An Analysis of Mutual Fund Managers’ Timing Abilities

– Evidence From Chinese Equity Funds

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Received: May 9, 2020
Accepted: June 15, 2020
Online Published: July 7, 2020
doi:10.5430/ijfr.v11n4p214
URL: https://doi.org/10.5430/ijfr.v11n4p214

Abstract

This paper examines Chinese mutual fund managers’ market, volatility, and liquidity abilities. Using a daily frequency sample of Chinese open-end equity funds from 2015 to 2019, we find evidence that mutual fund managers can time the market. Among the funds with different investment styles, the active funds have better market and liquidity timing ability, whereas the steady funds have better volatility timing ability. In different investment periods, there are more funds with timing ability in the fall period than in the rise period. We find the same results in the market (T-M), volatility, and liquidity timing models. It is especially for the active funds, nearly half of which have liquidity timing ability in the fall period. Among the funds with stock selection ability, the funds with market timing ability can outperform than the funds with other timing ability.

Keywords: market timing, volatility timing, liquidity timing, mutual fund

1. Introduction

There has been an endless debate on whether mutual fund managers have timing skills. Since the seminal paper of Treynor and Mazuy (1966), many scholars have conducted extensive research on the timing ability of funds. For example, Henriksson and Merton (1981), Chang and Lewellen (1984), Henriksson (1984), Jiang (2003), Jiang, Yao and Yu (2007), Gao, O’Sullivan and Sherman (2019), but their research could not prove fund managers have the ability of timing. However, Bollen and Busse (2001) found that compared with the monthly data, the daily data of the fund showed a more significant timing ability of Busse (1999) and Giambona and Golec (2009) found that funds increased their market exposure when market volatility decreased, thus achieving better performance and proving the fund's ability to fluctuate at market timing. Liao, Zhang and Zhang (2017) use monthly fund data to examine Chinese funds, proving that Chinese fund managers have market, volatility, and liquidity timing abilities. In a word, there is no conclusive study on whether the fund has timing ability, and most of the literatures are based on the studies of developed economies, while few literatures have examined the timing ability of funds in emerging economies. As the world’s second-largest economy, China is also the world's largest emerging economy. The development of China's capital market in recent years is more worthy of our in-depth understanding. This paper focuses on the timing ability of Chinese mutual funds, including market timing, volatility timing, and liquidity timing, and discusses the timing ability of funds with different investment styles and different periods.

Since the establishment of the first open-end fund in China in 2001, with the rapid development of China’s GDP, the size of the Fund has also shown an upward trend. According to figure 1, the net value of funds exceeded 8.2 trillion yuan at the end of 2015. By the end of 2019, the number of open-end funds was 5683, and the net value of funds was up to 13.2 trillion yuan, an increase of 60% in five years. With the opening up of the Chinese market, the government's push for the entry of domestic medium-and long-term funds into the market, the removal of restrictions on the entry of foreign funds into the market, and the inclusion of the MSCI and FTSE indices, more funds will enter China, so it will be more meaningful to study the Chinese stock market, and the Chinese market because of its particularity in several aspects, we speculate that the timing ability of Chinese funds is different from other markets.
First, individual investors have a leading position in the Chinese market. At the end of the third quarter of 2019, Chinese institutional investors accounted for 49.66% of the market value of A-shares, compared with individual investors, experienced institutional investors have fewer behavioral preferences, and the irrational preferences and investment characteristics of individual investors lead to the predictability of the Chinese Stock Market (Yi & He, 2016), suggesting that there may be timing ability in Chinese funds.

Second, the rapid development of Chinese funds in a relatively short time, the imperfect market system and the absence of short selling mechanism brought about the results of high volatility and high liquidity, especially in times of economic shocks (Tang, Wang & Xu, 2012; Jun, Li & Shi, 2014). High volatility provides an ideal environment for testing whether Chinese fund managers have abilities to time the markets.

Third, compared with the developed economies, China has a serious information asymmetry problem (Morck, Yeung & Yu, 2000), compared with individual investors, institutional investors, particularly funds have stronger information excavation capacity (Liao, Liu & Wang, 2011), also, the presence of short-selling restrictions in China, individual investors are difficult to quickly to arbitrage mispriced stocks (Chen, Kim, Yao & Yu, 2010). All of this provides an informational advantage for funds to use for timing arbitrage (Munoz & Vicente, 2018).

Finally, the Chinese stock market is highly influenced by changes in government policies, such as the introduction of restrictions on Dividend issuance, or the issuance of support policies for certain industries, these policy events will affect the Chinese stock market by influencing the trading behavior of retail investors, and since retail investors are the main force in the Chinese stock market, the change of policy events will greatly affect the future market trend (Wang, Tsai & Li, 2017), such macro-events have spurred more intensive timing in China.

Although previous scholars have made some researches on the ability of mutual fund managers in China, most of the researches have focused on the ability of stock selection of funds, and only a few have made a preliminary study on the ability of fund timing, there is no classification of the Fund's investment style or investment period. And most of the past research used the monthly fund data, for a mature market, the monthly fund data may be a suitable choice. But as the foreword suggests, the volatility of the Chinese market is so high that the market index could reverse in a matter of days, with a standard deviation of 1.54% for the CSI 300 Index between January 1,2015, and December 31,2019, with Dow Jonnes, S & P 500 and Nasdaq at 0.85% , 0.85% and 1.02% respectively over the same period, using higher frequency fund day data is a better test of Chinese mutual fund timing.

Based on Liao et al., (2017) ’s research, we have conducted an in-depth study on Chinese open-ended equity funds. This paper uses the daily data of 324 open-end stock funds from January 1,2015 to December 31,2019 to test the market timing, volatility timing and liquidity timing, to test the timing ability of Chinese mutual fund managers, we also used Active and Steady funds to test the timing ability of different types of funds, based on the Fabozzi and Francis (1979) and Pagan and Sosslounov (2003) criteria for market rise and fall, the market is divided into different
stages to study the timing ability of the funds in different periods, so as to make up for the lack of current research. The remainder of the paper proceed as follows, section 2 introduces the data and research methods, section 3 is the results of empirical analysis, section 4 is the further test, and section 5 is the conclusion.

2. Data and Methodology

2.1 Chinese Mutual Funds

Our Mutual Fund data comes from RESSET financial research dataset (RESSET), and the rest comes from China Stock Market & Accounting Research (CSMAR), where we have access to a total of 904 open-end equity funds, we screened out index funds with at least 250 days of fund day data for a total of 1,219 trading days between January 1, 2015, and December 31, 2019, during the study period, so our total sample contains 324 funds, and according to their investment style is divided into Active and Steady, the number of 120 and 204 funds.

