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# Performance persistence in institutional investment management: The case of Chinese equity funds

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**Abstract**

This paper investigates the performance and persistence in performance of equity funds in China. We apply the capital asset pricing model (CAPM) and the Carhart four-factor model to examine 520 equity funds for an eleven-year period with 39,449 observations. To investigate persistence, the entire sample is divided into ten portfolios (deciles) on the basis of lagged one-year performance and then observed over the next 12 months. We find that equity funds in China outperform their benchmark market but do not find any evidence of persistence in the performance of equity funds. Top-performing (worst-performing) funds do not continue to perform well (worse) in the following year. Top-performing funds are younger and have lower expense ratios than the worst-performing funds. However, the size of the top-performing funds and the worst-performing funds show no significant difference. Our results suggest that past performance of equity funds is not predictive of future fund performance.

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*Keywords:* Emerging markets; Equity mutual funds; Expense ratio; China; Performance; Persistence

## 1. Introduction

Analyzing the performance of mutual funds and persistence in their performance is important for both practitioners and academics. Investors believe that fund managers possess superior capabilities, and financial analysts investigate those fund managers' capabilities by analyzing the returns of equity mutual funds. Measuring fund performance is vital in the mutual fund industry, as current and potential investors watch fund performance over time. Therefore, performance information may be very influential for cash inflow and outflow from the funds. Moreover, from academic point of view, examining fund managers' skills is equivalent to testing the efficient market hypothesis.

A comparison of the performance of mutual funds and the stock market has long been a topic of discussion, and many studies have compared them, but the results are not unanimous. Some papers find that mutual funds outperform the stock market (see Białkowski & Otten, 2011; Huij & Post, 2011; Swinkels & Rzezniczak, 2009). However, Hayat and Kraeuss (2011), Otten and Bams (2002), and Christensen (2013) show that mutual funds are unable to beat the market and give lower returns than the market. Tang, Wang, and Xu (2012), Chi (2013), and Kiymaz (2015) examine Chinese funds' performance and report that equity funds outperform the benchmark market.

A lot of work has been done on persistence in the performance of mutual funds in developed economies. Mutual funds with a higher (lower) return in a previous time period tend to provide higher (lower) return in the subsequent time period

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(Bollen & Busse, 2001; Huij & Post, 2011; Mamaysky, Spiegel, & Zhang, 2007). Several studies (e.g. Białkowski & Otten, 2011; Brown & Goetzmann, 1995; Hendricks, Patel, & Zeckhauser, 1993) have documented persistence in mutual fund performance over short time horizons, whereas, Grinblatt and Titman (1992), Elton, Gruber, and Blake (1996), and Allen and Tan (1999) find evidence of predictability in the performance of mutual funds over long time horizons. Brown and Goetzmann (1995) assert that the persistence of performance depends on the period under study. Chasing funds is a risky approach, and funds that performed well this time may fail greatly next time. Funds that performed well last year may become funds that perform badly the following year. Carhart (1997), however, shows that the "hot hands" effect is attributable to persistence in expense ratios and following persistence strategies. Białkowski and Otten (2011) report strong persistence in the performance of Polish mutual funds and Abdel-Kader and Qing (2007) find performance persistence in equity mutual funds in Hong Kong over the short term. Heffernan (2001) and Keswani and Stolin (2006) find persistence in the performance of UK equity funds. They find that persistence is higher among sectors in which the concentration of assets under management is higher. European equity funds witness persistence in performance over time (Goñi Ecay, 2014). Taiwanese, Korean, and Greek mutual funds also show persistence in their performance (see Babalos, Kostakis, & Philippas, 2007; Hou, 2012; Kang, Lee, & Lee, 2011).

By contrast, Casarin, Pelizzon, and Piva (2008) do not support persistence, as they do not find any evidence for it. Winner (loser) funds from last year do not continue to be winners (losers) the following year (Agarwal & Naik, 2000). Huang and Mahieu (2012) do not find persistence in the performance of Dutch pension funds over time. Vicente and Ferruz (2005) affirm that Spanish markets demonstrate no persistence in the performance of equity funds. Busse, Goyal, and Wahal (2010) report persistence in the performance of funds using CAPM and the Fama–French (Fama & French, 1993) three-factor model. However, they do not find any evidence of persistence in fund performance when they apply the Carhart four-factor model as a performance measure. Alves and Mendes (2011) find no evidence of a relationship between past performance and capital flow in Portuguese mutual fund markets, but they find persistence in mutual fund performance.

We conduct this research on Chinese equity funds for several reasons. The number of studies on emerging markets such as China, regarding persistence in mutual fund performance, is low compared to those on developed or advanced economies. China has one of the fastest-growing markets in Asia in terms of the investment fund market, and the Chinese market has attracted many foreign investors in the past several years. The Chinese mutual fund industry has experienced strong growth over the past 20 years, and in 2014 assets under management in China totaled $2.8 trillion. If trust and bank wealth-management products are counted, the total exceeds $16.2 trillion (Chen, Xiong, & Huang, 2014). In the early years of its development, growth in the asset management industry was not very strong. With the combined efforts of market participants and regulators, the Chinese mutual fund industry has grown substantially over the past 20 years. The existence of a high number of mutual funds in Chinese market implies that there is a competition among the mutual funds and they try to outperform the benchmark market in order to attract investors. This means that some fund managers possess superior skills that allow them to earn better returns for their investors. Unlike in developed countries, in China, a large proportion of trading is conducted by individual domestic investors. The significant existence of individual domestic investors there is in sharp contrast to the dominance of institutional investors in the United States. Institutional and foreign investors are considered better informed than individual domestic investors. Therefore, examining performance and performance persistence in China may not yield the same findings as in the United States. Thus, this paper explores the equity funds in one emerging economy dominated by individual investors who may not be very well informed.

