

# Tests on the Relationship of Fund Performance and Net Fund Flow

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*This paper is funded by National Natural Science Foundation of China as a key project named as "The Evaluation Theories and Methods of Protecting Investors' Interests" (No.70632002).*

## Abstract

The relationship between net fund flow and performance of open-end funds was studied in this paper. The empirical tests on the performance and size of open-end funds in China show that the net fund flow of funds is positively correlated with pre-performance of funds, while the performance of funds is negatively correlated with the net fund flow of funds. These empirical studies imply that investors chose funds according to their historical performance, while the growing size decreases the funds' capability of achieving excellent performance.

**Keywords:** Open-end funds, Net fund flow, Performance

## 1. Introduction

Since China issued the first open-end funds, Huaan Innovation, in September, 2001, open-end funds have gained fast development. The size of open-end funds has already been larger than that of close-end funds that has a longer history. Till 30th, June, 2005, there are 54 close-end funds, valuing 77 billion Yuan, and 127 open-end funds, valuing 340 billion Yuan (calculated according to data from Fundlab. Open-end funds include monetary funds, etc.). Open-end funds have already become one of the main institutional investors in China's security market.

The primary difference between open-end funds and close-end funds is that the size of open-end funds is changing. Investors can purchase or redeem open-end funds at any time. Then, what factors will influence the size of open-end funds? Or, in other words, what factors will help investors to make a decision on purchasing or redeeming which one of open-end funds? For that question, the most direct answer is "performance". Surely, investors choose to invest in funds with better performance. And the funds with better performance can attract more investors than the funds with worse performance. Naturally, the size of funds with better performance will increase rapidly. The first goal of this paper is to test this answer by practical data. The second problem is whether the performance of funds is affected by the size or not. Or, what are the effects of changes of funds' size caused by new fund flow on the performance? For that question, the answer is not so direct. We will give the answer based on a test for real data.

## 2. Theory

### 2.1 Evaluation index for funds' performance

The simplest evaluation index for funds' performance is the rate of return. Investors can judge the funds by directly searching their rate of return. However, this index neglects the risks of funds investment. After the emergence of CAPM theory, funds' performance evaluation begins to take risks adjustment into consideration. The three traditional models for funds' performance evaluation, namely Sharpe (Sharpe W. E., 1966, p119-138), Treynor (Treynor J., 1965, p63-75), and Jensen (Jensen M., 1968, p389-416), aim at adjusting the return of funds by different risks measures based on the CAPM, what can serve as the index for funds' performance evaluation. In addition, because the CAPM merely considers the general risks of market, it can not explain the abnormal phenomenon in market (such as the small-enterprise effect, the one-month effect, etc.). Fama & French (Fama E.F. & French K.R., 1993, p3-56) construct a three-factor model, taking the effects of market, size, and book-to-market ratio on funds' performance into consideration. Based on this three-factor model, Carhart (Carhart M.M., 1997, p57-82) adds a new factor, the momentum of return on investment, and constructs a four-factor model, in hopes of evaluating funds' performance more exactly.

All these models mentioned above use one single index to describe the funds' performance. Treynor & Mazuy (Treynor J. & Mazuy F., 1966, p131-136) think that the funds' performance is determined by the ability of finding mispriced stocks and the ability of grasping market opportunities, using the ability of stock selecting and the ability of market timing to reflect the funds' performance. Later, Henriksson & Merton (Henriksson R. & Merton R., 1981, p513-533) advance a similar model to reflect funds' ability of stock selecting and the ability of market timing.

In China, the security market does not have a long history. Most investors do not know much about modern financial

theories. They prefer to use more direct methods to judge the funds instead of complex index as they determine an investment. Therefore, this paper chooses four indexes, rate of return, Sharpe, Treynor, and Jensen, for funds' performance evaluation. For the influences of changes of funds' size on the performance, because the size affects the performance funds managers, we take the ability of stock selecting and the ability of market timing in the TM and HM model into consideration.

## 2.2 Funds' net fund flow

Changes of funds' size are caused by two aspects: one is the return or loss on investment, and the other is the new purchase and redemption. This paper is chiefly to study how investors determine their investments according to funds' performance. Therefore, here we just consider new purchase and redemption, namely the relationship between so-called net fund flow and funds' performance.