Table 1. Summary statistics

|        | N  | Mean  | STD  | 25%   | Median | 75%   |
|--------|----|-------|------|-------|--------|-------|
| Total  | 324| -0.3801 | 1.5693 | -1.0842 | -0.3869 | 0.3688 |
| Active | 120| -0.3760 | 1.5801 | -1.0862 | -0.3895 | 0.3692 |
| Steady | 204| -0.3822 | 1.5636 | -1.0831 | -0.3851 | 0.3686 |
| MKT    | 1219| -0.4181 | 1.5444 | -0.9853 | -0.3750 | 0.2643 |
| SMB    | 1219| 0.0292 | 1.1184 | -0.4315 | 0.1155 | 0.5845 |
| HML    | 1219| -0.0098 | 0.7899 | -0.3778 | -0.0429 | 0.3433 |
| V      | 1219| 1.2284 | 0.8077 | 0.6759 | 1.0258 | 1.4817 |
| L      | 1219| 5.5889 | 22.9277 | 2.0161 | 3.2385 | 5.5214 |

This table reports the data summary statistics. The excess returns of the fund summarize the daily returns of the whole fund (Total), active (Active) and steady (Steady) funds. The summary of other variables in the table includes market excess return (CSI 300 index), size factor (SMB), book-to-market ratio factor (HML), market volatility measure (V), and Amihud market illiquidity measure (L), all of which are presented as percentages. N is the number of funds during the sample period. The sample period is from 1 January 2015 to 31 December 2019.

Table 1 reports the summary statistics of Chinese mutual fund samples. According to the average value of Table 1, in the whole sample period, the daily excess returns of Total, Active and Steady types are -0.3801%, -0.3760% and -0.3822%, respectively. The returns of the three types of funds are all better than the market excess returns of -0.4181% in the same period, while SMB and HML are 0.0292% and -0.0098%, respectively, with a volatility of 1.2284% and Amihud illiquidity of 5.5889%.

2.2 Methodology

In this Section, we will use the portfolio performance evaluation model proposed by Jensen (1968):

\[ R_{p,t} = \alpha_p + \beta_{p,1}MKT_t + \varepsilon_{p,t} \]  

(1)

Where \( R_{p,t} \) is the daily return of fund \( p \) minus the risk-free interest rate in period \( t \), and the risk-free interest rate is the daily one-year fixed deposit return. Because most of the performance reference standards of China mutual funds are benchmarked to the CSI 300 index, this paper defines the CSI 300 index as the market index, and \( MKT_t \) is the daily return of the market index minus the risk-free interest rate in period \( t \).

Some scholars, such as Elton (1993), think that the multi-factor model can explain the performance evaluation of funds better, so we introduce scale factor and book-to-market ratio factor:

\[ R_{p,t} = \alpha_p + \beta_{p,1}MKT_t + \beta_{p,2}SMB_t + \beta_{p,3}HML_t + \varepsilon_{p,t} \]  

(2)

Where, \( SMB_t \) and \( HML_t \) respectively for size and book-to-market ratio simulation portfolio in period \( t \). Based on Formula (2), we construct a timing model from Formula (3) to Formula (6) to test the three timing abilities of fund managers, namely, market timing, volatility timing and liquidity timing.
2.2.1 Market Timing Model

We use T-M model (Treynor & Mazuy, 1966) and H-M model (Henriksson & Merton, 1981) to test whether fund managers have market timing ability. Treynor and Mazuy (1966) believe that market exposure is linearly related to market returns:

\[ R_{p,t} = \alpha_p + \beta_{p,1}MKT_t + \gamma_pMKT_t^2 + \beta_{p,2}SMB_t + \beta_{p,3}HML_t + \varepsilon_{p,t} \quad (3) \]

Among them, \( MKT_t^2 \) is the square of the market's excess return in period t, and the estimation coefficient \( \gamma_p \) reflects the market's timing ability. Positive \( \gamma_p \) implies that the fund manager has timing ability.

Henriksson and Merton (1981) believed that market exposure depended on the market's directional response:

\[ R_{p,t} = \alpha_p + \beta_{p,1}MKT_t + \gamma_p\max(MKT_t,0) + \beta_{p,2}SMB_t + \beta_{p,3}HML_t + \varepsilon_{p,t} \quad (4) \]

Where \( \max(MKT_t,0) \) equals the market excess return in period t when it is positive and zero otherwise. Positive \( \gamma_p \) means that the fund manager has successfully adjusted the portfolio exposure, so it has the timing ability.

2.2.2 Volatility Timing Model

We use the following regression to test the volatility timing model:

\[ R_{p,t} = \alpha_p + \beta_{p,1}MKT_t + \gamma_p(V_{m,t} - \bar{V}_m)MKT_t + \beta_{p,2}SMB_t + \beta_{p,3}HML_t + \varepsilon_{p,t} \quad (5) \]

Among them, \( \gamma_p \) is the volatility timing factor. \( V_{m,t} \) is the volatility timing measure of the market in period t. We use the standard deviation of market excess return of 10 periods before period t to calculate \( V_{m,t} \), and use the average of the standard deviation of market excess return of 10 periods to calculate \( \bar{V}_m \). Negative \( \gamma_p \) indicates that the fund manager has the ability to choose the time of volatility, because it indicates that the adjustment of the fund exposure decrease (increase) with the increase (decrease) of market volatility.

2.2.3 Liquidity Timing Model

We use a method similar to formula (5) to construct a liquidity timing model:

\[ R_{p,t} = \alpha_p + \beta_{p,1}MKT_t + \gamma_p(L_{m,t} - \bar{L}_m)MKT_t + \beta_{p,2}SMB_t + \beta_{p,3}HML_t + \varepsilon_{p,t} \quad (6) \]

Where \( L_{m,t} \) is the illiquidity measure in period t proposed by Amihud (2002), \( \bar{L}_m \) is the average of the data in 10 periods before period t. Because \( L_{m,t} \) is a measure of illiquidity, when \( L_{m,t} \) is larger (smaller), the market liquidity is poorer (better). If \( \gamma_p \) is negative, it means that the fund manager has liquidity timing ability, because it means that the adjustment of fund exposure decreases (increases) with the increase (decrease) of market illiquidity.

In order to calculate \( L_{m,t} \), we use the data of outstanding A-shares from January 1, 2015 to December 31, 2019, and according to the practice of Amihud (2002), we exclude the stocks whose accumulated trading days in the previous year are less than or equal to 200 days, and at the same time, we exclude the stocks whose annual illiquidity value in the previous year accounts for the first 1% and the last 1% of the illiquidity value in the same period of all stocks on the market. First, we calculate the illiquidity measurement of stocks:

\[ L_{i,t} = \frac{1}{D_t} \sum_{d=1}^{D_t} \frac{r_{i,d}}{\text{vol}_{i,d}} \quad (7) \]

Where \( L_{i,t} \) is the illiquidity of stock i in period t, \( D_t \) is the trading days of stock i, \( r_{i,d} \) is the yield of stock i on day d, and \( \text{vol}_{i,d} \) is the trading amount of stock i on day d. After calculating the daily illiquidity of each stock, the market illiquidity is obtained by simple arithmetic average of the illiquidity of each stock:

\[ L_{m,t} = \frac{1}{N_t} \sum_{i=1}^{N_t} L_{i,t} \quad (8) \]

Where \( N_t \) is the number of sample stocks in period t. If the change of market trading volume causes the fluctuation of market index to be larger (smaller), the greater (smaller) \( L_{m,t} \), the worse (better) market liquidity.