Despite significant growth in the Chinese mutual fund industry, little is known about performance and performance persistence in Chinese equity funds. Therefore, a study on Chinese equity funds can contribute to the limited literature on mutual funds in emerging markets. Few studies have been done on persistence in the performance of Chinese mutual funds. Su, Zhao, Yi, and Dutta (2012) examine Chinese mutual funds and find persistence in the performance of mutual funds in the short run but not in the long term. They use a small sample of 42 funds with data for only seven years (2003–2009). Their study applies a simple approach and only compares raw returns with the benchmark market. Xu (2004) examines performance persistence in Chinese mutual funds but uses data for only three years (i.e. 2000–2002) and Li et al. (Xuefeng, Xi, & Yongfeng, 2007) take the data for only two years from year 2005 to 2006. In both these studies, time window is very small. Chen (2013) studies persistence in the performance of Chinese mutual funds using a sample of only 104 equity funds for a six-year period (2005–2010). His study does not use the Carhart four-factor model, which has become the standard measure for evaluating the performance of mutual funds. He finds evidence of performance persistence by Chinese mutual funds in the short run but not in the long run. Duan and Dong (2014) also investigate the performance persistence in Chinese mutual funds, studying only 215 mutual funds over a five-year period (2008–2012). Their study is not very elaborate and does not apply any of the models for measuring fund performance that have become the standard in finance literature, such as the CAPM, the Fama-French (Fama & French, 1993) three-factor model, or the Carhart four-factor model. They report very weak persistence in the performance of Chinese mutual funds. Our study is comparatively more elaborate, as we use a sample of 520 Chinese equity funds over an eleven-year period (2004–2014), which is uncontaminated by survivorship bias. To control the survivorship bias, those mutual funds are also included in the data that became dead or inactive during the period of study. Our study uses the CAPM and Carhart four-factor model to examine performance and divides the sample into ten deciles to investigate persistence in the performance of equity funds. To

the best of authors' knowledge, this is the first study to use a big sample of Chinese equity mutual funds for long period of eleven years and also the first to apply Carhart's (1997) approach in investigating persistence in performance of Chinese equity funds. We study only domestic equity funds because they offer the most widely accepted benchmarks and risk-adjusted approaches.

Our findings indicate that Chinese equity funds beat their benchmark market. This means that the results in this study are in line with the findings for Taiwanese and Korean markets, in which equity funds outperform the market (Hou, 2012; Kang et al., 2011). We do not find any evidence of persistence in the performance of equity funds. Well-performing (worse-performing) funds from last year do not continue to perform well (worse) in the following year. Returns in the top decile are not significantly different from returns in the bottom decile. This study also finds that well-performing equity funds have lower expense ratios and are younger in age than worse-performing equity funds. However, the size (total net assets) of well-performing funds and worse-performing funds show no significant difference. This study contributes to the limited literature on the performance persistence of mutual funds in emerging markets, especially China, and for investors, the economic significance of this paper is that the past performance of equity funds in China is not predictive of their future performance. The findings in this study help to further understanding of the Chinese mutual fund market.

The rest of the paper is organized as follows. The next section introduces the characteristics of the Chinese capital market and mutual fund industry. A data description and statistics are presented in Section 3. Our findings and discussion are in Section 4. Finally Section 5 concludes.

## 2. Characteristics of the Chinese mutual fund industry and capital market

The Chinese mutual fund industry has experienced robust growth since the first mutual fund was launched in 2001 (Tang et al., 2012). The development of the Chinese mutual fund industry has played a substantial role in the privatization and restructuring of the Chinese transitional economy, improvement in the governance mechanism at Chinese companies, and stability in financial markets (Firth, Gao, Shen, & Zhang, 2016). In China, mutual funds are among the top ten shareholders in more than half the listed companies (Dai, Kong, & Wang, 2013). At the end of 2012, China had 1175 mutual funds, of which 1130 were open ended and 45 closed ended, and net assets under management at mutual funds totaled RMB 2.867 trillion (around US$450 billion) (Firth, Lin, Liu, & Xuan, 2013). However, the number of equity mutual funds in China is still lower than in the United States.[1] In 2005, in the UK and the United States, equity funds owned more than 50% of the assets in the mutual fund industry whereas in China equity funds owned no more than 7% (Ramos, 2009). The Chinese stock market has a short history as it was established in 1990 but have shown strong growth afterwards. China now has the world's second-largest stock market, after the one in the United States. Over time, financial laws and regulations have been introduced gradually to address new developments in Chinese capital markets. However, as in other emerging markets, the legal system is not as fully developed in China as in the United States. For example, regulations on insider reporting and trading were introduced only in April 2007. Retail investors in China represent a huge proportion of the Chinese stock market. In 2003, Chinese retail investors comprised more than 87% of the stock market capitalization. More than 2500 stocks are listed on the Chinese stock exchanges in Shanghai and Shenzhen (Chi, 2015).

One of the reasons for the growth in the Chinese stock market is the share reform policy initiated in 2005, which allows the trading of restricted/non-tradable shares of companies. This share reform policy mainly targets state-owned enterprises (SOEs), which have most of the restricted/non-tradable shares. SOE stocks are generally large-cap. As a result of this reform, restricted/non-tradable shares are converted into floating/tradable shares on secondary exchanges. Since that reform in 2005, more than 1300 stocks have been converted into floating/tradable shares until 2014. The conversion of non-tradable shares into tradable shares contributed significantly to the growth of market capitalization of Chinese stock markets. The total market capitalization of SOEs increased from RMB 779 billion in 2003 to RMB 11.751 trillion in 2013. At the end of 2013, 962 publicly listed SOEs represented 39% of total stocks in the stock market and 58.6% of total stock market capitalization (Chi, 2015).

Chinese open-ended funds includes actively managed funds, index funds, money market funds, bond funds, and qualified domestic institutional investor (QDII)[2] funds. Yu and Du (2008) report that at the end of 2007, 28% of the assets on the Chinese equity market were owned by mutual funds. In addition to having a short history and small scale, the Chinese mutual fund industry differs from U.S. and other developed markets in several ways.

First, mutual funds in the United States are corporate entities, and a specific board of directors (or trustees) oversees each fund (Gil-Bazo & Ruiz-Verdú, 2009; Tufano & Sevick, 1997); however, in China, mutual funds are not corporate entities but contract funds. In China, the contractual form of mutual funds provides investors with fewer voting rights and makes them prone to agency problems. These agency problems are severe in China because of the weak and unpredictable legal system and high information asymmetry (Huang & Wang, 2015). Chinese mutual funds are wholly managed by their funding companies.

[1] The United States had 26,708 funds at the end of 2009, of which 9713 funds were domestic equity funds, and if funds that invest less than 50% in common shares are excluded, the remaining funds still number 9204; in China, the number of actively managed equity funds numbered less than 350 in 2009 (Reid & Rea, 2003).

[2] QDII are approved to invest in allowable foreign securities markets but with a maximum investment limit of 50% of their net assets. QDII are not allowed to invest more than 5% of their net value in a single stock.