Many empirical studies prove that investors will choose to purchase or redeem funds according to the former performance of funds (for example, researches of Sirri & Tufano (Sirri E.R. & Tufano P., 1998, p1589-1622), Shu et al (Shu P.G., Yeh Y.H. & Yamada T., 2002, p583-600), Kliger et al (Kleger D., Levy O. & Sonsino D., 2003, p341-363), etc.). In other words, there is a positive correlation between funds' net fund flow and funds' former performance. In theory, if the stock market is efficient, funds should not sustain continuous excess return. Therefore, the former performance of funds can not determine the future performance. According to Malkiel's studies on the persistence of funds' performance (Malkiel B., 1995, p549-572), although funds' performance shows its relatively strong persistence in 70s in 20th century, this persistence disappears in 80s, which indicates the improvement of market efficiency. In China, some empirical studies prove that the persistence of funds' performance is not significant (Qifang Wu, Shou Chen & Hui Lei, 2003, p33-37. Hu Wei, Ni Shuguang, & Zhang Ming, 2004, p44-48) and even there is a reversing phenomenon (Suyun Ni, Hui Xiao & Chongfeng Wu, 2002, p41-44). In this condition, whether is it meaningful or not if investors determine their investments based on funds' former performance? Berk & Green (Berk J.B. & Green R.C., 2004, p1269-1295) advances a model and thinks that funds' ability of realizing excess return connects with the size of funds. As the funds achieve better performance, it will attract more investments and the size of funds becomes larger. At this moment, funds managers have to bear greater costs as they exert their abilities of choosing stocks and grasping opportunities in trading stocks. As a result, the funds' performance will decrease as the size becomes larger. Therefore, the second proposition that will be tested in this paper is: whether the changes of size will affect funds' performance or not.

## 3. Data samples and description of variables

This paper takes open-end funds (include stock-oriented fund and stock-and-debt balanced fund) that chiefly invest in stocks in China's security market as samples for test. The size of funds and the types data are from the website of Huaan Fund Management Cooperation, and the funds' return of net value from the Fundlab database. The calculation is accomplished by SAS software.

Because we only can get the quarterly data of funds' size, the test is based on quarterly data. All variables are quarterly data.

The performance indexes include:

### (1) Return of net value

$$Return_{p,t} = (NetValue_{p,t} + D_{p,t}) / NetValue_{p,t-1} - 1 \quad (1)$$

Here,  $Netvalue_{p,t}$  means the net value per unit of fund  $p$  at the end of quarter  $t$ .  $D_{p,t}$  means the dividend of fund  $p$  at the quarter  $t$ .

### (2) Sharp Index (Sharp W.E., 1966, P119-138)

$$Sharpe_{p,t} = (Return_{p,t} - R_{F,t}) / \sigma_{p,t} \quad (2)$$

Here,  $R_{F,t}$  means riskfree rate (in this paper it is a constant: 2% per year).  $\sigma_{p,t}$  means the volatility of funds' return on investment, which can be calculated according to funds' daily returns at current quarter.

### (3) Treynor Index (Treynor J., 1965, p63-75)

$$Treynor_{p,t} = (Return_{p,t} - R_{F,t}) / \beta_{p,t} \quad (3)$$

Here,  $\beta_{p,t}$  is the funds' Beta value, which can be calculated by a regression of the daily return at current quarter to the index (it refers to the composite index of shanghai stock exchange) daily return.

### (4) Jensen Index (Jensen M., 1968, p389-416)

$$Jensen_{p,t} = Return_{p,t} - [R_{F,t} + \beta_{p,t} \cdot (Return_{M,t} - R_{F,t})] \quad (4)$$

Here,  $Return_{M,t}$  means the return of market index at the quarter  $t$ .