3. Empirical Analysis

In this Section, we examine the market, volatility and liquidity timing ability of mutual fund managers, and then analyze the funds with timing ability in detail.
First, we use the timing models expressed by regression Eqs. (3), (4), (5), and (6) to assess market timing, volatility timing and liquidity timing ability for the total, active, and steady funds.

Table 2. Cross-sectional distribution of t-statistics for the timing coefficients across individual funds

| Percentage of funds | Timing | Model | Category | t≤-2.326 | t≤-1.960 | t≤-1.645 | t≥1.645 | t≥1.960 | t≥2.326 |
|---------------------|--------|-------|----------|----------|----------|----------|----------|----------|----------|
| Market              | Total  | T-M   |          | 22.2222  | 26.2346  | 29.0123  | 13.5802  | 10.4938  | 7.0988   |
|                     | Active |       |          | 25.0000  | 27.5000  | 28.3333  | 20.0000  | 16.6667  | 13.3333  |
|                     | Steady |       |          | 20.5882  | 25.4902  | 29.4118  | 9.8039   | 6.8627   | 3.4314   |
| H-M                 | Total  |       |          | 23.7654  | 29.3210  | 33.3333  | 8.6420   | 7.0988   | 4.9383   |
|                     | Active |       |          | 22.5000  | 25.0000  | 30.0000  | 14.1667  | 11.6667  | 10.0000  |
|                     | Steady |       |          | 24.5098  | 31.8627  | 35.2941  | 5.3922   | 4.4118   | 1.9608   |
| Volatility          | Total  |       |          | 9.5679   | 12.0370  | 17.2840  | 13.8889  | 8.6420   | 5.2469   |
|                     | Active |       |          | 5.0000   | 6.6667   | 15.0000  | 14.1667  | 8.3333   | 4.1667   |
|                     | Steady |       |          | 12.2549  | 15.1961  | 18.6275  | 13.7255  | 8.8235   | 5.8824   |
| Liquidity           | Total  |       |          | 8.9506   | 12.0370  | 16.9753  | 6.1728   | 5.2469   | 4.3210   |
|                     | Active |       |          | 9.1667   | 12.5000  | 20.0000  | 5.8333   | 4.1667   | 4.1667   |
|                     | Steady |       |          | 8.8235   | 11.7647  | 15.1961  | 6.3725   | 5.8824   | 4.4118   |

Regression from Eqs. (3) to (6):

(3) \( R_{pt} = \alpha_p + \beta_{p,1}\text{MKT}_t + \gamma_p\text{MKT}^2_t + \beta_{p,2}\text{SMB}_t + \beta_{p,3}\text{HML}_t + \epsilon_{p,t} \)

(4) \( R_{pt} = \alpha_p + \beta_{p,1}\text{MKT}_t + \gamma_p\max(\text{MKT}_t, 0) + \beta_{p,2}\text{SMB}_t + \beta_{p,3}\text{HML}_t + \epsilon_{p,t} \)

(5) \( R_{pt} = \alpha_p + \beta_{p,1}\text{MKT}_t + \gamma_p(V_{m,t} - \bar{V}_m)\text{MKT}_t + \beta_{p,2}\text{SMB}_t + \beta_{p,3}\text{HML}_t + \epsilon_{p,t} \)

(6) \( R_{pt} = \alpha_p + \beta_{p,1}\text{MKT}_t + \gamma_p(L_{m,t} - \bar{L}_m)\text{MKT}_t + \beta_{p,2}\text{SMB}_t + \beta_{p,3}\text{HML}_t + \epsilon_{p,t} \)

This table summarizes the distribution of t-statistics for market timing, volatility timing, and liquidity timing coefficients. For each Chinese open-end equity fund with a return of at least 250 days during the sample period from 1 January 2015 to 31 December 2019, we estimate total, active and steady market timing, volatility timing and liquidity timing. Columns 4 to 9 list the percentage of funds which the t-statistics of the timing coefficient exceed the indicated values.

Table 2 reports the percentage of funds which the t-statistics of the timing coefficient exceed the indicated cutoff values.

In the T-M model of market timing, 13.5802%, 20.0000% and 9.8039% of the total, active and steady fund are greater than or equal to 1.645, respectively. Which means that fund have significant market timing ability (Later in this paper, t value greater than or equal to 1.645 is define as the fund have significant market timing ability, t value less than or equal to -1.645 is define as the fund have significant volatility or liquidity timing ability). We see similar results in the H-M model of market timing, with 14.1667% for active funds and 5.3922% for steady funds, the results show that the active funds are better than the steady funds in the ability to grasp the market timing. But on the whole, only a few funds have the market timing ability, and the percentage of 13.5802% with market timing ability is much less than that of 29.0123% with no market timing ability. Our results are similar to those of Pilbeam and Preston (2019), they studied 355 Japanese equity funds from 2011 to 2016 based on the T-M model, and found that about 9.30% of the funds had the market timing ability.

In terms of volatility timing, 17.2840%, 15.0000% and 18.6275% of the total, active fund and steady fund have significant volatility timing ability, respectively. There is no significant difference among the three types of fund results, while 18.6275% of the steady fund is slightly higher than 15.0000% of the active fund, which is consistent with the investment style of the steady fund and the demand to reduce volatility.

In terms of liquidity timing, 16.9753%, 20.0000% and 15.1961% of the total, active and steady fund respectively
have liquidity timing ability, and the proportion of the three types of funds without liquidity timing ability is 6.1728%, 5.8333% and 6.3725% respectively, showing a significant distribution with the left tail thicker than the right tail. Our results are similar to those of wattanatorn and tansupswatdikul (2018), wattanatorn et al., (2020). Their research on emerging markets proves that fund managers have liquidity timing ability.

After that, we make an in-depth analysis of the fund with timing ability. Table 3 to Table 6 report the fund with timing ability under each model, and we also analyze the fund manager's stock selection ability.

Table 3. Summary analysis of funds with market timing ability (T-M model)

| Panel A Percentage of funds |
|-----------------------------|
| Category | \( \alpha_p^+ \) | \( \gamma_p^+ \) | \( \alpha_p^+ + \gamma_p^+ \) |
| Total | 2.1605 | 17.9012 | 0.6173 |
| Active | 2.5000 | 25.0000 | 0.8333 |
| Steady | 1.9608 | 13.7255 | 0.4902 |

| Panel B Total |
|----------------|
| Code | \( \gamma_p \) | p value | \( \alpha_p \) | p value | \( \beta_{p,1} \) | p value | \( R^2 \) |
| 120 | 2.2146 | 0.0000 | -0.0014 *** | 0.0000 | 0.6703 | 0.0000 | 0.6834 |
| 155 | 2.1259 | 0.0000 | -0.0010 *** | 0.0000 | 0.7671 | 0.0000 | 0.8962 |
| 144 | 2.7422 | 0.0000 | -0.0007 *** | 0.0010 | 0.8800 | 0.0000 | 0.7539 |
| 137 | 2.3628 | 0.0000 | -0.0008 *** | 0.0000 | 0.7771 | 0.0000 | 0.7990 |
| 129 | 4.5094 | 0.0000 | -0.0001 | 0.4112 | 1.0584 | 0.0000 | 0.7113 |