Second, mutual fund investors in the United States are fund shareholders; they invest and own shares that signify a portion of their holdings, and their interests are looked after by a board of directors. In contrast, Chinese mutual fund investors are the beneficiaries, not the shareholders, of funds, and their interests are not represented properly by a board of directors. Third, in U.S. mutual funds, the fees are relatively flexible, the board of directors negotiates management fees, and those fees fluctuate according to market competition and fund performance. The management fee at all Chinese equity funds has been fixed at 1.5% of total assets under management since 2002, so management fees do not reveal much about the mutual fund's performance. Fourth, in the United States, mutual funds are distributed by various channels, including (1) The direct channel; (2) the advice channel; (3) retirement plans channel; (4) supermarkets channel; and (5) Institutional channel (Jiang, Laurenceson, & Tang, 2008). However, Chinese mutual funds are distributed mostly by commercial banks and securities companies. Insurance firms have very little role in distribution (Jun, Li, & Shi, 2014). Fifth, the turnover among Chinese fund managers is nearly three times that of their U.S. counterparts. The high turnover among Chinese fund managers is largely due to high labor competition and the incentive structure of asset management companies. Finally, the Chinese government exercises greater influence over the mutual fund industry than is the case in the United States. The China Securities Regulatory Commission (CSRC) is more powerful and more involved in the regulation of the mutual fund industry than is the U.S. Securities and Exchange Commission (SEC). For example, considerable differences exist with regard to approving the establishment of an asset management company (Articles 13 and 14 of CSRC), launching new mutual funds (Article 40), approving the higher management of asset management companies (Article 17), and canceling the license of an asset management company if required (Article 21). Moreover, the Chinese government exercises direct or indirect control over almost all asset management companies (Gil-Bazo & Ruiz-Verdú, 2009).

## 3. Data

This study analyzes persistence over a one-year frequency. Portfolios are sorted after observing their performance for an initial 12 months and for the next 12 months, for two reasons. First, most studies find persistence over a period of one year, and, second, fund managers and investors tend to evaluate performance of mutual funds over annual time periods.

We use data from the RESSET Financial Database.[3] We use data only for the period January 2004 to December 2014. The initial sample comprised 816 funds. Index funds, QDII funds, and conservative allocation funds are excluded, and only actively managed funds are studied. Principal guaranteed funds are also omitted, as they invest heavily in fixed-income securities and bonds. The second reason for dropping principal guaranteed funds is that when the regression is run only for them, the beta is 0.149, which is very low for a study of equity funds. Such a lower beta shows that principal guaranteed funds have very low risk; their return is not much correlated with the movement of stock exchange and they invest heavily in fixed yield securities or bonds. All the data is in Chinese Renminbi. Like other studies (e.g., Jun et al., 2014; Olivier & Tay, 2009), we study only equity funds that have data for at least 24 months in order to investigate risk-adjusted CAPM and Carhart four-factor model results. After subtracting the funds as described above, the final sample totals 520 equity mutual funds. We study data from 2004, prior to the non-tradable shares reform, when only a limited number of stocks in the Chinese market were available for trading (Chen & Xiong, 2001; Jiang et al., 2008) and only a few equity funds were available on the Chinese market (Tang et al., 2012).

The extensive sample in this study has the following two advantages: it comprises an extended period from 2004 to 2014, which also includes the financial crisis in 2008, and it is free of survivorship bias,[4] as it includes all mutual funds that became inactive or closed during the period of the study.

The summary statistics on equity funds in China, from 2004 to 2014, are listed in Table 1. From 68 funds in 2004, the number of funds increased to 516 in 2014. Mutual fund companies grew from 33 in 2004 to 70 in 2014. At the beginning of 2004, the total net assets (TNA) of equity funds were RMB 139 billion, and by the end of 2014, TNA had increased to RMB 1.09 trillion, with a peak in 2007 of RMB 2.55 trillion, a compound annual growth rate of 20.6%.[5] The TNA of equity funds show the robust growth before the financial crisis of 2008. The annual return is the dividend adjusted return, net of operating expenses. The compounded annual return is 15.82%, with the highest (120%) in 2007 and the lowest (−49.79%) in 2008. The cross-sectional standard deviation of annual returns varies considerably from year to year, with the highest (37.03%) in 2007 and the lowest (12.37%) in 2004. High returns and volatility in those returns indicates the high volatility in the Chinese market, particularly in 2007 and 2008. To illustrate a general view of volatility in the Chinese stock market, we list the market capitalization

[3] The RESSET database (www.resset.cn) is a widely cited professional financial database designed by experts at Peking University, Tsinghua University, and the London School of Economics. Oriented toward empirical research, it uses the standards of well-known international databases and takes into account China's financial environment. The high accuracy of RESSET data is ensured by logical testing and multiple comparisons among and within tables. In computing derived indices, it follows the procedures applied by well-known international databases such as that of the Center for Research in Security Prices (CRSP).

[4] In empirical asset pricing research, survivorship bias is a big problem. When inactive or closed funds are excluded, asset returns show an upward bias. Funds that are about to close show lower returns; otherwise they remain open. Their omission leads to upward bias in asset returns (Brown & Goetzmann, 1995).

[5] In the United States, the compound annual growth rate of equity mutual funds is 16% from 1980 to 2008 (Wahal & Wang, 2011). Jun et al. (2014) report a compound annual growth rate of 52.4% in the Chinese market from 2004 to 2009.

Table 1
Descriptive statistics. This table tells the summary statistics of Chinese actively managed equity funds at the end of every year from 2004 to 2014. Annual growth in TNA (Total Net Assets) and Average TNA are reported in columns 5 & 6 respectively. Annual return is dividend adjusted raw return and net of all operating expenses. The standard deviation of fund return is the annualized standard deviation of the sample funds at the end of each year based on monthly returns after dividend adjustments for the past 12 months. To show general volatility in Chinese stock market, in last two columns, we present the annual stock market return and the annualized standard deviation of daily Chinese stock market return.

| Year | Number of funds | Number of mutual fund companies | Total net assets (TNA) (billions) | Annual growth in TNA (%) | Avg total net assets (billions) | Annual return of funds (%) | Std. dev of fund return (annualized) (%) | Stock market return (%) | Std. dev of market return (annualized) (%) |
|---|---|---|---|---|---|---|---|---|---|
| 2004 | 68 | 33 | 139 | 187.78 | 2.04 | 1.31 | 12.3 | −14.99 | 20.88 |
| 2005 | 94 | 45 | 134 | −3.6 | 1.43 | 3.44 | 14.42 | −6.76 | 22.58 |
| 2006 | 150 | 50 | 404 | 201.49 | 2.75 | 117.87 | 23.96 | 107.62 | 23.59 |
| 2007 | 215 | 56 | 2550 | 531.19 | 11.9 | 120.56 | 37.03 | 131.96 | 35.82 |
| 2008 | 261 | 59 | 1130 | −55.69 | 4.34 | −49.79 | 28.46 | −64.28 | 46.68 |
| 2009 | 321 | 60 | 1740 | 53.98 | 5.43 | 65.58 | 28.31 | 89.79 | 30.67 |
| 2010 | 380 | 60 | 1620 | −6.9 | 4.28 | 4.18 | 19.13 | −7.47 | 23.33 |
| 2011 | 451 | 64 | 1240 | −23.46 | 2.76 | −23.72 | 16.28 | −23.27 | 19.58 |
| 2012 | 514 | 70 | 1230 | −0.81 | 2.39 | 5.01 | 19.81 | 4.83 | 19.02 |
| 2013 | 519 | 70 | 1190 | −3.25 | 2.3 | 15.87 | 19.33 | 3.51 | 18.97 |
| 2014 | 516 | 70 | 1090 | −8.4 | 2.12 | 24.34 | 16.84 | 49.14 | 17.31 |

