Performance ranking and style drift of public offering funds based on the DGTW approach

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Abstract

Due to the information asymmetry between investors and fund managers, under the pressure of performance ranking, some public fund managers would take advantage of their own information advantages, deviate from the investment direction agreed in the contract, and change the original investment style. In order to protect the rights and interests of investors, regulators have recently restricted the phenomenon of fund style drift and the behavior of "style drift" and "high turnover rate" to gain short-term trading profits. In this context, the research on the relationship between performance ranking and style drift of public funds has strong practical significance. By constructing DGTW style index and using position-based fund style identification method, this paper identifies the actual investment style of Chinese public funds from 2011 to 2021. Through the relationship between interim performance ranking and fund style drift, and taking the change of fund manager, market environment, fund size and the proportion of fund shares held by institutional investors as moderating variables, this paper analyzed the moderating factors between interim performance ranking and fund style drift. Then the influence of fund style drift on fund flow is also analyzed. The results shown that style drift is common in China's public funds, and the net inflow of funds could be promoted through fund style drift. Among them, the change of fund manager had a positive moderating effect on the relationship between

interim performance ranking and fund style drift, and the proportion of institutional investors had a negative moderating effect on the relationship. Based on this, our country should further improve and perfect the fund style monitoring mechanism. All fund managers and fund custodians shall adhere to the spirit of the contract, fulfill their fiduciary obligations, and abide by various laws and regulations. It is prohibited to mislead investors and damage the credibility of the industry. In addition, the risk committee of the fund company should carry out irregular inspection and supervision, and punish the fund manager who frequently happens to drift the style of the fund, so as to prevent and control the risk of the fund operation.

Key words: fund contract; style drift; DGTW; ranking pressure; spirit of contract

1. Introduction

The public offering fund industry in China is expanding at a rapid rate and experiencing increased competition. Fund managers in China's public offering funds are required to maximize their compensation in order to take advantage of the fixed-fee system's ability to attract investors. On the other hand, according to the fund offering prospectus's investment style and investment philosophy, investors typically select funds that are appropriate for their own investment style, income expectation, and risk tolerance. Fund managers can use their own information advantages to alter the initial investment style of the fund and maximize the salary target by pursuing short-term investment hot spots in the market and attracting capital inflows due to the information asymmetry between investors and fund managers and the pressure of performance ranking. As a result, fund style drift emerges as a phenomenon. Under the foundation that fund style drift conduct has turned into the worry of market oversight divisions, this paper attempts to figure out the system of break execution positioning influencing fund style drift and the impact of style drift on reserve capital stream, and advances idea on the administration of asset style drift peculiarity.

The Rate-based fund style identification method (RBSA) is used by the majority of scholars. When compared to the hold-based fund style identification method, the rate-based fund style identification method predicts the fund's future return rate more accurately. Based on the fund shareholding data that has been published in previous reports, the HBSA method can accurately measure the fund style and promptly detect changes in the fund style. Subsequently, HBSA method is better than RBSA method with regards to precision and idealness. The HBSA method is generally superior to the RBSA method. In addition, no single conclusion can be reached regarding the effect that interim performance ranking has on fund style drift. Early researchers are of the opinion that fund managers who have had poor performance in the interim will, in the second half of the year, make more risky investments, thereby increasing the degree of fund style drift. As a result of ongoing in-depth research, some academics established the expectation that fund managers with good interim performance would increase risk-taking activities in the following period to rectify the situation of lagging interim performance. As a result of this expectation, fund managers who have performed better in the interim will increase the risks in the second half of the investment to maintain their lead, attract capital, and maximize their compensation. There are numerous studies on how interim performance ranking affects fund style drift, but no analysis of how interim performance ranking affects style drift adjusts is available. At last, in past examinations because of style drift on store capital stream, most researchers accept that style drift asset can advance capital inflow. Although numerous studies have looked at how fund flows are affected by fund style drift, they have not looked at how market conditions regulate fund flows and style drift.

This paper introduces three main innovations. First, the fund holdings-based style identification method (HBSA) is used in this paper. By mentioning Daniel et al. (1997), the DGTW style index is created to determine the fund's actual investment strategy. It avoids the issue of a low degree of fitting in the regression process in comparison to the style recognition method based on fund rate of return (RBSA) and can accurately and promptly identify the fund style. Second, this paper investigates and examines the causes of fund style drift from the perspective of interim performance ranking using the style identification method based on fund holdings. This paper adds to the body of research on the impact of interim performance ranking

on fund style drift by introducing four moderating factors—change in fund manager, market environment, fund size, and proportion of shares held by institutional investors—as opposed to the previous literature. Thirdly, we investigate how fund flow is affected by fund style drift. This study, in contrast to previous research, examines the distinct impact of fund style drift behavior on fund flows in various market environments by using the market environment as a moderating factor.

2. The moderating factors analysis of the relationship between interim performance ranking and fund style drift

(1) The moderating effect of fund manager change on interim performance ranking and fund style drift

According to Shu(2013), when fund managers changed in a given year, the newly appointed managers were under greater performance pressure to demonstrate their trading skills. Yiet al. (2020) trusted that when store administrators change, the succeeding asset supervisors ought to perform as well as the active asset directors. This has encouraged subsequent fund managers to take on more risks as a result of the pressure of performance rankings. Changes to fund managers will put more pressure on them to perform, which will encourage fund style drift behavior. Xiaoet al. (2016) believed that the risk of fund managers being fired is related to past performance, and fund managers with poor past performance are more likely to be fired. Guo(2010) found that the more regularly store supervisors change, the more serious the style drift of the asset. Brown (2001) accepted that the expert market of asset chiefs is a profoundly serious market. The subsequent managers who manage the fund will be subjected to greater performance pressure if the manager of the fund changes frequently.

This paper argues that when fund managers leave their positions, newly hired managers need to demonstrate their trading skills quickly in order to avoid being fired, increase net fund inflows, maximize their own compensation, face increased performance pressure, and encourage the influence of interim performance ranking on style drift. Consequently, theory 3 is proposed in this paper.

H3: Fund manager changes have a positive moderating effect on the relationship between interim performance ranking and fund style drift.