| Panel C Active |
|----------------|
| Code | \( \gamma_p \) | p value | \( \alpha_p \) | p value | \( \beta_{p,1} \) | p value | \( R^2 \) |
| 120 | 2.2146 | 0.0000 | -0.0014 *** | 0.0000 | 0.6703 | 0.0000 | 0.6834 |
| 155 | 2.1259 | 0.0000 | -0.0010 *** | 0.0000 | 0.7671 | 0.0000 | 0.8962 |
| 270 | 2.8914 | 0.0003 | -0.0015 *** | 0.0000 | 0.6728 | 0.0000 | 0.7312 |
| 271 | 2.8798 | 0.0003 | -0.0015 *** | 0.0000 | 0.6725 | 0.0000 | 0.7316 |
| 194 | 4.2264 | 0.0005 | -0.0007 * | 0.0799 | 0.7024 | 0.0000 | 0.6151 |

| Panel D Steady |
|----------------|
| Code | \( \gamma_p \) | p value | \( \alpha_p \) | p value | \( \beta_{p,1} \) | p value | \( R^2 \) |
| 144 | 2.7422 | 0.0000 | -0.0007 *** | 0.0010 | 0.8800 | 0.0000 | 0.7539 |
| 137 | 2.3628 | 0.0000 | -0.0008 *** | 0.0000 | 0.7771 | 0.0000 | 0.7990 |
| 129 | 4.5094 | 0.0000 | -0.0001 | 0.4112 | 1.0584 | 0.0000 | 0.7113 |
| 138 | 2.5917 | 0.0001 | -0.0008 *** | 0.0029 | 0.8595 | 0.0000 | 0.8562 |
| 128 | 1.5759 | 0.0004 | -0.0006 *** | 0.0002 | 0.7973 | 0.0000 | 0.8360 |

| Panel E Funds with the ability of stock selection and timing |
|----------------|
| Code | \( \gamma_p \) | p value | \( \alpha_p \) | p value | \( \beta_{p,1} \) | p value | \( R^2 \) |
| 313 | 1.7376 | 0.0154 | 0.0006 ** | 0.0158 | 1.0207 | 0.0000 | 0.7772 |
| 149 | 1.1879 | 0.0171 | 0.0004 ** | 0.0470 | 0.8817 | 0.0000 | 0.7739 |

Regression with Eqs. (3):

(3) \( R_{p,t} = \alpha_p + \beta_{p,1} MKT_t + \gamma_p MKT_t^2 + \beta_{p,2} SMB_t + \beta_{p,3} HML_t + \epsilon_{p,t} \)
\( \alpha_p^+ \) means that the fund’s \( \alpha_p \) is significantly positive, \( \gamma_p^+ \) means that the fund’s \( \gamma_p \) is significantly positive, \( \alpha_p^+\gamma_p^+ \) means that the fund’s \( \alpha_p \) and \( \gamma_p \) both significantly positive. *, ** And *** Respectively indicate that the stock selection ability is significant at the level of 10%, 5% and 1%.

Table 3 reports the summary analysis of funds with market timing ability (T-M model).

Panel A reports percentage of funds that in the T-M model, \( \alpha_p \) is significantly positive, \( \gamma_p \) is significantly positive, \( \alpha_p \) and \( \gamma_p \) are significantly positive.

Panel B, Panel C and Panel D respectively report the top five funds with market timing ability in the T-M model. It can be seen that among the three types of funds, only 2.1605%, 2.5000% and 1.9608% of them are significantly positive. There is no significant difference among the three types of funds, indicating that in the sample period, Chinese open-end stock funds almost do not have significant stock selection ability and cannot obtain excess return. However, the positive ratio of \( \gamma_p \) is 17.9012%, 25.0000% and 13.7255% respectively, indicating that a small number of fund managers had market timing ability during the sample period, and the active fund was 11.2745% higher than the steady fund, which may be due to the difference of fund investment style. Due to the scarcity of funds with stock selection ability, only 0.6173%, 0.8333% and 0.4902% of the funds with stock selection ability and market timing ability respectively.

Panel E reports the funds with both stock selection and market timing ability. During the sample period, we obtained two funds with both stock selection ability and market timing ability through the T-M model, among which fund 313 is a steady fund and fund 149 is an active fund.

| Category | \( \alpha_p^+ \) | \( \gamma_p^+ \) | \( \alpha_p^+\gamma_p^+ \) |
|----------|----------------|----------------|---------------------|
| Total    | 9.5679         | 14.1975        | 0.0000              |
| Active   | 11.6667        | 22.5000        | 0.0000              |
| Steady   | 8.3333         | 9.3137         | 0.0000              |

| Code | \( \gamma_p \) | p value | \( \alpha_p \) | p value | \( \beta_{p,1} \) | p value | \( R^2 \) |
|------|---------------|---------|----------------|---------|----------------|---------|--------|
| Panel B Total |
| 129  | 0.4450        | 0.0000  | -0.0014 ***   | 0.0048  | 0.8503         | 0.0000  | 0.7155 |
| 194  | 0.3564        | 0.0004  | -0.0018 ***   | 0.0056  | 0.5263         | 0.0000  | 0.6154 |
| 282  | 0.3523        | 0.0004  | -0.0017 ***   | 0.0063  | 0.5277         | 0.0000  | 0.6163 |
| 303  | 0.0605        | 0.0006  | -0.0003 **    | 0.0180  | 0.9436         | 0.0000  | 0.9500 |
| 270  | 0.2193        | 0.0008  | -0.0021 ***   | 0.0000  | 0.5621         | 0.0000  | 0.7299 |
| Panel C Active |
| 194  | 0.3564        | 0.0004  | -0.0018 ***   | 0.0056  | 0.5263         | 0.0000  | 0.6154 |
| 282  | 0.3523        | 0.0004  | -0.0017 ***   | 0.0063  | 0.5277         | 0.0000  | 0.6163 |
| 270  | 0.2193        | 0.0008  | -0.0021 ***   | 0.0000  | 0.5621         | 0.0000  | 0.7299 |
| 271  | 0.2187        | 0.0008  | -0.0021 ***   | 0.0000  | 0.5621         | 0.0000  | 0.7303 |
| 172  | 0.2155        | 0.0022  | -0.0008 **    | 0.0292  | 0.7788         | 0.0000  | 0.7172 |
| Panel D Steady |
| 129  | 0.4450        | 0.0000  | -0.0014 ***   | 0.0048  | 0.8503         | 0.0000  | 0.7155 |
| 303  | 0.0605        | 0.0006  | -0.0003 **    | 0.0180  | 0.9436         | 0.0000  | 0.9500 |
| 138  | 0.1829        | 0.0012  | -0.0013 ***   | 0.0006  | 0.7644         | 0.0000  | 0.8548 |
| 255  | 0.2325        | 0.0088  | -0.0011 **    | 0.0452  | 0.8238         | 0.0000  | 0.7492 |
| 144  | 0.1111        | 0.0155  | -0.0009 ***   | 0.0018  | 0.7968         | 0.0000  | 0.7487 |
Regression with Eqs. (4):

\[ R_{p,t} = \alpha_p + \beta_{p,1}MKT_t + \gamma_p \max(MKT_t, 0) + \beta_{p,2}SMB_t + \beta_{p,3}HML_t + \epsilon_{p,t} \]

\( \alpha_p + \) means that the fund’s \( \alpha_p \) is significantly positive, \( \gamma_p + \) means that the fund’s \( \gamma_p \) is significantly positive, \( \alpha_p + \gamma_p + \) means that the fund’s \( \alpha_p \) and \( \gamma_p \) both significantly positive. *, ** and *** Respectively indicate that the stock selection ability is significant at the level of 10%, 5% and 1%.