weighted annual returns and annualized daily standard deviation of daily stock market returns in columns 9 and 10 of Table 1. The stock market return is the highest in 2007, at 113.96%, and the lowest in 2008, at −64.28%.

## 4. Discussion of results

### 4.1. Performance analysis

We investigate the performance of equally weighted portfolios of Chinese mutual funds using CAPM and the Carhart four-factor model. In CAPM, the monthly returns on an equally weighted portfolio of equity funds are regressed on the monthly return on the market portfolio (benchmark market return). The intercept, which is also known as Jensen's alpha (Jensen, 1968) shows that the fund outperformed the benchmark market. If this alpha is significant and positive, it means that mutual funds have achieved a better return than the benchmark market, and if it is significant and negative, it implies that mutual funds have achieved a lower return than the benchmark market.

Following is the CAPM regression equation that we run for 520 equity mutual funds:

$$R_{it} - R_{ft} = \alpha_i + \beta_i\left(R_{mt} - R_{ft}\right) + e_{it} \quad (1)$$

where $R_{it}$ is the raw return for find $i$ in month $t$, $R_{ft}$ is the risk-free rate in month $t$ (i.e., one-month deposit return rate in China), and $R_{mt}$ is the market return in month $t$ (i.e., dividend adjusted market capitalization weighted monthly return on China's A-share stock market index). $\alpha_i$ indicates the outperformance of fund $i$, and $\beta_i$ is the beta, which shows the sensitivity of the fund's return to the stock market return. $e_{it}$ is an error term.

The Carhart four-factor model, the extension of the Fama-French three-factor model, is more advanced than CAPM, and it has become the standard model for analyzing the performance of mutual funds in the finance literature. In addition to SMB and HML factors in the Fama-French three-factor model, Carhart introduces the momentum (PR12m) factor. Following is the regression equation of the Carhart four-factor model, which we run for 520 equity funds for the period January 2004 to December 2014:

$$R_{it} - R_{ft} = \alpha_i + \beta_0\left(R_{mt} - R_{ft}\right) + \beta_{1i}\mathrm{SMB}_t + \beta_{2i}\mathrm{HML}_t + \beta_{3i}\mathrm{PR12m}_t + e_{it} \quad (2)$$

where $\alpha_i$ is Carhart's alpha for fund $i$; $R_{it}$ is the raw return of fund $i$ in month $t$, $R_{ft}$ is the risk-free rate in month $t$ (i.e., one-month deposit return rate in China), and $R_{mt}$ is the benchmark market return in month $t$ (i.e., dividend-adjusted market capitalization weighted monthly return on China's A-share stock market index); $\mathrm{SMB}_t$ is the difference in return between a portfolio of small-cap stocks and a portfolio of large-cap stocks in month $t$; $\mathrm{HML}_t$ is the difference in return between a portfolio with high book-to-market stocks and a portfolio of low book-to-market stocks in month $t$; $\mathrm{PR12m}_t$ is the return difference between a portfolio of past one-year-winner stocks and a portfolio of past one-year-losers in time $t$; $e_{it}$ is an error term.

We get the factors SMB, HML, and PR12m from the RESSET financial database. To get the SMB factor, all stocks are sorted according to last year's size. The top 30% comprise the large-cap portfolio and the bottom 30% the small-cap portfolio. The market-capitalization weighted-return difference between the large cap and small cap portfolios provides the SMB factor. In the same way, to calculate HML factor, we rank all stocks according to last year's book-to-market value. The top 30% is assigned the portfolio with a high book-to-market value and the bottom 30% comprises the portfolio with a low book-to-market value. Their market-capitalization weighted-return difference provides the HML factor. To obtain the PR12m factor, all stocks are sorted on the basis of their previous 12-month returns. The market-capitalization weighted average of companies with the highest 30% 12-month returns lagged one month minus the market capitalization weighted average of companies with the lowest 30% 12-month returns lagged one month gives the PR12m factor.

Regression results of equations (1) and (2) are presented in Table 2. In a year-by-year analysis, we follow the methodology of Lai and Lau (2010) and mutual funds with 12 months of observations are used. For the analysis over a period of three years, mutual funds with 36 months of observations are used. The CAPM results in Table 2 indicate that Chinese equity mutual funds outperform the market, as alphas in column 2 of Table 2 are positive in most years. The overall CAPM alpha is 0.0021 and significant, which shows that Chinese equity funds beat the market. We examine the fund performance over a three-year horizon and a one-year horizon. In panel B of Table 2, the CAPM alpha is positive, which shows the outperformance of equity funds over the three-year investment horizon. Panel C shows the fund performance over the one-year investment horizon. In panel C, the CAPM alpha is positive in all the years except 2009, 2011, and 2014, which means that Chinese equity funds beat the benchmark market in most years. The overall beta in the CAPM results is 0.7408, which is less than 1. This implies that Chinese equity funds are less risky than the market.