(2) The moderating effect of market environment on interim performance ranking and fund style drift

Yi et al. (2021) found that fund managers with poor performance in the early stage will improve the degree of fund style drift in a bear market, while the change is not obvious in a bull market. According to Xiao(2016), during a bull market, investors tend to focus on performance, more money enters the market, and overall market returns are favorable. However, the overall money-making effect of the market is poor during a bear market, investors tend to ignore performance, and less money enters the market. Yiet al. (2020) accepted that compared with the bull market, in the bear market, less funds will flow into the capital market, and there is a certain lag in the flow of funds. Fund managers with poor performance in the early stage will try to improve their performance by increasing investment risks to attract capital inflows.

This paper argues that fund managers' trading abilities are more tested in a bear market than in a bull market, which results in increased competition among fund managers because of the poor overall money-making effect of the market and the low flow of funds into the market. By striving for higher performance rankings, fund managers have a stronger incentive to attract net inflows. Subsequently, fund managers will confront more prominent execution pressure. Because the market's overall return is high and there is more capital in the market during a bull market, fund managers will feel less pressure to perform, which reduces the impact of interim performance ranking on style drift. This paper therefore proposes hypothesis 4.

H4: The relationship between interim performance ranking and fund style drift is negatively moderated by the bull market environment.

(3) The moderating effect of fund size on interim performance ranking and fund style drift $% \left(\frac{1}{2} \right) = 0$

Kempf(2009) and Chan(2016) believed that the mechanism of linking fund managers' compensation to fund size (AUM) can motivate fund managers to maximize their compensation by pursuing relative performance ranking. Zou Pengfei et al. (2018) found that when the performance of a fund is better than its benchmark, the fund will gain excess net capital inflows, and the main purpose of the fund style drift behavior is that the fund manager seeks to maximize the scale.

The moderating effect of fund size on the relationship between interim performance ranking and style drift is discussed in academic circles. The first viewpoint is that fund size has a positive moderating effect on the relationship between interim performance ranking and fund style drift. Chua (2020) believed that compared with small funds, fund managers with large assets face greater risk of asset shrinkage and greater pressure on performance. They try to outperform their peers in terms of performance and become top-ranked funds to attract capital inflows.

The second view is that fund size has a negative moderating effect on the relationship between interim performance ranking and fund style drift. Yi et al. (2021) argued that small funds are easier to control than large ones. Therefore, under the pressure of interim ranking, small-scale funds are more likely to have style drift than large-scale funds in order to pursue compensation maximization. Therefore, this paper proposes the following alternative hypothesis to describe the moderating effect of fund size on interim fund performance and style drift:

H5a: Fund size has a negative moderating effect on the relationship between interim performance ranking and fund style drift.

H5b: Fund size has a positive moderating effect on the relationship between interim performance ranking and fund style drift.

(4) The moderating effect of institutional investor holding ratio on interim performance ranking and fund style drift

Gong et al. (2016)found that as a rule, most supports held by institutional fund investors could further develop store execution. This evidence demonstrated that, in contract setting, institutional investors are more effective than individual fund holders at supervising fund operation and safeguarding investor interests. According to Zhang (2021), institutional investors typically hold fund shares for a considerable amount of time, which, to some extent, lessens the impact of redemption on transactions. According to this paper, institutional investors outnumber all other fund holders in terms of their ability to acquire professional knowledge, investment experience, and information. As a result, it is easier to constrain fund companies and fund managers to ensure that their interests align with those of investors. Additionally, institutional investors frequently invest over the long term. The impact of interim performance ranking on fund style drift is limited by the lower short-term performance pressure fund managers will face with a higher proportion of institutional investors. This paper

H6: The relationship between interim performance ranking and fund style drift is negatively moderated by the holding proportion of institutional investors.

2.4 The mechanism theory analysis of fund style drift affecting fund capital flow

Some studies have found that when certain stocks or venture styles in the financial exchange perform well, public contribution assets might have group conduct inside the year, that is to say, drift to a specific style in a specific year (Wu et al., 2005; Li at el., 2010). Cooper (2005) was of the opinion that altering the fund's initial investment strategy and investing in short-term hot spots would encourage the manager of the fund to adopt a new style. Zouet al. (2018) tracked down that when the exhibition of an asset is superior to its benchmark, the asset will acquire overabundance net capital inflows, and the principal reason for the asset style drift conduct is that the asset supervisor looks to boost the scale. According to Sensoy (2009), fund managers use fund style drift as an operational strategy to boost fund flow. Guo et al. (2011) found that fund capital flow and fund style drift were positively correlated. This study argues that ordinary investors engage in irrational behavior when they invest in short-term market hot styles or hot stocks. Consequently, store supervisors draw in financial backers to contribute by making their assets drift towards the ongoing business sector hot styles, to get new assets and accomplish the objective of compensation boost. This paper therefore proposes hypothesis 7.

H7: Fund style drift can attract capital inflows.

3. Empirical analysis

3.1Data source

Sample data in this paper are divided into fund data and stock data. The year of sample data is from December 31, 2010 to June 30, 2021, including shareholding data published in the semi-annual report and annual report, fund net assets, fund company net assets, fund manager tenure, fund transaction costs, and proportion held by institutional investors, etc. The research objects selected partial stock mixed funds and stock funds established before June 2010, and made the following screening of funds:

First, the selected sample fund names, investment objectives and investment concepts have keywords that can show the fund strategy style, such as large market, mid-cap, small-cap, growth, value, dividend, value-added, etc.

Second, some samples are excluded: flexible allocation funds, index funds, QDII funds, enhanced index funds. Among them, the flexible allocation fund itself does not have a clear fixed investment style, and there is no clear restriction on asset allocation, so the investment position is relatively flexible. Therefore, it is excluded from the sample in this paper.

Third, funds that were delisted between December 31, 2010 and June 30, 2021 were retained to reduce the impact of survivor bias on the conclusions. The final sample consisted of 287 funds.

The stock data includes the financial data of Shanghai and Shenzhen stocks available for investment by public fund managers from 2010 to 2021, mainly including the circulating market value, price-to-book ratio, return rate and industry classification of stocks. The data comes from wind database, Guotai 'an database and TongHuaShun database.

