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Understanding emerging market equity mutual funds: The case of China

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Abstract

Investing in emerging equity markets is always a challenge to individual investors, even though the growth potential of these markets is attractive because of their fast economic development. This paper contributes to individual investment by investigating the characteristics of the Chinese stock market through a study of the Chinese equity funds. We find these Chinese funds outperform the stock market benchmark significantly with their Sharpe ratio values; but when performance is measured by asset pricing models, the evidence fades. In addition, larger funds outperform small or medium sized funds, regardless of the model and measurement selection. Our results suggest individual investors should favor actively managed equity funds when total-risk adjusted return is a concern and they should choose indexed funds if market-risk adjusted return is the objective. Investors should generally prefer larger equity funds over smaller funds when investing in the Chinese stock market.

JEL classification: G12; G15

Keywords: Mutual fund performance; Emerging markets

1. Introduction

More and more individual investors now realize that they are living in a global economy and their investment universe is no longer their home country or just the developed countries. Following the action of institutional investors, they must give greater attention to the emerging markets, especially those with robust economic growth potential such as China.

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The rapid growth of the GDP shares of emerging markets makes a strong argument for higher asset allocation in these countries (El-Erian 2008).

On the other hand, individual investors often do not have the support of a capital intensive R&D department or sophisticated empirical modeling. It is easy for investors to get lost in the large amount of market data and the number of financial products offered by the financial industry. A greater understanding of emerging markets becomes a critical task for individual investors.

This paper fills the gap by investigating the characteristics of Chinese equity mutual funds. Becoming one of the most prosperous countries in the last few decades, China surpassed Japan to become the second largest economy by GDP in 2010 (IMF data). The annual nominal GDP compound growth rate in Chinese currency was 14.3%, 14.0%, and 9.9% for the periods 1980–2010, 1990–2010, and 2000–2010, respectively. The compound GDP growth rate in the United States for the same periods was 5.7%, 4.7%, and 3.8%, respectively (Bureau of Economic Analysis). The Chinese stock market started from a few listed companies in the early 1990s to about two thousand companies in 2010. The Chinese mutual fund industry also prospered during this period. There were only 49 closed-end funds in China when the first open-end fund was created in September 2001. Open-end funds have experienced more rapid growth than closed-end funds, especially since the Law of the People's Republic of China on Securities Investment Fund was enacted in November 2003. By March 2008, the total number of both funds had risen to 392, with 357 (91%) of them being open-end funds. The mutual fund industry had USD 468 billion under management of which 94% were in open-end funds. Open-end funds have dominated the Chinese mutual fund market by both the number of the funds and the value of their assets under management (AUM) since late 2003. The number of closed-end funds has declined since 2006 with some of the closed-end funds changing their status to open-end funds to attract business.

Our focus on equity mutual funds (open-end) meets the investment needs of individual investors because it is almost impossible for them to research individual Chinese stocks that operate under a different accounting and legal environment. Equity mutual funds may also help diversify firm-specific risk. Our research addresses three major investment questions that investors face when investing in the Chinese equity mutual funds: (1) Should they choose indexing or actively managed funds? Do actively managed Chinese equity mutual funds outperform the stock market index? (2) Should individual investors favor larger equity funds or smaller funds? Or does equity fund size matter? and (3) Should individual investors favor winner funds? Or does the performance of the Chinese equity mutual fund persist?

The paper proceeds as follows: The next section reviews related literature, the third section describes our data and methodologies, the fourth section presents the test results, and the last section summarizes the findings.

2. Literature review

Indexing or actively managed mutual funds? This is the first decision an individual investor has to make. However, there are mixed empirical results on this question for both

United States and international funds. Most scholars agree that mutual funds, in aggregate, either underperform or deliver a return similarly to market benchmarks. For example, Henriksson (1984), Chang and Lewellen (1984), and Fama and French (2010) find U.S. mutual funds, on average, earn a market level of gross return to cover their expenses. When using mutual fund returns net of expenses, Carhart (1997), Wermers (2000), Cuthbertson et al. (2008), and Fama and French (2010) further confirm the underperformance of the U.S. mutual fund industry in comparison to the stock market. Underperformance evidence is also found in other countries, for example in the studies of U.K. equity funds by Cuthbertson et al. (2008) and Cuthbertson et al. (2010), and in a study of Hong Kong equity funds by Abdel-Kader and Qing (2007).

Other researchers offer opposite evidence. Treynor and Black (1973), Ippolito (1989), and Kon and Jen (1979) find that U.S. mutual funds, on average, outperform the market. In addition, Otten and Bams (2002) finds that mutual funds, especially small cap funds, from six European countries are able to beat the benchmark's performance and add value to investors. Shah and Hijazi (2005) finds that Pakistan mutual funds overall outperform their market proxy. Although Fortin and Michelson (1999, 2002) report that index funds outperform actively managed funds for most equity and all bond fund categories on both before-tax and after-tax bases, they find that actively managed Small Company Equity funds and International Stock funds significantly outperformed the index over most of the study period. In a later study, Fortin and Michelson (2005) finds that it is beneficial to select actively managed international mutual funds over index funds. However, little research has been done on one of the most prospering emerging markets: China.

The effect of size on mutual fund performance is an important topic to individual investors since the information of the size of a fund is available. Research has found that in the U.S. large funds underperform mid and small funds. For example, Chen et al. (2004) concludes that actively managed funds' returns decline with lagged fund size; Grinblatt and Titman (1989) finds that small funds outperform other funds and beat the market. However, this question has not been addressed for the international fund market.

Should individual investors chase fund winners? Performance persistence is always important to investment decisions. Sharpe (1966) and Hendricks et al. (1993), among others, document performance persistence in losers. On the other hand, evidence of outperformance persistence is provided by Grinblatt and Titman (1992), Droms and Walker (2001), and Huij and Verbeek (2007). A third group of research papers find persistence in both fund losers and winners. Examples include Otten and Bams (2002) on European equity funds, Abdel-Kader and Qing (2007) on Hong Kong equity funds, and Fama and French (2010) on U.S. equity funds. All of these studies agree that the persistence in fund performance, if it exists, can last in a time ranging from a few months to three years. Contrary to the above findings, Jensen's (1968) study on U.S. equity funds finds that funds' performances do not persist. However, little research on persistence in emerging markets has been done. The growing demand for emerging market investments requires additional research on a market that has great potential for sustainable returns. Our study contributes to the literature by providing performance evidence on the Chinese equity mutual fund market.