Table 2 also indicates the regression results of the Carhart four-factor model. The overall Carhart alpha for Chinese equity mutual funds is 0.0025, which is positive, indicating outperformance by Chinese equity funds. This shows that Chinese equity funds beat the market. In panels B and C, the Carhart alpha is also positive in most years, which shows the outperformance by Chinese funds. Our findings are similar to those by Tang et al. (2012) and Kiymaz (2015), in which they also show that Chinese equity funds outperform the market. However, this finding of outperformance by equity funds is in

Table 2
Investigation of Chinese equity funds performance. Regression results of CAPM and Carhart 4-factor model are presented in this table. Columns 2 & 3 present the CAPM alpha and beta respectively. Column 5 reports the Carhart alpha. RMRF is the excess market return from the risk free rate. SMB factor is the return difference between portfolio of small cap stocks and portfolio of large cap stocks. HML factor is the difference of return between portfolio of stocks with high book to market value and portfolio of stocks having low book to market value. PR12m is the difference of return between portfolio of previous year's winner stocks and portfolio having previous year's loser stocks. Panel A presents the overall results. Panels B and C show the funds' performance over the investment horizon of 3 years and 1 year respectively. $R^2$ of CAPM and Carhart model is presented in columns 4 & 10 respectively. ***, **, * indicate the significance at 1%, 5% and 10% level respectively.

| Classification (year) | CAPM | | | Carhart 4-factor model | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Alpha | Beta | $R^2$ | Alpha | RMRF | SMB | HML | PR12m | $R^2$ |
| *Panel A* | | | | | | | | | |
| Overall | 0.0021*** | 0.7408*** | 0.7184 | 0.0025*** | 0.7614*** | −0.0191*** | −0.3355*** | 0.1100*** | 0.7500 |
| | (11.61) | (263.78) | | (12.43) | (273.29) | (−2.85) | (−37.51) | (29.01) | |
| *Panel B − 3 year basis* | | | | | | | | | |
| 2004–2006 | 0.0105*** | 0.6790*** | 0.7496 | 0.0099*** | 0.6005*** | −0.1224**** | −0.4261*** | 0.2830*** | 0.7932 |
| | (18.98) | (78.14) | | (21.4) | (71.69) | (−6.37) | (−12.18) | (13.87) | |
| 2007–2009 | 0.0064*** | 0.7533*** | 0.782 | 0.0103*** | 0.7426*** | −0.0414*** | −0.1216*** | 0.1872*** | 0.7879 |
| | (12.27) | (179.67) | | (15.09) | (171.78) | (−3.53) | (−6.23) | (13.05) | |
| 2010–2012 | 0.0004* | 0.7709*** | 0.7441 | −0.0014*** | 0.7487*** | −0.0494*** | −0.4584*** | 0.0513*** | 0.8031 |
| | (1.61) | (193.28) | | (−6.47) | (181.07) | (−5.74) | (−59.03) | (21.98) | |
| 2013–2014 | 0.0013*** | 0.6585*** | 0.4743 | 0.0033*** | 0.8297*** | −0.1438*** | −0.5678*** | 0.1352*** | 0.5981 |
| | (4.25) | (81.5) | | (8.16) | (113.32) | (−9.31) | (−37.77) | (16.43) | |
| *Panel C − 1 year basis* | | | | | | | | | |
| 2004 | 0.0079*** | 0.5648*** | 0.7098 | 0.0098*** | 0.7025*** | −0.5506*** | 0.0507 | −0.1787** | 0.7869 |
| | (8.97) | (36.36) | | (11.68) | (35.36) | (−9.32) | (0.79) | (−2.42) | |
| 2005 | 0.0041*** | 0.4890*** | 0.5169 | 0.0025*** | 0.5751*** | −0.6476*** | −0.8672*** | 0.0787*** | 0.8239 |
| | (4.51) | (29.81) | | (4.63) | (58.67) | (−32.01) | (−19.58) | (4.3) | |
| 2006 | 0.0114*** | 0.7193*** | 0.7185 | 0.0128*** | 0.6447*** | −0.0788*** | −0.4694*** | 0.1682*** | 0.7284 |
| | (10.42) | (53.91) | | (11.27) | (37.27) | (−2.99) | (−7.01) | (4.44) | |
| 2007 | 0.0144*** | 0.7679*** | 0.5224 | 0.0159*** | 0.7995*** | −0.0720* | −0.1892** | 0.0633* | 0.5371 |
| | (7.89) | (69.01) | | (7.9) | (55.29) | (−1.87) | (−2.4) | (1.79) | |
| 2008 | 0.0006 | 0.6741*** | 0.8084 | −0.0028*** | 0.6631*** | 0.1680*** | −0.1657*** | 0.0349 | 0.8265 |
| | (0.81) | (100.33) | | (−3.67) | (95.56) | (15.05) | (−8.67) | (1.44) | |
| 2009 | −0.0042*** | 0.8289*** | 0.8793 | 0.0057*** | 0.7887*** | −0.1637*** | −0.1585*** | 0.2152*** | 0.8884 |
| | (−6.39) | (118.42) | | (5.78) | (95.99) | (−8.72) | (−6.25) | (15.62) | |
| 2010 | 0.0065*** | 0.6691*** | 0.7007 | −0.0071*** | 0.7271*** | −0.0631*** | −0.6713*** | 0.0677*** | 0.7640 |
| | (14.06) | (96.3) | | (−12.94) | (109.26) | (−4.13) | (−33.56) | (20.21) | |
| 2011 | −0.0020*** | 0.8803*** | 0.7288 | −0.0013*** | 0.8295*** | −0.2138*** | −0.4578*** | 0.1023*** | 0.8093 |
| | (−5.55) | (130.91) | | (−3.48) | (92.68) | (−9.34) | (−34.03) | (9.62) | |
| 2012 | 0.00006 | 0.7853*** | 0.7815 | 0.0028*** | 0.7565*** | −0.0902*** | −0.4982*** | −0.0462*** | 0.8165 |
| | (0.17) | (134.52) | | (8.55) | (117.16) | (−6.64) | (−33.01) | (−3.89) | |
| 2013 | 0.0087*** | 0.7842*** | 0.6757 | 0.0074*** | 0.8234*** | −0.2141*** | −0.6330*** | 0.0522*** | 0.7474 |
| | (21.67) | (112.72) | | (9.04) | (68.47) | (−6.28) | (−29.52) | (5.31) | |
| 2014 | −0.0032*** | 0.5638*** | 0.2844 | −0.0023*** | 0.8641*** | −0.0894*** | −0.5146*** | 0.1793*** | 0.4105 |
| | (−5.59) | (33.13) | | (−3.96) | (57.73) | (−4.81) | (−22.32) | (13.17) | |

contrast to the findings by Hayat and Kraeussl (2011), who do not find any outperformance by equity funds. In the regression results of the Carhart model, the overall RMRF factor is 0.76, which shows that equity funds are less risky than the market. Regarding the SMB factor, we find few interesting results in 2008, the year of the financial crisis. The SMB factor is negative throughout the sample period except in 2008. The positive SMB factor in 2008 indicates that investors invest more in small stocks, keeping in mind that small stocks are not swayed much by a global financial crisis. The PR12m factor shows insignificant results only in 2008. The overall $R^2$ of the Carhart model is 0.7500, which is more than the overall $R^2$ of the CAPM (0.7184). This shows that the Carhart four-factor model explains the performance of mutual funds better.