3.2Construction of style index and identification of fund style drift

(1) Style index was constructed according to DGTW research method

In this paper, the method of Daniel et al. (1997) is adopted to construct an A-share stock style index on June 30 each year. The indexes used to construct the stock style index are scale, book-to-market ratio and momentum. The size of the stock is measured by the float market value of the listed company, which is the data as of June 30 each year; The book-to-market ratio is firstly calculated by reciprocal of price-to-book ratio, and then adjusted by industry classification of CSRC, that is, the book-to-market ratio calculated by each company is subtracted from the average book-to-market ratio of the industry, and the data is used at the end of the previous year. The momentum is calculated by the monthly return rate of the stock, and the time span is calculated by the first 12 months of the formation date of the stock style index. For example, the style index shall be constructed on June 30, 2021, using the circulating market value of listed companies on June 30, 2021, the book-to-market ratio of listed companies on June 30, 2021, the book-to-market ratio of listed companies on June 30, 2021, the book-to-market ratio of listed companies on June 30, 2021, the book-to-market ratio of listed companies on June 30, 2021, the book-to-market ratio of listed companies on June 30, 2021, the book-to-market ratio of listed companies on June 2021.

After the scale, book-to-market ratio and momentum indexes of A-share listed companies are calculated, 125 portfolios are constructed by conditional triple sequencing. This ranking method is different from the ranking method used by Fama

when constructing the three-factor index. The specific steps are divided into three steps. The first step is to rank the circulating market value of listed companies and divide them into five groups using the method of quintile. Each group of listed companies is numbered and assigned points according to the circulating market value from high to low. The second step is to divide the portfolio into five groups on the basis of the five groups in the first step according to the book-to-market ratio index, so as to get 25 groups of portfolios. The scoring rule is the same as the first step. The group with the largest book-to-market ratio is 5 points, and the group with the largest book-to-market ratio is 1 point. The third step is to divide the group into five groups according to the momentum index on the basis of the second step. This time, the scoring rule is the same as before. The group with the largest momentum is 5 points, and the group with the largest momentum is 1 point. So it end up with 125 portfolios.

(2) Fund style recognition

Wermers (2012) and Sha (2020) use a position-based approach to identify fund styles, defining fund styles as the sum of the style dimensions of each holding stock. Specifically, the investment style of the fund *i* in time *t* is the sum of the characteristics of the stocks*k* held, which is expressed by the sum of the style scores ($SCORE_{D,t,i}$, D=1,2,3) . $SCORE_{1,t,i}$, $SCORE_{2,t,i}$, $SCORE_{3,t,i}$ respectively represents the sum of style exposure degree of fund *i*'s holdings of stock *k* to size factor, book-to-market ratio factor and momentum factor during period *t*.

$$SCORE_{D,t,i} = \sum_{k=1}^{n} w_{k,t,i} * style_{D,t,k} \#(4.1)$$

Where W represents the weight of stock *k* held by fund*i* at time *t*, measured by the market value of stocks*k* held in the total net asset value (NAV) of the fund, and *n* represents the types of holdings of the fund. $style_{D,t,k}$ represents the exposure degree of stock *k* to the three-factor style in time *t*,D=1,2,3, respectively representing the exposure degree of stock *k* to the scale factor, book-to-market factor and momentum factor. The specific calculation method is as follows: For example, on December 31, 2019, Huaxia Growth Mixed Fund owned Ningde Times. In the DGTW index constructed in 2019, the scale factor, book-to-market ratio factor and momentum factor of Ningde Times were assigned 5 points, 5 points and 2 points respectively. Then, the exposure degree of scale factor, book-to-market ratio factor and momentum factor in Ningde era is 5, 5 and 2 respectively, that is, the $style_D(D=1,2,3)$ values in Ningde era are 5, 5 and 2 respectively. Then, the three-factor score of all holdings of Huaxia Growth Mixed Fund is obtained by the same sequence. Finally, the $style_D$ value matched with the style index is multiplied by the shareholding ratio $(w_{k,t,i})$, and then summed respectively to get the total exposure degree of Huaxia Growth Mixed fund to the three factors, namely $SCORE_D$ (D= 1,2,3).

Chua (2020) believed that when calculating the actual fund style, the proportion of stocks held by the method of market value in the total net asset value of the fund cannot avoid the phenomenon of fund style changes caused by stock price fluctuations. Therefore, the shareholding ratio based on unit weight method is adopted to replace the original method of calculating the proportion of stock market value in the total net asset value of the fund. The unit weighting is calculated by dividing the number of shares held by the fund during the reporting period by the total number of shares held by the fund. The advantage of this method is that it can avoid the phenomenon of fund style changes caused by stock price fluctuations. As a result, the shareholding ratio based on unit weight method can intuitively estimate the intention of fund manager's style drift. In this paper, Chua's (2020) method is adopted to calculate the actual style of funds.

$$rankC_{D,i,t} = \sum_{k=1}^{n} q_{k,t,i} * style_{D,t,k} \# (4.2)$$

 $rankC_{D,i,t}$ represents the sum of style exposure degree of fund*i*'s holdings *k* to size factor, book-to-market ratio factor and momentum factor during period *t*. $q_{k,t,i}$ represents the proportion of the number of shares held in stock *k* to the total number of shares held by the fund. $style_{D,t,k}$ represents the exposure degree of stock*k* to the three-factor style at time t, D=1,2,3, respectively representing the exposure degree of stock *k* to scale factor, book-to-market factor and momentum factor. The calculation method is the same as Model 4.1.

3.3 Fund style drift identification

The fund style measurement in this paper is carried out half a year. First, all the holdings in the fund's semi-annual report and annual report are corresponding to the constructed style index one by one to get the scale, book-to-market ratio and the score of the portfolio where momentum is located of each stock. Then, the fund style score of each period is obtained by calculating and adding together the weight ratio of fund holdings. Then, the degree of fund style drift is measured by the difference between the current fund style score and the past style score (expressed by the fund voluntary

style volatility index, as defined below).

Wermers (2012) defined the investment style of the fund in the past as the style of the fund in the previous year. Brown et al. (2015) defined the past investment style of the fund as the average style of the fund in the past three years. Chua (2020) regards the past investment style of the fund as the average value of the fund style during the whole research period. For example, when the time is December 31, 2020, the past investment style of the fund is the average value of the fund style from 2011 to 2020. This paper believes that the fund style drift has continuity, so it is more reasonable to define the past investment style of the fund as the average value of the fund style during the whole research investigation period. That is, Chua's (2020) method is adopted in this paper to measure the past investment style of the fund. Considering that when calculating the volatility of the fund voluntary style in June 2011 is the first period of this paper, so the volatility of the first period voluntary style (*VFSV*) calculated in this paper is December 2011.

