

STOCKHOLM SCHOOL OF ECONOMICS

Department of Finance

Master's Thesis in Finance

Star Phenomenon and Spillover Effects within Mutual Fund Families:

-- A study in China's Mutual Fund Industry

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This paper examines Chinese investors' preferences for star funds and further tests whether Chinese fund families benefit from star funds' spillover effects at the family level. The empirical results indicate that neither the star phenomenon nor spillover effects within star families exist in China's mutual fund industry. Specifically, star funds are not rewarded with more money inflows by their previous outstanding performance. Moreover, star funds could not benefit non-star funds within the same families with greater money inflows. The findings may suggest that employing a strategy in creating a star fund might not be considered a wise approach in maximizing families' market coverage. Possible reasons underlying the results have been provided in the paper. Further, this paper finds evidence that fund families' sales promotion and the fund share dilution plan are the effective strategies in generating more money inflows to funds or families.

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1. Introduction

1.1 Background

When examining the development of China's mutual fund industry over the past few years, one can see that it has experienced high speed proliferation from 71 funds in the year 2002 to 364 funds in 2007². Accordingly, the total net assets (TNA) under management rose by 28 times to RMB 3,326 billion (USD 488 billion)³ in 2007. Accompanied by the presence of massive funds in China's mutual fund industry, one interesting phenomenon is that fund families only show limited growth. Here, fund families are defined as the fund companies that offer investors a selection of mutual funds to choose from. In China, 364 mutual funds were managed by 58 fund families⁴ in 2007, which means that each family owns six funds on average. The largest fund family in China owned 18 funds under management in 2007⁵.

A plausible reason for this phenomenon could be that fund families, with a selection of funds, experience economics of scale. Compared with individual fund's performance, fund families might be more concerned about the total profit to the whole family than only the profit of a single fund. By sharing information and expenses across funds, fund families could benefit from mitigating total cost of the families. Moreover, fund families probably wish to take the advantage of spillover effects to amplify their total money inflows. Targeting maximization of overall fund family profit, fund families are active in cross-subsidization, strategically transferring performance from low value funds within the families to high value funds (Gaspar, Massa & Matos, 2004). And then the families with high value funds could signal investors in high portfolio management skills and consequently further convince investors that holding funds within those families could enjoy the same information and resource as the high value funds do. Due to the information asymmetry, investors are easily able to chase funds with high performance ratings in order to reduce their information search costs. Those funds with star

² Data in this section are from the WIND database (China)

³ USD 1 = RMB 6.82 according to the official exchange rate from Industrial Central Bank of China website on 15 Nov, 2008. The exchange rate is applicable for all the sections in my paper.

⁴ One fund family was approved for incorporation but not included in the statistic figure, since it was still under construction then.

⁵ Huaxia Asset Management Company

performance that are prevalent in various rankings, such as in the media, make both the funds and their families stand out more than the alternatives. Star funds and star families are hot topics in Chinese media when various kinds of Star prizes are awarded during the year. This in turn can further benefit the whole families. Such spillover effects in the U.S market have been proved by Nanda, Wang and Zheng (2004).

In China, until now few studies on mutual fund industry have been conducted at the family level. In order to fill this gap in the literature, my study tests whether Chinese fund families could benefit from the spillover effects of the star performing funds at the family level.

1.2 Research motivation

The purpose of this paper is to investigate the star phenomenon and spillover effects within star families in China's mutual fund industry. Specifically, this paper conducts a test, which examines investors' preferences for star funds as well as the impact of star funds on other non-star funds within the same family. A star fund is defined as the fund with top performance ranking and a star family is a fund family with at least one star fund. An initial intuition is that a star fund attracts more attention from investors with greater money inflow and accordingly enhances inappropriate money inflows to non-star funds within the same family.

The empirical results of my study could provide a hint about whether investors are simply taking a naïve investment strategy of chasing star families. This finding may further help fund families in answering the question of whether it is necessary to employ strategies, i.e. cross-subsidization, on creating star funds so as to maximize their market coverage under competition.

This paper intends to complement previous Chinese studies on the mutual fund industry. Reviewing the studies in this field, my study is the first research directly testing on star phenomenon and spillover effects at the fund family level in China. Further, due to the short mutual fund history in China, only a relatively smaller number of samples are available for fund industry researches across the whole observed period. Thus Chinese studies of the mutual fund industry could be criticized for only counting on a small sample during a relatively short observed period. This is the reason why this paper does

not only look at equity funds (unlike other research) but also includes balanced funds. Furthermore, the fund sample is allowed to increase accompanied with fund proliferation across the year 2004 to 2007 as this may to some extent complement for the small size problem in Chinese research.

The remainder of this paper is organized as follows: Section two provides an overview of China's mutual fund industry and section three links this to the related literatures and studies that have previously been conducted. Section four clarifies the methodology applied in this paper and develops the hypotheses, whereas section five serves as to describe the data source, the sampling methods and the variables. Section six provides the fund performance analysis as reference for the proceeding analysis. Section seven reports empirical results and analyses the possible reasons behind the results as well as some other findings. Section eight concludes the study summarizing the main points and giving further ideas for research.

2 Overview of China's mutual fund industry

In China, the first closed-end fund and open-end fund were incorporated in 1998 and 2001 respectively. Since then, China's mutual fund industry has exploded. As can be seen in Figure 1, TNA surged from RMB118 billion⁶ (USD 17 billion) in 2002 to RMB 3,326 billion (USD 488 billion) in 2007. China's mutual fund category has diversified steadily and covered Equity funds, Balanced funds, Bond funds, Money market funds, and Qualified Domestic Institutional Investor fund (QDII) in 2007. Of all the funds, equity funds are the dominant funds in the industry⁷. Combined with balanced funds, the TNA of both equity funds and balanced funds accounted for 95.8% of total funds in 2007.

Fund families have expanded from only 17 families in 2002 to 58 families in 2007. At the same time, the average family size increased by eight times from RMB7 billion (USD1 billion) to RMB57 billion (USD 8 billion), due to large money inflows into mutual fund industry. Moreover, several super size fund families are present in the

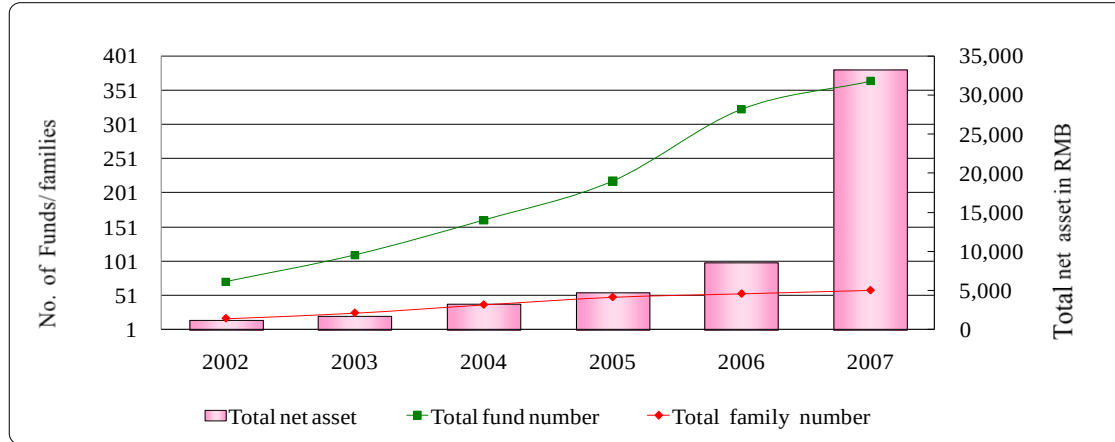
⁶ Data in the market overview are from Chinese database WIND

⁷ Equity funds include Index funds.

industry. Nine fund families reached the scale of RMB100 billion (USD 15 billion) last year, and three of them even managed over RMB200 billion (USD 29 billion) fund assets.

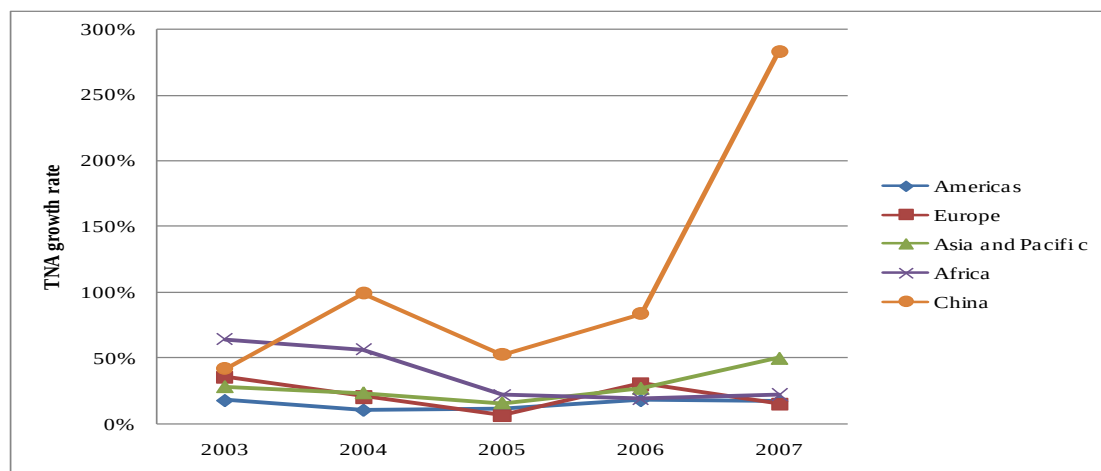
Figure 1: Growth of fund and fund families in China

Total net asset: in RMB100million



Comparing China's relatively short history with the long history of the U.S. mutual fund industry, where the first fund was launched in 1924, it is evident that China's mutual fund industry is lagging 74 years behind, but also that it catches up rapidly. As indicated in Figure 2, the average TNA growth rate is 112% in China's mutual fund industry from 2003 to 2007, and the TNA in China's mutual fund industry maintained a higher growth rate than other countries since 2004.