3. Data and methodology

3.1. Data

There were 330 open-end mutual funds managed by 59 fund families in China at the end of 2008. Our sample includes all equity funds that had at least two years of Net Asset Value (NAV) data at the end of 2008. The descriptive statistics of the sample, 159 Chinese equity funds, is reported in Table 1. Our sample period covers January 2003 to December 2008. A value-weighted Chinese stock market benchmark index was constructed using all A shares (1,574 stocks at the end of 2008, float value-weighted) traded on the Shanghai or Shenzhen stock exchange. All mutual fund data were extracted from the CCER database. Each fund's investment type was double checked with another database WIND.[1] Following other studies on the Chinese financial markets, we use three-month CD rates as our proxy for risk-free rates because there is not a very liquid Treasury bond market in China. Exchange rate data are from The People's Bank of China, and the S&P 500 data are from Standard & Poor's. There is no survivor bias problem in our sample since all Chinese open-end funds were in operation by the end of 2008.

Table 1 summarizes the annual sample statistics for Chinese equity mutual funds. To be included in the sample in year t, a fund must have year-end AUM data for year t-1 and have no missing monthly NAV data for the whole year t. According to Panel A and Panel B, the number of mutual funds increased from 12 in 2003 to 159 in 2008 with a compounded annual growth rate of 67.7%, while the total AUM increased from RMB 20 million in 2003 to RMB 733 million in 2008 with a compounded annual growth rate of 104.6%. Since the RMB appreciated against the USD during the sample period, the annual compounded growth rate of total AUM in USD was 112.4%. Because China's stock market peaked in the last quarter of 2007 then plummeted more than 50% in 2008, mutual funds' total AUM in 2008 was severely affected and was worth less than half of its 2007 level. If the time frame is narrowed to the period of 2003 to 2007, the annual compounded growth rate of AUM increases to 201.1% in RMB, or 210.6% in USD.

The average mutual fund size varied from USD 156 million to USD 251 million for the period 2003 through 2006 with an annual standard deviation that ranged from USD 93 million to USD 359 million. The mean fund size exploded to USD 1,277 million in 2007 then dropped to USD 557 million by the end of 2008, while the standard deviation went up to USD 1,096 million then down to USD 479 million. Variation in fund size is considerable: the smallest fund size (AUM) was 8 to 11 million USD from 2006 to 2008 while the largest fund size was more than 2 billion USD during the same period. This large variation in fund size requires an investigation of the size effect on fund performance.

Panel C reports the sample statistics for the Chinese mutual funds' annual returns. The Chinese stock market experienced tremendous growth in 2006 and 2007 with a benchmark return of 151.3% and 255.7%, respectively. However, the average annual returns for equity funds are 102.2% and 90.2% for these two years, which do not beat the benchmark. In years with a declining or stagnant market (2003, 2004, 2005, and 2008), they, on average, outperform the benchmark.

Using average monthly returns on Chinese equity funds as a proxy, Panel D reports that

Table 1 Mutual fund sample statistics

Panel A: Fund size (in millions of RMB)

Year	Number of funds	Mean	Median	Max	Min	SD	Total assets under management
2003	12	1,704	1,449	2,932	564	768	20,449
2004	34	1,289	1,174	3,552	269	862	43,817
2005	68	1,628	1,143	7,180	223	1,614	110,724
2006	101	2,077	980	17,209	62	2,974	209,822
2007	159	10,567	8,012	41,435	77	9,072	1,680,170
2008	159	4,609	3,464	19,569	91	3,963	732,907

Panel B: Fund size (in millions of USD)

Year	Number of funds	Mean	Median	Max	Min	SD	Total assets under management	Exchange Rate
2003	12	206	175	354	68	93	2,471	8.2766
2004	34	156	142	429	32	104	5,294	8.2765
2005	68	197	138	867	27	195	13,720	8.0702
2006	101	251	118	2,079	8	359	26,870	7.8087
2007	159	1,277	968	5,006	9	1,096	230,015	7.3046
2008	159	557	419	2,364	11	479	106,852	6.8591

Panel C: Annual return (%)

Year	Number of funds	Mean	Median	Max	Min	SD	Benchmark return[a]	S&P 500 total return
2003	12	17.7	17.1	24.1	11.4	3.4	3.6	28.7
2004	34	1.0	1.1	17.2	−10.4	6.5	−8.3	10.9
2005	68	2.3	2.7	16.6	−18.3	5.9	−1.4	4.9
2006	101	102.2	101.4	168.9	−2.3	26.8	151.3	15.8
2007	159	90.2	82.2	304.1	7.3	43.1	255.7	5.5
2008	159	−33.8	−32.1	−12.0	−68.3	12.8	−54.7	−37.0

Panel D: Correlation

	China equity fund	China stock market	S&P 500
Chinese equity fund	1	0.81	0.20
Chinese stock market	0.81	1	0.10
S&P 500	0.20	0.10	1

This table reports the annual sample statistics for the Chinese mutual funds. To be included in the sample in year t, a fund must have year-end Assets under Management (AUM) data for year t-1 and have no missing monthly Net Asset Value (NAV) data for the whole year t. A fund must have at least 24 months NAV data too. Panel A presents year-end fund AUM (size) in millions of RMB, the local currency, and Panel B translates the RMB values of the AUM in Panel A into USD values with year-end exchange rate. Panel C reports the sample statistics for the mutual funds' annual returns. Panel D provides the results of the pair-wise correlations between the Chinese equity funds, the Chinese stock market and the U.S. stock market using monthly returns.

