RELATIONSHIP BETWEEN MUTUAL FUND FLOW AND FUND PERFORMANCE—A STUDY IN CHINA

By

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– A STUDY IN CHINA

By

Jun Liu

Submitted to the MIT Sloan School of Management on May 6, 2011 in partial fulfillment of the requirements for the degree of Master of Business Administration

ABSTRACT

Use publically available data set on Chinese stock oriented mutual funds, examine whether the fund flow within one period depends on the past performance of this individual fund, and if there's a relationship, then what the detailed linkage between the past performance and the current period fund flow is. Different models involving regression will be used to exam the significance of each factor that may contribute to the relationship. The results found by using Chinese market data will be compared to developed markets, for example, the U.S. market, see if similar patterns appear in both markets.

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Title: Assistant Professor of Finance
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Introduction

China, with a population of nearly 1.4 billion, GDP of RMB 39798.3 Billion (US$6040 Billion), and a continuously 9% annual economic growth rate for last thirty years (National Bureau of Statistics of China), has become one of the largest economies around the world. The growth of the Chinese stock market is also impressive, “average monthly stock market returns in China were approximately 2.2% from 1992 to 2008”. (Chin-Hsiang Chang, Huang, and Pikki Lai, 2010) Therefore, overtime, increasing number of foreign corporations and individuals invest in China, in both industrial and financial markets. China has a relatively short history in its financial market operations, because the two stock exchanges in mainland China, namely the Shanghai Stock Exchange and Shenzhen Stock Exchange, were only established in 1990, and the bond market before 1987 was relatively illiquid. The financial system builds up quickly within the past 20 years, and now China has two stock exchanges in the mainland, trading different classes of stocks and derivatives including futures, options and mutual funds, open to both domestic and foreign investors. Because of the rapid growth in China’s economy, financial analysts around the world now are paying more attention on the trends and movements in Chinese financial markets. Especially after the 2008 financial crisis, people worry about the impact of globalization on different countries around the world, and more studies are believed to be done to assist analysts to find out the future of the global economy, and one way to analyze this is to find out the features in Chinese financial markets, because of the rapid growth and the volume of trading within Chinese financial markets. When the first open-ended fund was introduced and issued in 2001, Stock oriented fund weights more and more on household wealth, and is one of the popular intermediaries for individuals and corporations in China to build up and balancing their savings and wealth. Therefore, analysts should give more attention to this market, as well as understand how those funds are contributing to the Chinese financial market as a whole. This paper use financial data in China to find out the fund flow of stock oriented mutual funds in China, exam the relationship between the fund flows, from one period to another, with funds past performance, to see if there are differences between emerging markets and developed markets.
Mutual Fund History and Current Situation in China

The history of mutual fund started as early as in 1868, when the Foreign and Colonial Government Trust was set up in England, till year 1924, the first open-ended fund was issued in Boston. For the last century, mutual fund markets were developing rapidly around the world. However, compare to those developed countries such as England and U.S., the Mutual Fund history in China was a relatively short period of time as it only existed for 20 years. Though the idea of mutual fund was introduced to the Chinese market in 1987, when China International Trust and Investment Corporation, and the People’s Bank of China corporate with foreign institutions. However, they only issued national funds for foreign investors, thus there’s no funds for domestic individual investors existed at that time. It was until 1991, the first Fund opened to the domestic investors in China, with a total of RMB 69.3 Million.

Starting from 1992, the mutual fund market in China experienced a rapid expanding period, with an average annual growth of 38.99% in the total net assets under management (China Fund Industry Development Report). The Industry Development Report further stated that the year 1992 alone, there were 37 new funds been set up with a total of U.S.$ 2.2Billion. At the same year, the first fund management company was officially approved by Chinese Government. At the end of 1993, the total number of funds existed on the market was around 70, with a total face value of U.S.$4Billion. The number of fund management companies increased to 14 at the end of 2001, and this number further increased to 62 at the end of 2010. The total number of funds was 652 at the end of 2010, increased 17.06% over one year period from the end of 2009. Within all the mutual funds, the number of open ended funds is 725, including 407 stock oriented funds.

The mutual fund market has both close-ended funds, and open-ended funds. Part of the mutual funds is trading on the stock exchange, while others are only traded via bank counters. Though the close ended funds were the major components in the Chinese mutual fund market at the beginning stage, open-ended funds had continuously increased its market share, as the number of open-ended funds issued each year increased rapidly, while on the other hand, the number of issues for closed-ended funds decreased. By 2002, the total amount of fund raising for
open-ended funds had surpassed the total amount raised by close-ended funds, and became the major players in the Chinese mutual fund market. According to Stephan Binder in an interview by Bloomberg (2007), the Chinese fund management industry assets will exceed $1.4 trillion in 2016, and it is the world’s fastest growing country.

Chart 1-1 is showing the development of the mutual funds for the period from 1998 till 2007, by comparing the number of close-ended and open-ended funds at the end of each year, as well as the amount raised for each type of fund. We can see there’s no open-ended funds until 2001, and from that, this type of fund had obtained a rapid growth.

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of mutual funds</th>
<th>Amount raised (RMB100 Million)</th>
<th>No. of Close-ended funds</th>
<th>Amount raised for close-ended funds</th>
<th>No. of open-ended funds</th>
<th>Amount raised for open-ended funds</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>5</td>
<td>100</td>
<td>5</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1999</td>
<td>17</td>
<td>405</td>
<td>17</td>
<td>405</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2000</td>
<td>11</td>
<td>55</td>
<td>11</td>
<td>55</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2001</td>
<td>16</td>
<td>241.26</td>
<td>13</td>
<td>124</td>
<td>3</td>
<td>117.26</td>
</tr>
<tr>
<td>2002</td>
<td>22</td>
<td>580.99</td>
<td>8</td>
<td>133</td>
<td>14</td>
<td>447.99</td>
</tr>
<tr>
<td>2003</td>
<td>39</td>
<td>678.51</td>
<td>0</td>
<td>0</td>
<td>39</td>
<td>678.51</td>
</tr>
<tr>
<td>2004</td>
<td>51</td>
<td>1821.4</td>
<td>0</td>
<td>0</td>
<td>51</td>
<td>1821.4</td>
</tr>
<tr>
<td>2005</td>
<td>62</td>
<td>1002.79</td>
<td>0</td>
<td>0</td>
<td>62</td>
<td>1002.79</td>
</tr>
<tr>
<td>2006</td>
<td>89</td>
<td>3887.72</td>
<td>0</td>
<td>0</td>
<td>89</td>
<td>3887.72</td>
</tr>
<tr>
<td>2007</td>
<td>73</td>
<td>4267.54</td>
<td>2</td>
<td>76.75</td>
<td>71</td>
<td>4190.79</td>
</tr>
<tr>
<td>Total</td>
<td>385</td>
<td>13040.21</td>
<td>56</td>
<td>893.75</td>
<td>329</td>
<td>12146.46</td>
</tr>
</tbody>
</table>

Data resource: China Galaxy Securities 2007.7.3

Facing the rapid growth in mutual fund market, more and more mutual funds related regulations were put into effects, try to regulate the market and control the overall expanding speed. Furthermore, with the development of technology and nationalization, funds in different provinces or cities reduced their barriers to investors in other regions, and became tradable to all investors in China, which helped to increase the liquidity of the mutual fund market in China, and provide more information to individual and corporation investors, while leaving more space and
choices to fund managers and brokers on asset investments.