(5) Ability of stock selecting ( $a_{tm}$ ) and ability of market timing ( $b2_{tm}$ ) in TM model (Treyner J. & Mazuy F., 1966, p131-136)

$$r_p = \alpha_p + \beta_{1p} \cdot r_M + \beta_{2p} \cdot r_M^2 + \varepsilon_p \quad (5)$$

Here,  $r_p$  is the excess return of fund  $p$  ( $r_p = \text{fund's return of net value} - \text{riskfree rate}$ ).  $r_M$  means the excess return ratio of index. Estimate the coefficient of the regression equation discussed above by daily data in every quarter and get the index value that evaluates fund's ability of stock selecting and the ability of market timing in one quarter.

Ability of stock selecting:  $a_{tm_{p,t}} = \alpha_p$

Ability of market timing:  $b2_{tm_{p,t}} = \beta_{2p}$

(6) Ability of stock selecting ( $a_{hm}$ ) and ability of market timing ( $b2_{hm}$ ) in HM model (Henriksson R. & Merton R., 1981, p513-533)

$$r_p = \alpha_p + \beta_{1p} \cdot r_M + \beta_{2p} \cdot \max(r_M, 0) + \varepsilon_p \quad (6)$$

Estimate the coefficient of the regression equation discussed above by daily data in every quarter and get the index value that evaluates fund's ability of stock selecting and ability of market timing in one quarter.

Ability of stock selecting:  $a_{hm_{p,t}} = \alpha_p$

Ability of market timing:  $b2_{hm_{p,t}} = \beta_{2p}$

Use the total net value (value) to represent the size.

$value_{p,t}$  = fund's total net value at the end of one quarter (in unit of 100 million Yuan)

The net fund flow (flow):

$flow_{p,t}$  = total shares at the end of one quarter / total shares at the end of last quarter - 1

The table 1 shows us the average of each variable above in each quarter during the sample period. From this table, we notice that most Jensen indexes are positive, what indicates that these open-end funds, in general, obtain positive excess return after the risks adjustment. In the figure 1, the comparison between the return fund and the return ratio of market index reflects that the volatility of fund's return is smaller than that of the market return. Therefore, we can conclude that probably the fund beats the market because it controls risks properly. In the figure 2, we notice that: the average size of open-end funds that invest in stocks is decreasing from 2001; the average size is no less than 2 billion Yuan at present; and the average of fund flow indicates more redemption and less purchase (here, it does not include the purchase of newly-issued funds. As a matter of fact, except for few quarters, the overall size of whole funds is increasing due to the issue of new funds).

#### 4. Empirical test

In this paper the empirical test includes two parts: one is how funds performance affects net fund flow affects, and the other is how net fund flow affects funds performance.

##### 4.1 Effects of former performance on net fund flow

For the first part, how funds performance affects net fund flow, we can review the effects of last quarter's performance on current quarter's net fund flow. Because the funds' overall performance is different at different time and the market environment is far different, here we adopt the cross-section regression method to observe the relationship between funds' ability of absorbing new investments and their former performances in same market environment. The specific regression equation is:

$$flow_{p,t} = a_t + b_t \cdot Perform_{p,t-1} + \varepsilon_{p,t} \quad (7)$$

Here,  $Perform_{p,t-1}$  is the performance index (one of *Return*, *Sharp*, *Treyner*, and *Jensen*) of fund  $p$  in last quarter.  $a_t$  and  $b_t$  are regression parameters.  $\varepsilon_{p,t}$  is the residual. It is an independent identical distributed random variable with an average zero. According to the expectation, the coefficient  $b_t$  should be larger than zero.

Because there were less open-end funds early, we have chosen data since the third quarter in 2003 as samples and made section regression. The result of regression is in the table 2.

##### 4.2 Effects of net fund flow on performance

According to Berk & Green's model (Berk J.B. & Green R.C., 2004, p1269-1295), funds' management ability should have persistence. The reason for the poor persistence of performance is that the increasing size makes it more difficult to turn the management ability into performance. Therefore, we test it by make autoregressive on the time series of one fund's performance. The specific regression equation is:

$$Perform_{p,t} - Perform_{M,t} = a_p + b_p \cdot flow_{p,t} + v_{p,t} \quad (8)$$