Then, the voluntary style volatility index $(VFSV_{i,t})$ constructed by Chua (2020) is adopted to measure the degree of fund style drift. Firstly, the size factor, book-to-market ratio factor and momentum factor of each fund in each reporting period were calculated respectively, and then the average value of the three style volatility was summed to obtain the voluntary style volatility index $(VFSV_{i,t})$.

$$C_{D,i,t} = \sum_{n=0}^{m-1} \left[\frac{\left(rankC_{D,i,t-n} - mean \, rank_{D,i} \right)^2}{m-1} \right]^{\frac{1}{2}} \#(4.3)$$
$$VFSV_{i,t} = \sum_{D=1}^{3} \frac{C_{D,i,t}}{3} \#(4.4)$$

rank $C_{D,i,t-n}$ represents the exposure degree of fundi's three-factor style in each reporting period. mean rank_{D,i}represents the average of three-factor style exposure of fund i in the whole t period, which measures the fund's past investment style. m represents the time span of the reporting period, measured in monthly time. $C_{D,i,t}$ represents the three-factor style volatility (D=1,2,3, respectively represent the style volatility of size factor, book-to-market factor and momentum factor).

Chua's (2020) method is adopted to define the quantile of the calculated VFSV_{i,t} to distinguish between the style drift fund and the style "single-minded" fund. The style drift fund here refers to the fund in the top 5% quantile according to the ranking of VFSV_{i,t}, and the style "single-minded" fund. That is, style-invariant funds are those

in the bottom 5% quartile according to $VFSV_{i,t}$ ranking. In the robustness test below, 10% quantile and 20% quantile are also used to define fund style drift, so as to test the robustness of the method for measuring fund style drift.

3.4Design of regression model

(1) Interim performance ranking and style drift

In order to study the influence of interim performance ranking on fund style drift, the model chosen in this paper is the dual fixed effect model, which is detailed as follows:

$$SDS_{i,t} = \alpha_{i0} + \beta_{i1}rank_{i,t} + \beta_{i2}Lsize_{i,t} + \beta_{i3}Lcsize_{i,t} + \beta_{i4}Lage_{i,t} + \beta_{i5}Lratio_{i,t} + \beta_{i6}LFee_{i,t} + \gamma_t + \delta_i + \mathcal{E}_{i,t}\#(4.5)$$

SDS represents the difference of annual style drift, which is expressed by the difference between VFSV of the fund in the second half of the year and VFSV of the first half of the year; rank represents the ranking of the fund in the middle of the year, and Lsize, Lcsize, Lage, Lratio, LFee are the control variable, which are fund size, fund company size, fund age, fund shareholding ratio and fund expense ratio respectively. In addition, logarithm processing is performed, γ represents time effect and δ represents individual effect.

1.Explained variable (SDS)

In this paper, the explained variable is defined as *SDS* in reference to the research variable of Chua (2020), which represents the difference of annual style drift, calculated by the difference between the *VFSV* of the second half of the year and the *VFSV* of the first half of the year, wherein the *VFSV* of the second half and the *VFSV* of the first half of the year refer to the voluntary style volatility of the fund in December and June. A value greater than 0 indicates that the degree of style drift increases in the second half of the year, while a value less than 0 indicates that the degree of style drift decreases in the second half of the year. In addition, since the value of the first phase in this paper is *VFSV* in the second half of 2011, the result of the first phase of *SDS* calculated in this paper is 2012.

$$SDS = VFSV_{End-year} - VFSV_{mid-year} \# (4.6)$$

2.Explanatory variable (rank)

In this paper, variable rank is used to represent the interim performance ranking of funds. Drawing on existing literature (Kou Zonglai et al., 2020; Yi Li et al., 2021) ranked the performance of all funds in each period, and conducted percentile treatment for fund performance, so that the fund performance ranking was between [0,1]. The closer the ranking was to 1, the better the fund performance was. Fund performance is calculated using the cumulative return (*RNT*) for the first six months of each year.

 $RNT = [(1 + R_1) * (1 + R_2) * (1 + R_3) * \dots * (1 + R_m)] - 1\#(4.7)$

Rm represents the monthly growth rate of the unit net value of the fund share restoration. In this paper, m is calculated until June.

3.Control variable

(1) Fund size. The size of the fund is expressed by *Lsize*, measured by the average fund net assets of the annual semi-annual report and annual report, and processed logarithmically.

(2) The scale of fund companies. The size of the fund company is represented by *Lcsize*, measured by the average net assets of the fund company at the middle and end of the year, and treated logarithmically.

(3) Fund age. The age of the fund is expressed by *Lage*, measured by the difference between the current period of the fund and the time when the fund is established. The unit of measurement is year, and logarithmic processing is done.

(4) Fund shareholding ratio. The fund shareholding ratio is expressed by *Lratio*, measured by the average of the fund shareholding ratio in the annual semi-annual report and annual report published by the fund, and logarithmic processing is done.

(5) Fund expense ratio. The fund expense ratio is expressed by *LFee*, which is obtained by removing the total expense of the fund at the end of the year from the net asset of the fund at the end of the year, and treated logarithmically.

Table 1 describes the definitions and descriptions of all relevant variables in this paper.

Variable	Variable name	Variable interpretation
VFSV _{i,t}	Voluntary style	Describe how the fund's T-phase style differs from past
	volatility	styles.
$SDS_{i,t}$	Annual style drift	Describe the difference between the year-end VFSV