Mutual funds can be further divided into different categories according to the underlying investment assets. Types that we can normally observe from the market are stock oriented funds, bond funds, hybrid funds, Index Funds, principal guaranteed funds, and Exchange Traded Funds. Among all those different categories, stock oriented fund is the most significant category in size. By the end of Sep 2010, the total value of the stock oriented funds was RMB 1090 Billion, represents 53% of the total value of all the open-ended funds. Chart 2-1 shows the weighting percentage for each fund type in China as at the end of 4th quarter 2010. The stock-oriented fund, which is shown in blue color had a 43.79% share of the total funds, accounted for almost half of the market.

*Chart 2-1 Weights of different types of Funds in China*

This is the percentage of each type of fund accounts for the total mutual fund market, at the end of 4th quarter 2010. Source (http://zt.stcn.com/zt2010/content/2011-01/20/content_2026446.htm)

Individuals were the main investors in the Chinese fund market. By the end of the second quarter of 2010, individual investment accounts number represented 99.87% of the total investors in this market, and the number of shares held by individuals increased from 82.44% at the end of 2009 to 86.63%; the total value held by individuals was also increased from 81.77% to 83.82% over the same time period. The main reason of these increase is corporate investors withdraw funds from
the market at the end of 2009. (China Fund Industry Development Report, 2010)

Basic Idea of Stock Oriented Mutual Fund Flow

There are different researches and studies done on the relationship between fund flows and past performance. One reasons of those studies reflected the importance of the mutual fund market for one country's economy. U.S. as an example, had $10.4 trillion, including money market funds, at the end of July, 2009. (ICI internet publication, “Trends in Mutual Fund Investing”, July, 2009)

David A Dubofsky stated out that “If net investor inflows follow superior performance, mutual fund returns are lower because of decreasing returns to scale in active portfolio management” (David, 2010). Active portfolio management will incur higher transaction costs, and if the inflows and outflows are related so closely to the past performance, then the manager of the mutual funds may need to worry about the cash availability when facing unforeseeable redeems. This will lead to fund managers not use up all the possible cash but remain a relatively higher percentage of cash over total net asset within the fund, and thus reduce the possible returns otherwise could be earned by investing those cash. On the reverse situation, “the greater the volatility in investor flows, the lower the trading response to flow” (David A. Dubofsky, 2010) this is because, if the past performance was bad, and a huge redeem may force the fund managers to sell part of their investments, or even to borrow to repay investors, incur higher interest expenses, and thus incur extra costs on investors who are holding those mutual funds. Therefore, with more uncertainty, the fund managers are more reluctant to take actions towards those fund flows. To study and understand more about the relationship between the past performance and fund flows would help us to gain more information on the mutual fund market, especially in a developing country such as China.

“The dollars that flow into and out of mutual funds are affected by, among other things, past fund performance.” (David G. Shrider) Sirri and Tufano (1998) further stated that “Mutual fund consumers chase returns, flocking out funds with the highest recent returns, though failing to
flee from poor performers" (Sirri and Tufano, 1998) They further conclude that investors trading stock oriented funds are documented to “act as momentum traders at monthly or quarterly frequencies”. (Sirri and Tufano, 1998) Though there are different ways to measure the “performance” of an individual fund, such as measuring the return based on absolute value or comparing the particular fund returns with a benchmark, a stock market index, for example. Early fund flow researches indicate that “while past winners are rewarded with inflows, past losers are not symmetrically punished with the same level of outflow” (David G. Shrider). There are different explanations on those findings, such as the costs on getting extra information, transaction costs, and individual behavior biases.

When doing the research on mutual fund flows, it is helpful for us to use different models to calculate and examine whether there is excess returns compare to the stock market return, which is contributed by the management skills of those fund managers. Therefore, historical researches focuses on CAPM and Fama-French three factor models to look at whether each fund, over time, obtains a significant positive alpha, and then exam the relationship between the positive alpha with the fund flows overtime. Further, there are historical researches that look at Purchases and Redemptions of each period separately and compare to the past performance with the level of changes in both purchases and redemptions, and found out that there’s a nonlinear relationship between buying the past winners and selling the past losers, as investors tend to buy winners while still hold on to those past losers. Other researchers believe that redemptions and purchased may be caused by different determinants, or factors within or outside the market, as each individual funds, while facing the same systematic risk, still contains unsystematic or idiosyncratic risks that cannot be diversified easily, and investors may look at and evaluate those risks differently. The market performance should also be divided into “good times” and “bad times”, which would help further detect what are the factors that affect the fund flows the most. As David (2009) stated, “for redemptions, relative performance and risk adjusted performance are important determinants during a period of record flows into mutual funds”, while “during a period of poor performance, absolute performance becomes much more important”. (David G. Shrider)

While most of the past mutual fund flow studies are based on developed markets such as U.S.
market, the purpose of this paper is to examine whether similar results would be found in an emerging market such as Chinese market. This will help us to understand more about the differences between the developed markets and the emerging markets, and give some reasonable explanations on the causes of those differences.

Data Collection and Calculation

I have selected 49 open-ended stock oriented funds which have existed since the beginning of 2006 to be the sample size of my research. Further, I have collected all of their quarterly and annually reporting data including the change in the net asset under management, the asset management strategy for each fund, and quarterly per stock value change for the period from 2006 till 2010. Those funds, as their names indicated, have invested most of their investors’ money into the two Chinese stock markets – Shanghai Stock Exchange, and Shenzhen Stock Exchange. Therefore, I choose the Shanghai Shenzhen 300 Index to represent the market performance in China, as funds will buy and sell stocks in both stock exchanges. The Shanghai Shenzhen 300 Index, introduced by China Securities Index Co., Ltd, took into effect in April 2005, accounts for the total A-class share performance in China. It sets the base point equals 1000 on 31st Dec 2004, and has chosen 300 A-class shares in the two stock exchanges, where 179 in Shanghai Stock Exchange, and 121 in Shenzhen Stock Exchange. The Sample shares in Shanghai Shenzhen 300 Index have covered around 60% of the total value of the two stock exchanges in mainland China. Therefore, this index is the best index to reflect the overall stock market performance in China, and should be used to calculate each individual fund excess return, and thus examine how each fund performed in particular period of time regarding to the market.