Here,  $v_{p,t} = -c_p \cdot v_{p,t-1} + \varepsilon_{p,t}$

$Perform_{p,t}$  is the performance index (one of *Return*, *Sharpe*, *Treynor*, *Jensen*, *a\_tm*, *b2\_tm*, *a\_hm*, and *b2\_hm*) of fund  $p$  in current quarter.  $Perform_{M,t}$  is the market index's performance index in current quarter (for the market, *Jensen*, *a\_tm*, *b2\_tm*, *a\_hm*, and *b2\_hm* are equal to zero. But *Return*, *Sharpe*, and *Treynor* are not equal to zero) (in the time series regression, what we should consider is the excess return as a matter of fact. Because the market environment is different at different time, *Return*, *Sharp*, and *Treynor* are not the excess return though we make risks adjustment. Therefore, we use the difference of the fund performance over the market as the excess performance).  $a_p$ ,  $b_p$ , and  $c_p$  are the regression parameters.  $\varepsilon_{p,t}$  is the residual. It is an independent random variable with an average zero. According to the expectation, the coefficient  $b_p$  should be negative.

Because most open-end funds have a short history, we choose funds that were issued more than half and two years ago as samples to make time series regression. We choose fifteen funds. For the sake of length, here we only list the average of fifteen funds' estimated regression parameters instead of all regression result for each fund (see table 3).

Besides, according to Berk & Green's opinion (Berk J.B. & Green R.C., 2004, p1269-1295), as nearing the balance state, the funds managed by managers with strong abilities have larger size. In other words, the abilities of managers determine the size of funds. At this moment, funds' performance can not reflect managers' abilities any more, neither relate with the size of funds. In order to study the relationship between funds' performance and size, we should introduce a size variable *value* into the regression equation of time series.

$$Perform_{p,t} = a_p + b_p \cdot flow_{p,t} + d_p \cdot value_{p,t-1} + v_{p,t} \quad (9)$$

According to expectation, the regression coefficient  $d_p$  should be close to zero. The average of regression results is in table 4.

## 5. Result analysis

According to the test result for former performance's effects on net fund flow (see table 2), the average result indicates that former performance has a positive effect on net fund flow. As we use *Jensen* index to represent performance, this effect is significant statistically, which is in accord with our expectation: investors will increase investment in funds with better performances and decrease investment in funds with poor performance.

Then look at the time. During the second quarter respectively in 2004 and 2005, as we use any index to represent performance, the positive effect is significant statistically. While from the third quarter in 2004 to the first quarter in 2005, the effect is negative (the only exception is that use the return on investment to represent performance in the third quarter in 2004. In other situations, the effect is insignificant statistically). Together with the data in table 1, we find that there is relatively nice correlation between these coefficients and net fund flow (see figure 3). For example, at the third quarter in 2004 the funds' average net fund flow is the largest, either the effect of former performance on net fund flow. From the third quarter in 2004 to the first quarter in 2005, funds' average net fund flow is negative. And the effect of former performance on net fund flow is negative but not significant. At the second quarter of 2005, funds' average net fund flow is still negative, but much better than ever. And the effect of former performance on net fund flow is back to positive and significant. These characteristics prove that investors usually are affected much by funds' former performance as they purchase funds but less as they redeem funds.

According to the test result for the effects of net fund flow on current performance (see table 3), except for the index for the return of net asset (*Return*) and two indexes for the ability of stock selecting and the ability of market timing, other indexes are affected negatively and significantly by net fund flow. In other words, the more the net purchase increases in current period, the more the performance decreases, which is in accord with our expectation: the rise of funds' size caused by the increasing net fund flow will restrict managers' abilities, what may lead to the decrease of performance, which indicates that the rise of funds' size will restrict abilities of funds managers in obtaining excess return by adjusting risks and identifying stocks. Use the return index and two market timing indexes to make regression on net fund flow. Although the coefficient is positive, the result is not significant. The two market timing indexes do not be affected by net fund flow. The rise of funds' size does not restrict funds managers to gain returns by predicting market trend. Maybe that is because the average size of funds is not large enough to impact the stock market comprehensively. Besides, as funds' size is rising, funds managers may sustain higher returns by taking more risks. Therefore, as we use the return of net asset to measure the performance, we can not get the effect of net fund flow on performance.

