listed firms to make abnormal returns. Further research should be conducted on this aspect in the future. As well as using different investment strategies, different types of mutual funds prefer different characteristics in listed firms. Transient mutual funds focus on listed firms' operating performance, stock market value, and liquidity, and prefer to invest in riskier firms. Dedicated mutual funds prefer to invest in listed firms with high systematic risk, high liquidity, low

[16] The standard of being classified as a dedicated institution in China is lower than the standard in the US.

profitability, and small size. Quasi-index mutual funds, which are risk averse, prefer listed firms with large size, low risk, better operating performance, and high stock market value.

This paper can help both regulatory bodies and individual investors better understand the investment strategies adopted by the different types of mutual funds in China. Although the main purpose for the Chinese government in developing mutual funds is to stabilize the stock markets and to improve corporate governance, our research results show some issues of note for the regulatory bodies. First, during our sample period, 31.27% of mutual funds are transient funds, which have high turnover rates, small holdings in listed firms, and pay little attention to the management and corporate governance of listed firms. Second, previous research (such as Bushee, 1998; Koh, 2007) suggests that dedicated institutional investors can contribute more to sound corporate governance than can other types of institutions, since dedicated institutional investors have larger stakes in their portfolio firms, longer holding periods, and greater knowledge about the portfolio firms. Nonetheless, besides the fact that dedicated funds are so few (3.38%) in the Chinese stock market, the characteristics of dedicated funds also differ from those in developed stock markets. This paper finds that Chinese dedicated funds hold portfolio firms for shorter periods than do quasi-indexers and tend to invest in riskier and smaller firms. Therefore, we believe that the policy implication of this study is that the regulatory bodies should encourage the development of 'real' dedicated mutual funds in China, which construct more stable investment portfolios and pay more attention to the long-term earning ability and corporate governance of listed firms.

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Table 1: Institutional quarterly ownership statistics (Sep 2004 – Dec 2009)

| Variable | Mean | Median | Std. Dev. | Minimum | Maximum |
|---|---|---|---|---|---|
| MF | 0.36% | 0.13% | 0.61% | 0.0000009% | 7.30% |
| MFT | 0.70% | 0.25% | 1.20% | 0.0000009% | 19.81% |
| FMC | 0.63% | 0.25% | 0.99% | 0.000046% | 9.97% |
| FMCT | 1.22% | 0.49% | 1.93% | 0.000053% | 31.89% |

(1) MF is the ratio of a listed firm's number of shares held by a mutual fund to the listed firm's total number of shares outstanding (quarterly). (2) MFT is the ratio of a listed firm's number of shares held by a mutual fund to the listed firm's total number of tradable shares (quarterly). (3) FMC is the ratio of the number of a listed firm's shares held by a fund management company to the listed firm's total number of shares outstanding (quarterly). (4) FMCT is the ratio of a listed firm's number of shares held by a fund management company to the listed firm's total number of tradable shares (quarterly). MF and MFT have 57,200 observations. FMC and FMCT have 32,936 observations.

Table 2: Mutual Fund Classification

2a. Mutual Fund Classification 1 (Based on listed firms' total number of shares)

| | | Institutional Investor Groups | | |
|---|---|---|---|---|
| Factor | | Transient funds | Dedicated funds | Quasi-indexers |
| Factor1 | Mean | -0.091 | 4.639 | -0.136 |
| | Std. Dev. | 0.761 | 1.334 | 0.764 |
| Factor2 | Mean | -0.423 | -0.461 | 1.597 |
| | Std. Dev. | 0.622 | 0.901 | 0.623 |
| Factor3 | Mean | 0.065 | -0.231 | -0.214 |
| | Std. Dev. | 1.094 | 0.951 | 0.759 |
| N | | 1230 | 35 | 336 |
| Proportion | | 71.76% | 2.04% | 19.60% |

The table reports the results of Mutual Fund Classification 1. Mutual Fund Classification 1 classifies the mutual funds based on the mutual funds' holdings in listed firms' shares (including both tradable and non-tradable shares). (1) Factor 1 is each type of mutual funds' factor 1 score. (2) Factor 2 is each type of mutual funds' factor 2 score. (3) Factor 3 is each type of mutual funds' factor 3 score. The score of factor1, factor2, and factor3 have been standardized. All three scores have a mean of zero and a standard deviation of one across the entire distribution of the mutual funds. (4) N is number of institution-year observations. (5) Proportion is the ratio of the number of institution-year observations to the total number of institution-year observations. There are 115 mutual funds that have not been classified by Mutual Fund Classification 1 (6.7% of the total number of observations). This is because these funds have not been operated for more than one year, or they have missing data.