Table 4 reports the summary analysis of funds with market timing ability (H-M model).

Panel A reports percentage of funds that in the H-M model, \( \alpha_p \) is significantly positive, \( \gamma_p \) is significantly positive, \( \alpha_p \) and \( \gamma_p \) are significantly positive.

Panel B, Panel C and Panel D respectively report the top five funds with market timing ability in the H-M model. We can see the similar results with T-M model. In the positive percentage of \( \gamma_p \), 22.5000% of active funds is 13.1863% higher than 9.3137% of steady funds. We can see that under H-M model, the market timing ability of active funds is still better than that of steady funds. The difference is that the percentage of \( \alpha_p \) is significantly higher than that of T-M model, and the three types of funds are 9.5679%, 11.6667% and 8.3333% respectively. But at the same time, it is puzzling that when the percentage of funds with stock selection ability rises and the funds with market timing ability do not fluctuate significantly, the funds with these two abilities change to 0. We see the same results in all three types of funds.

Table 5. Summary analysis of funds with volatility timing ability

| Panel A Percentage of funds |
|-----------------------------|
| Category | \( \alpha_p + \) | \( \gamma_p - \) | \( \alpha_p + \gamma_p - \) |
| Total    | 1.5432 | 20.9877 | 0.3086 |
| Active   | 2.5000 | 20.0000 | 0.8333 |
| Steady   | 0.9804 | 21.5686 | 0.0000 |

| Code | \( \gamma_p \) | p value | \( \alpha_p \) | p value | \( \beta_{p,1} \) | p value | \( R^2 \) |
|------|--------------|---------|--------------|---------|---------------|---------|---------|
| Panel B Total |
| 38   | -13.0753     | 0.0000  | -0.0006 ***  | 0.0000  | 0.8177        | 0.0000  | 0.8574  |
| 85   | -14.6087     | 0.0000  | -0.0009 ***  | 0.0000  | 0.8436        | 0.0000  | 0.8431  |
| 89   | -16.4047     | 0.0000  | -0.0006 **   | 0.0110  | 0.8877        | 0.0000  | 0.8203  |
| 93   | -16.7187     | 0.0000  | -0.0008 ***  | 0.0002  | 0.8414        | 0.0000  | 0.7966  |
| 120  | -13.3740     | 0.0000  | -0.0010 ***  | 0.0000  | 0.6671        | 0.0000  | 0.6804  |
| Panel C Active |
| 120  | -13.3740     | 0.0000  | -0.0010 ***  | 0.0000  | 0.6671        | 0.0000  | 0.6804  |
| 75   | -8.6622      | 0.0004  | -0.0001      | 0.2834  | 0.8487        | 0.0000  | 0.8328  |
| 60   | -4.5986      | 0.0005  | -0.0001      | 0.2949  | 0.9531        | 0.0000  | 0.9472  |
| 44   | -5.2146      | 0.0008  | 0.0002 *     | 0.0545  | 1.0156        | 0.0000  | 0.9359  |
| 107  | -10.1539     | 0.0012  | -0.0002      | 0.1040  | 0.9219        | 0.0000  | 0.8016  |
| Panel D Steady |
| 38   | -13.0753     | 0.0000  | -0.0006 ***  | 0.0000  | 0.8177        | 0.0000  | 0.8574  |
| 85   | -14.6087     | 0.0000  | -0.0009 ***  | 0.0000  | 0.8436        | 0.0000  | 0.8431  |
| 89   | -16.4047     | 0.0000  | -0.0006 **   | 0.0110  | 0.8877        | 0.0000  | 0.8203  |
| 93   | -16.7187     | 0.0000  | -0.0008 ***  | 0.0002  | 0.8414        | 0.0000  | 0.7966  |
| 102  | -16.8695     | 0.0000  | -0.0005 ***  | 0.0071  | 0.8645        | 0.0000  | 0.7928  |
| Panel E Funds with the ability of stock selection and timing |
| 44   | -5.2146      | 0.0008  | 0.0002 *     | 0.0545  | 1.0156        | 0.0000  | 0.9359  |
Regression with Eqs. (5):

\[ R_{p,t} = \alpha_p + \beta_{p,1}MKT_t + \gamma_p(V_{m,t} - \bar{V}_m)MKT_t + \beta_{p,2}SMB_t + \beta_{p,3}HML_t + \epsilon_{p,t} \]

\(\alpha_p\) means that the fund’s \(\alpha_p\) is significantly positive, \(\gamma_p\) means that the fund’s \(\gamma_p\) is significantly negative, \(\alpha_p + \gamma_p\) means that the fund’s \(\alpha_p\) is significantly positive and \(\gamma_p\) is significantly negative. *, ** And *** Respectively indicate that the stock selection ability is significant at the level of 10%, 5% and 1%.

Table 5 reports the summary analysis of funds with volatility timing ability.

Panel A reports percentage of funds that in the volatility model, \(\alpha_p\) is significantly positive, \(\gamma_p\) is significantly positive, \(\alpha_p\) and \(\gamma_p\) are significantly positive.

Panel B, Panel C and Panel D respectively report the top five funds with volatility timing ability. It can be seen that the percentage of \(\alpha_p\) significantly positive remains at a very low level, while the volatility timing ability of the three types of funds is almost the same, 20.9877%, 20.0000 and 21.5686% respectively. Among the top five active funds, we have rarely seen a fund with an excess return.

Panel E reports on funds with both stock selection ability and volatility timing ability. We use the volatility timing model to obtain a fund that differs from the T-M market timing model. Fund 44 is an active fund.

Table 6. Summary analysis of funds with liquidity timing ability

| Category | \(\alpha_p\) | \(\gamma_p\) | \(\alpha_p + \gamma_p\) |
|----------|--------------|--------------|------------------------|
| Total    | 1.5432       | 25.0000      | 0.3086                 |
| Active   | 1.6667       | 28.3333      | 0.0000                 |
| Steady   | 1.4706       | 23.0392      | 0.4902                 |