[a]Benchmark: A value-weighted Chinese stock market portfolio. *Data source: Mutual fund data are from CCER and WIND. Exchange rate data are from The People's Bank of China. S&P 500 data are from Standard & Poor's.*

Table 2 Monthly portfolio return descriptive statistics

Panel A: Whole sample period (72 months, January 2003 to December 2008)

	Mean	Median	Max	Min	SD	Skewness	Kurtosis
VW stock portfolio	2.379	2.747	33.565	−23.801	10.246	0.152	3.670
EW stock portfolio	1.400	1.255	33.630	−24.711	11.207	0.255	3.467
VW fund portfolio	1.801	2.201	16.859	−10.525	5.986	0.197	3.040
EW fund portfolio	1.704	2.113	14.978	−10.043	5.733	0.123	3.017

Panel B: First half sample period (36 months, January 2003 to December 2005)

	Mean	Median	Max	Min	SD	Skewness	Kurtosis
VW stock portfolio	−0.031	−0.318	10.013	−10.632	5.557	0.130	2.299
EW stock portfolio	−0.985	−2.272	15.590	−12.374	6.722	0.489	2.675
VW fund portfolio	0.572	1.587	7.491	−8.311	3.549	−0.350	2.617
EW fund portfolio	0.613	1.514	7.295	−8.672	3.566	−0.408	2.732

Panel C: Second half sample period (36 months, January 2006 to December 2008)

	Mean	Median	Max	Min	SD	Skewness	Kurtosis
VW stock portfolio	4.789	4.822	33.565	−23.801	13.043	−0.320	2.795
EW stock portfolio	3.785	4.840	33.630	−24.711	14.067	−0.188	2.680
VW fund portfolio	3.029	2.981	16.859	−10.525	7.549	−0.149	2.218
EW fund portfolio	2.796	2.367	14.978	−10.043	7.177	−0.170	2.256

This table reports the descriptive statistics for the monthly returns of the value-weighted stock portfolios, equal-weighted stock portfolios, value-weighted fund portfolios, and equal-weighted fund portfolios. All data are in percentage.

the correlation between the Chinese equity fund returns and the U.S. stock market returns is 0.2, whereas the correlation between the Chinese stock market and the U.S. stock market is only 0.1. This implies that individual investors can potentially benefit from investing in the Chinese stock market, and Chinese local equity funds are good vehicles for such investments.

Table 2 reports more detailed descriptions on monthly returns of mutual funds and the stock market benchmark rates. We constructed value-weighted and equal-weighted fund portfolios using all equity funds in the sample; value-weighted (VW) and equal-weighted (EW) market portfolios were also constructed for stock market benchmarks. The four data series are depicted in Fig. 1.

According to Table 2 Panel A, Chinese mutual funds, on average, did better during our sample period using the equal-weighted averaging method but worse using the value-weighted averaging method. The average returns of the VW and EW stock portfolios are 2.38% and 1.40% respectively; the average returns of the VW and EW fund portfolio returns are 1.80%, and 1.70%. The standard deviation on these average returns show that mutual funds suffer only half the amount of the stock market volatility (5.99% vs. 10.25% for VW portfolios and 5.73% vs. 11.21% for EW portfolios). The maximum monthly return is 33.56% for the VW stock market portfolio and 33.63% for the EW stock market portfolio; 16.86% for the VW fund portfolio and 14.98% for the EW fund portfolio, all took place in April 2007. The minimum monthly return is −10.52% for the VW fund portfolio (November

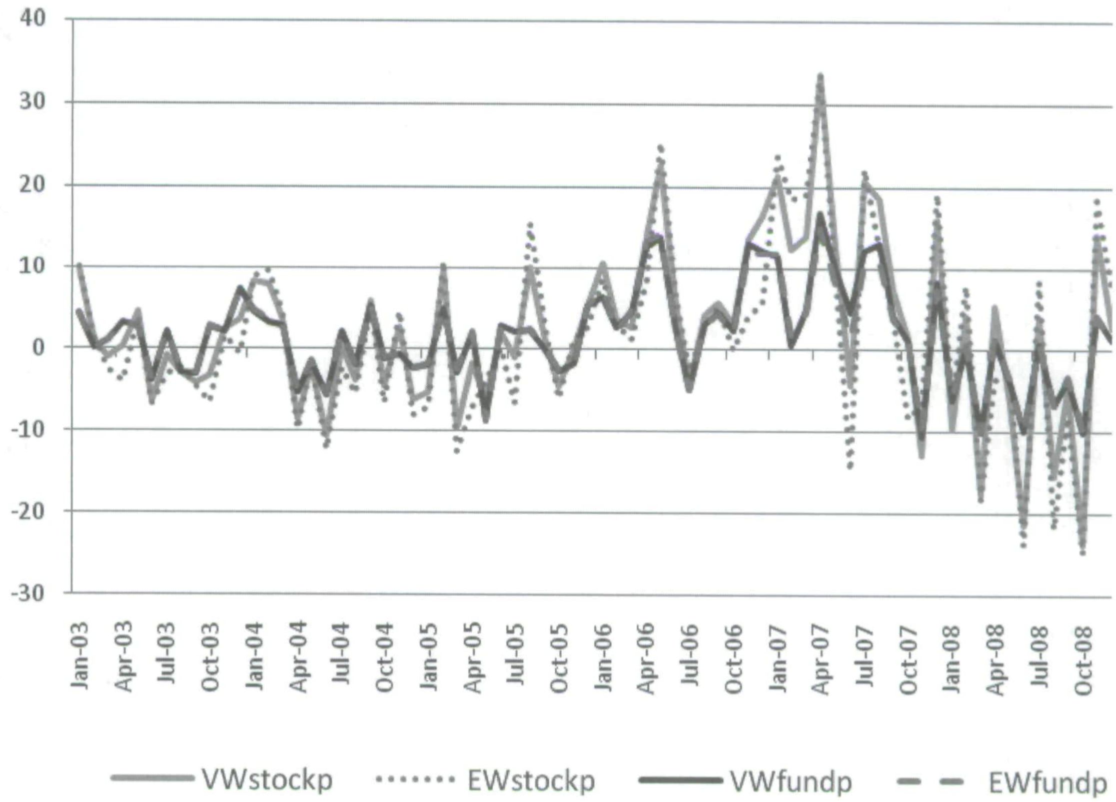


Fig. 1. Monthly returns (%) for stock and fund portfolios. Fig. 1 shows the four major monthly return series in our analysis: the value-weighted stock portfolio, the equal-weighted stock portfolio, the value-weighted fund portfolio, and the equal-weighted fund portfolio. The descriptive statistics is reported in Table 2.

2007); −10.04% for the EW fund portfolio (June 2008); −23.80% for the VW stock market portfolio (October 2008); and −24.71% for the EW stock market portfolio (October 2008).

Subsample period results from Table 2 Panel B and Panel C show that the VW and EW fund portfolios both have higher mean and median returns than the stock portfolios in the first half of the sample period but lower mean and median returns than the stock portfolios in the second half. This implies that return characteristics for the two sub sample periods might be different.

As shown in Table 2, the most significant and consistent feature of mutual fund returns is their low standard deviations compared to the benchmark. This may support the argument that Chinese mutual funds, though young and immature, are able to contribute to the stock market as a market stabilizer.