2b. Mutual Fund Classification 2 (Based on listed firms' tradable shares)

| | | Institutional Investor Groups | | |
|---|---|---|---|---|
| Factor | | Transient funds | Dedicated funds | Quasi-indexers |
| Factor1 | Mean | -0.109 | 4.157 | -0.182 |
| | Std. Dev. | 0.612 | 1.485 | 0.586 |
| Factor2 | Mean | -0.451 | -0.07 | 0.245 |
| | Std. Dev. | 0.645 | 1.048 | 1.12 |
| Factor3 | Mean | 1.035 | -0.332 | -0.533 |
| | Std. Dev. | 0.769 | 0.904 | 0.695 |
| N | | 536 | 58 | 1004 |
| Proportion | | 31.27% | 3.38% | 58.58% |

This table reports the results of Mutual Fund Classification 2. Mutual Fund Classification 2 classifies the mutual funds based on the mutual funds' holdings in listed firms' tradable shares. (1) Factor 1 is each type of mutual fund's factor 1 score. (2) Factor 2 is each type of mutual fund's factor 2 score. (3) Factor 3 is each type of mutual fund's factor 3 score. The score of factor1, factor2, and factor3 have been standardized. All three scores have a mean of zero and a standard deviation of one across the entire distribution of mutual funds. (4) N is the number of institution-year observations. (5) Proportion is the ratio of the number of institution-year observations to the total number of institution-year observations. There are 115 mutual funds that have not been classified by Mutual Fund Classification 2 (6.7% of total number of observations). It is because whether these funds have been operated for more than one year, or they have missing data.

Table 3: FMC classification (Based on listed firms' tradable shares)

| | | Institutional Investor Groups | | |
|---|---|---|---|---|
| Factor | | Transient FMCs | Dedicated FMCs | Quasi-indexers |
| Factor1 | Mean | -0.025 | 5.901 | -0.082 |
| | Std. Dev. | 0.863 | 2.463 | 0.687 |
| Factor2 | Mean | -0.124 | -1.193 | 0.028 |
| | Std. Dev. | 0.989 | 1.669 | 0.984 |
| Factor3 | Mean | 2.538 | -0.234 | -0.222 |
| | Std. Dev. | 1.208 | 1.275 | 0.582 |
| N | | 25 | 4 | 282 |
| Proportion | | 8.04% | 1.29% | 90.68% |

This table reports the results of the FMC classification. The FMC classification categorizes the fund management companies based on the fund management companies' holdings in the listed firms' tradable shares. (1) Factor 1 is each type of FMC's factor 1 score. (2) Factor 2 is each type of FMC's factor 2 score. (3) Factor 3 is each type of FMC's factor 3 score. The score of factor1, factor2 and factor3 have been standardized. All three scores have a mean of zero and a standard deviation of one across the entire distribution of fund management companies. (4) N is the number of institution-year observations. (5) Proportion is the ratio of the number of institution-year observations to the total number of institution-year observations.

Table 4: Descriptive statistics

| Variable | N | Mean | Std Dev | Sum | Minimum | Maximum |
|---|---|---|---|---|---|---|
| ALL | 1384 | 5.77% | 0.0690 | 79.895 | 0.013% | 71.785% |
| T | 948 | 2.47% | 0.026 | 23.414 | 0.006% | 19.587% |
| D | 314 | 3.60% | 0.032 | 11.308 | 0.036% | 18.856% |
| Q | 1034 | 4.40% | 0.052 | 45.173 | 0.008% | 63.792% |
| BETA | 1384 | 1.015 | 0.309 | 1405 | -4.096 | 2.234 |
| DE | 1384 | 1.319 | 1.324 | 1826 | -8.501 | 22.199 |
| TV | 1384 | 4.429 | 2.945 | 6130 | 0.203 | 19.695 |
| ROA | 1384 | 0.061 | 0.054 | 84.092 | -0.556 | 0.385 |
| TQ | 1384 | 1.640 | 0.999 | 2270 | 0.370 | 10.303 |
| PE | 1384 | 46.240 | 259.249 | 63995 | -2236 | 8786 |
| CTR | 1384 | 0.249 | 0.432 | 344 | 0 | 1 |
| STATE | 1384 | 0.316 | 0.251 | 437.512 | 0 | 0.863 |
| SIZE | 1384 | 9.666 | 0.523 | 13378 | 8.369 | 12.077 |