Figure 2: Fund TNA growth rate around the world⁸



Note: The figures of Asia and Pacific do not include the data of China according to investment company fact book and the figure in China is from WIND database

⁸ Data is obtained from the 2008 investment company fact book 48th edition (U.S)

3 Previous research

When looking at the previous literature on mutual fund industry at the individual fund level, the flow-performance relationship has been well examined. Ippolito (1992), Froot et al (1998), Sirri and Tufano (1998) find evidence that past fund performance can positively increase funds' money inflows. In recent years, more and more researchers have started to focus on the fund families' power in affecting the performance of the funds and segmentation of the fund industry. Khorana and Servaes (1999, 2000) empirically analyze the determinants of mutual fund starts, identifying a series of factors that induce fund families to set up new funds, such as economies of scale and scope, families' prior performance, and the overall level of funds invested. Guedj and Papastaikoudi (2005) find evidence of the persistent excess performance of the best performing funds, and argue that fund families allocate resources in proportion to fund performance and not fund needs, which indicate that better performing funds in a family might have a higher probability of getting more managers, and more resources. Gaspar, Massa and Matos (2004) document the fact that fund families engage in 'cross-fund subsidization' strategies of favoring some funds by transferring performance across member funds.

With regards to the papers examining the spillover effect within fund families, Massa (1998) documents the active market strategies employment of fund families including market segmentation and fund proliferation, by making use of the heterogeneity of the investors to generate the positive spillover effects with fund families. Nanda, Wang and Zheng (2004) indicate that star performance results in greater money inflow to the fund and to other funds in the family and further argued spillovers may induce lower ability families to pursue star creating strategic. Zhao (2003) shows that the existence of spillover effects in the fund families motivates fund closing decisions by closing a star fund and thus shifting investors' attention and investments to other funds in the family. The spillover effects in marketing are also confirmed by Huij and Verbeek (2007). The two authors find that funds with high marketing expense generate spillovers and enhance money inflow to family members with low marketing expense.

4 Methodology and hypothesis

4.1 Methodology

In this paper, the method employed by Nanda, Wang and Zheng (2004) is applied in China's mutual fund industry to test the impacts of star funds identities to the funds themselves and to non-star funds within the same family. With the regression, the estimation on the relationship between the new money growth of star funds and those of the alternatives can give evidence to which extent star funds benefit from their star identities. Further, the regression also aims to test the relationship between new money growth of non-star funds within star families and those in the alternative families so as to indicate the spillover effects at the family level. The regression is controlled for the fund and family specific characteristic. The regression equation is depicted below:

$$\begin{aligned} \text{Flow growth}_{i,t} = & \alpha_i + \beta_1 * \text{PER}_{i,[t-4,t-1]} + \beta_2 * \text{NF}_{i,t} + \beta_3 * \text{Fund size}_{i,t-1} \\ & + \beta_4 * \text{Fund age}_{i,t} + \beta_5 * \text{Star fund}_{i,[t-4,t-1]} + \beta_6 * \text{Star family}_{i,[t-4,t-1]} \\ & + \beta_7 * \text{MS fund}_{i,[t-4,t-1]} + \beta_8 * \text{MS family}_{i,[t-4,t-1]} + \mu_{i,t} \end{aligned} \quad (1)$$

where $\text{Flow growth}_{i,t}$ is fund i 's growth of new money flow at time t , PER is fund i 's performance in the past twelve months at time t ; NF is the number of fund within the same family at time t ; Star fund, star fund family, MS fund and MS family are four dummy variables to discriminate star identities. Star funds are the top 10% fund measured by the past performance at time t and star family dummy variable represents non-star funds within the specific star families. While MS funds are the 5-star rating funds in Morning star ranking and MS family variable represents non-MS funds within MS families. A more detailed description of the variables is given in Section five.

With respect to the regression method applied to the model, the following four regressions have ever been considered:

- OLS regression
- OLS regression with time dummy
- OLS regression with fund dummy
- Fixed effect panel regression

However, after running the informal regressions, the fixed effect panel regression is considered as the best fit among the four regressions as it has the highest R-square according to the empirical results. The OLS regression probably suffers from endogeneity bias in the form of omitted variable bias. Since the data applied in the model are covering both cross sectors and cross time serial, there are two variations within the data: first, Inter-fund variation, meaning variation in the average growth of money flow from one fund to another. And second, Intra-fund variation, meaning variations within each fund over time. Both OLS regression and OLS regression with only time dummy/ fund dummy fail in taking the combined effect of those variations into consideration. It is necessary to assume no changes in each variable over time within each fund that we cannot control for. Hence, a panel data regression is implemented in my study and the intercept is allowed to change across both the time and fund sectors. In order to minimize the possibility that the result is affected by the individual difference among the family, the fixed effect panel regressions are applied by controlling for the fund and family specific characteristic. As a robustness check, alternative measures for evaluating fund performance will be included in the models of actual return and Capital asset pricing model (CAPM) risk-adjusted return.

4.2 Hypothesis

Given the evidence in Nanda, Wang and Zheng (2004) with respect to star phenomenon and spillover effects in the U.S market between 1992 and 1998, four hypotheses are formulated and tested on China's mutual fund industry, which are described below.

Hypothesis one: Star funds generate more money inflows than non-star funds

Ippolito (1992), Froot et al (1998), Sirri and Tufano (1998) prove the flow-performance relationship in the U.S mutual fund industry. It is possible to assume that a star fund with outstanding past performance is rewarded by receiving a greater money inflow in comparison to the alternatives in China. Compared to the non-star funds, star funds are more visible to investors by the prevalent net asset value (NAV) rankings via media. In an emerging market, such as China, the investors are more apt to chase the star

funds when forming investment decisions so as to maximize their returns and minimize the related search costs.

Hypothesis two: Morning star funds generate more money inflows than non-Morning star funds

As another privilege star identity, Morning star rating from the Morning Star Company does not only rate the funds in views of past performance but with composite factors based on its own professional analysis. This rating is effective in testing fund managers' investment capability, like the ability of securities selection, variation in timing, asset weighting. And it is easier to understand for the average investors with one to five stars, thus it is reasonable to believe that it could assure the investors in selecting funds, which attracts more money inflows compared to the alternatives. This is also in line with the finding of Guercio and Tkac (2007), who indicate that Morning star has substantial independent influence on the investment allocation decisions of retail mutual fund investors. The two authors show evidence of significant a positive abnormal flow following rating upgrades, and a negative abnormal flow following rating downgrades. In other words, investors have strong preferences in chasing the top Morning star funds.

Hypothesis three: Spillover effects exist within star fund families

Since fund families offer platforms for the fund members to share the market information, spillover effects do exist when investors believe that non-star funds can benefit from acquiring the same valuable information applied in the star funds within star families. On the other hand, non-star funds within star families are more visible than similar funds in the alternatives, which again attract higher money inflows.

Hypothesis four: Spillover effects exist within Morning star families

Morning star funds provide the families with reputable identities. It is reasonable to assume that the non-MS funds within MS families can take the advantage of families' brand names as the indicators of "profit makers" or "quality vehicles", which in turn attract more investors to invest without considering their own past performances in depth.

5 Data

5.1 Data source and sample selection

The primary data applied in this paper are from WIND database (China), which has been applied by 80% Chinese financial institutions and is considered as one of the most reputable financial software in China. The database covers the daily unit NAV of all funds, fund sizes, fund classifications, fees, family information, daily stock indexes and bond indexes etc. Since WIND database has included all the funds through the whole period, no survivor bias is found in my sample.

My sample covers open-end funds that are categorized as equity funds and balanced funds. As indicated in Section three above, those two types of funds account for 95.8% of the TNA of funds. Bond funds, guaranteed funds and money market funds, are not included in my sample since they invest in different financial products, where fewer observations exist. Concerning the index funds, they have been excluded from my sample since they are the passive funds tracing the specific stock market index with different risk exposure and requiring the additional benchmarks. Under the same consideration, QDII, the funds targeted in the foreign market instead of the domestic market, are out of my sample as well.