I assume that the change of number of total shares, or the volume of the fund, at the end of each quarter represents the fund flows. More specifically, when the redemption is higher than the purchase for one fund for one particular quarter, then the fund has an absolute fund outflow; On the reverse side, if the total purchase is greater than the total redemption, then the fund is said to have an absolute inflow for that particular quarter. After calculating the fund flow by volume changes, I also conduct fund flow and past performance comparisons by using the changes in each fund’s Total Assets Under Management as the fund flow.
I classify the total sample funds into four different categories according to the different strategies each of the fund implements. These four categories are: Value & Growth, which captures all funds that mainly buy the value stocks or the growing stocks, as well as funds that trying to balance their asset holdings by buying both of value and growth stocks on different weights; Industrial Difference, which captures all funds that are trading on a specific segments of the Chinese stock markets; Market Index, which captures all the funds that trade and balance their holdings according to the change in different types of indexes, including Shanghai Shenzhen 300 Index, Shanghai Stock 50 Index, Shenzhen Stock 100 Index, ect; Size, which captures those funds that trade particularly in either large size company stocks or small size company stocks.

By categorize all those funds, it gives us more ideas how different strategies implemented by each fund would impact on the fund flows, and therefore, see if the strategies are one of the main factors that may affect investors’ decision makings on when to buy and sell the funds.

**Correlation Analysis with absolute fund flow**

I first find out the correlation between the change of the number of trading shares at time $t$, and last quarter performance $R_{t-1}$. $R_{t-1}$ is calculated from the quarterly price change, taken into account any dividends paid out for that period. The formula for calculating the last quarter performance is shown as below:

$$R_{t-1} = \frac{P_{t-1} + \text{Div}_{t-1} - P_{t-2}}{P_{t-2}}$$

Further, I also define the quarterly relative returns, which are calculated by subtracting the Shanghai Shenzhen 300 Index returns from each individual fund quarterly returns; those returns represent how each fund is doing relative to the stock market in China as a whole within certain time period. Then I calculate the correlation between the trading shares volume change at time $t$, and the relative past quarterly returns for each fund.

By comparing the two different correlations, namely absolute correlation, which capturing the difference between the absolute return and the fund flow, and relative correlation, which
capturing the above market return and the fund flow, I could see how many of those funds within the sample obtain strong correlations between the past performance and the current fund flow, and what are the signs of those correlations. From these results, we can gain a brief view of whether the past performance will have impact on current fund flow, and whether the impact is a positive or negative impact.

Table 1-1 Correlations of absolute fund flow

<table>
<thead>
<tr>
<th>Fund Title/No.</th>
<th>absolute Corr</th>
<th>Relative Corr</th>
</tr>
</thead>
<tbody>
<tr>
<td>华夏成长 000001</td>
<td>0.215863794</td>
<td>-0.02944399</td>
</tr>
<tr>
<td>华安创新 040001</td>
<td>0.358016126</td>
<td>-0.24171383</td>
</tr>
<tr>
<td>华安中国 A 股 040002</td>
<td>-0.398785237</td>
<td>0.288715291</td>
</tr>
<tr>
<td>博时裕富 050002</td>
<td>0.209446354</td>
<td>-0.03212266</td>
</tr>
<tr>
<td>博时精选 050004</td>
<td>0.527014153</td>
<td>-0.222313514</td>
</tr>
<tr>
<td>易方达策略成长 110002</td>
<td>0.596116197</td>
<td>-0.296998903</td>
</tr>
<tr>
<td>易方达 50 110003</td>
<td>0.231268778</td>
<td>-0.328369459</td>
</tr>
<tr>
<td>易方达积极成长 110005</td>
<td>0.28062559</td>
<td>-0.07983956</td>
</tr>
<tr>
<td>南方高增长 160106</td>
<td>-0.189561455</td>
<td>0.236583284</td>
</tr>
<tr>
<td>博时主题行业 160505</td>
<td>0.334546345</td>
<td>-0.169984785</td>
</tr>
<tr>
<td>嘉实 300 160706</td>
<td>0.264329645</td>
<td>-0.2663513</td>
</tr>
<tr>
<td>嘉实中盘 161007</td>
<td>0.437410628</td>
<td>0.1052299</td>
</tr>
<tr>
<td>融通深证 100 161604</td>
<td>0.053391935</td>
<td>-0.161870806</td>
</tr>
<tr>
<td>融通蓝筹 161605</td>
<td>0.010105508</td>
<td>0.252510026</td>
</tr>
<tr>
<td>融通巨潮 161607</td>
<td>0.48014812</td>
<td>-0.302012812</td>
</tr>
<tr>
<td>招商优质成长 161706</td>
<td>0.506402302</td>
<td>-0.13943075</td>
</tr>
<tr>
<td>万家公用 161903</td>
<td>0.162888152</td>
<td>-0.41644254</td>
</tr>
<tr>
<td>金鹰中小盘 162102</td>
<td>-0.083552097</td>
<td>0.33321737</td>
</tr>
<tr>
<td>泰达成长 162201</td>
<td>-0.164402433</td>
<td>0.043602616</td>
</tr>
<tr>
<td>泰达周期 162202</td>
<td>0.45889084</td>
<td>0.09957417</td>
</tr>
<tr>
<td>泰达稳定 162203</td>
<td>0.48231168</td>
<td>0.237106362</td>
</tr>
<tr>
<td>景顺鼎益 162605</td>
<td>0.159753596</td>
<td>-0.29395918</td>
</tr>
<tr>
<td>泰达宏利精选 162204</td>
<td>0.258330675</td>
<td>0.018160815</td>
</tr>
<tr>
<td>广发小盘成长 162703</td>
<td>0.313805215</td>
<td>-0.433116291</td>
</tr>
<tr>
<td>银华 8 8 180003</td>
<td>0.232442641</td>
<td>-0.130742474</td>
</tr>
<tr>
<td>长城久泰 200002</td>
<td>0.392501767</td>
<td>-0.14189938</td>
</tr>
<tr>
<td>南方稳健 202001</td>
<td>0.416800589</td>
<td>-0.050354165</td>
</tr>
<tr>
<td>宝盈泛海 213002</td>
<td>0.200626114</td>
<td>-0.289982824</td>
</tr>
<tr>
<td>大摩基础 233001</td>
<td>0.007984691</td>
<td>0.072484809</td>
</tr>
<tr>
<td>宝康消费品 240001</td>
<td>0.279674756</td>
<td>0.000280114</td>
</tr>
<tr>
<td>宝康灵活配置 240002</td>
<td>0.407123953</td>
<td>0.140913816</td>
</tr>
<tr>
<td>华安动力 240004</td>
<td>0.284830274</td>
<td>0.008616798</td>
</tr>
</tbody>
</table>
Table 1-1 shows the absolute correlation and relative correlation between the fund flow and past performance at the individual fund level. From this table, we could see that the absolute correlations mostly show a positive relationship between the absolute fund flow and absolute past return, which indicate that higher positive past return will lead to a higher inflow within the current time period. However, this is not a perfect correlation equal to 1, the average correlation here is around 0.2461, which indicate that the volume change is relatively less volatile when compare to the past return changes. On the other hand, the relative correlation, which takes into account the stock market performance, showed a different scenario. Around half of the funds within the sample showed a negative relationship between the fund flow and past relative return. The average correlation here is around -0.0779, which is relatively small when compare to the previous absolute correlation. This result give us a sense that there’s no strong correlation between the past relative performance and current fund flow.
Scatter 1-1 plots the correlations between the past absolute returns and the current fund flows within the sample. We could see that most of the funds showed a positive correlation here, and the center is around 0.2.