Table 4 reports the descriptive statistics of mutual funds' ownership in listed firms at the end of the first quarter of each year from 2005 to 2009, and mutual funds' portfolio firms' characteristics at the end of each year from 2004 to 2008. (1) ALL is the total mutual funds' ownership in a listed firm, including all types of mutual funds' ownership. (2) T is the ownership of transient mutual funds, classified by Mutual Fund Classification 2. (3) D is the ownership of dedicated mutual funds, classified by Mutual Fund Classification 2. (4) Q is the ownership of quasi-index mutual funds, classified by Mutual Fund Classification 2. Mutual Fund Classification 2 categorizes the mutual funds based on the mutual funds' holdings in the listed firms' total tradable shares. ALL, T, D, and Q are calculated based on the number of listed firms' tradable shares. (5) BETA is the listed firm's beta coefficient. (6) DE is the listed firm's financial leverage ratio (total debt/total equity). (7) TV is the listed firm's trading volume scaled by the firm's total number of tradable shares. (8) ROA is the listed firm's return on assets. (9) TQ is the listed firm's Tobin's Q ratio. (10) PE is the listed firm's share price to earnings ratio. (11) CTR is a dummy variable, which takes the value of 1 if the firms are not ultimately controlled by the government, and 0 otherwise. (12) STATE is the percentage of the listed firm's shares held by the government, including the shares directly held by the government and the shares held by the state-owned legal persons. (13) SIZE is the listed firm's log value of total assets.

Table 5: Pearson Correlation

| | ALL | BETA | DE | TV | ROA | TQ | PE | CTR | STATE | SIZE |
|---|---|---|---|---|---|---|---|---|---|---|
| ALL | 1 | -0.151*** | -0.039 | -0.110*** | 0.224*** | 0.209*** | -0.020 | -0.128*** | 0.166*** | 0.150*** |
| *p-value* | | *<.0001* | *0.146* | *<.0001* | *<.0001* | *<.0001* | *0.458* | *<.0001* | *<.0001* | *<.0001* |
| BETA | | 1 | 0.082*** | 0.290*** | -0.205*** | -0.170*** | 0.020 | 0.058*** | -0.088*** | -0.089*** |
| *p-value* | | | *0.002* | *<.0001* | *<.0001* | *<.0001* | *0.463* | *0.031* | *0.001* | *0.001* |
| DE | | | 1 | 0.021 | -0.372*** | -0.166*** | -0.013 | -0.057** | 0.018 | 0.256*** |
| *p-value* | | | | *0.430* | *<.0001* | *<.0001* | *0.625* | *0.033* | *0.506* | *<.0001* |
| TV | | | | 1 | -0.093*** | 0.137*** | 0.004 | 0.062** | -0.025 | -0.213*** |
| *p-value* | | | | | *0.001* | *<.0001* | *0.892* | *0.022* | *0.352* | *<.0001* |
| ROA | | | | | 1 | 0.385*** | -0.066** | 0.087*** | 0.034 | -0.110*** |
| *p-value* | | | | | | *<.0001* | *0.014* | *0.001* | *0.213* | *<.0001* |
| TQ | | | | | | 1 | 0.025 | 0.141*** | -0.151*** | -0.280*** |
| *p-value* | | | | | | | *0.349* | *<.0001* | *<.0001* | *<.0001* |
| PE | | | | | | | 1 | -0.001 | 0.013 | 0.030 |
| *p-value* | | | | | | | | *0.962* | *0.636* | *0.263* |
| CTR | | | | | | | | 1 | -0.654*** | -0.298*** |
| *p-value* | | | | | | | | | *<.0001* | *<.0001* |
| STATE | | | | | | | | | 1 | 0.292*** |
| *p-value* | | | | | | | | | | *<.0001* |
| SIZE | | | | | | | | | | 1 |

Table 5 reports the Pearson Correlation coefficients between the independent variables. (1) ALL is total mutual funds' ownership in a listed firm, including all types of mutual funds' ownership (based on listed firms' tradable shares). (2) BETA is the listed firm's market beta coefficient. (3) DE is the listed firm's financial leverage ratio (total debt/total equity). (4) TV is the listed firm's trading volume scaled by the firm's total number of tradable shares. (5) ROA is the listed firm's return on assets. (6) TQ is the listed firm's Tobin's Q ratio. (7) PE is the listed firm's share price to earnings ratio. (8) CTR is a dummy variable, which takes the value of 1 if the firms are not ultimately controlled by the government, and 0 otherwise. (9) STATE is the percentage of the listed firm's shares held by the government, including the shares directly held by the government and the shares held by the state-owned legal persons. (10) SIZE is the listed firm's log value of total assets.
*, **, and *** indicate statistical significance at the 0.1, 0.05, and 0.01 levels, respectively (two-sided).