Another fund selection criterion in my data sample is that, at each time interval only funds that have at least one year of performance history are included so as to better assess the relationship between the funds new money growth and the funds' lagged performance within the last year. If a fund has not totally 12 monthly return observations in a given year, i.e. incorporated in the middle of the quarter or not the exact beginning of the quarter, the observation will be excluded.

Since only 17 out of 71 funds are open-end fund before the year 2003 in China, in order to ensure enough fund samples with at least one year performance history, my observed period starts from the year 2004 to 2007 in my analysis. With regards to time interval, it is on the quarterly basis since the TNA, which are crucial for money flow calculation, are only disclosed in the quarter report and annual report.

The final observations across different observed period will be as below:

Table 1: Observation summary

		Total fund observations
2004	First Quarter	14
	Second Quarter	14
	Third Quarter	20
	Fourth Quarter	31
2005	First Quarter	37
	Second Quarter	40
	Third Quarter	60
	Fourth Quarter	68
2006	First Quarter	72
	Second Quarter	79
	Third Quarter	87
	Fourth Quarter	95
2007	First Quarter	105
	Second Quarter	110
	Third Quarter	126
	Fourth Quarter	146
Total		1104

5.2 Variables description

5.1.1 Dependent variable

The growth of new money flow, i.e. the dependent variable reflects the money change of TNA over the last period that comes from new external money inflow instead of price appreciation on the assets under management. All dividends distributed by the funds are assumed to be reinvested into fund assets at the same time. This equation is given below:

$$\text{Flow growth}_{i,t} = \frac{\text{TNA}_{i,t} - \text{TNA}_{i,t-1} * (1 + R_{i,t})}{\text{TNA}_{i,t-1}} \quad (2)$$

where $\text{Flow growth}_{i,t}$ is fund i 's growth of new money flow at time t , $R_{i,t}$ is the compound return rate of fund i at time t .

The growth of fund new money flow is a good proxy for investors' response to their investment decision. One consideration for using the money change instead of share change in TNA to imitate investors' preferences in selecting funds is that, the assessment on money change in TNA will better reveal the actual subscription and redemption variation. An example could be given as below:

For example, A fund's NAV is USD 2 with 1000 shares at the beginning of time t, there is no subscription and redemption occurred during t period, meanwhile the dividend of USD 1 is distributed at the end of time t. The NAV should be USD 1 with 2000 shares after the dividend distribution. Money change variable could reflect the actual situation with zero flow, but the share change variable indicates 50% increase of the inflow. The sample indicates that the money change form is more suitable for testing the investors' responds to the mutual fund industry.

5.1.2 Performance variable

As a robustness check, both the actual return and CAPM risk-adjusted return are employed to evaluate funds' past performance.

➤ Actual return

The actual return is a fund's compounded return earned on the quarterly basis. It is the direct method in calculating individual fund's performance to capture the price appreciation or depreciation. The actual return variable is presented as the lag form since the investors need some time to react on the fund industry after digesting the information by funds' past performances.

➤ CAPM risk –adjusted return

Investors will not only measure a fund's absolute return earned but also evaluate the fund's comparable return to other financial assets when considering the related risks they undertake. In this paper, the single factor CAPM is applied in acquiring the Jensen's alpha as the measuring of risk-adjusted return.

Since equity funds and balanced funds involve different investment allocations between the stock and the bond market, the returns on broad asset class for investment opportunity set have been applied in the model so as to acquire the discrepancy between the funds and benchmarks. The equation is given as below:

$$R_{i,t} - R_{free,t} = \alpha_i + \beta_1 * (R_{m,t} - R_{free,t}) + \beta_2 * (R_{b,t} - R_{free,t}) + \mu_{i,t} \quad (3)$$

where R_{it} is the monthly actual compounded return of fund i at time t ; $R_{free,t}$ is the risk free rate at time t ; $R_{m,t}$ is the monthly stock market return at time t ; $R_{b,t}$ is the monthly Bond market return at time t .

In China, there are two main stock exchanges: the Shanghai stock exchange and Shenzhen stock exchange, which are the sole stock markets that Chinese mutual funds access to. While only QDII are allowed to invest in the foreign stock market. Shanghai Composite Index and Shenzhen Composite Index are two main proxies for the price variances of the listed companies here. $R_{m,t}$ is constructed by taking each 50% of the monthly return between Shanghai composite index and Shenzhen composite index. The Zhongxin All-Bond Index is applied in the model to capture the bond market return as it represents price trend of all the bonds exist at the given time period. When choosing the proxy for the risk free rate, instead of using one month or three months T-bill rate as previous literatures did, one-year deposit rate has been employed in CAPM model. This approach is consistent with most research applied in China. Since different to the U.S bond market, China's bond market lacks of short term treasure bonds of one month or three months but only with three or five years term. By running this regression, a fund's risk related to the allocation investing the stock will be captured by β_1 and the risk for other faction is reflected by β_2 .

5.1.3 Star identity variables

In the regression, four dummy variables have been created to distinguish star funds and non-star funds within star families from the alternatives. Star funds are defined as the funds ranking at the top 10% by their lagged return. The number of star funds in each quarter increased from 1 to 14 across time, consistent with the growth of fund industry, totally amounting to 104 star fund observations. The non-star fund members within a family that has at least one of the star funds would be imposed in star family dummy totally with 131 observations in my sample. Further, concerning the fact that Morning star ranking became undisputed prestige rating in China now, Morning star funds evaluated with five starts are included as another star fund dummy namely MS fund. The data is collected from the monthly Morningstar report from its website. The Morning star family dummy is defined analogously to the star family dummy. The total MS fund and MS family dummy are 138 and 194 observations respectively in my sample. Morning star

rating has been introduced in China in 2004 covering all the funds that incorporated for more than a year, except for Money market fund and guarantee fund. The main methodology of the Morning star rating is to rank the Morningstar risk-adjusted return within different fund categories, which is calculated upon Expected Utility theory. And it also has the advantage in punishing a fund by the risk with larger variation in monthly total return.

5.1.4 Other control variables

Fund attributes or fund family attributes that potentially affect money flow are included in the model as the control variables in order to isolate the effects on the dependent variable. Those attributes are prevalent in previous literature, and the variables included in my model are as below:

- Fund size
- Fund age
- Total number of funds within a family

The fund size is computed by taking the TNA relative to the median TNA of the fund at time $t-1$ in its logarithm form. Fund age is the logarithm form of the total days between the observation time t and the fund's incorporation day. The total number of funds within a family will rise from time to time on the quarter basis since the sample is increasing across the time.

In addition to the three control variables mentioned above, two more variables are ever considered as the main control variables in my regression. But finally they are not included in my model, which is due to the data missing and data value similarity problem. The first one is the fee ratio, including redemption fee, subscription fee and management fee. The fee of funds is similar to the price of a product. The fee under average level will be easily accepted by investors. Families with price advantage can help in winning their competitors. Dahlquist, Engström, and Söderlind (2000) find evidence that low-fee funds outperform high-fee funds in the Swedish market. In line with the Swedish evidence, Carhart (1997) finds a negative relation between fees and performance for the U.S. mutual funds. Fee ratio might be argued to indirectly affect the fund's money flow. When adding the fee variables in my model, all the observations have been dropped since there

is not large discrepancy among fund's fee charge. This situation is totally different from that in the U.S or Sweden market. In my sample, the average redemption fee, subscription fee and management fee is 0.5%, 1.5% and 1.5% respectively, while 85.6% funds in my sample (123 funds out of total 146 funds) have set the redemption fee at 0.5% level. Similarly, 84% of funds set the subscription fee at 1.5% level, and 95% of funds charged the same management fee of 1.5%. The discrepancy in fee is not as significant as that in western countries.

Another variable is the turnover ratio variable which reflects how actively fund managers change their investment portfolios over time. This ratio is not very prevalent as other variables that are disclosed in the company website, reports, financial website or the WIND database. Even after contacting the customer service in WIND database in order to obtain the related data, parts of the observations are still missing. Due to this problem, the turnover ratio variable is not included as the control variable in my model.

6 Evaluating fund performance

Between the years 2004 to 2007, China's mutual funds could averagely generate a 15.86% quarterly return within my sample. It shows that, on average, holding funds promises stable income to investors during the period. When comparing the fund performance with the capital market, the average positive annual alpha of 0.77 has been obtained according to CAPM result. However, only 65 out of 1104 (6%) alphas are significant at 10% level. That means within my sample, CAPM holds and China's mutual fund industry does not allow for the fund managers to generate positive alphas. Since according to CAPM, the only factor that should be priced is the market factor. When CAPM holds, the results of insignificant alphas and average significant market coefficients should be obtained. In my sample, 1087 out of 1104 (98%) of stock market coefficients are significant at 10% level. It seems that averagely investing in mutual fund is not better off than holding a passive portfolio of the market. Further, fund managers might not be able to gain profit by more careful investment selections within China's fund industry during the observed period in my sample.