In table 4, the regression coefficient ( $c_p$ ) of net fund flow is equal to the result in table 3. The regression coefficients ( $d_p$ ) of funds' size is insignificant totally. It indicates that the size does not affect funds' performance, which is also in accord with our expectation: it is the changes of size, instead of the size, that affects performance. If the size does

not change, funds' performance will not change either no matter whether the former size is large or small.

## 6. Conclusions

Based on an empirical test for the relationship between the domestic open-end funds' performance and the net fund flow, we can draw these conclusions as follow:

- (1) As investors choose funds and make investment, they are affected by funds' former performance. The funds with better former performance can attract more investments.
- (2) In the purchase of funds, the effects mentioned above are relatively significant, but in redemption insignificant.
- (3) As fund absorb new investments, the ability of stock selecting decreases and either the excess return after risks adjustments, what indicate that funds mangers' ability of realizing excess return is affected by changes of funds' size.
- (4) Funds' ability of market timing does not be affected by changes of funds' size, which indicates that the stock market has a large capacity that permits funds to trade stocks in quantities and makes the stock market free from being affected.
- (5) The size of funds does not affect funds' performance, which proves that abilities of funds managers have persistence.

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Table 1. Average of Funds' performance indexes, sizes, and net fund flows

Date	Number	Return	Sharpe	Treynor	Jensen	a_tm	b2_tm	a_hm	b2_hm	value	flow
Dec-2001	1	1.10 (-)	7.68 (-)	45.03 (-)	0.57 (-)	2.00 (-)	-0.24 (-)	2.99 (-)	-3.08 (-)	50.65 (-)	- (-)
Mar-2002	3	2.06 (0.28)	4.37 (0.54)	7.86 (1.05)	1.25 (0.61)	3.50 (0.84)	-0.32 (0.45)	2.43 (2.00)	-0.21 (3.96)	38.14 (5.53)	-0.04 (-)
Jun-2002	3	5.54 (0.95)	8.65 (0.63)	14.54 (1.21)	2.24 (0.63)	2.40 (1.00)	0.53 (0.17)	-0.60 (1.28)	8.00 (2.31)	39.93 (3.85)	0.03 (0.04)
Sep-2002	6	-4.53 (0.48)	-12.70 (0.82)	-10.00 (0.71)	-0.50 (0.17)	-0.80 (0.65)	0.07 (0.90)	-0.56 (0.94)	-0.81 (2.74)	37.54 (4.12)	0.11 (0.05)
Dec-2002	13	-5.09 (1.04)	-10.35 (1.99)	-32.12 (8.54)	-1.44 (0.31)	-5.90 (0.84)	2.96 (0.44)	-9.11 (1.25)	16.32 (2.39)	28.98 (3.10)	0.00 (0.05)
Mar-2003	15	6.38 (0.56)	10.56 (0.65)	14.80 (1.17)	1.43 (0.43)	2.76 (0.84)	-0.11 (0.42)	3.66 (1.35)	-2.53 (2.97)	25.02 (2.88)	-0.10 (0.03)
Jun-2003	18	1.81 (0.65)	1.23 (0.82)	1.68 (1.13)	2.55 (0.62)	1.80 (1.00)	1.69 (0.49)	0.79 (1.26)	7.42 (2.34)	18.70 (2.18)	-0.19 (0.02)
Sep-2003	28	-3.02 (0.33)	-6.91 (0.58)	-8.76 (1.50)	1.15 (0.29)	1.05 (0.45)	1.32 (0.54)	1.04 (0.48)	2.59 (1.73)	15.02 (1.63)	0.03 (0.04)
Dec-2003	35	10.17 (0.61)	14.47 (0.62)	20.04 (1.06)	5.27 (0.52)	9.49 (1.02)	-0.61 (0.27)	8.95 (1.06)	-0.58 (1.21)	14.32 (1.64)	-0.17 (0.02)
Mar-2004	39	11.96 (0.45)	11.38 (0.42)	15.49 (0.64)	0.17 (0.46)	-0.67 (1.16)	0.64 (0.51)	2.95 (1.32)	-5.31 (2.28)	15.88 (1.70)	0.02 (0.04)
Jun-2004	47	-11.28 (0.64)	-13.96 (0.52)	-19.54 (0.57)	0.91 (0.27)	1.21 (0.71)	0.24 (0.27)	0.50 (0.97)	2.15 (1.40)	22.10 (3.68)	0.08 (0.03)
Sep-2004	53	5.37 (0.35)	5.98 (0.33)	8.80 (0.56)	4.64 (0.34)	4.71 (0.60)	1.09 (0.15)	3.67 (0.66)	6.29 (0.86)	22.23 (3.20)	-0.03 (0.02)
Dec-2004	70	-2.77 (0.39)	-3.62 (0.50)	-5.78 (0.67)	1.31 (0.23)	-0.47 (0.43)	1.58 (0.18)	-2.26 (0.48)	9.44 (0.95)	20.57 (2.56)	-0.07 (0.01)
Mar-2005	75	0.02 (0.43)	-0.07 (0.53)	-0.58 (0.85)	3.52 (0.38)	4.34 (0.64)	1.28 (0.15)	0.29 (0.71)	12.97 (1.17)	18.37 (2.25)	-0.07 (0.01)
Jun-2005	82	-3.23 (0.36)	-2.34 (0.29)	-5.45 (0.51)	1.79 (0.32)	-1.89 (0.55)	1.21 (0.10)	-9.82 (0.92)	18.41 (1.26)	16.57 (1.90)	-0.02 (0.02)
Sep-2005	97	4.02 (0.38)	5.23 (0.39)	6.77 (0.71)	1.11 (0.20)	-1.69 (0.42)	1.92 (0.16)	-5.81 (0.52)	14.48 (0.87)	16.50 (1.74)	-0.07 (0.01)