Our findings about China corroborate previous studies on emerging economies. We find that Chinese equity funds outperform the market and have a beta of less than 1, which indicates that they are less risky than the market. Findings about beta are in line with the findings of Hayat and Kraeussl (2011), who also find a beta of less than 1 for equity funds, which means that equity funds are less risky than the market.

### 4.2. Persistence in performance

In this section, we investigate the persistence in performance of Chinese equity mutual funds. For this purpose, the sample is divided into 10 deciles, and equally weighted portfolios are computed on the basis of lagged one-year performance on January 1 of each year. We use reported returns on the basis of which portfolios are formed. Reported returns are net of all operating expenses. We observe the return on portfolios for 12 months and then rebalance the portfolio again. This procedure gives the time series of monthly returns on all 10 portfolios from 2004 to 2014. For additional detail, we further divide the top and bottom deciles into three portfolios. We use again the CAPM (eq. (1)) and Carhart four-factor model (eq. (2)) and run the ordinary least squares (OLS) regression.

Table 3 shows the regression results. The performance of mutual funds formed on the lagged one-year return shows variation in the mean returns of the top and bottom deciles, but this spread is not significant. The spread is only 2 basis points, which means an annualized spread of 0.24%. Moreover, the spread here is negative, which means that the bottom deciles give better returns than the top decile in the next year. The worst-performing funds of last year give better returns in the next year than the top-performing funds of last year. The subdivided portfolios show a comparatively wider spread, but again this spread is insignificant. The top decile (1A) gives lower returns than the bottom decile (10C), and the spread is 11 basis points, which means an annual difference in the return of 1.3%. The cross-sectional variation is higher in decile 1 than in decile 10. The variation in decile 1 is 18 basis points per month (72–90) whereas the spread in decile 10 is 12 basis points per month (76–88). The insignificant spread between the monthly excess returns of the top and bottom deciles indicates that Chinese equity mutual funds do not exhibit persistence in performance. Top-performing funds from last year fail to continue to perform better in the following year; similarly, the worst-performing funds also do not continue to perform worse in the following year.

The CAPM results show that all the deciles outperform the market, as CAPM alphas are positive for all the portfolios. The CAPM alphas indicate that the top and bottom deciles exhibit almost the same level of performance. The top decile shows an outperformance of 22 basis points whereas the bottom decile shows an outperformance of 23 basis points. The spread between the CAPM alphas of the top and bottom deciles is 1 basis point, and this spread is insignificant. The difference between the CAPM alphas of the top 30th (1A) and bottom 30th (10C) funds is only 3 basis points, and this difference is also insignificant. Like the results of raw monthly returns, CAPM results show that there is no persistence in the performance of Chinese equity mutual funds. The top- (worst-) performing funds of the previous year fail to continue to perform well (worse) in the following year. However, the CAPM betas of the top (1) and bottom (10) deciles are significantly different. The beta of the top decile (1) is 0.77, and that of the bottom decile (10) is 0.79. Moreover, the beta of the top 30th (1A) portfolio is 0.75, and the beta of the bottom 30th (10C) is 0.82. The spread in betas is negative, which means that funds in the bottom decile are more risky, as their betas are greater than the betas of the top-decile funds.

The Carhart four-factor model explains the pattern and differences in portfolios (deciles) better than the CAPM. It takes into account three more factors: size, book-to-market value, and momentum effect. The value of the adjusted $R^2$ is also bigger in the Carhart four-factor model than in the CAPM model, which means that the Carhart four-factor model explains performance better.

Table 3 shows that funds in the top decile invest more in small funds than do funds in the bottom decile. The spread of the HML factor indicates that top-decile funds invest more in stocks with a low book-to-market value. The PR12m coefficient shows that this momentum factor is highly positive and significant in top-decile funds whereas this momentum factor is highly negative and significant in bottom-decile funds. This means that returns at top-decile funds are strongly positively related to the one-year momentum factor and returns at bottom-decile funds are strongly negatively related to this factor. In the regression results of the Carhart four-factor model, the RMRF factor (beta) of the top (1) decile and bottom decile (10) show no significant difference. For both the top (1) and bottom (10) decile, the RMRF factor (beta) is 0.8, which means that both the top (1) and bottom (10) deciles expose their investors to the same level of risk. However, when we compare the top 30th (1A) and bottom 30th (10C) deciles, we found a significant difference between the RMRF factors (betas). The RMRF factor (beta) for decile 1A is 0.79 and for decile 10C it is 0.84, which implies that the bottom 30th decile (10C) is more risky than the top 30th (1A) decile. Table 3 shows that Carhart alphas for all the deciles are positive, which indicates that all the deciles outperform the market. The Carhart alpha for the top (1) decile is 0.0018, and for the

Table 3
Total funds are sorted on the basis of past one year performance and divided into ten deciles and then performance of deciles is watched over next 12 months. Portfolios are equally weighted as portfolios are readjusted accordingly when any fund disappears. Funds with highest return comprise the decile 1 and funds with lowest return make the decile 10. Deciles 1 and 10 are further subdivided into thirds. Column 2 shows the monthly excess return. Columns 4 and 5 show the alpha and beta of CAPM respectively. Column 7 shows the Carhart's alpha. RMRF, SMB and HML are the three factors of Fama-French model. PR12m is the momentum factor. The *t*-statistics are in parenthesis. ***, **, * indicate the significance at 1%, 5% and 10% level respectively.