7 Empirical results

In the following section, the regression results will be presented with robustness check. The correlation result among variables has been indicated, followed by the summary of empirical results from the regressions.

7.1 Correlation results among the variables and identification of outliers

7.1.1 Correlation results among the variables

Table 2: Summary correlation results

	Flowgrowth	PER	NF	Fundsize	Fundage
Flowgrowth	1				
PER	0.1439★ 0.0000	1			
NF	0.004 0.8933	0.3349★ 0.0000	1		
Fundsize	-0.1709★ 0.0000	0.0276 0.3598	0.0841★ 0.0052	1	
Fundage	-0.0219 0.4679	0.1975★ 0.0000	0.3018★ 0.0000	-0.0057 0.8494	1

★ Significant at 1% level

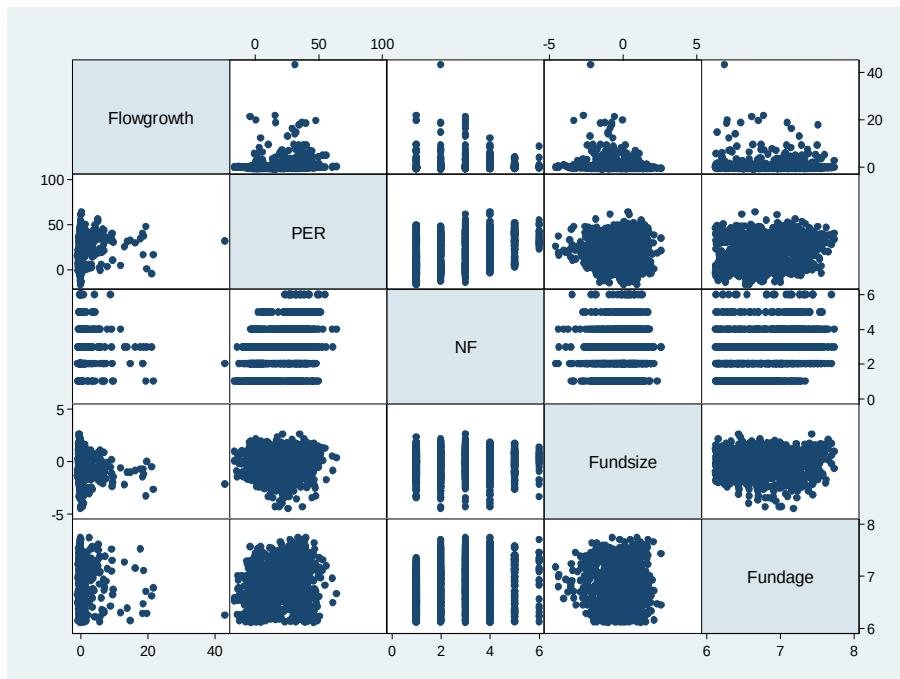
From the correlation results, a significant positive relationship between growth of fund money inflow and fund performance is in line with my original intuition. Further, the fund size is negatively related to growth of fund money inflow, which is identical to the finding in some previous literatures, such as Nanda, Wang and Zheng (2004). Nevertheless, an insignificant result is noted in fund money flow growth with both fund age variable and NF variable (number of funds within a family). Fund age and NF are initially presumed as not important in affecting investors' investment decision in China.

With respect to the relations among the independent variables, the coefficient is not that strong, though there are some significant results within the variables. This

relationship does not result in the multicollinearity problem or hamper my ability to draw the conclusion for distinguishing among the different hypotheses.

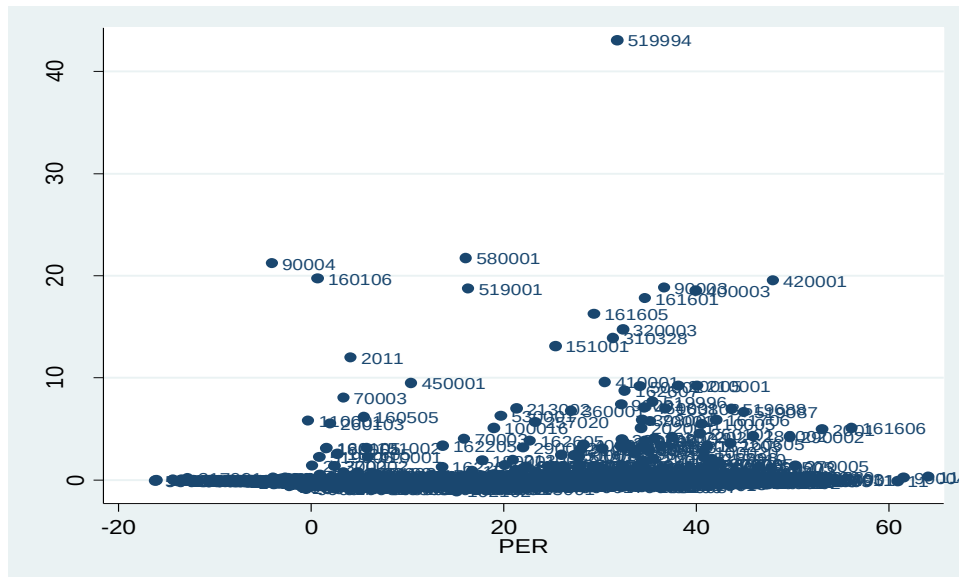
However, one obvious finding from the matrix correlation chart (Figure 3) is that there exist some extreme observations which fall out of the main trend. In order to further discuss this problem, a scatter chart has been plotted between the growth of fund money flow variable and fund performance variable (Figure 4).

Figure 3: Mixed correlation scatter chart



7.1.2 Identification of outliers

Figure 4: Scatter chart between growth of fund money flow and performance



By simply looking the scatter chart, one can easily see that there exist significant outliers in my sample. As indicated, most of the observations are between -1 and 10 times the average money growth rate, while several extreme situations are within a different trend, and may be up to 40 times the average money growth rate. Gujarati (2004) defines an outlier as an observation which deviates so much from other observations, and it may raise the suspicion that the value was generated by a different mechanism. The present of significant outliers would enlarge the error variance and further shrink the power of the test results. The Studentization of residual has been applied with the guideline of detecting residual large than ± 3 standard deviations so as to initially identify outliers. The next step will closely examine the outliers data based on the results on the screening, and decide how to further deal with outliers.

When running the regression on the fixed effect model, 19 out of the 1104 observations have the residuals larger than ± 3 standard deviations, which could be indicated as the outliers. The probability of such large residual only could ensure a normally distributed error item with 0.26%. If the error item is normally distributed, the large residual should be expected no more than 5% of the total observations. In my model, 1.7% of the large residual are still acceptable in that case. Since, among the researchers, there is no thorough review on what to do with an identified outlier, it may

be better to look into the effect from the outliers and specify the cause for them (Osborne & Overbay, 2004). All the 19 observations with the residual larger than ± 3 standard deviations have ever been excluded. Nevertheless, the result does not improve a lot in the significance among the coefficients, with only a slight increase in the R^2 from 16.7% to 19% as shown in Table 3 (Regression III) below. Automatic rejection of outliers seems not a wise procedure in my model. One might argue that the outliers are of vital interest and need further investigation rather than rejection. After investigating the 18 outliers with 3 standard deviations, one third of them are confirmed as the funds ever implemented fund share dilution plan as the marketing measure during the destined quarter. And 5/6 of outliers have announced sales promotion with a lower subscription fee to attract more money inflow then. The logic behind the fund share dilution is similar to that of share allocation for the stock. That means diluting the fund NAV as well as the share investors held without changing its TNA.

Example for fund share dilution plan: *an investor owned USD 2000 in a fund with 1000 shares at the NAV of USD 2. After the share dilution announcement at the ratio of 1:2, the NAV is down to USD 1, and the TNA of the fund double, this investor held 2000 shares of fund instead of 1000 now. In that case, he still kept the same amount investment in fund as USD 2000.*

The first fund share dilution case occurred in July 2006, followed by some other cases during 2007, which successfully acted as one of the key drive in accelerating the money inflow into the fund industry. In a particular sample, Changxin Jinli fund⁹ has RMB16.6 billion net inflow in a quarter when the fund family implemented the dilution, which size is 43 times larger than that in the previous quarter.

As with the probability investors are sensitive to the promotion strategy as share dilution plan and sales promotion from fund family, it might be the cause for the significant outliers.

⁹ Fund code: 519994 (长信金利趋势)

7.1.3 Further improvement on the model

According to the finding from the outlier's investigation, one may argue the sales promotion and fund share dilution plan are the important factors in increasing investors' subscription desires for funds. In order to capture the effect of those promotion strategies, two more dummies have been added in the model to see in which level they could affect the growth of fund money flow.