*Scatter Plot 1-2 Correlation between past relative performance and fund flow*

Scatter plot 1-2 indicates the relationship between the current fund flows and the past relative
returns at the individual fund level, and the dots within the graph are relatively random, and give
us a feeling that there's no obvious clear relationship between the past relative returns and
current fund flows.

Regression Analysis with absolute fund flow

In addition to the correlation scatter plot, which only gives us a brief observation about the
relationship between the past performance and current fund flow of each fund within the sample,
regression is also a good way to predict the relationship between two data trends. It gives us the
slope of the trend for each individual fund within the sample, as well as the significance of those
trends, or in other words, the coefficients of the funds flows to the past performance. Therefore,
two regression models are formed to see how the fund flow is affected by last quarter
performance, and the models are as below:

\[
\text{volume change} = \alpha + \beta \times R_{\text{fund}_{it}}
\]

It tries to find out whether there's a significant relationship between the fund flow at time \( t \) and
the absolute return at \( t-1 \) for each individual fund;

\[
\text{volume change} = \alpha + \beta \times (R_{\text{fund}_{it}} - R_{\text{mkt}})
\]

This model is used to predict whether there's an obvious relationship between the fund flow at
time \( t \) and the relative return, or the excess return at \( t-1 \) for individual fund.

By applying the first model, with a 95% confidence interval and t-statistic of 1.65, 18 out of 49
stock oriented funds had a significant beta coefficient, indicate a significant relationship between
those funds' current fund flows and absolute past returns, those funds are shown in Table 1-2
below:

\[
\begin{array}{|c|c|c|}
\hline
\text{基金代码} & \text{Beta} & \text{T-stat} \\
\hline
\text{华安中国 A 股 040002} & -1946220757 & -1.792970711 \\
\text{博时精选 050004} & 10059153603 & 2.55682577 \\
\hline
\end{array}
\]
From the above table, we could see that most of the significant beta coefficients show a positive relationship between the current fund flows and the past absolute returns, as only one out of the 18 funds has a negative beta coefficient. This result seems to agree with the historical research results, however, only less than half of the total sample size showed the positive significant relationship, we cannot conclude the impact of past absolute performance on the current fund flows.

By applying the second model to the entire sample, and evaluate the results using the same 95% confidence interval, with a t-statistic of 1.65, only 4 out of the total 49 stock oriented fund are showing significant β coefficients, and those βs are shown in table 1-3 as below:

**Table 1-3 Regression results for relative performance**

<table>
<thead>
<tr>
<th>Fund</th>
<th>Beta</th>
<th>T-stat</th>
</tr>
</thead>
<tbody>
<tr>
<td>广发小盘成长 162703</td>
<td>-1859829019</td>
<td>-1.981259103</td>
</tr>
<tr>
<td>诺安股票 320003</td>
<td>-10451634738</td>
<td>-2.199404957</td>
</tr>
<tr>
<td>华泰柏瑞盛世中国 460001</td>
<td>-4964013244</td>
<td>-2.413616848</td>
</tr>
<tr>
<td>银华核心价值优选 519001</td>
<td>-20337892000</td>
<td>-2.270932837</td>
</tr>
</tbody>
</table>
Interestingly, all the 4 significant beta coefficients show negative betas, which indicate that those funds have negative relationships between the past relative returns and current fund flows, which means if past relative return is better than the market return for an individual fund, it will have a current fund outflow. However, only 4 out of 49 showed such a pattern, which indicates a weak relationship, different from the usually observed by researchers. In addition, this cannot be an indication to conclude that there’s a negative relationship between the past relative performance and the current fund flow at the individual fund level.

One thing we should pay attention with is that the R-square of both regressions are relatively low, around 0.1 – 0.2, which means only around 10% - 20% of the current fund flow is explained by the past performance factor, and the current model may not be a good predictor for the changes of fund flows for each individual fund. However, we still could gain some expression from the two regression model results. We could see there are more connection between the fund flow and absolute past performance than the relative past performance, though both of the tests only shows only a relatively small amount of funds passed the test and showed significant relationships, we cannot determine whether the past performance is the key driver to explain the changes of the fund flows over different time periods, and more tests should be done to test the confidence of this relationship.

**Correlation Analysis with excess to average fund flow**

Up to now, I have compared the absolute changes in fund flow for each individual with the absolute past performance and relative past performance. However, the relationship maybe related to the relative fund flow, instead of the absolute fund flow over different time periods. Relative fund flow is defined the fund flow of each fund less the average fund flow for a certain time period. Therefore, I should also look at the relative fund flow change for each stock oriented fund and see if there’s a stronger relationship between the relative fund flows and the past performance.

I firstly find out the average fund flow changes for each period, and subtract the average from the absolute change for each individual fund. This is the relative fund flow for the sample. I then apply different models to test whether there’s clear relationship between the performance and
fund flow.

First, I start again at the simplest way to observe relationship, which is the test of correlation. Similar as prior calculation, both the correlation between the relative fund flow and the absolute past return, and the correlation between the relative fund flow and the relative past return are tested, and the results are shown in Table 2-1 as below:

Table 2-1 correlations for past returns and relative fund flow

<table>
<thead>
<tr>
<th>No. of Funds</th>
<th>Fund Name &amp; Code</th>
<th>absolute Corr</th>
<th>relative Corr</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>华夏成长 000001</td>
<td>0.056783268</td>
<td>0.136541296</td>
</tr>
<tr>
<td>2</td>
<td>华安创新 040001</td>
<td>0.104088639</td>
<td>-0.023194281</td>
</tr>
<tr>
<td>3</td>
<td>华安中国 A 股 040002</td>
<td>-0.645273326</td>
<td>0.442200391</td>
</tr>
<tr>
<td>4</td>
<td>博时裕富 050002</td>
<td>0.125051832</td>
<td>-0.003073134</td>
</tr>
<tr>
<td>5</td>
<td>博时精选 050004</td>
<td>0.460395032</td>
<td>-0.138807835</td>
</tr>
<tr>
<td>6</td>
<td>易方达策略成长 110002</td>
<td>-0.366332412</td>
<td>0.294106621</td>
</tr>
<tr>
<td>7</td>
<td>易方达 50 110003</td>
<td>0.115319417</td>
<td>-0.326629574</td>
</tr>
<tr>
<td>8</td>
<td>易方达积极成长 110005</td>
<td>0.192011618</td>
<td>0.020045908</td>
</tr>
<tr>
<td>9</td>
<td>南方高增长 160106</td>
<td>-0.262688126</td>
<td>0.31838083</td>
</tr>
<tr>
<td>10</td>
<td>博时主题行业 160505</td>
<td>0.165670463</td>
<td>-0.03425471</td>
</tr>
<tr>
<td>11</td>
<td>嘉实 300 160706</td>
<td>0.195655555</td>
<td>-0.234137946</td>
</tr>
<tr>
<td>12</td>
<td>富国天惠 161005</td>
<td>0.283116448</td>
<td>0.312801051</td>
</tr>
<tr>
<td>13</td>
<td>融通社保 100 161604</td>
<td>-0.139113253</td>
<td>0.045666986</td>
</tr>
<tr>
<td>14</td>
<td>融通蓝筹 161605</td>
<td>-0.0584871</td>
<td>0.328364043</td>
</tr>
<tr>
<td>15</td>
<td>融通巨潮 161607</td>
<td>-0.495659081</td>
<td>0.371926988</td>
</tr>
<tr>
<td>16</td>
<td>招商优质成长 161706</td>
<td>0.339839301</td>
<td>0.120317916</td>
</tr>
<tr>
<td>17</td>
<td>万家电通 161903</td>
<td>-0.437465042</td>
<td>0.447833351</td>
</tr>
<tr>
<td>18</td>
<td>金鹰中小盘 162102</td>
<td>-0.06231142</td>
<td>0.710650882</td>
</tr>
<tr>
<td>19</td>
<td>泰达成长 162201</td>
<td>-0.439581419</td>
<td>0.500735229</td>
</tr>
<tr>
<td>20</td>
<td>泰达周期 162202</td>
<td>-0.242855262</td>
<td>0.51703047</td>
</tr>
<tr>
<td>21</td>
<td>泰达稳定 162003</td>
<td>-0.200401474</td>
<td>0.536117796</td>
</tr>
<tr>
<td>22</td>
<td>景顺鼎益 162605</td>
<td>0.023647169</td>
<td>-0.203469058</td>
</tr>
<tr>
<td>23</td>
<td>泰达宏利精选 162204</td>
<td>-0.44073192</td>
<td>0.306122722</td>
</tr>
<tr>
<td>24</td>
<td>中信小盘成长 162703</td>
<td>0.054363234</td>
<td>0.342367238</td>
</tr>
<tr>
<td>25</td>
<td>银华 8 8 180003</td>
<td>0.171222229</td>
<td>-0.039814993</td>
</tr>
<tr>
<td>26</td>
<td>长城久泰 200002</td>
<td>-0.527365265</td>
<td>-0.044720687</td>
</tr>
<tr>
<td>27</td>
<td>南方稳健 202001</td>
<td>0.34421419</td>
<td>0.029997091</td>
</tr>
<tr>
<td>28</td>
<td>宝盈泛沿海 213002</td>
<td>-0.180396526</td>
<td>0.064752145</td>
</tr>
<tr>
<td>29</td>
<td>大摩基础 233001</td>
<td>-0.566611268</td>
<td>0.35328659</td>
</tr>
</tbody>
</table>
To make the numbers more visually identifiable, scatter plots are conducted to assist for further analysis. The results are shown in scatter plot 2-1 and 2-2 separately.

**Scatter 2-1 absolute correlation plots**
From the above scatter plots, we could see that the correlations do not show a clear positive relationship between the past returns and relative fund flows as there’s no clear pattern on the scatter plots, and there are both positive and negative correlations show on the plots.

However, here, we could see, different from the previous test, the absolute correlation shows more negative points than the relative correlation, which is the opposite when we test for the correlation with absolute changes in fund flows and the past performance.
Regression Analysis with Excess to Average Fund Flow

Regressions are also tested for both situations. There are also two models for each of the returns. Both of the regressions are set up for the purpose of looking at whether there's a significant relationship between the $y$-relative fund flows at time $t$, and the past performance at $t-1$ for each individual stocks.

$$\text{Fund Flow}_{i,t} - \text{Average Fund Flow}_t = \alpha + \beta \times \text{Return}_{t,i}$$

$$\text{Fund Flow}_{i,t} - \text{Average Fund Flow}_t = \alpha + \beta \times (\text{Return}_{t,i} - \text{Return}_{mk,t})$$

The results are read as if the t-statistics are greater than 1.65, which is the 95% confidence interval, the same as the previous regression tests, then those stock-oriented funds’ fund flows are said to have a strong relationship with their past performance.

Only those funds with significant different from zero beta coefficients are listed under the following tables.

Table 2-2 Absolute regression

<table>
<thead>
<tr>
<th>No. of Funds</th>
<th>Fund Name &amp; Code</th>
<th>a</th>
<th>b</th>
<th>R2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>华安中国 A 股 040002</td>
<td>267353724.7</td>
<td>-3590639126</td>
<td>0.41637766</td>
</tr>
<tr>
<td>2</td>
<td>博时精选 050004</td>
<td>-583081838.1</td>
<td>7598900945</td>
<td>0.21196359</td>
</tr>
<tr>
<td>3</td>
<td>融通日新 161007</td>
<td>-67336296.33</td>
<td>-1800817614</td>
<td>0.24567792</td>
</tr>
<tr>
<td>4</td>
<td>万家公用 161903</td>
<td>-150635174.5</td>
<td>-2251321342</td>
<td>0.19137566</td>
</tr>
<tr>
<td>5</td>
<td>泰达成长 162201</td>
<td>-86229933.45</td>
<td>-3316258387</td>
<td>0.1932182</td>
</tr>
<tr>
<td>6</td>
<td>泰达宏利精选 162204</td>
<td>-171665389.5</td>
<td>-1358300202</td>
<td>0.19424463</td>
</tr>
<tr>
<td>7</td>
<td>长城久泰 200002</td>
<td>-100947792.9</td>
<td>-1725473188</td>
<td>0.27811412</td>
</tr>
<tr>
<td>8</td>
<td>大摩基础 233001</td>
<td>-203870882.4</td>
<td>-2557622206</td>
<td>0.32104833</td>
</tr>
<tr>
<td>9</td>
<td>华夏上证 50 510050</td>
<td>187730829.5</td>
<td>-2705986868</td>
<td>0.18887444</td>
</tr>
</tbody>
</table>

By applying the first model, only 9 out of 49 funds are showing significant beta coefficients, and most of those coefficients have negative signs, which suggest that the relative fund flow and the absolute last quarter returns are moving in the opposite direction.

Table 2-3 relative regression

<table>
<thead>
<tr>
<th>No. of Funds</th>
<th>Fund Name &amp; Code</th>
<th>a</th>
<th>b</th>
<th>R2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
By applying the second model, also only 9 out of 49 stock-oriented funds are showing positive beta coefficients, and most of those coefficients have positive signs, which indicate that the relative fund flow and last quarter relative return is moving in the same direction.

The two regressions show very different results, however both have only a small number of funds with significant beta coefficients. Therefore, it is not strong enough to conclude, by using the results we just got, the fund flow is affected by the past performance of the individual fund.