3.2. Methodology

Following the mutual fund research literature, we measure fund performance with Sharpe ratio, Jensen's alpha, and the alpha estimated from three-factor model. These measures are conducted on both aggregate fund level and individual fund level.

A mutual fund's monthly return (r_{it}) is calculated using its net asset value adjusted for dividends and interest payments, net of all expenses.

$$r_{it} = \frac{NAV_{i,t}}{NAV_{i,t-1}} - 1 \tag{1}$$

Sharpe ratio is considered the best measure to compare performance of funds with various investment objectives or styles, because it is not restricted to the level of diversification of each fund.

$$\text{Sharpe} = \frac{\overline{(r_{it} - r_{ft})}}{\sigma_{(r_{mt} - r_{ft})}} \tag{2}$$

where r_{it} is the return on mutual fund i for month t, r_{ft} is risk-free rate, and $(r_{mt} - r_{ft})$ is the excess return on fund i for month t. $\sigma_{(r_{mt} - r_{ft})}$ is the standard deviation of the excess return. Jensen's alpha (α_i) measures the market-adjusted mutual fund return, controlled for systematic risk using the Capital Asset Pricing Model (CAPM):

$$r_{it} - r_{ft} = \alpha_i + \beta_i[r_{mt} - r_{ft}] + \varepsilon_{it} \tag{3}$$

where r_{mt} is the monthly average return of the stock market, and $[r_{mt} - r_{ft}]$ is the excess market return.

Fama-French three-factor model excels CAPM in its greater explanation power on the variation of stock returns.

$$r_{it} - r_{ft} = \alpha_i + \beta_{1i}[r_{mt} - r_{ft}] + \beta_{2i}SMB + \beta_{3i}HML + \varepsilon_{it} \tag{4}$$

where SMB (Small Minus Big) is the size factor and HML (High Minus Low) is the value/growth factor. We constructed the SMB, HML, and excess market return series using Chinese stock data following Fama-French methodology.

Following Hendricks et al. (1993), we test the persistence of the Chinese equity mutual funds' residual returns controlled for their average level or their market risk. By letting R_{it} be the excess return on fund i at time t ($R_{it} \equiv r_{it} - r_{ft}$), it can then be decomposed into two parts:

$$R_{it} = M_{t-1}(R_{it}) + \varepsilon_{it}. \tag{5}$$

where $M_{t-1}(R_{it})$ denotes the market's expected fund return conditioned on the information available to the market at time t-1; ε_{it} is the residual return realized in time t. To examine the persistence of fund i's performance, we check whether the fund's residual return at time t depends on its previous periods' residual returns. The model specification is as follows:

$$\varepsilon_{it} = k_t + \textstyle\sum_{j=1}^{J} \alpha_{jt}\varepsilon_{it-j} + u_{it} \tag{6}$$

For each month t, we run a cross-section regression using current residual return on each fund as the dependent variable and its 1–12 months' lags as the independent variables. We then report the average estimate of each coefficient α_j, and calculate its student-t value.

As a robustness check, following Hendrick et al. (1993) method, we use cross-section

CAPM regression to control for each fund's market risk and generate a new residual return for each mutual fund at time t, and run the same tests. The regression results are similar to those of the main testing models.

$$R_{it} = b_{0i} + b_{1i}R_{mt} + \varepsilon_{it} \tag{7}$$

$$\varepsilon_{it} = k_t + \textstyle\sum_{j=1}^{J} \alpha_{jt}\varepsilon_{it-j} + u_{it} \tag{8}$$

4. Empirical results

Table 3 provides the Sharpe ratios for both the Chinese stock portfolios and the Chinese mutual fund portfolios for the entire sample period and for the most recent two-year period. Because of the size gap between the smallest and largest mutual funds, we constructed three size-based fund portfolios by equally dividing sample mutual funds into small, mid and big fund groups. Table 4 reports the statistics of the distribution of the individual fund's Sharpe ratios for both the entire sample period and the most recent two-year period.

According to Table 3 Panel A, both the VW and EW fund portfolios outperform the stock portfolios measured by the Sharpe ratio: the VW and EW stock portfolios have a Sharpe ratio of 0.215 and 0.110, respectively, while the VW and EW fund portfolios' Sharpe ratios are 0.272 and 0.267. Much lower return variation of fund portfolios contributes most to the difference. Examining mutual fund performance by size, the big fund group outperforms the mid fund group, which outperforms the small fund group. Each portfolio's Sharpe ratio is reported in the same structure in Table 3 Panel B for the most recent two-year period. The monotonic change of fund portfolio performance by fund size is still very significant. The large fund group not only has a higher average return than the small fund group, but it also has a lower standard deviation, showing advantages in investment skills as well as diversification capability. However, the overall performance of the mutual funds failed to outperform the market from January 2007 to December 2008, when the stock market experienced its rally in early 2007 and a severe sell off in late 2007 and 2008. Even though these mutual funds were able to maintain quite a low return variation, their monthly returns declined faster than the stock market and that brought their performance measure to a lower level than the stock market. This may have been partially because of the double hits that mutual funds normally face in market downturns: decreased value on their stock holdings and increased selling pressure from fund investors.

The results in Table 4 show that 81.8% and 59.7% of the individual funds have higher Sharpe ratios than their EW and VW benchmarks, respectively. However, the percentages decline to 32.1% and 18.9% for the most recent two-year period. To further investigate the reasons for the different Sharpe ratios for the whole sample period and the sub period of year 2007 and 2008, we constructed a rolling Sharpe ratio for each of the stock or fund portfolios for a 24-month window. That is, from December 2004, a Sharpe ratio for each portfolio at the end of each following month is calculated using its previous 24 months' returns. This rolling Sharpe ratio captures the time-varying characteristic of each portfolio's excess return and standard deviation. The results are presented in Fig. 2. Fig. 2A shows that for 34 out of the 49 months in our sample the VW mutual fund portfolio had a higher rolling Sharpe ratio

Table 3 Sharpe ratio for stock and fund portfolios

Panel A: Portfolio Sharpe ratio for the value-weighted (VW) and equal-weighted (EW) stock and fund portfolios for the period from January 2003 through December 2008