| Code | \(\gamma_p\) | p value | \(\alpha_p\) | p value | \(\beta_{p,1}\) | p value | \(R^2\) |
|------|--------------|---------|--------------|---------|----------------|---------|--------|
| Panel B Total |            |         |             |         |                |         |        |
| 22   | -0.4640      | 0.0000  | -0.0004 *   | 0.0603  | 0.8460         | 0.0000  | 0.8085 |
| 315  | -0.3894      | 0.0000  | -0.0007 *** | 0.0014  | 0.7959         | 0.0000  | 0.8305 |
| 25   | -0.3537      | 0.0000  | -0.0005 *** | 0.0082  | 0.9289         | 0.0000  | 0.8526 |
| 75   | -0.3739      | 0.0000  | -0.0003     | 0.1389  | 0.8272         | 0.0000  | 0.8334 |
| 71   | -0.2552      | 0.0003  | -0.0015 *** | 0.0000  | 0.7282         | 0.0000  | 0.8276 |
| Panel C Active |         |         |             |         |                |         |        |
| 75   | -0.3739      | 0.0000  | -0.0003     | 0.1389  | 0.8272         | 0.0000  | 0.8334 |
| 71   | -0.2552      | 0.0003  | -0.0015 *** | 0.0000  | 0.7282         | 0.0000  | 0.8276 |
| 1    | -0.1229      | 0.0005  | -0.0003 *** | 0.0021  | 0.8851         | 0.0000  | 0.9601 |
| 26   | -0.2531      | 0.0007  | -0.0003 *   | 0.0825  | 0.8783         | 0.0000  | 0.8770 |
| 90   | -0.3193      | 0.0010  | -0.0011 *** | 0.0000  | 0.9011         | 0.0000  | 0.8190 |
| Panel D Steady |        |         |             |         |                |         |        |
| 22   | -0.4640      | 0.0000  | -0.0004 *   | 0.0603  | 0.8460         | 0.0000  | 0.8085 |
| 315  | -0.3894      | 0.0000  | -0.0007 *** | 0.0014  | 0.7959         | 0.0000  | 0.8305 |
| 25   | -0.3537      | 0.0000  | -0.0005 *** | 0.0082  | 0.9289         | 0.0000  | 0.8526 |
| 42   | -0.3098      | 0.0007  | -0.0006 *** | 0.0052  | 0.8959         | 0.0000  | 0.8625 |
| 144  | -0.3423      | 0.0014  | -0.0004 **  | 0.0243  | 0.8442         | 0.0000  | 0.7498 |
| Panel E Funds with the ability of stock selection and timing | | | | | | | |
| 313  | -0.1974      | 0.0456  | 0.0008 ***  | 0.0014  | 1.0098         | 0.0000  | 0.7766 |
Regression with Eqs. (6):

\[ R_{p,t} = \alpha_p + \beta_{p,1}MKT_t + \gamma_p(L_{m,t} - \bar{L}_m)MKT_t + \beta_{p,2}SMB_t + \beta_{p,3}HML_t + \epsilon_{p,t} \]

\( \alpha_p \) means that the fund’s \( \alpha_p \) is significantly positive, \( \gamma_p \) means that the fund’s \( \gamma_p \) is significantly negative, \( \alpha_p + \gamma_p \) means that the fund’s \( \alpha_p \) is significantly positive and \( \gamma_p \) is significantly negative. * , ** And *** Respectively indicate that the stock selection ability is significant at the level of 10%, 5% and 1%.

Table 6 reports the summary analysis of funds with liquidity timing ability.

Panel A reports percentage of funds that in the liquidity model, \( \alpha_p \) is significantly positive, \( \gamma_p \) is significantly positive, \( \alpha_p \) and \( \gamma_p \) are significantly positive.

Panel B, Panel C and Panel D respectively report the top five funds with volatility timing ability. The percentage of funds with a significant positive value is still very low, with only 1.5432%, 1.6667% and 1.4706% of the three types of funds, respectively. However, the percentage of funds with \( \alpha_p \) significant positive value is further increase, with a quarter of the funds with a significant positive value of \( \gamma_p \), and 28.3333% of the active funds with liquidity timing ability.

Panel E reports on funds with both stock selection ability and liquidity timing ability. Fund 313 also have market timing ability in T-M model.

Next, we summary the funds with timing ability obtained from the above models.

Table 7. Summary of funds with stock selection ability and timing ability

| Code | \( \gamma_p \) | p value | \( \alpha_p \) | p value | \( \beta_{p,1} \) | p value | \( R^2 \) |
|------|----------------|---------|----------------|---------|----------------|---------|---------|
| 313 (T-M) | 1.7376 | 0.0154 | 0.0006 ** | 0.0158 | 1.0207 | 0.0000 | 0.7772 |
| 149 | 1.1879 | 0.0171 | 0.0004 ** | 0.0470 | 0.8817 | 0.0000 | 0.7739 |
| 44 | -5.2146 | 0.0008 | 0.0002 * | 0.0545 | 1.0156 | 0.0000 | 0.9359 |
| 313 (Liquidity) | -0.1974 | 0.0456 | 0.0008 *** | 0.0014 | 1.0098 | 0.0000 | 0.7766 |

Panel B Comparison of fund and market returns

| Code | N | CFR | CMR | Mean | Std |
|------|---|-----|-----|------|-----|
| 313 | 682 | 75.8200 | 17.9449 | 0.0918 | 1.3481 |
| 149 | 1001 | 156.5420 | 10.5412 | 0.1045 | 1.4343 |
| 44 | 1165 | 31.2302 | 21.6716 | 0.0432 | 1.9835 |

Code is the sample fund code, N is the sample days, CFR is cumulative fund return, CMR is cumulative market return.

Table 7 reports the summary of funds with stock selection ability and timing ability.

Panel A reportes three funds with the stock selection ability and timing ability. Among which fund 313 have the stock selection ability and timing ability in T-M model and liquidity timing model respectively, fund 149 have the stock selection ability and timing ability in T-M model, fund 44 have the stock selection ability and timing ability in volatility timing model, H-M model do not find the fund with the above ability. Among the three funds with timing ability, \( \beta_{p,1} \) of two funds is greater than 1.

Panel B reports the comparison of fund and market returns. The returns of the two funds with market timing ability
are 75.8200% and 156.5420% respectively, which are significantly higher than the market returns of the same period. At the same time, the return of these two funds is also higher than that of fund 44 (which have volatility timing ability). In these two funds, the return of fund 149 (only have market timing ability) is significantly higher than that of fund 313 (which have two timing abilities). While the return of fund 44 with volatility timing ability is 31.2302%, which is higher than the market return of 9.5586% in the same period.

4. Further Analysis

In order to effectively study the timing ability of funds in different periods, this paper further divides the study period into rise and fall periods base on Fabozzi and Francis (1979) and Pagan and Sossounov (2003)'s criterion of market rise and fall, in which Fabozzi and Francis (1979) divides the study period into rise and fall periods base on market trends, if the market index rises for 3 consecutive months from a low in a particular band, or falls for 3 consecutive months from a high in a particular band, it is define as the starting point of the rise period and the fall period respectively. In addition, each period of this paper must be in accordance with Pagan and Sossounov (2003)'s definition, that is the index must rise 20% from the low point or fall 20% from the high point.

![Figure 2. Trend of CSI 300 index](image)

Figure 2 shows the trend of the market index.

| Period              | Index change   | Return  | N  | Trend |
|---------------------|----------------|---------|----|-------|
| 2015/01-2015/05     | 3533.71-4840.83 | 36.99%  | 5  | Rise  |
| 2015/06-2016/02     | 4840.83-2877.47 | -40.56% | 9  | Fall  |
| 2016/03-2018/01     | 2877.47-4275.90 | 48.60%  | 23 | Rise  |
| 2018/02-2018/12     | 4275.90-3010.65 | -29.59% | 11 | Fall  |
| 2019/01-2019/12     | 3031.65-4096.58 | 36.07%  | 12 | Rise  |

N is the number of months in the period.