The equation is given as below:

$$\begin{aligned}
 \text{Flow growth}_{i,t} = & \alpha_i + \beta_1 * \text{PER}_{i,[t-4,t-1]} + \beta_2 * \text{NF}_{i,t} + \beta_3 * \text{Fund size}_{i,t-1} \\
 & + \beta_4 * \text{Fund age}_{i,t} + \beta_5 * \text{Star fund}_{i,[t-4,t-1]} + \beta_6 * \text{Star family}_{i,[t-4,t-1]} \\
 & + \beta_7 * \text{MS fund}_{i,[t-4,t-1]} + \beta_8 * \text{MS family}_{i,[t-4,t-1]} \\
 & + \beta_9 * \text{Sales promotion}_{i,t} + \beta_{10} * \text{Share dilution plan}_{i,t} + \mu_{i,t}
 \end{aligned} \tag{4}$$

Due to lack of the summary related to such fund promotion announcements in any database, the information have been collected manually from different fund families' website. In my sample, totally 390 observations are affected by the promotion factor and 27 observations have ever diluted the fund share during the observation period. In the next section, I will further enunciate the empirical result for the models and the reasons behind, as well as the finding on how the promotion strategies affect the dependent variable.

7.2 Summary of regression results

In this section, the empirical results are reported, which is followed by a further analysis on the plausible reasons behind in section 7.4.

Table 3: Empirical results summary

<u>Dependent Variables: Fund new money flow growth</u>				
<u>Independent variables</u>	<u>I. Original regression (Actual return data set)</u>	<u>II. Robustness Check regression (Risk-adjusted return data set)</u>	<u>III. Original Regression excluded outliers with +/- 3 standard deviations</u>	<u>IV. Improved Model with two promotion dummies</u>
Past performance	0.021 (1.37)	-0.0151 (-0.15)	0.029 ** (3.98)	0.005 (0.39)
Fund size	-1.354 ** (-11.04)	-1.3619 ** (-11.11)	-0.522 ** (-8.66)	-1.125 ** (-9.83)
Fund Age	-0.323 (-0.32)	-0.2277 (-0.22)	-0.124 (-0.26)	-0.655 (-0.70)
Numebr of funds within the same family	-0.028 (-0.17)	-0.0268 (-0.16)	0.006 (0.07)	0.090 (0.58)
Star fund Dummy	-0.092 (-0.30)	-0.1324 (-0.41)	0.065 (0.44)	-0.034 (-0.12)
Star Family Dummy	0.080 (0.32)	0.0457 (0.19)	0.075 (0.63)	-0.135 (-0.59)
MS Dummy	0.228 (0.80)	0.2797 (0.97)	0.169 (1.25)	0.236 (0.90)
MS Family Dummy	0.025 (0.10)	0.0265 (0.11)	-0.003 (-0.03)	0.061 (0.28)
Sales promotion Dummy				0.529 * (3.04)
Fund share dilution Dummy				5.932 ** (12.71)
Number of observations	1104	1104	1085	1104
R square	0.1673	0.1656	0.1930	0.2951

** Significant at 1% level, * Significant at 2% level

To summarize, the empirical results for four regressions have been given above. Regression I and II are robustness check regressions based on alternative measures for evaluating fund performance, namely actual return and risk-adjusted return data set. After identifying the outliers from the data, two more regressions have been tried to improve the model. One is Regression III that excludes outliers with +/-3 standard deviations from original regression. The last regression (IV) improves the original regression by adding two more family promotion dummies as mentioned in section 7.1.3.

7.2.1 Hypothesis One: Star funds generate more money inflows than non-star funds

From the regression results, the coefficient of star fund dummy is not significant. The p-value is high making the sign of the coefficients not as important as they should be. This implies that the 10% best performing funds as star funds are probably not capable of bringing more money inflows than non-star funds in the following quarter. It is somewhat contradictive with the finding of Nanda, Wang and Zheng (2004) that star funds could benefit from their star identities. Thus the results do not support the hypothesis.

7.2.2 Hypothesis two: Morning star funds generate more money inflows than non-Morning star funds

Insignificant result of MS fund dummy coefficients has been obtained from the model. That means funds with 5-star rating are not rewarded for this by an increase in money inflows. Compared to star funds, MS funds enjoy the advantage of taking fund managers' investment skills and investors' utilities into considerations, MS funds still fail in generating stronger money inflows than non 5-star funds. Brand name effect is not favorable to MS funds in my sample. The results do not support the hypothesis as well.

7.2.3 Hypothesis three: Spillover effects exist within star fund families

There is no direct connection between fund money growth and star fund family from the regression result, indicating spillover effects do not exist in China's mutual fund industry. A non-star fund under the star family does not benefit from being more visible than similar funds in the alternative. Star funds are not identified as the priority subscription targets by investors. Similarly, less attention is paid to the families with stars. Here, the results do not support the hypothesis.

7.2.4 Hypothesis four: Spillover effects exist within MS families

MS funds do not bring the advantage to their non-MS fund members within the same family. Not only within star families but also MS families could not observe any spillover effects in China. With the privilege MS identity, MS families could not maximize the profit of the whole family. Hence, the results also do not support the hypothesis.

7.3 Results of robustness check and other regressions

When making the robustness test on the model, the result of Regression II, which is based on risk-adjusted return data set, has obtained similar insignificant coefficients of star fund, star family, MS fund and MS family dummy variables. And the same R-square of 0.16 is acquired as that of the Regression I with actual return data set. Further, by excluding the large outliers in Regression III and adding two extra family promotion dummies in Regression IV, little evidence of the star phenomenon or spillover effects within fund families has been found in China's mutual fund industry within my sample. Hypothesis (1) (2) (3) & (4) are not tenable as well. The finding is different to empirical results of Nanda, Wang and Zheng (2004) with positive and significant coefficients on both star fund dummy and star family dummy for all performance measures.

7.4 Plausible reasons for the results

The empirical results indicate that Chinese fund families do not benefit from spillover effects of their star funds within my sample. In order to explain why Chinese investors behave different to those investing in the U.S mutual fund industry for chasing star family, three plausible reasons are provided in the following section.

7.4.1 Reason one: Past outstanding performance is probably not capable of predicting future superior return

When looking at the coefficient of the fund performance variable as shown in Table 3, the insignificant result of star fund might not be surprising. Economic intuition suggests a positive relationship between the growth of fund money flow and performance, while no such connection has been found in my sample. This finding implies that investors do not link their investment selection decisions to the funds' past returns only. Consequently star funds might lose their power in influencing investors' choice since they are mainly created on the basis of fund performance. One plausible reason is that Chinese investors might presume the past outstanding performance could not promise future superior return. Such presumption is consistent with Blake and Morey (2000)'s finding that Morning star fund with 5-star cannot present a strong performance in the consequent period in the U.S

mutual fund industry. Another supporting literature is Nanda, Wang Zheng's finding of the inconsistency performance within star fund (2004). Their empirical result indicates that funds within star families fail to benefit investors at a later point in time. In my sample, star funds in each quarter vary all a lot as indicated in the star frequency summary (Appendix 9), which shows that star funds are not able to maintain outstanding performance in the subsequent period.

Further, a family with star funds may not assure its investment ability. Accompanied with the presence of star funds, star fund managers have more exposure in the media than before. Consequently star fund managers benefit the star families as they implied for the high investment skills. Nevertheless the high fund manager's turnover probably weakens investors' preferences on chasing the star fund or the star family. From Essence securities report 2007, 353 notifications related to fund manager replacement are noted during that year, and 171 out of 364 mutual funds' managers left their fund families. Similarly, pursuant to the China Management Report 2004, the turnover ratio of mutual fund managers between the year 1999 and 2003 is 48%, and 40%¹⁰ of all fund managers have been replaced in 2005. All of the facts above indicate the replacement of fund managers is frequent in China's mutual fund industry. And it might further convince the investors that the fund family could not maintain a stable investment strategy on funds. Khorana (2001) documents a deterioration relative to the past performance after a fund manager has been replaced within the over performing fund, while the opposite result is noted for underperforming fund.

In summary, the less consistent fund performance and the high fund manager turnover may be probably considered as the reason for Chinese investors not to follow the naive strategy of chasing both star fund and star family.

10 Source : Beijing local taxation bureau website

7.4.2 Reason two: There might exist a “Redemption dilemma” in China

Several Chinese researchers have examined the relationship between fund performance and the money flow. Different results have been obtained. Between 2005 and the first half year of 2006, Xue (2006) documents that fund performance positively correlates to fund subscription growth as well as the redemption growth when applying Splitting Cash Flow (SCF)¹¹ method of O’Neal, but their influence is asymmetrical. On the other hand, Lu, Chen, Xu and Xie (2007) uncover a negative and concave flow-performance relationship when examining 14 open-end funds between 2003 and 2006. Before that, Li (2003), Zhang, Xiao and Dai(2006) draw similar conclusions with the data within the first half year in 2003, and both 2003 & 2004 respectively. They call this specific phenomenon a “Redemption dilemma”. And those results induced some Chinese researchers, among them are Luo and Wang (2005), Chen (2006), Wang and Wu (2006), to further analyze the redemption adverse behavior by using both the Prospect Theory and the disposition effect. That means losses have a higher emotional impact than gains¹². Kahneman and Tversky (1979) also point out that investors are loss averse, and that is indicated by the convex function in profit and concave function in loss. Thus, investors are more inclined to take the risk when they experience losses, thus they dispose of the funds making profit and keep the funds with lower return. This is also called the disposition effect. In my sample, no significant negative flow-performance relationship has been obtained as the previous Chinese literatures did. However, it could not preclude the possibility that some Chinese investors’ behaviors are influenced by the disposition effect at some level. The star funds might probably be the target for those investors to sell out when they are ranked among the top performance. Chinese investors behave different to the investors in the U.S or other Western countries in that their redemption dilemma, which affects the insignificant result of the star phenomenon test.