Up to this point, I only analyze at the individual stock-oriented fund level to indicate the relationship between the past performance and the fund flow. I should extend my analysis by looking at the fund flow and past performance relationship at the cross sectional level, which means I should include all the mutual funds within the sample. To do this, I use the scatter plot diagram with X-axis as the past performance of the fund, and Y-axis being the relative fund flows calculated the same way as before. We will use the quarterly performance versus relative fund flow first, to look at the trends, comparing both the relative performance and absolute performance with the relative fund flows. As there are 49 stock-oriented funds within the sample, and the sample period is from 1st quarter 2006 till 4th quarter 2010, there will be 20 periods, and therefore 960 dots all together. Further, to avoid the seasonality problem, I will then plot the scatter plots by using the yearly performance and fund flows, by doing the same process. The annual fund flow is just a simplified calculation by using the volume of each fund at the end of each year, and subtracts the previous year’s end volume. The annual performance of the funds is also just using the year end price and compares it with the previous year end price to get the percentage change.
According to the prior researches, the trend should be a non-linear but positive relationship, as the better the past performance, the more accelerated the net inflows of the funds, and the worse the past performance, the more accelerated the net outflows of the funds. Therefore, we expect the trend to be a convex shape in the fourth quadrant, and a concave shape in the first quadrant.

The quarterly scatter plots of both volume change with absolute return and relative return are shown as below:

*Scatter 3-1 Quarterly Scatter Plot with absolute return*

![Quarterly fund volume change VS past quarter absolute return](image)

From the above scatter plot, we could see that no matter what the past absolute return is, the current fund flows are mostly surrounding zero, which indicate that there’s no obvious relationship between the two trends. The fund flows are less volatile when the past absolute returns are negative, and more volatile when the past performances are positive, as shown on the graph, the spread is larger on the right quadrants than on the left quadrants.

The relative past return and relative fund flow scatter plot on the other hand, also show that
most of the fund flows are surrounding zero, no matter what the relative past returns were. This is also indicating that there's no obvious relationship between the fund flow at time \( t \) and the relative return at \( t-1 \). However, the volatility of fund flow changes was different from the absolute return scatter plot shown above. The fund flow seems to be more volatile when the past relative returns were negative, which is the opposite situation from the absolute return scatter plot. The Graph is shown as below:

In order to avoid possible seasonality problem with current sample data, I also plot the scatter diagram for the same time length, but with annually data. Two scatter plots are drawn to show the same relationship as above, one is between the absolute past performance and current fund flow, and the other is between the relative past performance and current fund flow.

The two scatter plots are shown in Scatter plot 3-3 and 3-4 separately as below, and they both show similar patterns as the quarterly scatter plots. Most of the points are still surrounding zero, which means there's no relationship between the past performance and the current fund flow,
no matter the past performance is calculated in absolute terms or relative terms. We can also see that the volatility of the fund flows seems stable over different past returns, not affected by the signs of the past returns.

*Scatter 3-3 Annually Scatter Plot with absolute past returns*

---

**Annual Volume change VS Absolute past Return**

X-axis: past annual absolute return  
Y-axis: Annual volume change

---

*Scatter 3-4 Annually Scatter Plot with relative past returns*
From the four scatter plots above, we could not see the patterns we expected. Instead, all the scatter plots showed that there’s no obvious relationship between the past performance and the current fund flow, when the past performance is calculated as the absolute returns and relative returns of each individual fund. However, there are different ways to analyze past performances; one of the alternative ways is the CAPM model alpha.

The CAPM Model

An alternative way of testing the performance of the sample funds is to use the CAPM model to find out the alpha for each of the stock-oriented fund for each time period. The alpha represents the excess return contributed by the fund manager. The higher the alpha for one fund, the better the management skills provide higher than normal returns for the fund.

Here, I still use the Shanghai Shenzhen 300 index as the market index, to find out the market return for each time period. I will first calculate the CAPM for each quarter, by using the daily returns for the market and for each stock-oriented fund returns to build the CAPM model calculation, and then scale the daily alpha to quarter alpha by multiply the number of trading days within the quarter period. Once again, to avoid the possible seasonality problem within the
sample, I will do the same process to calculate the annual CAPM and compare the annual alpha within the sample.

I also need to define the risk free rate in order to establish the CAPM model. In China, this risk free rate is reflected from the Shanghai Interbank Offered Rate (Shibor), which is “a simple, no-guarantee, wholesale interest rate calculated by arithmetically averaging all the interbank RMB lending rates offered by the price quotation group of banks with a high credit rating.” The quotation group is consisted by 16 commercial banks, and these banks are “primary dealers of open market operation or market makers in the FX market, with sound information disclosure and active RMB transactions in China’s money market.” Using the data on 14th Mar 2011, the one year Shibor is 4.6378%, and from this, we calculate the daily risk free rate, by dividing the 252 trading days per year, which is 0.0184%.

The CAPM model is stated as below:

\[ R_{it} - r_f = \alpha + \beta \times (R_{mkt} - r_f) \]

Where the \( R_{it} \) represents the return of the fund i at time t, the \( r_f \) is the risk free rate for the period, and \( R_{mkt} \) is the market return for the same period.

The scatter plots are also generated for the CAPM alpha, to indicate whether there’s a clear relationship between the CAPM alpha at time \( t - 1 \) and the fund flow at time t. I still test the CAPM for both quarterly performance and annually performance, to avoid the possible seasonality. The results are shown as below:

*Scatter Plot 4-1 Quarterly scatter plot with CAPM alpha*
This diagram shows that most of the dots are surrounding the center, which means there's no obvious relationship between the last quarter alpha, which represents the excess returns contributed by the management skills, and the current fund flow. Compare the above result with the annually alpha and fund flow scatter plot, we can see that the annually alpha scatter plot has a similar pattern as those scatter plots with absolute returns and relative to market returns. The fund flows move along the X-axis, with little change to the fund flow when there're changes in the alpha over time.

The dots are surrounding zero, and which indicate that there's no clear relationship between the past quarter alpha and the excess fund flow in the current growth strategy funds sample. As not all of the alphas calculated are significantly different from zero, I then eliminate those insignificant alphas, and only maintain the ones that are significantly different from zero at the 95% confidence level. The following scatter shows the result. We can see that the dots are mostly align with X-axis, indicating that no matter how the fund flow changes over time, the alphas, or the excess returns in other words, are relatively stable.

*Scatter 4-2 Quarterly Significant Alpha VS Excess Fund Flow*
Scatter 4-3 also indicates that the past annually alpha calculated from the CAPM model is not a key driven factor that affect the net fund flow in the current period, as most of the dots are surrounding zero.

Scatter 4-3 Annually Scatter Plot with annual CAPM Alpha
Further, the confidence level should be considered as well, and only the dots with significant from zero coefficients should be plotted to show the relationship. This is shown in Scatter 4-4 as below.

Scatter 6-8 Growth Annual Fund Flow VS Annually Significant CAPM Alpha

Most of the dots are now surrounding X-axis, showing similar relationship as the quarterly significant CAPM Alpha analysis.