Table 8 shows the index change and period return in the rise and fall periods.

After the above classification, in order to retain the fund with at least 250 days of trading data in the sample period, the number of our three types of fund samples is change to 253, 78 and 175 in the rise period, respectively, while 133, 41 and 92 in the fall period, respectively. Then we test the market timing, volatility timing and liquidity timing again.
Table 9. Cross-sectional distribution of t-statistics for the timing coefficients across individual funds

| Period | Model | Category | t≤-2.326 | t≤-1.960 | t≤-1.645 | t≥1.645 | t≥1.960 | t≥2.326 |
|--------|-------|----------|----------|----------|----------|----------|----------|----------|
| **Panel A Market Timing** | | | | | | | | |
| | | Rise | | | | | | |
| | | T-M | Total | 8.6957 | 12.2530 | 14.6245 | 5.1383 | 3.5573 | 2.3715 |
| | | | Active | 7.6923 | 10.2564 | 12.8205 | 6.4103 | 3.8462 | 2.5641 |
| | | | Steady | 9.1429 | 13.1429 | 15.4286 | 4.5714 | 3.4286 | 2.2857 |
| | | H-M | Total | 11.4625 | 16.2055 | 20.9486 | 3.9526 | 1.9763 | 1.5810 |
| | | | Active | 14.1026 | 15.3846 | 19.2308 | 5.1282 | 3.8462 | 3.8462 |
| | | | Steady | 10.2857 | 16.5714 | 21.7143 | 3.4286 | 1.1429 | 0.5714 |
| | | Fall | | | | | | |
| | | T-M | Total | 26.3158 | 32.3308 | 36.0902 | 7.5188 | 6.0150 | 3.0075 |
| | | | Active | 26.8293 | 39.0244 | 43.9024 | 7.3171 | 4.8780 | 0.0000 |
| | | | Steady | 26.0870 | 29.3478 | 32.6087 | 7.6087 | 6.5217 | 4.3478 |
| | | H-M | Total | 24.8120 | 32.3308 | 42.1053 | 4.5113 | 3.0075 | 1.5038 |
| | | | Active | 17.0732 | 26.8293 | 36.5854 | 2.4390 | 2.4390 | 0.0000 |
| | | | Steady | 28.2609 | 34.7826 | 44.5652 | 5.4348 | 3.2609 | 2.1739 |
| **Panel B Volatility Timing** | | | | | | | | |
| | | Rise | | | | | | |
| | | Total | 7.9051 | 13.0435 | 16.6008 | 6.3241 | 5.1383 | 2.7668 |
| | | Active | 6.4103 | 7.6923 | 14.1026 | 6.4103 | 3.8462 | 2.5641 |
| | | Steady | 8.5714 | 15.4286 | 17.7143 | 6.2857 | 5.7143 | 2.8571 |
| | | Fall | | | | | | |
| | | Total | 13.5338 | 20.3008 | 25.5639 | 10.5263 | 5.2632 | 1.5038 |
| | | Active | 12.1951 | 21.9512 | 24.3902 | 7.3171 | 0.0000 | 0.0000 |
| | | Steady | 14.1304 | 19.5652 | 26.0870 | 11.9565 | 7.6087 | 2.1739 |
| **Panel C Liquidity Timing** | | | | | | | | |
| | | Rise | | | | | | |
| | | Total | 0.3953 | 2.3715 | 5.5336 | 0.0000 | 0.0000 | 0.0000 |
| | | Active | 0.0000 | 2.5641 | 5.1282 | 0.0000 | 0.0000 | 0.0000 |
| | | Steady | 0.5714 | 2.2857 | 5.7143 | 0.0000 | 0.0000 | 0.0000 |
| | | Fall | | | | | | |
| | | Total | 22.5564 | 28.5714 | 33.0827 | 19.5489 | 18.7970 | 14.2857 |
| | | Active | 34.1463 | 43.9024 | 46.3415 | 12.1951 | 12.1951 | 9.7561 |
| | | Steady | 17.3913 | 21.7391 | 27.1739 | 22.8261 | 21.7391 | 16.3043 |

This table reports the t-statistic distribution of market timing, volatility timing and liquidity timing coefficients. We test the market timing, volatility timing and liquidity timing ability of total, active and steady funds in the rise and fall periods respectively. Panel A reports the results of market timing model, Panel B reports the results of volatility timing model, and Panel C reports the results of liquidity timing model. Columns 4 to 9 list the percentage of funds which the t-statistics of the timing coefficient exceed the indicated values.

Table 9 reports the percentage of funds market timing, volatility timing and liquidity timing ability coefficient of Total, Active and Steady funds in the rise and fall periods exceed the indicated value.

Panel A reports the results of the market timing T-M model. Generally speaking, the percentage of funds with significant market timing ability in the fall period is higher than that in the rise period, indicating that fund managers are more able to select the market timing in the fall period. In particular, the percentage of active funds with market
timing ability decrease more than that of the whole period, with an increase period of 6.4103% and a decrease period of 7.3171%, compared with 20.0000% in the whole period (Table 2). The results of market timing H-M model in rise and fall periods are almost the same, both of which are below 8%. Similar to the results of the whole period, there is almost no market timing ability in the sample period.

Panel B reports the results of the volatility timing model. The percentage of the three types of funds with the volatility timing ability in the rise period was 16.6008%, 14.1026% and 17.7143%, which were about 1% lower than the whole period, while the percentage of the funds with the volatility timing ability in the fall period is 25.5639%, 24.3902% and 26.0870%, which are significantly higher than the whole period, and the percentage of the three types of funds is little different. It can be seen that Chinese open-end equity funds are more able to adjust fund exposure according to market volatility in the fall period to resist risks.

Panel C reports the results of liquidity timing ability, which is similar to that of volatility timing ability. Only 5.5336%, 5.1282% and 5.7143% of the three types of funds in the rise period have liquidity timing ability, which are significantly lower than that in the whole period, but opposite in the fall period. The percentage of the three types of funds is 33.0827%, 46.3415% and 27.1739%, which are respectively higher than that in table 2, it is 16.1074%, 26.3415% and 11.9778% higher in the whole period. It can be judged that when the market falls, fund managers have more liquidity timing ability, especially active funds. In the fall period, nearly half of the funds (46.3415%) have liquidity timing ability significantly.

5. Conclusion

This paper focuses on the test of timing ability of Chinese open-end equity funds. The sample period lasts for 1219 trading days in 5 years, covering the bull market and sharp fall of Chinese stock market in 2015, as well as the shocks and reversals in the following years, which is enough to effectively observe the timing ability of fund managers in different periods.

