

Do Chinese Investors Get What They Don't Pay For?

Expense Ratios, Loads, and The Returns to China's Open-End Mutual Funds

by

Yang Wang

Program in Statistical and Economic Modeling  
Duke University

Date: \_\_\_\_\_

Approved:

\_\_\_\_\_  
Kent P. Kimbrough, Supervisor

\_\_\_\_\_  
Edward Tower

\_\_\_\_\_  
Surya T. Tokdar

Thesis submitted in partial fulfillment of  
the requirements for the degree of Master of Science in the Program in Statistical and  
Economic Modeling in the Graduate School  
of Duke University

2015

ABSTRACT

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## **Abstract**

In this paper we analyze the performance of China's open-end mutual funds by different approaches. Using the data of 467 open-end mutual funds from 60 fund families from Jan 2010 to Apr 2015, we find that the performance of most mutual funds does not beat the collection of indexes that most closely track the fund, and the fund families with high expense ratios serve investors less well than those with low expense ratios. Investors would earn higher returns by investing in mutual funds with low expenses and low front end loads.

## **Dedication**

I dedicate my dissertation work and give special thanks to my advisor dear Professor Ed. Tower for your guidance through the entire process; your discussion, ideas, and feedback have been absolutely invaluable.

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# 1. Introduction

Compared with the U.S. and other mature fund markets, China's fund market is relatively new, and so far research on China's fund industry is not abundant enough to paint a complete picture. After the financial crisis in 2008, China's fund market has been gradually recovering, and open-end mutual funds are now playing an important role in China's fund market.

The first open-end mutual fund was established in September 2001, and with only fourteen years of development, by the end of April 2015, the total open-end mutual fund assets in China exceeded 6 trillion CNY and accounted for over 97% of the entire fund market (AMAC, 2015). However, while competition intensified, there was no significant decline of the expense ratio. This suggests that few investors and researchers pay attention to the fees and expense ratios of Chinese mutual funds.

So is there any problem with the expense ratios of China's open-end mutual fund market? Do the investors get what they pay for? How well do China's open-end funds perform compared to the United States? In this paper these questions will be answered by studying the performance of China's mutual funds in different ways.

Here is the structure of the paper. We test the relationship between expense ratio and fund return, both in the aggregate and disaggregated by different fund types. Next, we construct a tracking index for each fund and calculate the excess return over that

index for each mutual fund. Finally, we group the data by fund family and report the performance of each fund family.

We believe that this is the first study of the relationship between China's fund expense ratios and performance that includes proper controls, namely adjusting for mutual fund type, which we do by introducing a tracking index. We hope that by publicizing the underperformance of most mutual funds we will create pressure from clients on mutual fund families to reduce expenses and thereby bring mutual fund performance closer to that of their component stocks, as well as to get them to switch to lower cost index funds and lower cost electronically traded funds.

## 2. Literature

In 2001 there were only three open-end mutual funds in China, and all of them set the expense ratio at 1.5 %.<sup>1</sup> Open-end mutual funds had a 20% return on average in the year 2001, which was far beyond bank deposit interest rates and bond yields. However, the entire fund industry didn't perform well in 2002, and as Feng (2003) documents some people thought that the high expense ratio and sale loads were not justified by the funds' performance. Since the expense ratios of the US market from 2001 to 2003 were relatively high and were similar to Chinese market at that time, many scholars such as Wen (2002) and Feng (2003) maintained that the expense ratios of China's open-end funds were not far too high even compared with that of the mature US market. Zhang and Xu (2003) considered that the smallness of the Chinese market meant that scale economies were lacking at that time, which justified the expense ratios.

With the growth of more open-end funds, the market changed, and many scholars shifted their attitudes. Xu and Zheng (2004) showed that the sale loads were lower than the average international level, while the bank trustee fee was high and expense ratio was suitable. Cheng (2005) pointed out that the level of expenses and fees of China's open-end funds was similar to that of the 1980s' US market, and was higher than the expense level of the then current US mutual fund industry. In addition, the expense ratio was not significantly related to fund size and type. However, the sales

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<sup>1</sup> The data in this paragraph are from Ressel.cn (2015).

loads were lower than the average level of the US market. Cheng also argued that such low sales loads might decrease investors' transaction costs, and discourage investors from holding investments long term; long term investment is a rational way for investors to enhance return by decreasing transactions costs, and reducing the negative externality that one investor imposes on others when he trades funds frequently.

In China, many scholars studied the expense ratio and fee structure from the perspective of the principal-agent relationship. Li (2002) suggested that the fund managers' incentive compensation should be determined by the fund's performance but not the managers' efforts. Peng, Tan and Yan (2010) established a principal-agent model with adverse selection and moral hazard, using the data of 38 open-end funds from 2007 to 2008, and figured out that the average expense ratio was too high and it overly benefits fund managers.