Therefore, even using an alternative way to calculate the past performance, we still cannot observe the expected pattern that described by the past researches, but found out that there’s no obvious relationship between the past performance and the fund flow in Chinese fund market.

Further analysis could be made by change the measurement of the fund flows. We are using the volume change of each individual fund to calculate the net fund flow for each time period so far, which is the change in number of shares over different time period. Another way to indicate the net fund flow is to look at the total asset under management, see how the total asset under management changes over time for each fund. This is a dollar term measure, and I conducted the annually scatter plot to find out the relationship between the total asset under management at year t, and the past performance at time $t - 1$. The result is shown as below:
From the diagram we could see that most of the dots are still surrounding the X-axis, though it seems to have an upward tendency. Therefore, there's no clear relationship between the net fund flow calculated as the change in the total net asset under management and the past relative return of each individual fund over time.

The relationship between the asset under management fund flow and the absolute fund return should also be examined. The result is shown in the following scatter plot. The X-axis here is the absolute fund flow for each individual fund over the sample period, and the Y-axis represents the total net assets under management. We could see from the scatter plot that most of the points are surrounding the X-axis no matter what the past absolute returns were. Therefore, the diagram indicates that there's no obvious relationship between the total net asset under management and the past absolute return.
From the above two scatter plots, we could then conclude that by using the net change of total net asset under management to represent the fund flow over time, and then compare the data trend with the past performances, there's still no clear positive relationship, which differs from the historical research results based on the developed markets.

**Analysis according to strategy categories**

Different fund management will use different strategies and skills to chase possible higher performance of the fund under management, and different strategies may affect the fund flow itself. That is, investors may focus on one of the categories of funds, such as funds that trade mainly on those value stocks, or funds that trade on a particular industry. Therefore, we should divide the sample size by looking at the strategies each fund manager is using, and then try to figure out whether there's a similar linkage between fund flow and past performance within a particular fund category. As I mentioned at the beginning, there are four different fund categories, and here, I will focus mainly on the growth stock invested funds and index funds, to see if there's
a special pattern that can be observed.

The Growth stock invested funds focus on those companies with high growth potential in the future. There are a total of 19 funds within the sample that are using this strategy. We will follow the same analyzes as what we did for the whole sample, that is, using different measurement for both past performance and fund flow, and apply to different time intervals, try to figure out whether there’s an obvious pattern that link those two data trends.

*Scatter 6-1 Quarterly Growth Category Fund Flow VS Absolute Return*

The above scatter plot has a X-axis representing the past quarterly absolute returns for each growth strategy fund, and a Y-axis representing the excess fund flows for each quarter. From the graph we could see that most of the dots are surrounding X-axis, which means no matter how past quarter returns fluctuate, the current quarter fund flow seems to be very stable, and therefore, the past quarter absolute return could not explain the changes of the fund flow in current quarter.

I then plot the quarterly fund flow against quarterly relative returns for all the growth strategy funds, and the graph shown as below shows a similar result. Most of the dots are surrounding the X-axis, which means there’s no clear relationship between the excess fund flows and the past
quarterly relative returns for all the growth strategy funds within the sample.

Then I use CAPM alpha as an alternative measurement for past performance, and draw the scatter plot where X-axis is the past quarterly CAPM alpha, and the Y-axis represents the excess fund flow for all the growth strategy funds within the sample.
In addition, to avoid the seasonality problem, we will conduct the scatter plots for annual data in the same way as before.

*Scatter 6-5 Annually Growth fund flow VS Absolute Return*

The graph shows that when the absolute return is greater than zero, there’s higher volatility in the net fund flow, however, basically there’s no clear trend can be drawn from the above graph, as most of the data sets are surrounding the X-axis, indicates the past annually absolute return has little impact on the current year fund flow.
Scatter Plots are also drawn for the net annual volume change against relative annual return, and the result is similar as the above graph, where most of the data sets are aligned with X-axis and I cannot read a obvious trend from the graph. Further, CAPM Alpha is used to present the past annual performance, and is plotted against the net volume change over time, the result shows that most of the dots are surrounding zero, indicating there's no clear trend that would link the past annual CAPM alpha to the net volume change of each growth strategy fund. The two graphs are shown as below:

*Scatter 6-6 Growth Annual Fund Flow VS Relative Return*

![Growth Category Annual Volume Change VS last year excess to market return](image1)

*Scatter 6-7 Growth Annual Fund Flow VS Annually CAPM Alpha*

![Growth Category Annual Volume Change VS last year CAPM Alpha](image2)
Further, to adjust for the significance of those annual alphas by just maintaining those alphas that are significantly different from zero at the 95% interval, I get the new scatter plot as shown below. We can see that not many of those annually alphas are significantly different from zero, and though it seems more volatile than the quarterly significant alpha scatter plot, most of the dots are still surrounding X-axis, indicating that there is no obvious relationship between the previous year annual excess returns earned from fund managers imply different trading strategies, and the current year excess fund flow.

Then, I change the fund flow measurement from the excess net volume change to the change of net asset under management, and compare this fund flow measurement to the absolute return, relative return, and CAPM Alpha respectively. Compare to the above graphs which use volume change as the fund flow measurement, the scatter plots showed similar results, though the volatility seems higher when using net asset under management as the fund flow measurement. This may be the case that when using the net asset under management, it also takes into account of the current price change of the underling funds, and therefore has higher fluctuation then just using the volume change. Scatter Plots are shown as below.

\[\text{Scatter 6-7 Annual Asset under Management Change VS Absolute Return}\]

\[\text{Net change in Asset Under Management VS past absolute return}\]

\[\text{X-axis: Last year absolute return}\]
\[\text{Y-axis: net change in Asset Under Management}\]

\[\text{Scatter 6-8 Annual Asset under Management change VS Relative Return}\]
From all the analysis relate to the growth strategy funds within the sample, it seems there's no clear relationship between the past performance and current fund flow, which is consistent with what I found for the whole sample. Therefore, growth strategy is not a key factor that may cause investors to trade against performance overtime.

Now, I will look at the other category, which including all the index funds within the sample. There are 15 funds within the 49 total sample funds that focus on the index trading. Those funds,
though focus on different types of indexes, are still showing the similar patterns as those funds trading by using growth stock strategy and as well as the whole sample. The scatter plots for both quarterly and annually analysis, using different measurement for past performance and current fund flows, show that most of the data sets are surrounding the X-axis, though they are more spread out when comparing to the total sample size and with the growth strategy funds. However, the basic idea is the same here, there’s no obvious relationship between the past performance and the current fund flow for Chinese fund market.

Some of the scatter plots are shown as below, and with X-axis as the past performance, conducted by using different formulas, and Y-axis as the current fund flows, measured in volume change and total asset under management change. All the graphs are showing similar results as before, the dots are most time locate along the X-axis, representing a constant fund flow regardless of the fund’s past performance. Therefore, similar conclusion could be made here, in the Index Category, using different measurements for fund flows and past performance, still showing that there’s no obvious relationship between the current fund flow and past performance.