Table 1 Description of variables studied in this paper

Variable	Variable name	Variable interpretation
	difference	value and the mid-year VFSV value of the fund period
		t. Describe the ranking of fund returns, do quantile
rank	Interim fund	processing, value range [0,1], the best performance of
Γαπκ _{i,t}	performance ranking	the fund is taken 1, the worst performance of the fund
		is taken 0.
		The average value of the net assets of each reporting
Lsize _{i,t}	Fund size	period in the t period of the fund is treated
		The average value of the assets of the fund company in
<i>Lcsize</i> _{i,t}	Fund company size	the t reporting period is treated logarithmically
_		The age of the fund minus the absolute value of the
$Lage_{i,t}$	Fund age	current year.
Iratio	Fund shareholding	Fund report period published shareholding ratio, do
LTutto _{i,t}	ratio	logarithmic processing.
LFeeit	Fund expense ratio	The total expense of the fund at the end of the year is
<i>t</i>		divided by the total assets.
F		If the fund manager changes in the sample fund during
Fmc _{i,t}	Fund manager change	the year, it is recorded as 1, and if it does not change, it
	Fund manager change	Describe the moderating effect of fund manager
rank; +*Fmc; +	and fund size	changes on the influence of performance ranking on
	adjustment variable	style drift.
$Market_{i,t}$	Market environment	Bull market is 1, bear market is 0.
	Market environment	Describe the moderating effect of market environment
$rank_{i,t}*Market_{i,t}$	and fund size	on the influence of performance ranking on style drift
	adjustment variable	
	F 1 ' 1'	The size of the fund is treated as the median. If it is
<i>RStZe</i> _{i,t}	Fund size ranking	larger than the median, it is recorded as 1, and 11 it is
	Moderating variable	smaner man me median, it is recorded as 0.
rank _{i t} *RSize _{i t}	of performance	Describe the moderating effect of fund size on
	ranking and fund size	performance ranking affecting style drift.
UCV	Proportion held by	The proportion of fund shares held by institutional
IICY _{i,t}	institutional investors	investors in the total fund shares
	Performance ranking	Describe the adjustment effect of institutional
rank _{i.t} *IICY _{i.t}	and moderating	investors' holding ratio on the influence of
-,- 6,6	variables of fund	performance ranking style drift.
	management models	Describe the flow of funds during the second helf of
$FLOWVOT_{i,t}$	Fund flows	the year
		uic yeai.

3.5 Descriptive statistical results

(1) Descriptive statistics of relevant variables

In this paper, 2,866 fund sample data were defined as variables, and descriptive statistical analysis was carried out by stata statistical software. Specifically, the mean value, standard deviation of all research variables and the mean value of single variable in subsample were compared as shown in the table:

Variable	Sample number	Mean	Standard deviation	Minimum	Maximum
SDS	2866	0.1893	0.1751	-0.1520	1.2086
rank	2866	0.4995	0.2898	0.0000	1.0000
Lsize	2866	2.4735	1.3102	-2.1023	6.3223
Lcsize	2866	6.7332	1.3743	2.0319	9.6952
Lage	2866	2.2549	0.4060	0.7655	3.0096
Lratio	2866	-0.2009	0.1547	-2.2275	-0.0231
LFee	2866	-3.6045	0.3838	-5.3897	-1.6979
Fmc	2866	0.3772	0.4848	0.0000	1.0000
Market	2866	0.6996	0.4585	0.0000	1.0000
IICY	2866	0.1362	0.1895	0.0000	0.9966

Table 2 Descriptive statistics of related variables

The statistical results show that the mean value of *SDS* of the explained variable is 0.1893, the maximum value is 1.2086, and the minimum value is -0.1520, indicating that in general, most funds increase the degree of style drift in the second half of the year. The standard deviation of explanatory variable rank and control variable is relatively small, indicating that there is little difference in distribution. Among them, the average value of the control variable fund manager change (*Fmc*) is 0.3772, indicating that 37.72% of the selected research samples have experienced fund manager change from 2012 to 2021, and fund manager change is relatively frequent. The average of institutional holding proportion (*IICY*) is 0.1362, that explains our country fund investment mainly by individual investors.

(2) Interim performance ranking and fund style drift correlation test and variance inflation factor test

In this paper, the correlation test and variance inflation factor test of major variables are conducted by stata15. The results are as follows: independent variable is significant at the 5% level, control variable *Lsize*, *LFee* is not significant, and other control variables are significant at the 1% level. Meanwhile, the variance inflation factor values are all less than 10, indicating that there is no multicollinearity problem.

	Table 3 Correlation test results						
	SDS	rank	Lsize	Lcsize	Lage	Lratio	LFee
SDS	1						
rank	0.1170***	1					
Lsize	0.0040	0.0720***	1				
Lcsize	-0.1580***	0.0590***	0.3040***	1			
Lage	-0.3040***	-0.0480**	0.1490***	0.4060***	1		
Lratio	-0.0500***	0.0220	0.0230	-0.0010	-0.1030***	1	
LFee	0.0260	-0.2040***	-0.3410***	-0.2000***	-0.1490***	0.0310	1

Note: ***, **, * respectively means 1%, 5%, 10% level is significant

Table	e 4 Test results of variance inflati	on factor
Variable	VIF	1/VIF
rank	1.0500	0.9491
Lsize	1.2100	0.8249
Lsize	1.3000	0.7668
Lage	1.2300	0.8128
Lratio	1.0200	0.9851
LFee	1.2000	0.8354
Mean VIF	1.1700	

(3) Interim style drift and fund capital flow correlation test and variance inflation factor test

In this paper, the correlation test and variance inflation factor test were conducted on the main variables by stata15. The results are as follows: independent variable is significant at the 5% level, control variable *Lsize* is not significant, and other control variables are significant at the 1% level. Meanwhile, the variance inflation factor values are all less than 10, indicating that there is no multicollinearity problem.

	FLOWVOT	VFSV	Lsize	Lcsize	Lage	Lratio	LFee
FLOWVOT	1						
VFSV	0.3850***	1					
Lsize	-0.0200	-0.2860***	1				
Lcsize	0.2040***	0.2830***	0.3040***	1			
Lage	0.3040***	0.6150***	0.1490***	0.4060***	1		
Lratio	0.0410**	0.0430**	0.0230	-0.0010	-0.1030***	1	
LFee	-0.2110***	-0.0060	-0.3410***	-0.2000***	-0.1490***	0.0310	1

Note: ***, **, * respectively means 1%, 5%, 10% level is significant

Table 6 Test results of variance inflation factor					
Variable	VIF	1/VIF			
VFSV	2.2700	0.4405			
Lsize	2.1000	0.4756			
Lcsize	1.6600	0.6041			
Lage	1.3600	0.7372			
Lratio	1.0500	0.9553			
LFee	1.1500	0.8664			
Mean VIF	1.6000				

4. Empirical results and analysis

In this paper, Brown et al. (1996) 's contingency table method is used to study the influence of interim performance ranking on style drift. Brown et al. (1996) Basic principle of the combined table method is that there is competitive bidding among fund managers, and fund managers face ranking competition every year. The competition among fund managers increases risk for all managers facing year-end rankings, but those at the bottom of the list increase risk more than those at the top.