	Monthly excess return mean	Monthly excess return SD	Sharpe ratio
VW stock portfolio	2.208	10.258	0.215
EW stock portfolio	1.229	11.218	0.110
VW fund portfolio	1.630	6.000	0.272
EW fund portfolio	1.534	5.748	0.267
VW small fund portfolio	1.334	5.472	0.244
VW mid fund portfolio	1.576	6.002	0.263
VW big fund portfolio	1.549	5.770	0.269
EW small fund portfolio	1.344	5.395	0.249
EW mid fund portfolio	1.565	6.000	0.261
EW big fund portfolio	1.694	5.900	0.287

Panel B: Portfolio Sharpe ratio for the value-weighted (VW) and equal-weighted (EW) stock and fund portfolios for the period from January 2007 through December 2008

	Monthly excess return mean	Monthly excess return SD	Sharpe ratio
VW stock portfolio	2.852	14.982	0.190
EW stock portfolio	2.552	16.597	0.154
VW fund portfolio	1.240	7.986	0.155
EW fund portfolio	0.891	7.350	0.121
VW small fund portfolio	0.771	6.993	0.110
VW mid fund portfolio	0.880	7.845	0.112
VW big fund portfolio	1.027	7.492	0.137
EW small fund portfolio	0.715	6.752	0.106
EW mid fund portfolio	0.872	7.847	0.111
EW big fund portfolio	1.086	7.494	0.145

This table reports the mutual fund and the stock portfolios' Sharpe ratios for two different sample periods. Panel A is for the whole sample period from January 2003 through December 2008 and Panel B is for the subsample period from January 2007 through December 2008. The value-weighted stock portfolio is calculated using each stock's market capitalization (its total floating shares outstanding times its share price) as weight. The value-weighted fund portfolio is calculated using each fund's AUM value in year t-1 as its weight in year t. The value-weighted fund portfolio is rebalanced annually. The mutual funds are grouped into small, mid, and large funds by their AUM values at the end of year t-1 with 33% and 67% as the cutoff points. The risk-free rate used to calculate excess return is the three-month CD rate, which is universal and made by the central bank, the People's Bank of China.

than that of the VW stock portfolio. This means that the Chinese mutual funds beat the benchmark continuously before February 2007. The outperformance of the mutual fund portfolio for the whole sample period is mainly supported by their earlier years achievement. Looking at the rolling Sharpe ratio of each mutual fund size group, the large fund group has a higher rolling Sharpe ratio than the small fund portfolio in 41 out of 49 months.

Fig. 2B reports the results for the equal-weighted stock and mutual fund portfolios. The EW fund portfolio has a higher rolling Sharpe ratio than the stock portfolio for all months except December 2008. The big fund portfolio has a higher rolling Sharpe ratio than the small fund portfolio for all 49 months. The size effect is very strongly present in Fig. 2, which confirms the results reported in Table 3. The large fund portfolio outperforms the

Table 4 Sharpe ratio for individual funds

Panel A: Summary statistics for individual fund Sharpe ratios for the period January 2003 through December 2008

Number of funds	Mean	Median	Max	Min	SD
159	0.238	0.258	0.513	−0.151	0.123

Panel B: Number of funds with higher Sharpe ratio than the stock portfolio for the period January 2003 through December 2008

	Number	Percent
Funds with Sharpe ratio higher than the VW benchmark portfolio	95	59.7%
Funds with Sharpe ratio higher than the EW benchmark portfolio	130	81.8%
Total number of funds	159	

Panel C: Summary statistics for individual fund Sharpe ratios for the period January 2007 through December 2008

Number of funds	Mean	Median	Max	Min	SD
159	0.119	0.109	0.376	−0.328	0.092

Panel D: Number of funds with higher Sharpe ratio than the stock portfolio for the period January 2007 through December 2008

	Number	Percent
Funds with Sharpe ratio higher than the VW benchmark portfolio	30	18.9%
Funds with Sharpe ratio higher than the EW benchmark portfolio	51	32.1%
Total number of funds	159	

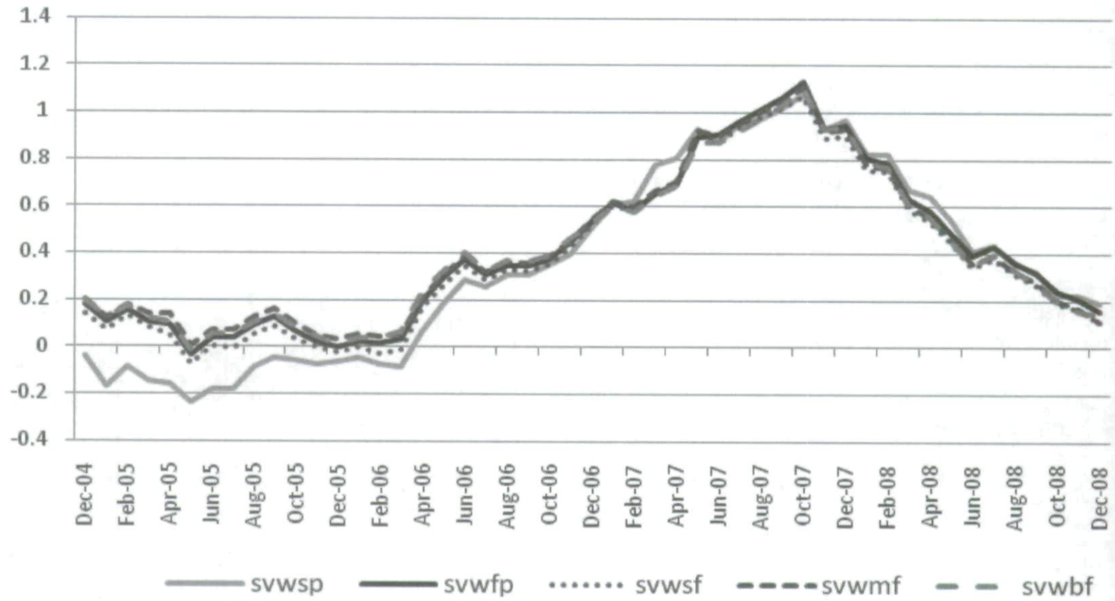
This table reports the Sharpe ratio values of the individual funds. Panels A and B summarize the statistics and the distribution of the individual funds' Sharpe ratio values for the whole sample period. Panel C and D present the statistics and the distribution of the individual fund Sharpe ratios for the sub sample period from January 2007 through December 2008.

small fund portfolio for 84% of the time for value-weighted portfolios and 100% of the time for equal-weighted portfolios.

The Sharpe ratio frequency histogram of the individual funds is provided in Fig. 3. Fig. 3A and 3B show the distribution frequency for the whole sample period and the sub sample period. Both figures are constructed using the same data reported in Table 4.