Through empirical analysis, we find that during the sample period, Chinese open-end equity funds can hardly obtain excess returns, and only a few funds have the ability to choose the time. Specifically, in terms of the market timing ability in the whole period, Active funds perform better than Steady funds, but divided into rise period and fall period, active funds lost this advantage, falling into a lower level with steady funds. In terms of volatility timing ability, about one-seventh of the funds had volatility timing ability during the whole period, and the percentage of the sample funds that had volatility timing ability increase by about 10% during the fall period, it can be seen that Chinese open-end equity funds have a good volatility performance in the fall period, up to a quarter of the fund has volatility timing ability. Similar to the result of volatility timing ability, the percentage of funds with liquidity timing ability is higher, and it is more noticeable that the percentage of active funds with liquidity timing ability is as high as 45.34% in the fall period, far outperform during the rise period.

Among the funds with both stock selection ability and timing ability, those with market timing ability through T-M model have excellent stock selection ability, among them, the fund with market timing ability is higher than the fund with both market timing ability and liquidity timing ability, and the fund with volatility timing ability is slightly higher than the market return. Based on this, it can be inferred that investors may obtain higher excess returns by choosing funds with market timing ability through T-M model, and can also obtain a small amount excess returns by choosing funds with volatility and liquidity timing ability.

Due to the generally poor performance of Chinese open-end equity funds during the sample period, only a few funds can obtain excess returns, which leads to the inability to better explain the impact of timing ability on fund returns. However, due to the influence of Chinese current policies, the positions of equity funds must be kept at more than 80%, and it is impossible to avoid risks by reducing positions when the market falls, which may become an important factor limiting the performance of equity funds.

Overall, our study provides some insights on whether fund managers have different types of timing ability and whether they have such timing ability in the rise and fall periods. Future research can explore new types of timing ability, or funds of more different types of investment or of different frequencies.

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**Appendix**

**Chinese equity funds**

| Code | Fund Code | Style |
|------|-----------|-------|
| 1    | 000082    | 1     |
| 2    | 000309    | 2     |
| 3    | 000326    | 1     |
| 4    | 000409    | 1     |
| 5    | 000411    | 2     |
| 6    | 000418    | 2     |
| 7    | 000457    | 2     |
| 8    | 000471    | 1     |
| 9    | 000513    | 1     |
| 10   | 000524    | 2     |
| 11   | 000549    | 2     |
| 12   | 000577    | 2     |
| 13   | 000586    | 1     |
| 14   | 000592    | 1     |
| 15   | 000594    | 1     |
| 16   | 000628    | 1     |
| 17   | 000688    | 2     |
| 18   | 000696    | 2     |
| 19   | 000697    | 2     |
| 20   | 000711    | 1     |
| 21   | 000729    | 2     |
| 22   | 000746    | 2     |
| 23   | 000751    | 1     |
| 24   | 000756    | 2     |
| 25   | 000761    | 2     |
| 26   | 000778    | 1     |
| 27   | 000780    | 1     |
| 28   | 000793    | 2     |
| 29   | 000803    | 2     |
| Page | ISSN 1923-4023 | E-ISSN 1923-4031 |
|------|----------------|------------------|
| 30   | 000828 1       |                  |
| 31   | 000831 2       |                  |
| 32   | 000854 1       |                  |
| 33   | 000866 2       |                  |
| 34   | 000867 2       |                  |
| 35   | 000884 1       |                  |
| 36   | 000893 1       |                  |
| 37   | 000913 2       |                  |
| 38   | 000916 2       |                  |
| 39   | 000925 2       |                  |
| 40   | 000955 2       |                  |
| 41   | 000960 1       |                  |
| 42   | 000971 2       |                  |
| 43   | 000974 1       |                  |
| 44   | 000978 1       |                  |
| 45   | 000979 2       |                  |
| 46   | 000985 2       |                  |
| 47   | 000991 2       |                  |
| 48   | 000996 2       |                  |
| 49   | 001008 1       |                  |
| 50   | 001009 2       |                  |
| 51   | 001028 2       |                  |
| 52   | 001036 2       |                  |
| 53   | 001039 2       |                  |
| 54   | 001040 2       |                  |
| 55   | 001042 2       |                  |
| 56   | 001043 1       |                  |
| 57   | 001044 2       |                  |
| 58   | 001047 2       |                  |
| 59   | 001048 1       |                  |
| 60   | 001050 1       |                  |
| 61   | 001054 2       |                  |
| 62   | 001070 2       |                  |
| 63   | 001072 2       |                  |
| 64   | 001097 2       |                  |
| 65   | 001104 2       |                  |
| 66   | 001105 1       |                  |
| 67   | 001126 2       |                  |
| 68   | 001158 1       |                  |
| 69   | 001162 2       |                  |
| 70   | 001163 2 | 170  | 002952 2 | 270  | 005628 1 |
| 71   | 001166 1 | 171  | 002980 2 | 271  | 005629 1 |
| 72   | 001167 1 | 172  | 003053 1 | 272  | 005635 1 |
| 73   | 001171 1 | 173  | 003054 1 | 273  | 005636 1 |
| 74   | 001178 2 | 174  | 003069 1 | 274  | 005662 2 |
| 75   | 001186 1 | 175  | 003145 2 | 275  | 005663 2 |
| 76   | 001188 1 | 176  | 003190 1 | 276  | 005669 2 |
| 77   | 001193 2 | 177  | 003191 1 | 277  | 005763 1 |
| 78   | 001195 2 | 178  | 003230 1 | 278  | 005777 2 |
| 79   | 001208 2 | 179  | 003231 1 | 279  | 005802 2 |
| 80   | 001223 1 | 180  | 003232 1 | 280  | 005825 2 |
| 81   | 001230 1 | 181  | 003233 1 | 281  | 005826 2 |
| 82   | 001236 2 | 182  | 003298 2 | 282  | 005885 1 |
| 83   | 001245 2 | 183  | 003299 2 | 283  | 005894 2 |
| 84   | 001277 2 | 184  | 003312 2 | 284  | 005927 1 |
| 85   | 001291 2 | 185  | 003416 2 | 285  | 005928 1 |
| 86   | 001313 2 | 186  | 003492 2 | 286  | 005960 1 |
| 87   | 001319 2 | 187  | 003622 1 | 287  | 005961 1 |
| 88   | 001396 1 | 188  | 003623 1 | 288  | 005962 1 |
| 89   | 001404 2 | 189  | 003624 1 | 289  | 005963 1 |
| 90   | 001409 1 | 190  | 003625 1 | 290  | 005968 1 |
| 91   | 001410 2 | 191  | 003634 1 | 291  | 005969 1 |
| 92   | 001416 2 | 192  | 003745 2 | 292  | 006002 1 |
| 93   | 001421 2 | 193  | 003834 2 | 293  | 006003 1 |
| 94   | 001473 2 | 194  | 003853 1 | 294  | 006138 2 |
| 95   | 001476 2 | 195  | 003865 1 | 295  | 006195 1 |
| 96   | 001482 2 | 196  | 003956 2 | 296  | 006265 2 |
| 97   | 001490 2 | 197  | 003984 2 | 297  | 006346 2 |
| 98   | 001496 2 | 198  | 003985 2 | 298  | 006347 2 |
| 99   | 001520 2 | 199  | 004040 1 | 299  | 006478 2 |
| 100  | 001521 2 | 200  | 004041 1 | 300  | 110022 2 |

Style 1: Active fund  
Style 2: Steady fund