Firstly, the cumulative return rate (RNT) of the sample funds at the end of each June is calculated, that is, the monthly growth rate of the net value of the unit of compound rights of the funds from January to June of each year. Then, the median treatment is carried out on the RNT, and the funds are divided into two groups: those with RNT higher than the median are recorded as winners and those with RNT lower than the median are recorded as losers.

Then, according to the median of annual style drift difference (*SDS*) each year, the two groups were divided into high *SDS* and low *SDS* groups, and finally four groups were obtained: high *RTN* (winner)/high *SDS* (high style drift in the second half), high *RTN* (winner)/low *SDS* (low style drift in the second half), low *RTN* (loser)/high *SDS* (high style drift in the second half), and low *RTN* (loser)/low *SDS* (low style drift in the second half).

If the fund manager does not adjust the risk taking level in the later period according to the performance in the earlier period, that is to say, *RTN* in the earlier period and *SDS* in the later period are independent of each other, then the overall distribution of the fund in the above four areas is balanced, accounting for 25% each.

On the contrary, if the fund manager adjusts the risk level of the later period

according to the performance of the previous period, according to the research results of Brown et al. (1996), the frequency of losers/high SDS and winners/low SDS will be higher than the other two conditions, that is, the degree of style drift of losers will increase in the second half of the year. The comparison of frequencies between different groups is tested by chi-square statistics, which is based on the null hypothesis that the samples received by each cell are equally distributed (i.e., the four regions account for 25% each). If the test result P-value is significant, the null hypothesis is rejected. The results are shown in the table below.

Performance SDS	highSDS	lowSDS	Chi-square	p-value
			value	
winner	29.97%	20.20%	106 70 00	0.000***
loser	20.17%	29.66%	106.7300	0.0000***

Table 7 Influence of performance on style drift in the interim

Note: ***, **, * respectively means 1%, 5%, 10% level is significant

As can be seen from the above table, the investment style of the fund will change with the performance ranking in the middle of the year.

The frequency of winners/high SDS and losers/low SDS groups was significantly higher than the other two conditions. The winner fund showed high style drift in the second half of the year accounted for 29.97%, while the loser fund showed low style drift in the second half of the year accounted for 29.66%, and the Chi-square test results were significant at 1% level. This indicates that funds with higher ranking in the interim will show a higher degree of style drift in the second half of the year, which supports the H2a hypothesis in hypothesis 2. In contrast to Brown et al. (1996), Chua (2020) explained why the results are contrary to Brown et al. (1996). In this study, an expectation was introduced that fund managers with good interim performance predicted that fund managers with poor interim performance would increase risk-taking activities in the next period to change the situation of lagging interim performance. Under such an expectation, fund managers with better performance in the interim will increase risks in the second half of the investment, so as to consolidate their leading position, attract capital inflows and maximize their compensation.

4.1 The fixed effect model was used to test the relationship between interim performance ranking and fund style drift

4.1.1 Model selection

In this paper, panel data is used to test relevant theoretical hypotheses. For this purpose, Hausman test is used to determine whether the fixed effects model or the random effects model is selected. The test results are shown in Table 8 below.

	fe	re	Difference	S.E.		
rank	0.0751	0.0651	0.0099	0.0041		
Lsize	-0.0061	0.0089	-0.0150	0.0055		
Lcsize	0.0332	-0.0081	0.0414	0.0071		
Lage	-0.2478	-0.1246	-0.1231	0.0150		
Lratio	-0.0341	-0.0960	0.0619	0.0182		
LFee	0.0063	0.0078	-0.0015	0.0062		
chi2			104.0800			
Prob>chi2			0.0000			

According to the test results in the above table, chi2=104.0800 and the corresponding p value is 0.0000. Therefore, the original hypothesis "H0: u is not correlated with explanatory variables" is rejected, so the fixed effect model is used in this paper.

4.2 The mechanism test of the influence of performance ranking on fund style drift

After using the joint table method to preliminarily test the influence of interim performance ranking on style drift, this paper conducts non-equilibrium panel fixed effect regression for model 4.5, and the results are shown in Table 9 below.

	SDS		
a an le	0.0775***		
Типк	(6.78)		
Laiza	-0.0150**		
LStZe	(-2.35)		
Locizo	0.0109		
LCSIZE	(1.31)		
Lago	-0.1170***		
Luge	(-3.19)		
Iratio	-0.0327		
LTatto	(-1.15)		
I Fac	0.0028		
Lree	(0.24)		
Individual-fixed effect	YES		
Time-fixed effect	YES		

Table 9 Influences of performance on style drift in the interim

	SDS	
	0.5300***	
_cons	(4.69)	
Ν	2866	
\mathbb{R}^2	0.2688	

Note: ***, **, * respectively means 1%, 5%, 10% level is significant

In this paper, only the performance ranking variable and the annual difference variable of fund style are used for regression. From the perspective of regression coefficient, the regression coefficient is 0.0775, greater than 0 and significant at the 1% level, indicating that performance ranking has a positive impact on fund style drift. Fund managers with better interim performance expect that fund managers with poor interim performance will increase risk-taking activities in the next period to change the situation of lagging interim performance. Under such an expectation, fund managers with better performance in the interim will increase risks in the investment in the second half of the year, so as to consolidate their leading position to attract capital inflows and maximize their compensation. The empirical results support Ha in hypothesis 2. In addition, the regression coefficients of fund size and fund age among the control variables are less than 0 and significant, indicating a negative relationship with fund style drift.

4.3 The moderating factors analysis of the relationship between interim performance ranking and fund style drift

4.3.1 The moderating effect of fund manager change on interim performance ranking and fund style drift

Then, the moderating effect of fund manager changes on interim performance ranking and fund style drift is studied. Model 4.8 is used for regression, and the results are shown in Table 10 below.

e	
	SDS
rank	0.0623***
	(4.28)
rank * Fmc	0.0391*
	(1.75)
Lsize	-0.0145**
	(-2.28)
Lcsize	0.0108
	(1.30)
Lage	-0.1160***

Table 10 Moderating effect of fund managers on interim performance influencing style drift

	SDS
	(-3.15)
Lratio	-0.0324
	(-1.14)
LFee	0.0023
	(0.20)
Fmc	-0.0137
	(-1.06)
Individual-fixed effect	YES
Time-fixed effect	YES
_cons	0.5270***
	(4.66)
Ν	2866
R ²	0.2678

注: ***, **, *分别表示 1%、5%、10%水平显著

In terms of the regression coefficient of the interaction term between interim performance ranking and fund manager change, the regression coefficient is 0.0391, which is greater than 0 and significant at the 10% level, indicating that the change of fund manager has a positive moderating effect on the relationship between interim performance ranking and fund style drift. The empirical results support hypothesis 3. In addition, from the perspective of control variables, the regression coefficients of fund size and fund age are less than 0 and significant, indicating a negative relationship with fund style drift.