Table 5 and Table 6 report the statistics of Jensen's alpha at aggregate fund level and individual fund level. The results are mixed. Table 5 shows that the VW fund portfolio does not bring in significant positive alpha while the EW fund portfolio does. The EW fund portfolio generates an extra 1.04% monthly return after compensating for corresponding market risk. For size-based portfolios, the EW large fund portfolio has an alpha of 1.20%, the EW mid fund portfolio of 1.04%, and the EW small fund of 0.88%. Once again, the big fund group is the best performer using Jensen's alpha.[2]

A



B

Fig. 2. A 24-month rolling Sharpe ratio for stock and fund portfolios. (A) Value-weighted stock and fund portfolios. (B) Equal-weighted stock and fund portfolios. Starting at the end of December 2004, a rolling Sharpe ratio is calculated at the end of each month using the return data for the previous 24 months. Such rolling Sharpe ratio is calculated for both the fund portfolios and the stock market portfolios. svwsp is the Sharpe ratio of the value-weighted (VW) stock market portfolio; svwfp is the Sharpe ratio of the VW fund portfolio; svwsf is the Sharpe ratio of the VW small fund portfolio; svwmf the Sharpe ratio of the VW mid fund portfolio; and svwbf the Sharpe ratio of the VW big stock portfolio. Sewsp is the Sharpe ratio of the equal-weighted (EW) stock market portfolio; sewfp the Sharpe ratio of the EW fund portfolio; sewsf the Sharpe ratio of the EW small fund portfolio; sewmf the Sharpe ratio of the EW mid fund portfolio; and sewbf the Sharpe ratio of the EW big stock portfolio.

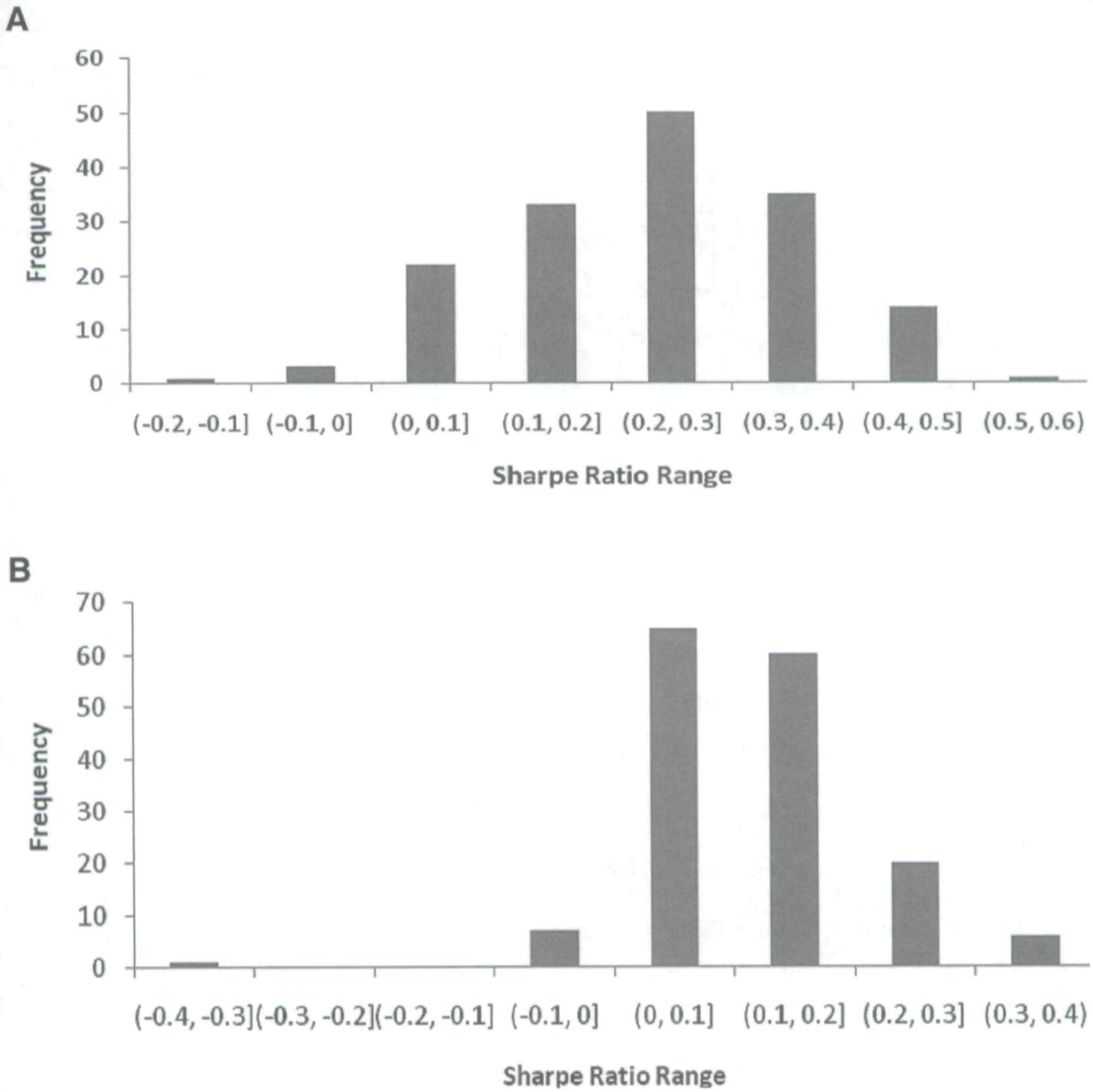


Fig. 3. Individual fund Sharpe ratio frequency histogram. (A) For the period from January 2003 to December 2008. (B) For the period from January 2007 to December 2008. These two figures show the distribution frequency histogram of the individual funds' Sharpe ratios' for the whole sample period from January 2003 through December 2008, and for the period from January 2007 through December 2008. It is constructed using the same data reported in Table 4.

The distribution of the individual fund's Jensen's alpha is reported in Table 6. Using VW stock market portfolio as a benchmark, 15 out of 159 funds have positive alphas that are significant at the 10% level; while 16 funds have negative alphas at the 10%; 128 funds have no significant alpha at the 10% level, meaning these funds provide risk-adjusted return similar to the stock market's average level.