| Portfolio | Monthly excess return | Std dev | CAPM | | | Carhart 4-factor model | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Alpha | Beta | Adj *R* sq | Alpha | RMRF | SMB | HML | PR12m | Adj *R* sq |
| 1A | 0.72% | 7.28% | 0.0019 | 0.7556*** | 0.6686 | 0.0013 | 0.7909*** | 0.0574** | −0.5471*** | 0.1754*** | 0.7569 |
| | | | (1.57) | (48.58) | | (1.19) | (56.62) | (2.13) | (−16.08) | (8.38) | |
| 1B | 0.90% | 7.23% | 0.0029*** | 0.7570*** | 0.6972 | 0.0027*** | 0.7861*** | 0.0393 | −0.4482*** | 0.1527*** | 0.7570 |
| | | | (2.51) | (53.33) | | (2.46) | (58.94) | (1.57) | (−13.78) | (7.39) | |
| 1C | 0.76% | 7.32% | 0.0019* | 0.7981*** | 0.7320 | 0.0014 | 0.8247*** | 0.0392 | −0.4261*** | 0.1612*** | 0.7881 |
| | | | (1.7) | (56.95) | | (1.36) | (63.05) | (1.56) | (−13.45) | (8.26) | |
| 1 | 0.79% | 7.27% | 0.0022*** | 0.7699*** | 0.6992 | 0.0018*** | 0.8003*** | 0.0451*** | −0.4728*** | 0.1630*** | 0.7667 |
| | | | (3.34) | (91.4) | | (2.91) | (102.82) | (3.04) | (−24.98) | (13.84) | |
| 2 | 0.70% | 6.92% | 0.0013** | 0.7326*** | 0.6925 | 0.0015*** | 0.7698*** | 0.0117 | −0.4806*** | 0.1144*** | 0.7574 |
| | | | (1.96) | (90.03) | | (2.46) | (101.47) | (0.81) | (−26.19) | (10.03) | |
| 3 | 0.68% | 6.79% | 0.0011* | 0.7452*** | 0.7425 | 0.0013** | 0.7721*** | −0.0039 | −0.3858*** | 0.1267*** | 0.7891 |
| | | | (1.88) | (101.71) | | (2.29) | (110.95) | (−0.29) | (−22.96) | (12.13) | |
| 4 | 0.62% | 6.59% | 0.0007 | 0.7376*** | 0.7687 | 0.0014*** | 0.7695*** | −0.0405*** | −0.4181*** | 0.1142*** | 0.8199 |
| | | | (1.26) | (109) | | (2.81) | (122.82) | (−3.38) | (−27.54) | (12.16) | |
| 5 | 0.69% | 6.63% | 0.0015*** | 0.7417*** | 0.7673 | 0.0019*** | 0.7650*** | −0.0282** | −0.3322*** | 0.1110*** | 0.8020 |
| | | | (2.78) | (108.77) | | (3.65) | (115.93) | (−2.23) | (−20.79) | (11.26) | |
| 6 | 0.77% | 6.94% | 0.0022*** | 0.7433*** | 0.7031 | 0.0023*** | 0.7646*** | 0.0041 | −0.3127*** | 0.1029*** | 0.7328 |
| | | | (3.55) | (92.33) | | (3.6) | (95.44) | (0.27) | (−16.11) | (8.61) | |
| 7 | 0.71% | 6.71% | 0.0016*** | 0.7564*** | 0.7785 | 0.0021*** | 0.7774*** | −0.0356*** | −0.2889*** | 0.0917*** | 0.8029 |
| | | | (2.93) | (112.49) | | (3.93) | (116.84) | (−2.8) | (−17.91) | (9.23) | |
| 8 | 0.83% | 7.73% | 0.0026*** | 0.7542*** | 0.5866 | 0.0030*** | 0.7779*** | −0.0242 | −0.3266*** | 0.1006*** | 0.6103 |
| | | | (3.13) | (71.25) | | (3.53) | (72.16) | (−1.19) | (−12.52) | (6.21) | |
| 9 | 0.76% | 6.83% | 0.0018*** | 0.7492*** | 0.7435 | 0.0025*** | 0.7727*** | −0.0431*** | −0.3036*** | 0.0836*** | 0.7679 |
| | | | (3.13) | (101.97) | | (4.28) | (105.36) | (−3.1) | (−17.09) | (7.57) | |
| 10 | 0.82% | 7.04% | 0.0023*** | 0.7878*** | 0.7792 | 0.0029*** | 0.8050*** | −0.0410*** | −0.2354*** | 0.0761*** | 0.7936 |
| | | | (4.23) | (112.65) | | (5.18) | (113.5) | (−3.04) | (−13.65) | (7.1) | |
| 10A | 0.76% | 6.84% | 0.0023** | 0.7618*** | 0.7627 | 0.0027*** | 0.7804*** | −0.0295 | −0.2568*** | 0.0781*** | 0.7805 |
| | | | (2.38) | (61.65) | | (2.76) | (62.62) | (−1.23) | (−8.47) | (4.2) | |
| 10B | 0.88% | 6.99% | 0.0025*** | 0.7761*** | 0.7850 | 0.0033*** | 0.7935*** | −0.0468** | −0.2258*** | 0.0647*** | 0.7975 |
| | | | (2.69) | (67.16) | | (3.41) | (67.44) | (−2.12) | (−7.87) | (3.55) | |
| 10C | 0.83% | 7.30% | 0.0022** | 0.8264*** | 0.7904 | 0.0028*** | 0.8422*** | −0.0465** | −0.2250*** | 0.0855*** | 0.8033 |
| | | | (2.27) | (66.63) | | (2.81) | (66.77) | (−1.92) | (−7.37) | (4.54) | |
| 1A−10C | −0.11% | 7.29% | −0.0003 | −0.0708*** | −0.1218 | −0.0015 | −0.0513*** | 0.1039*** | −0.3221*** | 0.0899*** | −0.0464 |
| | | | (−0.18) | (−3.56) | | (−1.00) | (−2.73) | (2.88) | (−7.05) | (3.2) | |
| 1−10 | −0.02% | 7.16% | −0.0001 | −0.0178* | −0.0800 | −0.0011 | −0.0047 | 0.0862*** | −0.2373*** | 0.0869*** | −0.0269 |
| | | | (−0.13) | (−1.63) | | (−1.34 | (−0.45) | (4.3) | (−9.27) | (5.46) | |

bottom (10) decile it is 0.0029. Like CAPM alphas, the Carhart alphas for the top and bottom deciles are not statistically different, which indicates the absence of persistence in the performance of Chinese equity mutual funds.

In Table 3, all three performance measures—raw monthly return, CAPM alphas, and Carhart alphas—show that Chinese equity mutual funds do not exhibit persistence in performance. Funds that were winners last year do not remain winners in following year; similarly, funds that were losers last year do not continue to be losers the following year. Our findings are similar to those by Huang and Mahieu (2012) and Vicente and Ferruz (2005), in which they also report the absence of persistence in the performance of Dutch and Spanish mutual funds, respectively. However, our results are in contrast to the studies of the United States by Bollen and Busse (2001), Hendricks et al. (1993), and Białkowski and Otten (2011), who find evidence of persistence in the performance of mutual funds. Similarly, our study findings are also in contrast to those of Heffernan (2001) and Keswani and Stolin (2006), who report persistence in the performance of UK equity funds.

The absence of persistence in the performance of Chinese equity mutual funds implies that the top-performing and worst-performing funds fail to continue their previous-year performance. As we do not find evidence of performance persistence in equity funds, it means that the efficient market hypothesis holds true for the Chinese market. This absence of persistence can be attributed to numerous factors. The first is diminishing investment opportunities for well-performing funds, a situation examined by Berk and Green (2004). Their point of view is that fund managers can exploit an investment opportunity only with a limited amount of money; otherwise, with a large flow of money, the market impact will become significant, and that investment opportunity might be arbitraged away. A second explanation is that good

performance often capitalizes into a rise in the management fee for fund managers. When the management fee is raised, fund managers have less incentive to exhibit superior performance. Moreover, fund managers may try to take advantage of their good reputation and move to a more rewarding job, such as at a hedge fund. Third, as the worst-performing funds last year perform better in the following year and come off the list of the worst-performing funds, it may be that asset management companies change fund managers or fund managers change their investment strategies to give better results to investors in the following year. The change of fund managers or change in investment strategy gives the worst-performing mutual funds the motivation to perform better the following year.