*Scatter 7-2 Index Quarterly Fund Flow VS Relative Returns*
Scatter 7-5 Index Annually Fund Flow VS Relative Returns

Scatter 7-6 Index Annually Fund Flow VS CAPM Alpha
Index Annually FL VS CAPM Alpha

X-axis: CAPM Alpha
Y-axis: Index Category Annual Fund Flow

Index AUMFL VS Absolute R

X-axis: Past Absolute Return
Y-axis: Index Category Asset Under Management Change
**Assets Under Management Weighted Analysis**

To examine the relationship even further, by considering the size of each fund within the sample, I have calculated the weighted average relative fund flow for each fund, and compare to the past performance to test for any possible relationship.

I use the Asset Under Management of each fund to calculate the weight percentage for that fund for a certain year, by divide that particular fund's Asset Under Management to the total Asset Under Management for the whole sample, and then use this percentage to allocate the net fund flow for that particular time period. The formula is shown as below:

\[
\text{AUM weighted Relative Fund Flow} = \text{Fund Flow}_{i,t} - \text{AUM Weighted} \% \times \text{Total Fund Flow}_{t}
\]

The Total Fund Flow represents the net fund flow of the total sample size for one particular year, and multiply the Total Fund Flow with AUM Weighted % will replicate the fact that each fund has a different weight in the market, and this size factor should be considered when calculating the relative fund flows to the market.

However, the results, plotted in the scatter plots to compare the relationship with the absolute and relative past returns, showed similar patterns.

*Scatter 8-1 AUM Weighted Relative Fund Flow VS Absolute Past Performance*
AUM Weighted Fund Flow VS Absolute Return
X-axis: Absolute past return
Y-axis: Asset Under Management Weighted Fund Flow

AUM Weighted Fund Flow VS Relative Return
X-axis: Past Relative Returns
Y-axis: Asset Under Management Weighted Fund Flow

Scatter 8-2 AUM Weighted Relative Fund Flow VS Relative Past Performance
Conclusion

I have conducted a series of testing to examine the relationship between the past performance and the current fund flow of the funds in Chinese Fund Market. I have selected a sample size which contains 49 funds, all have had existed since 2006. Correlations and regressions are calculated to examine whether there's significant link between the two data sets. Different performance measurements are used, including absolute price change over time, relative performance by subtracting the stock market returns in each time period, and the CAPM alpha for each period to see whether a particular fund obtains excess returns because of the fund manager’s management skills. In addition, two types of fund flow measurements are computed, one focuses on the volume change in particular time period, and the other focuses on the net change of the total asset under management for a particular fund within the sample. Scatter plots are drawn to see the relationship between different past performances – current fund flow measurements, and this relationship is also tested by grouping funds which are trading by using the same strategy.

All the analysis so far showed that investors who invest in the Chinese Fund Market are not really follow the past returns to trade, and therefore, there's no clear linkage between the net fund flow in current period and the fund performance in the past. It may be the case that most of the investors in China are individual investors, and they usually don’t have up to date information and therefore cannot take actions in time to trade. On the other hand, there are different problems in current China fund market, including “strong political orientation, fewer investment directions, higher fees and government supervision divergence” (Matthew, Huang, Zhu, 2007), some of the individual investors who have internal information related to particular fund or particular company may not follow the usual patterns for buying and selling the funds. Other individual investors may learnt that there’s few useful information revealed from past performances, and therefore, the current performance and past performance may not be highly correlated. Thus buying a past winner will not necessarily ensure current gains from those past winner funds. Another explanation of this situation may be that individual investors in China tend to hold funds as a long term investment, and therefore, do not adjust their holdings in short period of time. There are regulations supporting a relative long holding period by establishing punishment type
transaction costs. According to the Open-end Stock Oriented Funds Selling Costs Regulation, the transaction costs are no less than 1.5% of the total redemption amount for less than one week holding period and 0.75% of the total redemption amount for less than one month holding period. Further, those individual investors in fund market are usually investing in Chinese stock market as well, and hold the stock oriented funds as one portion of their total investment portfolio. These may also be explanations on the results I have concluded, and also explains why Chinese fund market is different from most of the developed markets, such as U.S. market where most of the historical researches focused on.

**Comparison to U.S. Mutual Fund Market**

Sirri and Tufano in 1998 conducted similar calculations tried to find out the relationship between the past performance and current fund flows in US, and they found the relationship is a nonlinear regression. Judith and Glenn used a semiparametric model to estimate the shape of this relationship over the 1982 to 1992 period. The graph shared similar information as Sirri and Tufano brought out.

The graph Sirri and Tufano generated, which plotted the fund flow performance relationship for funds with different ages, showed a clear nonlinear relationship between the fund flow and the past performance, with a convexity showing that the better the past performance, the higher the current period fund flow is, and the fund flow is rising at an increasing rate. On the other hand, if the past performance was bad, this will cause a current fund outflow, with an increasing rate at first, and later turned into a decreasing rate.

**Other Consideration:**

In my research, I only used CAPM alpha to test for the returns generated by fund managers’ management skills, however, further tests of alpha may be conducted by using the FAMA French Three Factor model, including size factor, market-to-capital ratio as the growth/value factor and the market premium factor to calculate the alpha, which may bring a different result. In addition,
time interval for examining the relationship may also affect the results. I have only examined for quarterly or annually relationship, but it may be a much shorter period interval that would reveal a stronger relationship between the fund flow and past fund performance, such as monthly or even daily.

There are different theories and researches on the fund flow and performance relationship, which could be my further research on this topic, to find out more patterns regarding the relationship by using different time period and data frequency.

David Rakowski focused on a daily frequency to find the relationship between the mutual fund flow volatility and fund performance. He found a “significant negative relationship between daily mutual fund flow volatility and performance” (David Rakowski, 2010) David further stated that “the evidence here is consistent with the short-term discretionary trading of fund managers, proxied for by turnover, being positively related to performance for equity funds, after correcting for its correlation with other variables. Short-term liquidity-motivated trading, proxied for by daily flow volatility and unexpected flows, is negatively related to performance.” (David Rakowski, 2010)

Karen, Robert, and Tom had done research trying to find out the relationship between the current month fund flows and the current month returns, however concluded “current flows show no impact on returns”, however, “current returns together with past returns do have a positive impact on flow. Investors are quick to recognize the high performing funds and money follows.” (Karen L. Benson, Robert W. Faff, Tom Smith, 2010)

In addition, other factors within the fund management may affect the fund flow as well, such as the fee arrangements, as according to Sirri, “flows are fee-sensitive”, and investors respond “differently to high and low fees, as well as to fee increases and decreases”. Further, Sirri found out that media coverage may also have impacts on fund flows, and “find some evidence that garnering a larger share of current media cites is related to faster current growth”. Those areas could be further detected see if those factors also have impact on China Fund Market.
Reference:


The risk free rate describe and data: http://www.shibor.org/shibor/web/html/index_e.html