11 The method separates the fund money flow into two parts of fund subscription inflow and fund redemption outflow

12 Source:investopedia.com

7.4.3 Reason three: Family protection policy of temporary subscription suspension possibly affects investor's investment decisions

The star fund phenomenon and spillover effects are not prominent in my sample, yet family protection measures might be argued to be another reason which influences the funds' money flows. In China, pursuant to fund covenants, fund families have the right to temporarily stop investors from subscribing certain funds within the family. In case fund families consider the economic situation turning to be detrimental to the fund shareholders, they will probably conduct this protection measure. The suspending period can range from one day to more than a year. And the suspending scope can be divided by either complete suspension for subscriptions or partly suspension for substantial amount subscriptions. Between 2004 and 2007 (Appendix 10), 186 notices have been obtained for the complete suspension as well as 115 notices for the partly suspension. Under the extreme situation, 14 observations of my sample are completely suspended from the subscription transaction in a full observed quarter, 3 of them are star funds and 7 of them are MS fund. That means that those star fund observations could not be rewarded by their particularly outstanding performance in the given quarter, in contrast they could only be redeemed resulting in the purely money outflow. Besides, there are another 3 star fund observations which are restricted from the subscription for more than 2 months in a quarter as well as 2 star fund observations which are restricted from partly subscription in a full quarter. As indicated in the frequency summary of the subscription suspension (Appendix 10), the same situation also could be noticed for the star family dummy variables. Thus, the protection measure might somewhat affects the investors' investment decision.

The reason for imposing selling limitations on funds by families may be argued that fund families need to maximize their utilities with suitable family scales. Funds' investment risk will increase along with the growth of the fund's size, and difficulties in management or investment portfolio construction arises, especially when stock prices are at an irregularly high level under the bull market. Looking at the suspension announcements, the main purpose for conducting a suspension restriction can be described as preventing funds to be oversize; minimizing specific side effects from stock market; or protecting fund share holder's interests on dividend distributing date, etc. The

suspending period can be short in the last two situations, while in the first case fund families could suspend funds subscription for a long period until they consider the funds size to be under control or to meet their management targets. Hence, on the one hand, fund families wish to enlarge the market share, but on the other hand, they would exert administrative means to protect the fund families' interest as well as the fund share holders' interest. Consequently, those measures affect funds' money flows and probably weaken star funds or star families' power on investors' investment behavior.

7.5 Other findings

After identifying the outliers in my data as indicated in section 7.1.2, both sales promotions and fund share dilution plans are found to be prevalent during my observed period. By adding those two factors, Regression IV further captures the effects of those two factors on the fund new money growth. As shown in Table 3 the empirical result of this regression does not change the result significantly within star fund and star family dummy variables, but it does improve the regression result which results in a higher R-square from 16% to 29%. Moreover, from the empirical result, the sales promotion and the fund share dilution plan are proved to boost funds' money flows

With regards to the result on the sales promotion, the estimate coefficient is significant at the 2% level with a positive value, which means that the funds' money inflows under a price promotion scheme is 0.53% higher than the alternatives. This finding is consistent with the evidence provided in Khorana Ajay and Henri Servaes (2004), who find that price competition is important in the U.S fund industry and that families could obtain market shares if they charged lower fees than the competitors, but only if these fees are above the average to begin with. However, in China's mutual fund industry, it seems that fund families do not distinguish themselves by imposing various fees to gain the market share. As indicated in section 5.2.4, the fees are almost the same across the funds. Since the fund categories in China are far less than that in the U.S market, the fund families' services are somewhat homogenous, making the fees less volatile. Thus the price competition of fund families switches to a promotion contest in the subscription fee that could attract more money inflows during the given period. When looking at the sales promotion dummy variables, in most situations, fund families are inclined to apply the

promotion strategies at the same time on all the fund members within to expand their market coverage. With the promotion plan, fund families can take the advantage of both the flexibility of the promotion and the advertising effect. Afterwards it may be easy for fund families to adjust back the fee to the beginning level in order to ensure a high profit margin.

Another finding is that the empirical result of the fund share dilution plan dummy indicates that diluting fund shares significantly boosts the sales of fund families. On average, funds have a stronger flow-performance by 5.9% after they diluted the share compared to the alternative funds without such plans. This finding is in line with a survey made by one financial news paper, namely the ‘China Securities Post’ in 2007, where it was found that 33.05% of 1905 investors expressed an interest in subscribing the fund with dilution plan. Further 18.69% of the investors are inclined to initially subscribe the new launched funds. Though the dilution could not bring the essential change to the fund except for the fund share size, it offers the illusion to the investors that they could subscribe the fund under a cheaper price with more shares and a lower unit NAV, and that these funds have a higher possibility of earning higher returns. Investors’ behavior on favoring fund dilution is more affected by its psychology application than by the actual consequences of a dilution.

Those two findings on the other hand can somewhat contribute to explaining why the star phenomenon and spillover effects within star families are not prevalent in China. Investors’ preference to lower NAV funds after dilution and cheaper funds with a fee promotion might probably distract their attention on star identity. In recent years, the mutual fund industry is booming with a high demand. And the dilution strategy and the promotion plan may be argued as being more effective in maximizing the fund families’ market share than forming a star identity.

8 Conclusion

8.1 Main findings

This paper intends to test the star phenomenon and spillover effects within the star families in China's mutual fund industry. Specifically, a test is performed to examine the impacts of the star fund identity on both itself and on the funds within the same family. Different to the evidence of Nanda, Wang and Zheng (2004) obtained in the U.S market, the empirical results in my study indicate that neither star funds nor non-star funds in the star families could successfully attract more attention from investors with greater money inflows than the alternatives. That means star funds are not rewarded with more money inflows by their past outstanding performance in my sample. Moreover, star funds might not benefit non-star funds within the same star families. The similar results have been obtained within the robustness check regressions (Regression I & II), as well as another two revised regressions by adding two more promotion factors (Regression IV) and excluding large outliers (Regression III) respectively. Stated differently, both the star phenomenon and spillover effects within fund families do not exist in China's mutual fund industry within my sample. The findings above further suggest that employing a strategy in creating a star fund may not be considered a wise approach in maximizing families' market coverage.

Several possible reasons underlying the findings of this study have been provided. Firstly, as indicated from my data summaries, the star funds might not be able to maintain their star identities across time. Moreover fund manager turnover is high in China's mutual fund industry, which could indicate a relatively unstable investment strategy on funds. It is possible for Chinese investors not to follow a naive strategy of chasing the funds within star families when they presume past outstanding performance could not predict future superior return. Further, the Chinese investors' behavior might also psychologically be influenced by the disposition effect and the loss-averse effect, as some Chinese previous studies stated. Last but not least, the fund family protection measure could have some effects on funds' money inflows and it probably weakens the star identities' power on investors' investment selections.

On the other hand, the sales promotion and the fund share dilution plan are proved to be the effective strategies in generating more money inflows to funds or families. Upon discovering that the outliers in the original regression are affected by the sales promotion and the fund share dilution plan, those two promotion factors are included to an improved model (Regression IV). Though this model could not change the empirical results for spillover effects, it increases R-square by 13% and further shows evidence of investors' preferences for lower NAV funds after dilution and cheaper funds with fee promotion. This finding might be argued as a factor that probably distracts investors' attention on star identities.

8.2 Limitations and further research

Some improvements to this paper and additional further research could be made if it is possible to obtain the necessary data:

First of all, the sample size may be not large enough. The reason behind this is that the fund TNA data can only be officially updated each quarter in the fund quarter report. When rating the funds with at least one year of performance history, a lot of observations need to be dropped. Thus, if the monthly data of TNA could be accessed, the sample would become much larger and the results obtain more reliability.

Secondly, the impact of fund manager's investment skills on fund money flow is not taken into account explicitly in my model, due to the lack of data, an example being the turnover ratio. Again, if the data can be obtained, it could help in increasing the reliability of the results.

Third, the possible reasons underlying the results in this paper could be further investigated in the future studies.