Meanwhile, some researchers started to study the relationship between the expense ratio and earnings, performance and many other factors. Wang and Gao (2005) figured out that the expense ratio of China's open-end fund was only related to the fund type and had little variability within type. Zhao (2010) pointed out that China's expense ratio was too high and the structure was not rational since the expense ratio of blended (stocks combined with bonds) funds was higher than that of equity funds on average. Wang (2012) said that expense ratio should be determined by the fund performance. He divided the investors in two types: mature ones and naive ones, and then fitted a game

theory model to point out that the expense ratio would be negatively related to the manager's stock selection capacity when naive investors are dominant.<sup>2</sup> In addition, as the proportion of naive investors became greater, returns would fall. When you have a bunch of naive investors who don't pay attention to performance or expense ratios you are going to have expense ratios that are high. And once investors become smarter you are going to see expense ratios decline. We think investor naivety is an important explanation of why Chinese expense ratios are high. Cheng, Wang and Zheng (2013) used the data of 58 open-end funds from 2011 to 2012 and figured out that the performance and the rate of total fees (expenses plus loads) are not positively related. Even though their study tests the relationship between performance and expense, there is a lack of consideration that fund performance also could be influenced by asset type and the entire market situation. Therefore, it is necessary to control for other factors, as we do in this study.

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<sup>2</sup> In Wang's study, the mature investors are defined as those who understand the role of expenses in reducing return. The naive investors are those who don't have such ability, and they will buy the fund based on foolish reasoning, such as extrapolating recent returns into the future.

When the investor is mature, he will choose funds according to the well-reasoned predicted net return. The indifference curve of fund choice is linear, and a unique separating equilibrium exists. In this case the expense that set by manager with higher capacity will be greater than that from the manager with lower capacity under the equilibrium.

When the investor is naive, he will randomly choose funds, and no manager wants to reduce expense for him. In this case, a unique pooling equilibrium exists, and the expense that is set by manager with higher capacity will be the same as that from the manager with lower capacity under the equilibrium.

When naive investors are dominant in the market, fund managers with low capacity don't want to decrease the expense to compete with managers who have high capacity, because the expense has to be reduced a lot to attract mature investors in this way, and the same reduction will occur for both mature and naive investors, which would not be worth the candle. This is the same result that Tower and Zheng (2008) found. Fund families with low expenses for their favored clients are the ones who have relatively high gross returns (before expenses are deducted). These fund families are aiming for the sophisticated client market.

Even though many studies mentioned that the funds' performance should be a factor in the determination of the expense ratio, most studies only regarded this idea as a policy suggestion. Just a few empirical analysis on how the fund performance is related to the fund's expense ratio and they don't consider the problem in a more comprehensive way. In contrast, the United States has abundant research on this topic. Bogle (1998 & 2002), Malkiel (1995), Cahart (1997), Minor (2001) and Tower and Zheng (2008) all researched the relationship between expense ratio and mutual fund performance. Cahart (1997) figured out that loads and high expenses would mark a low performance of mutual funds. Malkiel (1995) found that gross of expenses, U.S. mutual funds on average did not beat the S&P 500 index. Tower and Zheng (2008) found that the performance of most funds didn't beat the index, and high turnover and expense ratio led to low performance. The research approach of our paper is strongly inspired by Tower and Zheng (2008), and we use the same technique to create the tracking index and evaluate the fund's performance.

### 3. How do Expense Ratios and Loads Affect Return—No Controls Except Risk?

We expect that funds that invest in riskier assets will have higher returns. If front end loads and deferred loads and expenses are used to improve stock selection we should find these variables positively related to return. If, however, these fees are markers for the fund's management's indifference to client welfare we should expect negative coefficients on these three elements of fee structure. To find the relationship, we build an OLS model using the data of all funds which were established before Jan 01 2010 (N=467), and use their return, expense ratio as well as the sales loads from Jan 2010 to April 2015. All of the data analyzed in this paper is collected from Rasset Financial Research Database ([www.resset.cn](http://www.resset.cn)), a widely used database provided and maintained by Tsinghua University. For each fund we use the annual geometric average return (continuously compounded return, %/year) and the annual expense ratio (%/year). Here the expense ratios are the averages over the entire five year period. The data were collected over just five years. The measurement of risk is the standard deviation of the MONTHLY continuously compounded return (%/month). All of the funds are composed of the assets from Chinese firms and institutions, and we include all types of open-end funds (i.e., equity funds, bond funds, index funds, etc.) in our study.