Table 6: Results of the OLS regressions on different types of mutual funds' ownership (based on the listed firms' tradable shares)

| Variable | T | | D | | Q | |
|---|---|---|---|---|---|---|
| Regression | 1 | 2 | 3 | 4 | 5 | 6 |
| Intercept | -0.008 | -0.009 | 0.196*** | 0.189*** | -0.099*** | -0.099*** |
| *P-value* | *0.643* | *0.592* | *<.0001* | *<.0001* | *0.007* | *0.006* |
| BETA | 0.003 | 0.003 | 0.004 | 0.004 | -0.014** | -0.013** |
| *P-value* | *0.382* | *0.244* | *0.500* | *0.483* | *0.026* | *0.030* |
| DE | 0.001* | 0.001* | -0.002* | -0.002 | 0.001 | 0.001 |
| *P-value* | *0.082* | *0.085* | *0.081* | *0.150* | *0.451* | *0.408* |
| TV | 0.003*** | 0.003** | 0.006*** | 0.006*** | -0.003 | -0.003 |
| *P-value* | *0.009* | *0.020* | *0.008* | *0.008* | *0.198* | *0.109* |
| ROA | 0.054*** | 0.044*** | -0.045 | -0.057 | 0.208*** | 0.188*** |
| *P-value* | *0.001* | *0.005* | *0.265* | *0.180* | *<.0001* | *<.0001* |
| TQ | 0.003*** | 0.004*** | -0.001 | -0.0002 | 0.007*** | 0.008*** |
| *P-value* | *0.006* | *0.003* | *0.715* | *0.902* | *0.001* | *0.0004* |
| PE | 0.00002** | 0.00002** | 0.000002 | 0.000002 | -0.000005*** | -0.000005*** |
| *P-value* | *0.027* | *0.032* | *0.585* | *0.622* | *0.0001* | *<.0001* |
| CTR | -0.006*** | | -0.016*** | | -0.012*** | |
| *P-value* | *0.001* | | *<.0001* | | *<.0001* | |
| STATE | | 0.013*** | | 0.022*** | | 0.025*** |
| *P-value* | | *0.0002* | | *0.002* | | *<.0001* |
| SIZE | 0.002 | 0.001 | -0.016*** | -0.017*** | 0.014*** | 0.013*** |
| *P-value* | *0.302* | *0.443* | *<.0001* | *<.0001* | *<.0001* | *0.0002* |
| R-square | 5.63% | 6.19% | 14.39% | 14.17% | 12.54% | 13.01% |
| Adj. R-square | 4.83% | 5.39% | 12.14% | 11.92% | 11.86% | 12.33% |
| No. of Obs. | 948 | | 314 | | 1034 | |

This table reports the regression results of different types of mutual funds' ownership on listed firms' characteristics. (1) T is the ownership of transient mutual funds, classified by Mutual Fund Classification 2. (2) D is the ownership of dedicated mutual funds, classified by Mutual Fund Classification 2. (3) Q is the ownership of quasi-index mutual funds, classified by Mutual Fund Classification 2. Mutual Fund Classification 2 categorizes the mutual funds based on the mutual funds' holdings in the listed firms' tradable shares. T, D, and Q are calculated based on the number of listed firms' tradable shares. (4) BETA is the listed firm's market beta coefficient. (5) DE is the listed firm's financial leverage ratio (total debt/total equity). (6) TV is the listed firm's trading volume scaled by the firm's total number of tradable shares. (7) ROA is the listed firm's return on assets. (8) TQ is the listed firm's Tobin's Q ratio. (9) PE is the listed firm's share price to earnings ratio. (10) CTR is a dummy variable, which takes the value of 1 if the firms are not ultimately controlled by the government, and 0 otherwise. (11) STATE is the percentage of the listed firm's shares held by the government, including the shares directly held by the government and the shares held by the state-owned legal persons. (12) SIZE is the listed firm's log value of total assets. The p-values are based on heteroskedasticity-consistent standard errors that are robust to unknown heteroskedasticity.