The estimates of the coefficients of the Fama-French three factor model are presented in Table 7 and 8. The adjusted R^2 reported in Table 7 are uniformly higher than those in Table

Table 5 Jensen's alpha for fund portfolios for the period January 2003 through December 2008

Panel A: Value-weighted portfolios

Dependent variable		Independent variable: VW stock portfolio		
		α	β	Adj. R^2
VW fund portfolio	Coefficient	0.444	0.537***	0.840
	SE	0.290	0.028	
VW small fund portfolio	Coefficient	0.240	0.495***	0.861
	SE	0.246	0.024	
VW Mid Fund Portfolio	Coefficient	0.376	0.543***	0.860
	SE	0.271	0.026	
VW Big Fund Portfolio	Coefficient	0.420	0.511***	0.824
	SE	0.292	0.028	

Panel B: Equal-weighted portfolios

Dependent variable		Independent variable: EW stock portfolio		
		α	β	Adj. R^2
EW fund portfolio	Coefficient	1.039**	0.402***	0.611
	SE	0.425	0.038	
EW small fund portfolio	Coefficient	0.876**	0.381***	0.622
	SE	0.393	0.035	
EW mid fund portfolio	Coefficient	1.044**	0.424***	0.623
	SE	0.437	0.039	
EW big fund portfolio	Coefficient	1.200***	0.402***	0.579
	SE	0.454	0.041	

*** Significant at the 1% level.

** Significant at the 5% level.

* Significant at the 10% level.

This table reports the estimates of Jensen's alphas for the value-weighted and the equal-weighted portfolios using one-factor model: $r_{pt} - r_{ft} = \alpha_i + \beta_{1i}[r_{mt} - r_{ft}] + \varepsilon_{it}$, where r_{pt} is the monthly portfolio return, r_{ft} is the monthly risk-free rate, and r_{mt} is the monthly stock market portfolio return. The sample period is from January 2003 through December 2008.

Table 6 Individual fund distribution according to estimated coefficients

One factor model using the VW stock portfolio as marketportfolio

	p-value range	Alpha	market beta
When estimated parameter ≥0	(0, 0.05)	7	159
	[0.05, 0.1)	8	0
	[0.1, up)	76	0
When estimated parameter <0	(0, 0.05)	13	0
	[0.05, 0.1)	3	0
	[0.1, up)	52	0
	total	159	159

This table reports the estimated coefficients of the individual funds using one-factor market model: $r_{it} - r_{ft} = \alpha_i + \beta_{1i}[r_{mt} - r_{ft}] + \varepsilon_{it}$, where r_{it} is the monthly return for fund i, r_{ft} is the monthly risk-free rate, and r_{mt} is the monthly value-weighted stock market portfolio return. The sample period is from January 2003 through December 2008.

Table 7 Three factor model regression results

Panel A: Value-weighted portfolios

Dependent variable		Independent variable: VW stock portfolio, SML, and HML				
		α	β (Market)	β (SML)	β (HML)	Adj. R^2
VW fund portfolio	Coefficient	−0.531**	0.537***	−0.300***	−0.181***	0.940
	SE	0.206	0.018	0.036	0.052	
VW small fund portfolio	Coefficient	−0.522**	0.500***	−0.207***	−0.169***	0.926
	SE	0.208	0.018	0.036	0.052	
VW mid fund portfolio	Coefficient	−0.478**	0.545***	−0.249***	−0.172***	0.933
	SE	0.218	0.019	0.038	0.054	
VW big fund portfolio	Coefficient	−0.344	0.510***	−0.249***	−0.129*	0.892
	SE	0.265	0.023	0.046	0.066	

Panel B: Equal-weighted portfolios

Dependent variable		Independent variable: EW stock portfolio, SMB, and HML				
		α	β (Market)	β (SML)	β (HML)	Adj. R^2
EW fund portfolio	Coefficient	−0.508*	0.468***	−0.533***	−0.176**	0.879
	SE	0.281	0.023	0.048	0.070	
EW small fund portfolio	Coefficient	−0.556**	0.442***	−0.481***	−0.177***	0.875
	SE	0.268	0.022	0.046	0.067	
EW mid fund portfolio	Coefficient	−0.527*	0.490***	−0.554***	−0.165**	0.883
	SE	0.288	0.023	0.049	0.072	
EW big fund portfolio	Coefficient	−0.437	0.472***	−0.566***	−0.185**	0.864
	SE	0.306	0.025	0.052	0.076	

Panel C: Correlation matrix

	Market	SMB	HML
Market	1		
SMB	−0.09126	1	
HML	0.268333	0.296095	1

*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.

This table reports the regression results of the value-weighted and equal-weighted fund portfolios using three-factor model: $r_{pt} - r_{ft} = \alpha_i + \beta_{1i}[r_{mt} - r_{ft}] + \beta_{21i}SMB + \beta_{3i}HML + \varepsilon_{it}$, where r_{pt} is the monthly portfolio return, r_{ft} is the monthly risk-free rate, r_{mt} is the monthly stock market portfolio return, SMB (Small Minus Big) is the size factor, which is the average return on the three small stock portfolios minus the average return on the three big stock portfolios, and HML (High Minus Low) is the average return on the two value stock portfolios minus the average return on the two growth stock portfolios. The sample period is from January 2003 through December 2008.

5, which indicates an increasing overall fitness in the Fama-French three factor model compared to the CAPM. All beta coefficients in Table 7 are statistically significant regardless of the weighting method and fund portfolio.

Contrary to the results in Table 5, the estimates of the alpha from three-factor model are significantly negative at the 5% or 10% level except for the big fund portfolios. The big fund portfolios have negative but insignificant alphas, which indicates that the big funds perform

Table 8 Individual fund distribution according to estimated coefficients

Three factor model using VW stock portfolio as market portfolio					
	p-value range	Alpha	Market beta	SMB beta	HML beta
When estimated parameter ≥0	(0, 0.05)	0	159	2	0
	[0.05, 0.1)	0	0	0	0
	[0.1, up)	15	0	3	19
When estimated parameter <0	(0, 0.05)	39	0	95	69
	[0.05, 0.1)	15	0	13	15
	[0.1, up)	90	0	46	56
	total	159	159	159	159

This table reports the estimated coefficients of the individual funds using three-factor model: $r_{it} - r_{ft} = \alpha_i + \beta_{1i}[r_{mt} - r_{ft}] + \beta_{21i}SMB + \beta_{3i}HML + \varepsilon_{it}$, where r_{it} is the monthly return for fund i, r_{ft} is the monthly risk-free rate, r_{mt} is the monthly value-weighted stock market portfolio return, SMB (Small Minus Big) is the size factor, which is the average return on the three small stock portfolios minus the average return on the three big stock portfolios, and HML (High Minus Low) is the average return on the two value stock portfolios minus the average return on the two growth stock portfolios. The sample period is from January 2003 through December 2008.

no better than the market but relatively better than the mid and small size funds. This provides further evidence of the large fund effect in the Chinese mutual fund industry.