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Appendices:

Appendix 1: Glossary definition

Open-end fund*	A fund raises money by selling shares of the fund to the public. Open-end funds then take the money they receive from the sale of their shares (along with any money made from previous investments) and use it to purchase various investment vehicles, such as stocks, bonds and money market instruments. In return for the money they give to the fund when purchasing shares, shareholders receive an equity position in the fund and, in effect, in each of its underlying securities. For most open-end funds, shareholders are free to sell their shares at any time, although the price of a share in an open-end fund will fluctuate daily, depending upon the performance of the securities held by the fund.
Close-end fund*	A fund with a fixed number of shares outstanding and one which does not redeem shares the way a typical mutual fund does. Closed-end funds issue a fixed number of shares to the public in an initial public offering, after which time shares in the fund are bought and sold on a stock exchange, and they are not obligated to issue new shares or redeem outstanding shares as open-end funds are. The price of a share in a closed-end fund is determined entirely by market demand, so shares can either trade below their net asset value ("at a discount") or above it ("at a premium").
Equity fund***	A fund that invests at least 60% of fund assets in stock market ¹³
Bond fund***	A fund that invests at 80% of fund assets in bond market
Money market fund***	A fund that only invests in money market instruments
Balanced fund***	A fund that invests among stock market, bond market and money market, while it does not meet the requirement of equity fund and bond fund
Guarantee fund*	A fund established for the protection of customers' monies; the clearing members contribute a percentage of their gross revenues to the guarantee fund
Index fund*	A passively managed mutual fund that tries to mirror the performance of a specific index, such as the S&P 500.
QDII**	Qualified Domestic Institutional Investor, also known as QDII, is a scheme relating to the capital market set up to allow financial institutions to invest in offshore markets such as securities and bonds. Similar to QFII (Qualified Foreign Institutional Investor), it is a transitional arrangement which provides limited opportunities for domestic investors to access foreign markets at a stage where a country/territory's currency is not traded or floated completely freely and where capital is not able to move completely freely in and out of the country.

*Source: Investorword.com, 22 Nov 2008: <http://www.investorwords.com>

** Source: Campbell R. Harvey's Hypertextual Finance Glossary: <http://dictionary.babylon.com/QDII>

*** Source: "Regulation on mutual fund operation and management in China " No.29 (<证券投资基金运作管理办法>)

13 Morning Star Company (China) defines a fund that invests at least 70% of fund assets in stock market as equity fund in its ranking from June 2004. Source: Morning Star Company website

Appendix 2: Regression I. Empirical result of the original regression (Actual return data set)

Fixed-effects (within) regression				Number of obs =	1104	
Group variable (i): fundcode				Number of groups =	146	
R-sq: within	0.1673			Obs per group: min =	1	
between	0.0239			avg =	7.6	
overall	0.0676			max =	16	
				F(23,935) =	8.17	
corr(u_i, Xb)	-0.5658			Prob > F =	0	
Flow growth	Coef.	Std. Err.	t	P> t	[95% Conf.	Interval]
-----+-----	-----	-----	-----	-----	-----	-----
PER	0.021	0.015	1.370	0.171	-0.009	0.051
Fund size	-1.354	0.123	-11.040	0.000	-1.595	-1.113
NF	-0.028	0.168	-0.170	0.866	-0.358	0.301
Fund age	-0.323	1.011	-0.320	0.750	-2.308	1.662
star fund	-0.092	0.309	-0.300	0.765	-0.698	0.514
Star family	0.080	0.248	0.320	0.748	-0.407	0.567
MS fund	0.228	0.284	0.800	0.423	-0.330	0.785
MS family	0.025	0.235	0.100	0.917	-0.436	0.485
Time dummy1	0.427	1.643	0.260	0.795	-2.797	3.652
Time dummy2	0.515	1.530	0.340	0.736	-2.487	3.518
Time dummy3	1.171	1.537	0.760	0.446	-1.846	4.188
Time dummy4	0.823	1.345	0.610	0.541	-1.817	3.462
Time dummy5	1.044	1.294	0.810	0.420	-1.495	3.584
Time dummy6	1.030	1.171	0.880	0.379	-1.269	3.328
Time dummy7	1.077	1.113	0.970	0.333	-1.106	3.260
Time dummy8	0.926	0.959	0.970	0.335	-0.957	2.808
Time dummy9	0.812	0.904	0.900	0.370	-0.962	2.586
Time dummy10	0.648	0.736	0.880	0.379	-0.796	2.092
Time dummy11	0.438	0.601	0.730	0.466	-0.741	1.617
Time dummy12	2.061	0.694	2.970	0.003	0.699	3.422
Time dummy13	1.624	0.446	3.640	0.000	0.749	2.499
Time dummy14	1.815	0.430	4.220	0.000	0.971	2.659
Time dummy15	1.492	0.320	4.660	0.000	0.864	2.121
Time dummy16 (dropped)						
_cons	1.056	7.398	0.140	0.887	-13.462	15.573
-----+-----	-----	-----	-----	-----	-----	-----
sigma_u	2.269591					
sigma_e	2.300015					
rho	0.493342	(fraction of variance due to u_i)				
-----	-----	-----	-----	-----	-----	-----
F test that all u_i=0:	F(145, 935) =	2.32	Prob > F = 0.0000			

(The regression is given in equation (1) in the main text)

Appendix 3: Regression II. Empirical result of robustness check regression (Risk-adjusted return data set)

Fixed-effects (within) regression				Number of obs =	1104	
Group variable	(i): fundcode			Number of groups =	146	
R-sq: within	0.1656			Obs per group: min =	1	
between	0.0177			avg =	7.6	
overall	0.0606			max =	16	
				F(23,935) =	8.07	
corr(u_i, Xb)	-0.5836			Prob > F =	0	
flowgrowth	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
-----+-----	-----	-----	-----	-----	-----	-----
Risk-adjusted PER	-0.015	0.097	-0.150	0.877	-0.206	0.176
Fund size	-1.362	0.123	-11.110	0.000	-1.602	-1.121
NF	-0.027	0.169	-0.160	0.874	-0.358	0.304
Fund age	-0.228	1.013	-0.220	0.822	-2.215	1.759
Star fund	-0.132	0.323	-0.410	0.682	-0.765	0.501
Star family	0.046	0.247	0.190	0.853	-0.438	0.530
MS fund	0.280	0.287	0.970	0.331	-0.284	0.844
MS Family	0.027	0.238	0.110	0.911	-0.440	0.493
Time dummy1	0.116	1.632	0.070	0.943	-3.087	3.319
Time dummy2	0.165	1.514	0.110	0.913	-2.806	3.135
Time dummy3	0.315	1.412	0.220	0.823	-2.456	3.086
Time dummy4	0.334	1.303	0.260	0.797	-2.223	2.891
Time dummy5	0.343	1.198	0.290	0.774	-2.008	2.695
Time dummy6	0.411	1.091	0.380	0.706	-1.730	2.552
Time dummy7	0.356	0.985	0.360	0.718	-1.577	2.289
Time dummy8	0.359	0.878	0.410	0.683	-1.365	2.082
Time dummy9	0.146	0.786	0.190	0.853	-1.397	1.689
Time dummy10	0.273	0.693	0.390	0.693	-1.086	1.633
Time dummy11	0.471	0.601	0.780	0.433	-0.708	1.650
Time dummy12	1.425	0.527	2.700	0.007	0.391	2.460
Time dummy13	1.577	0.447	3.530	0.000	0.700	2.454
Time dummy14	1.539	0.383	4.020	0.000	0.788	2.291
Time dummy15	1.434	0.321	4.470	0.000	0.804	2.064
Time dummy16	(dropped)					
_cons	1.114041	7.414547	0.15	0.881	-13.43704	15.66512
-----+-----	-----	-----	-----	-----	-----	-----
sigma_u	2.3216046					
sigma_e	2.3024715					
rho	0.50413764	(fraction of variance due to u_i)				
-----	-----	-----	-----	-----	-----	-----
F test that all u_i=0:	F(145, 935) =	2.43	Prob > F = 0.0000			

(The regression is given in equation (1) in the main text)

Appendix 4: Regression III. Empirical result of original regression excluded outliers with +/- 3 standard deviations