*, **, and *** indicate statistical significance at the 0.1, 0.05, and 0.01 levels, respectively (two-sided).

Table 7: Results of the OLS regressions on total mutual funds' ownership (based on the listed firms' tradable shares) and on two sub-samples (non-state controlled firms vs. state controlled firms)

| Variable | ALL | | NSC | SC |
|---|---|---|---|---|
| Regression | 1 | 2 | 3 | 4 |
| Intercept | -0.188*** | -0.195*** | -0.145** | -0.214*** |
| *P-value* | *<.0001* | *<.0001* | *0.020* | *<.0001* |
| BETA | -0.011 | -0.010 | -0.012 | -0.008 |
| *P-value* | *0.139* | *0.182* | *0.145* | *0.418* |
| DE | 0.0004 | 0.0005 | 0.0002 | 0.0008 |
| *P-value* | *0.739* | *0.720* | *0.920* | *0.563* |
| TV | -0.003 | -0.004 | -0.004 | -0.005 |
| *P-value* | *0.267* | *0.133* | *0.245* | *0.151* |
| ROA | 0.204*** | 0.177*** | 0.020 | 0.262*** |
| *P-value* | *<.0001* | *<.0001* | *0.654* | *<.0001* |
| TQ | 0.015*** | 0.016*** | 0.009*** | 0.020*** |
| *P-value* | *<.0001* | *<.0001* | *0.0003* | *<.0001* |
| PE | -0.00001 | -0.00001** | 0.00003 | -0.00001*** |
| *P-value* | *0.118* | *0.019* | *0.138* | *<.0001* |
| CTR | -0.018*** | | | |
| *P-value* | *<.0001* | | | |
| STATE | | 0.038*** | | |
| *P-value* | | *<.0001* | | |
| SIZE | 0.024*** | 0.023*** | 0.020*** | 0.025*** |
| *P-value* | *<.0001* | *<.0001* | *0.002* | *<.0001* |
| R-square | 13.17% | 13.75% | 12.49% | 13.63% |
| Adj. R-square | 12.66% | 13.24% | 10.66% | 13.05% |
| No. of Obs. | 1384 | | 344 | 1040 |

This table reports the regression results of mutual funds' ownership on listed firms' characteristics. (1) ALL is the total mutual funds' ownership in a listed firm, including all types of mutual funds' ownership (based on listed firms' tradable shares). (2) NSC indicates the sub-sample only containing the listed firms that are not ultimately controlled by the state. (3) SC indicates the sample only containing the listed firms that are ultimately controlled by the state. (4) BETA is the listed firm's beta coefficient. (5) DE is the listed firm's financial leverage ratio (total debt/total equity). (6) TV is the listed firm's trading volume scaled by the firm's total number of tradable shares. (7) ROA is the listed firm's return on assets. (8) TQ is the listed firm's Tobin's Q ratio. (9) PE is the listed firm's share price to earnings ratio. (10) CTR is a dummy variable, which takes the value of 1 if the firms are not ultimately controlled by the government, and 0 otherwise. (11) STATE is the percentage of listed firm's shares held by the government, including the shares directly held by the government and the shares held by the state-own legal persons. (12) SIZE is the listed firm's log value of total assets. The p-values are based on heteroskedasticity-consistent standard errors that are robust to unknown heteroskedasticity.

*, **, and *** indicate statistical significance at the 0.1, 0.05, and 0.01 levels, respectively (two-sided).

Table 8: Descriptive statistics

| Variable | N | Mean | Std Dev | Sum | Minimum | Maximum |
|---|---|---|---|---|---|---|
| ALL1 | 1384 | 2.92% | 0.035 | 40.446 | 0.007% | 30.225% |
| T1 | 948 | 1.28% | 0.014 | 12.166 | 0.003% | 11.931% |
| D1 | 314 | 1.76% | 0.016 | 5.536 | 0.011% | 8.284% |
| Q1 | 1034 | 2.20% | 0.025 | 22.750 | 0.004% | 25.059% |
| TVA | 1384 | 10.040 | 0.525 | 13896 | 8.618 | 11.717 |
| TR | 1384 | 0.509 | 0.173 | 705.571 | 0.068 | 1 |