4.3.2 The moderating effect of market environment on interim performance ranking and fund style drift

• This paper studied the moderating effect of market environment on interim performance ranking and fund style drift. This paper divided market environment into bull market and bear market, and took 1 for bull market and 0 for bear market. Model 4.9 is used for regression.

	SDS
rank	0.1320***
	(6.63)
rank * Market	-0.0785***
	(-3.34)
Lsize	-0.0142**
	(-2.23)
Lcsize	0.0102
	(1.24)

Table 11 Adjusting effect of market environment on interim performance style drift

	SDS
Lage	-0.1170***
	(-3.18)
Lratio	-0.0277
	(-0.98)
LFee	0.0029
	(0.25)
Market	0.1890***
	(5.30)
Individual-fixed effect	YES
Time-fixed effect	YES
_cons	0.3560**
	(2.62)
Ν	2866
\mathbb{R}^2	0.2700

Note: ***, **, * respectively means 1%, 5%, 10% level is significant

In terms of the regression coefficient of the interaction term between interim performance ranking and market environment, the regression coefficient is -0.0142, less than 0 and significant at the 5% level, indicating that the bull market environment has a negative moderating effect on the relationship between interim performance ranking and fund style drift, and inhibits the positive influence of interim performance ranking on fund style drift. Compared with the bear market, in the bull market, much more funds will flow into the capital market than in the bear market. Moreover, in the bull market, fund managers are more likely to obtain high returns, so fund managers will face less pressure brought by performance ranking and shrinking assets under management, which will weaken the influence of previous performance pressure on style drift. The empirical results support hypothesis 4. In addition, from the perspective of control variables, the regression coefficients of fund size and fund age are less than 0 and significant, indicating a negative relationship with fund style drift

4.3.3 The moderating effect of fund size on interim performance ranking and fund style drift

The moderating effect of fund size on interim performance ranking and fund style drift was studied. In this paper, the fund size was treated as the median, and funds larger than the median were marked as 1, while those smaller than the median were marked as 0. Model 4.10 was used for regression, and the regression results were shown in Table 12.

 Table 12 Moderating effect of fund size on interim performance influencing style drift

	SDS
rank	0.0957***
	(6.10)
rank * RSize	-0.0396*
	(-1.80)
Lcsize	0.0093
	(1.12)
Lage	-0.1280***
	(-3.48)
Lratio	-0.0313
	(-1.10)
LFee	0.0094
	(0.82)
DSize	0.0068
RSize	(0.42)
Individual-fixed effect	YES
Time-fixed effect	YES
_cons	0.5250***
	(4.65)
Ν	2866
R ²	0.2665

Note: ***, **, * respectively means 1%, 5%, 10% level is significant

In terms of the regression coefficient of the interaction term between interim performance ranking and fund size, the regression coefficient is -0.0396, less than 0 and significant at the 10% level, indicating that fund size has a negative moderating effect on the relationship between interim performance ranking and fund style drift. Compared with small-scale funds, large-scale funds are not easy to be controlled, and the size of large-scale funds is generally stable, which makes the performance pressure of fund managers relatively small, and inhibits the positive impact of interim performance ranking on fund style drift. Empirical research results support the H5a hypothesis in hypothesis 5. In addition, the regression coefficient of control variable fund age is less than 0 and significant at 1% level, indicating a negative correlation with fund style drift.

4.3.4 The moderating effect of institutional investor holding ratio on interim performance ranking and fund style drift

Finally, the moderating effect of institutional investors' holding ratio on interim performance ranking and fund style drift is studied. The product of institutional investors' holding ratio and interim performance ranking is taken as the interaction term, and Model 4.11 is used for regression. The regression results are shown in Table

13 below.

performance		
	SDS	
rank	0.1030***	
	(7.41)	
rank * IICY	-0.1620***	
	(-2.80)	
Lsize	-0.0052	
	(-0.75)	
Lcsize	0.0108	
	(1.30)	
Lage	-0.1330***	
	(-3.61)	
Lratio	-0.0370	
	(-1.31)	
LFee	0.0056	
	(0.47)	
IICY	0.0076	
	(0.19)	
Individual-fixed effect	YES	
Time-fixed effect	YES	
_cons	0.5200***	
	(4.63)	
Ν	2866	
\mathbb{R}^2	0.2726	

Table 13 Moderating effect of institutional investors' holding ratio on style drift of interim

Note: ***, **, * respectively means 1%, 5%, 10% level is significant

The regression coefficient of the interaction term between interim performance ranking and the proportion held by institutional investors is -0.1620, which indicates that the proportion held by institutional investors has a negative moderating effect on the relationship between interim performance ranking and fund style drift. This coefficient is less than 0 and is significant at the 1% level. The empirical findings of this study back up hypothesis 6. Among all fund holders, institutional investors have advantages over ordinary investors in terms of acquiring professional knowledge, investment experience, and information. Thus, institutional investors are more apt to constrain fund companies and fund managers to ensure that their interests are in line with those of investors. Additionally, institutional investors have a propensity to invest for the long term, and the greater the proportion of institutional investors, the less performance pressure short-term fund managers will face. As a result, the positive impact of interim ranking on the drift in fund style will be limited. Additionally, there

is a negative correlation between fund style drift and the control variable fund age, which is significant at the 1% level.

5. Conclusions and Suggestions

5.1 Research conclusion

In this paper, partial stock hybrid and stock funds established before June 2010 are selected. The A-share style index constructed annually is used to identify the actual investment style of the fund from 2011 to 2021, and then the voluntary style volatility of the fund is calculated to identify the fund style drift behavior. The results shown that the style drift of Chinese public offering funds is common. In a given year, there was a mainstream investment style in the stock market, and most of the drift funds tended to pursue the mainstream investment hot spot of the market at that time.