Notice: (1) In the "Date", use the last month of one quarter represents the quarter; (2) The average's standard error is in the parentheses; (3) Because the calculation of *flow* needs the data at the end of last quarter, the fund must be in market since last quarter. Therefore, as we calculate the average of *flow*, the number of samples are listed in last quarter; (4) The variables, Return, Sharp, Treynor, and Jensen, are calculated from the quarterly return, and *a\_tm*, *b2\_tm*, *a\_hm*, and *b2\_hm* from daily return in one quarter. They have relatively smaller absolute values. And in this table, values of these variables have been magnified one hundred times.

Table 2. Result of cross-section regression.

Date	Sample size	Return	Sharpe	Treynor	Jensen
Sep-2003	18	0.34(0.29)	-0.19(-0.20)	0.09(0.13)	0.96(0.79)
Dec-2003	27	0.33(0.22)	0.49(0.59)	-0.14(-0.45)	1.46(0.87)
Mar-2004	35	1.67(1.46)	1.28(1.12)	0.84(1.28)	2.21(1.68)
Jun-2004	39	3.25(3.97)*	2.21(2.27)*	1.44(2.27)*	2.18(2.49)*
Sep-2004	46	-0.74(-2.04)*	-0.81(-1.83)	-0.48(-1.20)	-0.82(-0.97)
Dec-2004	53	-0.44(-0.90)	-0.65(-1.27)	-0.43(-1.44)	-0.41(-0.83)
Mar-2005	70	-0.53(-1.34)	-0.37(-1.19)	-0.27(-1.17)	-0.05(-0.08)
Jun-2005	75	1.09(2.26)*	0.86(2.20)*	0.67(2.81)*	1.60(3.05)*
Sep-2005	96	0.97(2.43)*	1.30(2.63)*	0.46(1.70)	0.69(1.56)
Average		0.66(1.57)	0.46(1.33)	0.24(1.11)	0.87(2.36)*

Notice: This table shows us the value of the regression parameter  $b_t$  in the regression equation (7). Values in parentheses are the  $t$  test values of this parameter. \* means significant under 95% confidence. The last line lists the average of parameters above. The dependent variable is  $Flow_{p,t}$ , and the independent variables are  $Return_{p,t-1}$ ,  $Sharpe_{p,t-1}$ ,  $Treynor_{p,t-1}$ , and  $Jensen_{p,t-1}$ .