(1) ALL1 is the total mutual funds' ownership in a listed firm, including all types of mutual funds' ownership. (2) T1 is the ownership of transient mutual funds, classified by Mutual Fund Classification 2. (3) D1 is the ownership of dedicated mutual funds, classified by Mutual Fund Classification 2. (4) Q1 is the ownership of quasi-index mutual funds, classified by Mutual Fund Classification 2. Mutual Fund Classification 2 categorizes the mutual funds based on the mutual funds' holdings in the listed firms' total number of tradable shares. ALL1, T1, D1, and Q1 are calculated based on the total number of listed firms' shares (including tradable and non-tradable). (5) TVA is the log value of the listed firm's trading value. (6) TR is the listed firm's tradable share ratio.

Table 9: Results of the OLS regressions on different types of mutual funds' ownership (based on the listed firms' total number of shares)

| Variable | T1 | | D1 | | Q1 | |
|---|---|---|---|---|---|---|
| Regression | 1 | 2 | 3 | 4 | 5 | 6 |
| Intercept | -0.016* | -0.020** | 0.066*** | 0.061*** | -0.059*** | -0.065*** |
| *P-value* | *0.089* | *0.037* | *0.0001* | *0.0004* | *0.0003* | *<.0001* |
| BETA | 0.002 | 0.002 | 0.006* | 0.005* | -0.001*** | -0.008*** |
| *P-value* | *0.12* | *0.129* | *0.069* | *0.096* | *0.003* | *0.002* |
| DE | 0.001 | 0.001 | -0.001 | -0.001 | 0.001 | 0.001 |
| *P-value* | *0.105* | *0.109* | *0.362* | *0.403* | *0.21* | *0.227* |
| TVALUE | 0.003** | 0.003** | 0.006** | 0.006** | -0.001 | -0.001 |
| *P-value* | *0.033* | *0.035* | *0.013* | *0.014* | *0.719* | *0.717* |
| TR | 0.012*** | 0.013*** | 0.012** | 0.013** | 0.028*** | 0.032*** |
| *P-value* | *<.0001* | *<.0001* | *0.021* | *0.032* | *<.0001* | *<.0001* |
| ROA | 0.017* | 0.015* | -0.035* | -0.037* | 0.080*** | 0.077*** |
| *P-value* | *0.071* | *0.098* | *0.081* | *0.069* | *<.0001* | *<.0001* |
| TQ | 0.002*** | 0.002*** | -0.00001 | -0.0001 | 0.004*** | 0.004*** |
| *P-value* | *0.004* | *0.005* | *0.991* | *0.918* | *<.0001* | *<.0001* |
| PE | 0.00001 | 0.00001 | 0.0000001 | -0.0000001 | -0.000003 | -0.000003 |
| *P-value* | *0.144* | *0.169* | *0.986* | *0.989* | *0.338* | *0.317* |
| CTR | -0.002** | | -0.006*** | | -0.005*** | |
| *P-value* | *0.04* | | *0.008* | | *0.009* | |
| STATE | | 0.003 | | 0.005 | | 0.007** |
| *P-value* | | *0.205* | | *0.234* | | *0.05* |
| SIZE | -0.001 | -0.001 | -0.012*** | -0.012*** | 0.007*** | 0.007*** |
| *P-value* | *0.334* | *0.396* | *<.0001* | *<.0001* | *0.003* | *0.002* |
| R-square | 7.98% | 7.73% | 18.00% | 16.46% | 14.03% | 13.78% |
| Adj. R-square | 7.10% | 6.84% | 15.58% | 13.98% | 13.27% | 13.02% |
| No. of Obs. | 948 | | 314 | | 1034 | |