It is interesting to note that the coefficients of the size and value factors are all significantly negative. In other words, investing in small capitalized stocks or value stocks reduces mutual funds' returns.[3] Table 8 confirms the results in Table 7. There is not a single fund that has a significant positive alpha using the three-factor model, and there are 54 mutual funds that have significant negative alphas. Most funds have significant negative betas on SMB and HML.

The persistence test is a good tool to investigate whether a mutual fund is able to maintain its previous performance in the future through distinguished investment skills. If its performance is based on luck, then its future returns will move randomly, and there is no predicting power of its current or previous years' performance record. The results on our persistence tests are reported in Table 9.

Both panels in Table 9 indicate that Chinese mutual funds, on average, are only able to maintain their past performance for one month. The influence of previous month's performance on current month varies from 0.095 to 0.159 across different model specifications. This persistence is much shorter than that reported in prior U.S. mutual fund research. For example, Hendricks et al. (1993) uses quarterly U.S. data and finds positive performance persistence for four quarters.

In summary, our results show that a mutual fund's performance is quite sensitive to model selection. When measured with Sharpe ratio, the total-risk adjusted return, the Chinese mutual funds on average outperform the benchmark at both the aggregate and individual fund levels, but when measured with market-risk adjusted return, the evidence of outperformance largely disappears. When the fund return is controlled for market characteristics such as market excess return, size, and value/growth, Chinese mutual funds actually show underperformance. Our results are in line with Fortin and Michelson (2002, 2005) that "international stock funds significantly outperform the index" when using Sharpe ratio as the measure. Using market-risk adjusted return, however, we are in the same camp as Fama and

Table 9 Mutual fund performance persistence

Panel A: Persistence test on the demeaned excess returns on mutual fund

	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Intercept	0.006	0.004	0.006	0.004	0.001	0.005	−0.005	0.007
rl1	0.148***	0.055	0.141***	0.051	0.159***	0.044	0.146**	0.067
rl2	0.011	0.046	0.023	0.044	0.051	0.046		
rl3	0.033	0.040	0.051	0.035	0.076**	0.037		
rl4	−0.045	0.057	0.006	0.047				
rl5	0.027	0.037	0.049	0.038				
rl6	0.039	0.055	0.029	0.045				
rl7	0.034	0.039						
rl8	−0.037	0.025						
rl9	0.053	0.046						
rl10	0.049	0.029						
rl11	0.055*	0.031						
rl12	−0.033	0.029						
obs	48		54		57		59	

Panel B: Persistence test on the market adjusted returns on mutual fund

	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Intercept	−0.002	0.003	−0.001	0.003	−0.002	0.003	−0.001	0.003
rlag1	0.095**	0.044	0.098**	0.045	0.121***	0.040	0.109**	0.047
rlag2	−0.035	0.041	−0.021	0.040	−0.011	0.040		
rlag3	0.011	0.039	0.021	0.037	0.013	0.036		
rlag4	−0.090	0.059	−0.037	0.049				
rlag5	−0.006	0.040	0.026	0.040				
rlag6	0.017	0.053	0.015	0.043				
rlag7	0.003	0.039						
rlag8	−0.060**	0.026						
rlag9	0.024	0.046						
rlag10	0.032	0.030						
rlag11	0.034	0.032						
rlag12	−0.042	0.031						
obs	48		54		57		59	

*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.

This table reports the results of the persistence test of the Chinese mutual funds' performance using Hendricks et al. (1993) method. For each month t, the excess return on mutual fund j is regressed on its past 1 to 12 months' returns. Repeat this cross-sectional regression for every month. The coefficient estimates of each term from different monthly regressions are then treated as normally distributed samples, and their average value and the standard error are reported in the table above.

Panel A shows the test results using each mutual fund's demeaned excess returns as the dependent variable; while, Panel B reports the results using each fund's market-adjusted excess returns as the dependent variable. The value-weighted stock market portfolio returns are used as the market benchmark in Panel B.

French (2010), among others, that indexing is a better choice for investors. Nonetheless, there is one result that is consistent through all performance tests: large Chinese equity funds consistently beat the mid and small size funds in their performance, regardless of the benchmark and model selection. This is different from the evidence in the U.S. market that large funds underperform mid and small funds (e.g., Chen et al., 2004 and Grinblatt and Titman 1989). The explanation of this difference deserves further research.

5. Conclusions

Individual investors often are attracted by the growth potentials in emerging equity markets. At the same time, they may not feel comfortable investing in these markets because of their lack of understanding of the market characteristics. Using a sample of 159 Chinese equity funds from January 2003 through December 2008, our research presents empirical evidence on the performance of Chinese equity funds and its persistence during this period. We find both value-weighted and equal-weighted Chinese equity fund portfolios provide higher Sharpe ratios than their benchmark. This result is largely from their much lower return variation. This implies that individual investors can benefit from better total-risk adjusted returns by investing in Chinese equity mutual funds. However, when using other performance measures such as Jensen's alpha and Fama-French three-factor model's alpha, the benefits largely disappear, which reminds individual investors to consider whether total-risk adjusted return or market-risk adjusted return as their investment objective. If total-risk adjusted return is the investor's objective, actively managed funds are a better choice. Indexed funds, on the other hand, should be favored when market-risk adjusted return is the concern.

A major finding of this study is that large Chinese equity funds consistently outperform the mid and small funds during the sample period under various market conditions and different measurements. This suggests that individual investors should favor larger equity funds over smaller funds when investing in the Chinese stock market.

Notes

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2. In unreported tests we also examined Jensen's alpha in two equal length subsample periods. The VW big fund and mid fund portfolios do generate significant positive alpha for the first half sample period at the 10% level. For EW fund portfolios, the small fund portfolio and the mid fund portfolio both have a significant alpha for the first sub sample period, while the big fund portfolio has a significant positive alpha for both subsample periods.
3. In unreported tests we also investigated the funds' alphas using the three factor model for two equal length sub sample periods. The results are similar to those reported in Table 7.

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