Table 3. Time series' autoregressive result I.

Autoregressive variable	$a_p$	$b_p$	$c_p$
$Return_p - Return_M$	3.34(10.90)*	0.02(0.53)	0.14(3.46)*
$Sharpe_p - Sharpe_M$	3.00(9.39)*	-0.07(-2.99)*	0.04(0.58)
$Treynor_p - Treynor_M$	0.05(0.11)	-0.16(-3.89)*	0.26(4.86)*
$Jensen$	2.04(6.79)*	-0.07(-3.64)*	0.15(2.66)*
$A_{tm}$	0.91(1.90)	-0.14(-3.37)*	0.13(2.63)*
$b2_{tm}$	1.43(11.00)*	0.01(0.66)	0.20(3.38)*
$A_{hm}$	-1.33(-2.77)*	-0.14(-3.29)*	-0.12(-2.00)
$b2_{hm}$	8.89(14.16)*	0.00(0.01)	-0.14(-2.15)*

Notice: (1) This table lists the average of regression parameters that are calculated by equation (8) based on fifteen funds' data. The value in parentheses is the  $t$  test value of this parameter. \* means significant under 95% confidence. (2) Values of  $a_{tm}$ ,  $b2_{tm}$ ,  $a_{hm}$ , and  $b2_{hm}$  have been magnified one hundred times. The reason is the same with that in table 1. (3) The dependent variable is  $Flow_p$  and the independent variables are listed in the first column.

Table 4. Time series' autoregressive result II.

Autoregressive variable	$a_p$	$b_p$	$d_p$	$c_p$
$Return_p - Return_M$	1.36(0.72)	0.01(0.32)	0.13(1.14)	0.17(3.29)*
$Sharpe_p - Sharpe_M$	4.35(3.25)*	-0.07(-3.48)*	-0.02(-0.28)	0.10(1.54)
$Treynor_p - Treynor_M$	5.18(2.29)*	-0.17(-3.69)*	-0.28(-1.84)	0.26(4.67)*
Jensen	4.20(3.62)*	-0.08(-4.25)*	-0.10(-1.64)	0.20(3.68)*
$a_{tm}$	4.35(1.79)	-0.16(-3.86)*	-0.18(-1.27)	0.22(4.50)*
$b2_{tm}$	0.74(1.28)	0.01(1.30)	0.07(1.66)	0.26(5.19)*
$a_{hm}$	0.84(0.25)	-0.15(-3.19)*	-0.09(-0.41)	-0.03(-0.73)
$b2_{hm}$	10.28(2.03)	0.02(0.23)	0.00(0.00)	-0.05(-0.76)

Notice: (1) This table lists the average of regression parameters that are calculated by equation (9) based on fifteen funds' data. The value in parentheses is the t test value of this parameter. \* means significant under 95% confidence. (2) Values of  $a_{tm}$ ,  $b2_{tm}$ ,  $a_{hm}$ , and  $b2_{hm}$  have been magnified one hundred times. The reason is the same with that in table 1. (3) The dependent variable is  $Flow_p$  and the independent variables are listed in the first column.

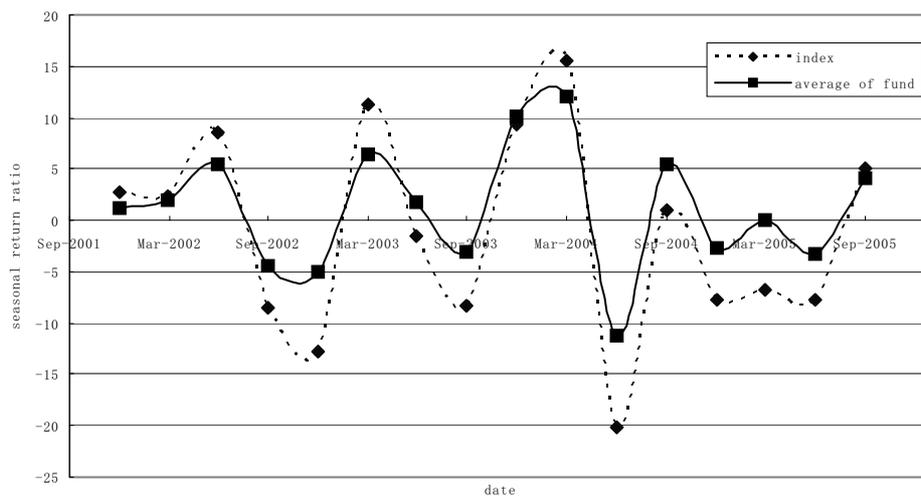


Figure 1. Comparison between the Average Return of Fund and the Return of Market Index.