This table reports the regression results of different types of mutual funds' ownership on listed firms' characteristics. (1) T1 is the ownership of transient mutual funds, classified by Mutual Fund Classification 2. (2) D1 is the ownership of dedicated mutual funds, classified by Mutual Fund Classification 2. (3) Q1 is the ownership of quasi-index mutual funds, classified by Mutual Fund Classification 2. Mutual Fund Classification 2 categorizes the mutual funds based on the mutual funds' holdings in the total number of listed firms' tradable shares. T1, D1, and Q1 are calculated based on the total number of listed firms' shares (including both tradable and non-tradable shares). (4) BETA is the listed firm's market beta coefficient. (5) DE is the listed firm's financial leverage ratio (total debt/total equity). (6) TVALUE is the log value of the listed firm's trading value. (7) TR is the listed firm's tradable share ratio. (8) ROA is the listed firm's return on assets. (9) TQ is the listed firm's Tobin's Q ratio. (10) PE is the listed firm's share price to earnings ratio. (11) CTR is a dummy variable, which takes the value of 1 if the firms are not ultimately controlled by the government, and 0 otherwise. (12) STATE is the percentage of listed firm's shares held by the government, including the shares directly held by the government and the shares held by the state-owned legal persons. (14) SIZE is the listed firm's log value of total assets. The p-values are based on heteroskedasticity-consistent standard errors that are robust to unknown heteroskedasticity.

*, **, and *** indicate statistical significance at the 0.1, 0.05, and 0.01 levels, respectively (two-sided).

Table 10: Results of the OLS regressions on total mutual funds' ownership (based on the listed firms' total number of shares) and on two sub-samples (non-state controlled firms vs. state controlled firms)

| Variable | ALL1 | | NSC | SC |
|---|---|---|---|---|
| Regression | 1 | 2 | 3 | 4 |
| Intercept | -0.122*** | -0.133*** | -0.137*** | -0.128*** |
| *P-value* | *<.0001* | *<.0001* | *<.0001* | *<.0001* |
| BETA | -0.005 | -0.005* | -0.001* | -0.002 |
| *P-value* | *0.117* | *0.09* | *0.055* | *0.545* |
| DE | 0.001 | 0.001 | -0.00005 | 0.001 |
| *P-value* | *0.429* | *0.474* | *0.973* | *0.438* |
| TVALUE | 0.001 | 0.001 | 0.005 | -0.004 |
| *P-value* | *0.847* | *0.87* | *0.257* | *0.239* |
| TR | 0.0308*** | 0.0355*** | 0.033*** | 0.034*** |
| *P-value* | *<.0001* | *<.0001* | *<.0001* | *<.0001* |
| ROA | 0.083*** | 0.079*** | 0.002 | 0.112*** |
| *P-value* | *<.0001* | *<.0001* | *0.941* | *<.0001* |
| TQ | 0.008*** | 0.008*** | 0.005*** | 0.012*** |
| *P-value* | *<.0001* | *<.0001* | *0.001* | *<.0001* |
| PE | -0.000003 | -0.000004 | 0.00001 | -0.000004 |
| *P-value* | *0.321* | *0.295* | *0.27* | *0.242* |
| CTR | -0.007*** | | | |
| *P-value* | *0.001* | | | |
| STATE | | 0.008** | | |
| *P-value* | | *0.047* | | |
| SIZE | 0.012*** | 0.013*** | 0.010** | 0.016*** |
| *P-value* | *<.0001* | *<.0001* | *0.031* | *<.0001* |
| R-square | 14.63% | 14.23% | 21.01% | 14.61% |
| Adj. R-square | 14.07% | 13.67% | 19.12% | 13.95% |
| No. of Obs. | 1384 | | 344 | 1040 |

This table reports the regression results of mutual funds' ownership on listed firms' characteristics. (1) ALL1 is total mutual funds' ownership in a listed firm, including all types of mutual funds' ownership. ALL is calculated based on the total number of listed firms' shares (including both tradable and non-tradable shares). (2) NSC indicates that the sample only contains the listed firms that are not ultimately controlled by the state. (3) SC indiates that the sample only contains the listed firms that are ultimately controlled by the state. (4) BETA is the listed firm's beta coefficient. (5) DE is the listed firm's financial leverage ratio (total debt/total equity). (6) TV is the log value of the listed firm's trading value. (7) TR is the listed firm's tradable share ratio. (8) ROA is the listed firm's return on assets. (9) TQ is the listed firm's Tobin's Q ratio. (10) PE is the listed firm's share price to earnings ratio. (11) CTR is a dummy variable, which takes the value of 1 if the firms are not ultimately controlled by the government, and 0 otherwise. (12) STATE is the percentage of listed firm's shares held by the government, including the shares directly held by the government and the shares held by the state-owned legal persons. (13) SIZE is the listed firm's log value of total assets. The p-values are based on heteroskedasticity-consistent standard errors that are robust to unknown heteroskedasticity.

*, **, and *** indicate statistical significance at the 0.1, 0.05, and 0.01 levels, respectively (two-sided).