For robustness, we divide the funds into three equally weighted groups on the basis of the past one-year performance and then observe their performance for the next 12 months. We run an OLS regression for three groups and find qualitatively equivalent regression results that show the absence of persistence in the performance of Chinese equity mutual funds. These results are available upon request from the authors.

### *4.3. Characteristics of mutual fund portfolios*

Mutual fund managers assert that the management fee is directly proportional to the performance of a mutual fund. If a mutual fund has a higher management fee, that fund will give its investors a higher return. Several papers consider that giving a fee to a fund management company is justified on economic grounds. Deli (2002) shows evidence supporting the hypothesis that fees are set to offer fund managers proper performance incentives. He opines that managers are more likely to get high-level performance rewards if their marginal product and difficulty of analyzing performance are greater. He also gives statistics demonstrating that benefits arise from economies of scale, such as reduced operational costs as fund's size increases, and they are passed on to investors in the form of lower management expenses. Murphy (1998) proposes that it is optimal to compensate good performance at a higher marginal rate.

The relationship between the fund size and fund performance has also been the topic of discussion in finance literature. Larger funds are subject to the problems of high hierarchical and coordination cost, organizational structure friction, and liquidity restraints, which corrode their performance (Beckers & Vaughan, 2001; Chen, Hong, Huang, & Kubik, 2004). In smaller funds, it is easier for fund managers to persuade others to apply a new strategy to get better returns (Stein, 2002). Babalos et al. (2007) report the absence of economies of scale at large funds and show a negative relationship between fund size and performance.

In this section, we investigate the characteristics of different portfolios (deciles). Total net assets, management expense ratio, total expense ratios, and age are studied for ten deciles. For each year, we calculate the cross-sectional average for each decile portfolio of a fund's total net assets, management expense ratio, total expense ratio, and age in years.

In Table 4, the average portfolio characteristics indicate that the management expense ratio, total expense ratio, and fund age are related to portfolio performance. Top deciles have a lower management expense ratio and lower total expense ratio than bottom deciles. For the top decile, the management expense ratio is 1.33% and the total expense ratio is 2.52% whereas for the bottom decile, the management expense ratio is 1.50% and the total expense ratio is 2.78%. This shows that the expense ratio is negatively related to the fund's performance fund. This negative relationship between the expense ratio and fund performance is also seen in the studies by Carhart (1997) and Wongsurawat (2011) of the United States and Thailand, respectively. Our findings about expense ratios are similar to those by Carhart (1997), who also finds the predictive power of expense ratios for future fund performance. Moreover, the top deciles are younger in age than the bottom deciles. However, it does not become clear that total net assets (size) explain the difference in portfolio performance as total net assets show no significant difference between the top and bottom deciles.

## 5. Conclusion

Despite strong growth in the Chinese mutual fund industry, little is known about persistence in the performance of mutual funds in China. Thus, this study sheds light on Chinese equity funds, which is a large market. Stock markets in China are highly volatile, and Chinese investors are very vulnerable to stock market variations (Chen & Xiong, 2001). Individual

Table 4
Ten deciles are formed after sorting mutual funds annually for the period from 2004 to 2014 on the basis of lagged one year return. Decile 1 comprises those mutual funds that have highest lagged one year return and decile 10 consists of those mutual funds that have lowest lagged one year return. Deciles 1 and 10 are further divided according to the same procedure. TNA is total net assets in billion and expense ratios are expenses divided by average TNA. Average age of decile is presented in last column.

| Decile | Average annual decile characteristics | | | |
|---|---|---|---|---|
| | TNA (RMB billions) | Management expense ratio | Total expense ratio | Age (years) |
| 1A | 8.03 | 1.24 | 2.48 | 14.30 |
| 1B | 2.09 | 1.27 | 2.69 | 15.18 |
| 1C | 3.03 | 1.47 | 2.40 | 14.86 |
| 1(high) | 4.38 | 1.33 | 2.52 | 14.78 |
| 2 | 3.99 | 1.42 | 2.64 | 15.09 |
| 3 | 3.44 | 1.44 | 2.70 | 15.25 |
| 4 | 3.83 | 1.48 | 2.73 | 15.46 |
| 5 | 3.96 | 1.52 | 2.78 | 15.36 |
| 6 | 3.82 | 1.51 | 2.71 | 15.66 |
| 7 | 3.55 | 1.46 | 2.69 | 15.97 |
| 8 | 3.81 | 1.48 | 2.76 | 15.65 |
| 9 | 3.47 | 1.48 | 2.73 | 15.57 |
| 10(low) | 3.01 | 1.50 | 2.78 | 15.51 |
| 10A | 2.28 | 1.52 | 2.83 | 15.99 |
| 10B | 3.55 | 1.50 | 2.68 | 15.73 |
| 10C | 3.2 | 1.48 | 2.83 | 14.81 |

domestic investors dominate the trading of stocks in China, in contrast to developed countries. These facts make it attractive to do research on equity funds in China.

We use the CAPM and Carhart four-factor model to examine persistence in the performance of equity funds. Like Tang et al. (2012), Chi (2013), and Kiymaz (2015), we also find that equity funds outperform the market in China. One possible explanation for this outperformance may be that institutional investors, who are seen as informed investors, exploit the uninformed individual investors, whose trade comprises the majority of trade volume in Chinese stock exchanges. Furthermore, unlike findings for the United States, this study does not find any evidence of persistence in the performance of Chinese equity funds. Equity funds that perform well (worse) in the past year do not continue to perform well (worse) in the following year. Top-performing funds are younger and have lower expense ratios than the worst-performing funds. However, the size (TNA) of top-performing and worst-performing funds has no significant difference.

As an empirical study on the Chinese mutual fund market, this study offers specific insights, which is useful for international investors. Investors do well if they invest in equity funds instead of index funds, as the results demonstrate that equity funds in China beat their benchmark market. The absence of persistence in the performance of equity funds implies that the strategy of buying funds that were winners last year and selling funds that were losers the previous year does not seem to be profitable in China. However, a worthwhile avenue for further research is examining whether findings observed in this paper hold true in other emerging markets.

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