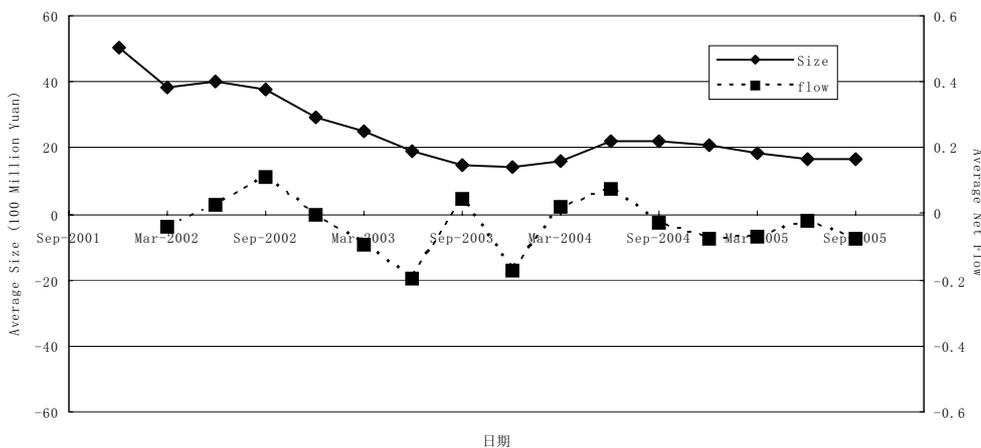


Figure 2. Average Size of Funds and Average Fund Flow.

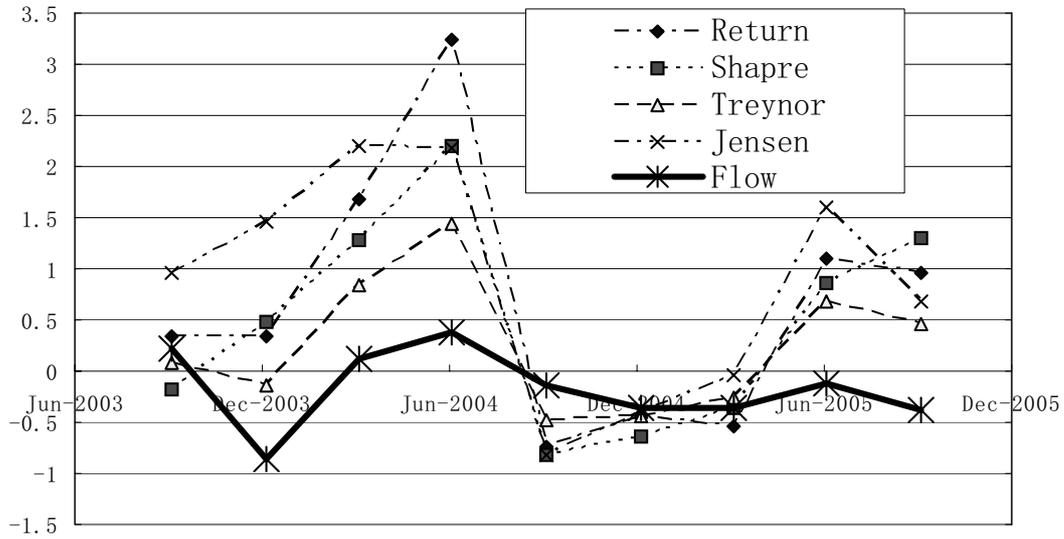


Figure 3. Section Regression Parameters and Net Fund Flow (the net fund flow (*Flow*) is magnified five times).