Fixed-effects (within) regression				Number	of obs =	1085
Group variable	(i): fundcode			Number	of groups =	145
R-sq: within	0.193			Obs per	group: min =	1
between	0.0326				avg =	7.5
overall	0.11				max =	16
				F(23,917)	=	9.54
corr(u_i, Xb)	-0.5055			Prob >	F =	0
-----+-----	-----	-----	-----	-----	-----	-----
flowgrowth	Coef.	Std. Err.	t	P> t	[95% Conf	. Interval]
-----+-----	-----	-----	-----	-----	-----	-----
PER	0.029	0.007	3.980	0.000	0.015	0.043
Fund size	-0.522	0.060	-8.660	0.000	-0.640	-0.404
NF	0.006	0.080	0.070	0.943	-0.151	0.162
Fund age	-0.124	0.481	-0.260	0.796	-1.068	0.820
star fund	0.065	0.147	0.440	0.657	-0.224	0.355
Star family	0.075	0.118	0.630	0.527	-0.157	0.306
MS fund	0.169	0.135	1.250	0.210	-0.096	0.435
MS family	-0.003	0.112	-0.030	0.977	-0.222	0.216
Time dummy1	0.568	0.779	0.730	0.466	-0.961	2.098
Time dummy2	0.610	0.725	0.840	0.401	-0.814	2.034
Time dummy3	1.309	0.730	1.790	0.073	-0.123	2.740
Time dummy4	0.792	0.638	1.240	0.215	-0.460	2.044
Time dummy5	1.086	0.614	1.770	0.077	-0.119	2.291
Time dummy6	0.975	0.556	1.750	0.080	-0.115	2.066
Time dummy7	1.091	0.528	2.070	0.039	0.054	2.127
Time dummy8	0.868	0.455	1.910	0.057	-0.025	1.761
Time dummy9	0.736	0.429	1.710	0.087	-0.107	1.578
Time dummy10	0.426	0.349	1.220	0.223	-0.259	1.110
Time dummy11	0.065	0.285	0.230	0.819	-0.494	0.624
Time dummy12	1.370	0.330	4.160	0.000	0.723	2.016
Time dummy13	1.164	0.212	5.490	0.000	0.747	1.580
Time dummy14	0.887	0.207	4.280	0.000	0.481	1.294
Time dummy15	0.729	0.153	4.750	0.000	0.428	1.030
Time dummy16	(dropped)					
_cons	-0.326	3.518	-0.090	0.926	-7.230	6.579
-----+-----	-----	-----	-----	-----	-----	-----
sigma_u	0.7060514					
sigma_e	1.0855483					
rho	0.2972756 (fraction of variance due to u_i)					
-----	-----	-----	-----	-----	-----	-----
F test that all u_i=0:	F(144, 917) =	1.26	Prob > F = 0.0264			

(The regression is given in equation (1) in the main text)

Appendix 5: Regression IV. Empirical result of improved model with two extra promotion dummies

Fixed-effects (within) regression				Number	of obs	=	1104
Group variable	(i): fundcode			Number	of groups	=	146
R-sq: within	0.2951			Obs per	group: min	=	1
between	0.1337				avg	=	7.6
overall	0.1898				max	=	16
				F(25,933)		=	15.63
corr(u_i, Xb)	-0.4259			Prob >	F	=	0
flowgrowth	Coef.	Std. Err.	t	P> t	[95% Conf.	Interval]	
-----+-----							
PER	0.005	0.014	0.390	0.698	-0.022	0.033	
Fund size	-1.125	0.114	-9.830	0.000	-1.349	-0.900	
NF	0.090	0.155	0.580	0.561	-0.214	0.395	
Fund age	-0.655	0.932	-0.700	0.483	-2.483	1.174	
Sales promotion	0.529	0.174	3.040	0.002	0.188	0.870	
Fund share dilution	5.932	0.467	12.710	0.000	5.016	6.848	
Star fund	-0.034	0.284	-0.120	0.905	-0.592	0.524	
Star family	-0.135	0.229	-0.590	0.557	-0.585	0.315	
MS fund	0.236	0.262	0.900	0.366	-0.277	0.750	
MS family	0.061	0.216	0.280	0.777	-0.363	0.486	
Time dummy1	0.278	1.517	0.180	0.855	-2.700	3.256	
Time dummy2	0.382	1.413	0.270	0.787	-2.391	3.156	
Time dummy3	0.646	1.419	0.460	0.649	-2.139	3.431	
Time dummy4	0.571	1.243	0.460	0.646	-1.868	3.010	
Time dummy5	0.729	1.197	0.610	0.542	-1.619	3.078	
Time dummy6	0.697	1.082	0.640	0.519	-1.426	2.820	
Time dummy7	0.666	1.028	0.650	0.517	-1.352	2.684	
Time dummy8	0.687	0.887	0.770	0.439	-1.054	2.428	
Time dummy9	0.526	0.837	0.630	0.530	-1.117	2.169	
Time dummy10	0.567	0.682	0.830	0.406	-0.771	1.906	
Time dummy11	0.647	0.561	1.150	0.250	-0.455	1.748	
Time dummy12	1.699	0.640	2.650	0.008	0.443	2.955	
Time dummy13	1.593	0.413	3.860	0.000	0.783	2.402	
Time dummy14	1.401	0.399	3.510	0.000	0.619	2.183	
Time dummy15	1.276	0.296	4.320	0.000	0.696	1.856	
Time dummy16	(dropped)						
_cons	3.186	6.817	0.470	0.640	-10.191	16.564	
-----+-----							
sigma_u	1.981218						
sigma_e	2.118429						
rho	0.466568	(fraction of variance due to u_i)					
-----+-----							
F test that all	u_i=0:	F(145, 933)	) = 2	0.22	Prob >	F = 0.0000	

(The regression is given in equation (4) in the main text)

Appendix 6: Variables description

<u>Variables</u>	<u>Observations</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Min</u>	<u>Max</u>
Flowgrowth	1104	0.482	2.622	-1.086	43.034
PER	1104	18.271	16.526	-16.201	64.062
Risk-adjusted PER	1104	0.769	1.182	-3.240	8.006
Fund size	1104	-0.165	1.134	-4.531	2.595
NF	1104	2.661	1.249	1.000	6.000
Fund age	1104	6.809	0.388	6.125	7.737

Appendix 7: Summary of outliers with +/- 3 standard deviations

Fund code	Time Period	Residual
519994	200703	12.77906
090004	200604	8.562071
580001	200702	8.249326
420001	200704	7.787771
090003	200703	7.330424
160106	200604	7.191025
161601	200703	6.92251
519001	200702	6.732144
161605	200701	6.314858
400003	200702	5.289318
151001	200702	4.519122
310328	200702	4.401824
320003	200701	3.924126
002011	200604	3.803034
020005	200703	3.249141
410001	200702	3.236784
050001	200703	3.170756
450001	200702	3.027833
519994	200704	-12.77906

Note: This table summarizes the outliers with +/-3 standard deviations that have been excluded in the improved model III.

Appendix 8: Summary of funds with share dilution plan

<i>Fund code</i>	<i>Time period</i>	<i>Fund code</i>	<i>Time period</i>
100020	200603	519994	200703
519688	200701	270005	200703
260101	200701	257020	200703
110005	200701	020005	200703
161706	200701	162607	200703
213002	200702	290002	200703
360001	200702	460001	200703
410001	200702	163803	200703
070003	200702	481001	200704
530001	200702	210001	200704
310328	200702	420001	200704
163402	200702	217001	200704
519001	200702	398001	200704
180001	200702		

Note: The time period is on the quarter basis.

Appendix 9: Frequency summary for Star fund and MS fund

Frequency	No. of Funds with Star Fund identity	No. of Funds with Morning star identity
8	0	1
7	0	4
6	0	4
5	0	3
4	0	3
3	9	5
2	11	12
1	55	12
Total star observations	104	138

Appendix 10: Frequency summary for temporary subscription suspension

(Number of funds)	Star Fund	MS fund	Star family	MS family
<u>Fully subsuspension</u>				
Within the full observed period (90 days)	3	2	7	3
Within the part of observed period (60 days)	3	2	2	4
Total fully subsuspension announcement			186	
<u>Partly subsuspension for substantive amount</u>				
Within the full observed period (90 days)	2	4	1	5
Total partly subsuspension announcement			114	

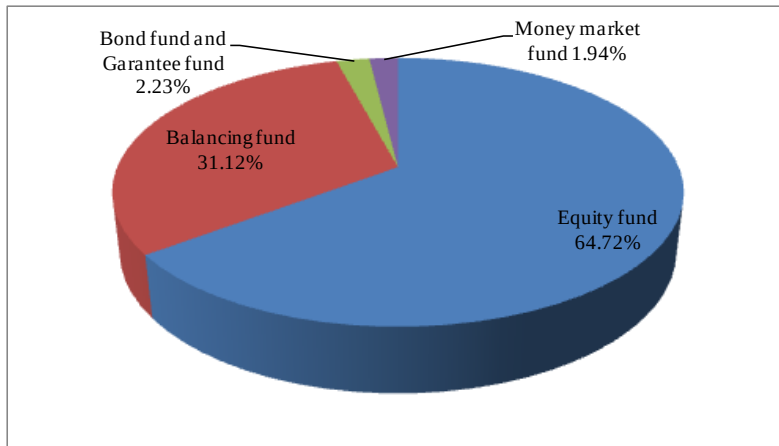
Appendix 11: Fund total net asset growth rate around the world:

	2003	2004	2005	2006	2007
Americas	17.6%	10.3%	11.0%	17.6%	17.0%
Europe	35.2%	20.4%	6.4%	30.0%	15.1%
Asia and Pacific	28.0%	23.2%	15.6%	26.7%	49.7%
Africa	64.2%	56.7%	21.5%	19.0%	22.0%
Global total	24.1%	15.1%	9.9%	22.8%	20.1%

China	41.6%	99.0%	52.0%	83.3%	283.4%
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Note: Data is obtained from the 2008 investment company fact book 48th edition (U.S)

The figure in Asia and pacific does not include the data in China and the figure in China is from WIND database

Appendix 12: Fund category composition on fund TNA¹⁴

Note: The shares of Index funds and QDII are included in Equity fund

¹⁴ Data: from WIND database(China) and Essence Securities analysis center in January 2008