Next, this paper studied the influence of interim performance ranking on fund style drift and found that funds with higher interim performance ranking were more likely to have style drift behavior. The winner fund will increase its investment risk in the second half of the year in order to change its lagging position. Therefore, under this expectation, winner foundations adopt strategies to increase investment risks in the next investment to ensure their leading position in performance and increase the degree of style drift.

This paper then studied the moderating factors of performance ranking affecting style drift from four aspects: fund manager change, market environment, fund size and institutional investor holding ratio.

The results shown that, first, the change of fund manager had a positive moderating effect on the relationship between interim performance ranking and fund style drift, which strengthened the positive effect of interim performance ranking on fund style drift. In the case of the turnover of fund managers, the newly appointed fund managers needed to prove their trading ability in a short period of time, so as to reduce the risk of being fired and obtain more net fund inflows, so as to maximize their compensation, so as to face greater performance pressure and promote the influence of interim performance ranking on style drift. Second, the bull market environment had a negative moderating effect on the relationship between interim performance ranking and fund style drift, which inhibited the positive effect of interim performance ranking on fund style drift. Compared with the bear market environment, in the bull market, much more funds would flow into the capital market than in the bear market. Moreover, in the bull market, fund managers were more likely to obtain high returns, so fund managers would face less pressure such as performance ranking and assets under management shrinkage, which would weaken the positive influence of the previous performance pressure on style drift.

Third, fund size had a negative moderating effect on the relationship between interim performance ranking and fund style drift. Compared with small-scale funds, large-scale funds are not easy to be controlled, and the size of large-scale funds is generally stable, which made the performance pressure of fund managers relatively small, thus restraining the positive influence of interim performance ranking on fund style drift.

Fourth, the proportion of institutional ownership had a negative moderating effect on the relationship between interim performance ranking and fund style drift. Among all fund holders, compared with ordinary investment, institutional investors have an advantage in acquiring professional knowledge, investment experience and information, so they were more conducive to restrain fund companies and fund managers, so that their interests tended to be consistent with those of investors. In addition, institutional investors tended to make long-term investments, and the higher the proportion of institutional investors, the pressure on short-term performance of fund managers would be reduced, thus restraining the positive influence of interim ranking on fund style drift.

At the end of this paper, the impact of style drift on fund flows was studied, and the results shown that style drift funds can indeed improve the net inflows of funds. Ordinary investors had irrational investment preferences, and drift fund managers made use of this irrational preference to attract investors' capital inflows by investing in hot stocks or hot investment styles. Then, the heterogeneity analysis of the influence of fund style drift on fund flows was carried out, and the samples were divided into two groups according to the market environment: bull market and bear market. The results shown that the influence of fund style drift on fund flows was different in different market environments, that is, the phenomenon of fund style drift promoting net inflows was more obvious in the bull market.

5.2 Policy suggestion

The findings of the preceding research suggest that Chinese public offering funds frequently exhibit style drift. Information asymmetry, the conduct of fund managers that goes against the terms of their contracts, can lead to fund style drift, which is a principal-agent problem. The fund contract itself will be destroyed if the fund's "style drift" results in not following the agreed-upon course. Investors' expectations of investing in the fund will be shattered, and investors' realization of the allocation goal of investing in the fund will be affected, despite the fact that it may increase the fund's market adaptability. Hence, it is exceptionally unjustifiable for these financial backers to anticipate that assets should contribute as per the expressed legally binding goals.

The regulatory layer has recently increased its oversight of fund style drift behavior, making it abundantly clear that it opposes "fund style drift." A notice on the phenomenon of fund investment style drift, the inadequate examination and approval of individual stocks in "style drift," the inadequate implementation of warehouse procedures, and the inadequate control of index product design has been issued by the China Securities Regulatory Commission (CSRC). Hence, in light of the examination results, this paper trusts that the asset style drift conduct can be represented, so the asset speculation can get back to the sane venture street, not exclusively to safeguard the privileges and interests of standard financial backers, yet additionally to direct the steady improvement of the asset business. Style drift funds that seek short-term investment hot spots in the market may be able to attract capital inflows and grow in size, as the aforementioned research findings suggest. Moreover, the asset the executives expense is connected to the size of the asset, so many asset organizations assents to the asset style drift and just focus on the transient advantages brought by the asset style drift, disregarding the asset style drift won't just harm the interests of financial backers, yet in addition prevent the consistent advancement of the asset business. In the event that the asset organization can go to particular lengths to distinguish the asset style drift and control the gamble, it will be helpful for the great activity of the asset and the solid improvement of the capital market. This paper presented the following three viewpoints from the point of view of fund companies.

Enhance the fund style monitoring system firstly. The fund company should measure the risk posed by the style change and monitor in real time whether the fund style has changed significantly. Limiting the number of investors who subscribe to the fund should be done if the fund company believes that the risk is greater. Investors should be made aware of the reasons behind fund style drifts from time to time in order to increase fund investment transparency, protect investors' right to know, and help them fully comprehend the fund style and investment risk.

Second, cut down on manager turnover. In the asset test chosen in this paper, 37.72% of asset chiefs changed somewhere in the range of 2012 and 2021, demonstrating that Chinese asset supervisors changed regularly and had high liquidity. Store chiefs who stand firm on footings when may have different venture ideas and targets, which will build the likelihood of asset style drift and subsequently increment the gamble of asset speculation. Fund companies should either increase the performance incentive for fund managers or think about replacing them. They should also try to ensure that the current and previous fund managers have similar investment concepts and styles so that the fund's investment style and investment philosophy can last.

Third, lay out a sound interior control and hazard counteraction and control system. It is beneficial to fund operation risk prevention and control for fund companies to improve their internal control. Thusly, all asset chiefs and asset caretakers ought with first truly comply to the soul of agreement, perform guardian commitments, fortify venture discipline, further develop speculation the executives, stringently submit to different regulations and guidelines and asset contract arrangements, comply to long haul venture and worth speculation, and abstain from deluding financial backers and harming the validity of the business. In addition, the fund company's risk committee should conduct irregular inspections and supervisions and take punitive action against the fund manager who frequently exhibits fund style drift in order to effectively implement risk prevention and control measures.

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