Since investors with more to invest pay lower loads, we simply use dummy variables to denote whether front-end load and back-end load exist in each fund: one for existence and zero for non-existence. In the OLS regression given by Stata, the

coefficients of both front-end load and back-end load are negative but not significant as the result shows below.

$$\text{Return} = 4.54 + 0.59\text{SDReturn} + 1.73\text{ExpenseRatio} - 0.63\text{FrontEndLoad} - 0.31\text{BackEndLoad}$$

t=(5.28)	(4.06)	(2.38)	(-0.91)	(-0.33)
p=(0.000)	(0.000)	(0.018)	(0.363)	(0.741)

$$F=22.5, R\text{-squared}=0.163$$

So whether there is front-end load or back-end load in fund trading is not significantly related to the return of the fund, although the coefficients are substantial. Then we do the regression analysis without sales loads. According to the analysis from Stata, the OLS regression is as follows.

$$\text{Return} = 4.15 + 0.55 * \text{SDReturn} + 1.50 * \text{ExpenseRatio}$$

t=(3.92)	(2.15)	(7.43)
p=(0.000)	(0.032)	(0.000)

$$F=44.38, R\text{-squared}=0.1606$$

Since all of the variables are significant with 95% significance level, the return is positively related to the standard deviation of return (as expected) and positively related to the expense ratio. Will the conclusion that the expense ratio is positively related to return stand up through the rest of the paper?



#### 4. With Investment Type as a Control, High Expense Ratios Do Not Contribute to a Higher Return Either Consistently or Significantly

In our data set all funds are classified as five types: growth, value, blend, index and bond. We set five dummies equal to 1 for each fund type named as "Growth", "Value", "Blend", and "Index." Setting all dummies equal to zero defines a "Bond" fund. A simple regression of expense ratio on all fund types shows the expense ratios vary substantially and significantly with type:

$$\begin{array}{l} \text{Expense Ratio} = 0.661 + 0.837 * \text{Growth} + 0.812 * \text{Blend} + 0.172 * \text{Index} + 0.838 * \text{Value} \\ t=(68.52) \quad (42.17) \quad (6.78) \quad (32.49) \quad (66.42) \\ p=(0.000) \quad (0.000) \quad (0.000) \quad (0.000) \quad (0.000) \end{array}$$

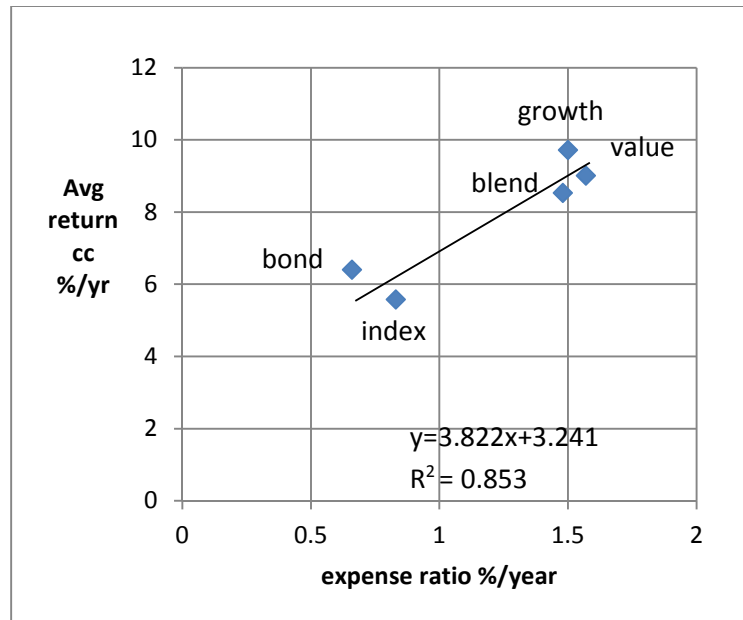
F=1333.64, R-squared=0.92

The average expense ratio for each type is presented in the Table 1 below.

**Table 1: Average Expense Ratio by Fund Type**

	Growth	Value	Blend	Index	Bond
Average Expense Ratio	1.50%	1.57%	1.48%	0.83%	0.66%

Figure 1 shows that expenses and net returns are positively correlated by fund type.



**Figure 1: By Fund Type Expenses and Net Returns are Positively Correlated**

The R-square is 0.85, which means that expense ratio is highly correlated with the fund type. When we run separate regressions, the relationship between return and expense ratio is not significant and consistent among different types.

For Growth:	Return = 9.53 + 1.35 * SDReturn - 4.92 * ExpenseRatio
	t=(2.18) (4.07) (-1.67)
	p=(0.030)(0.000) (0.097)

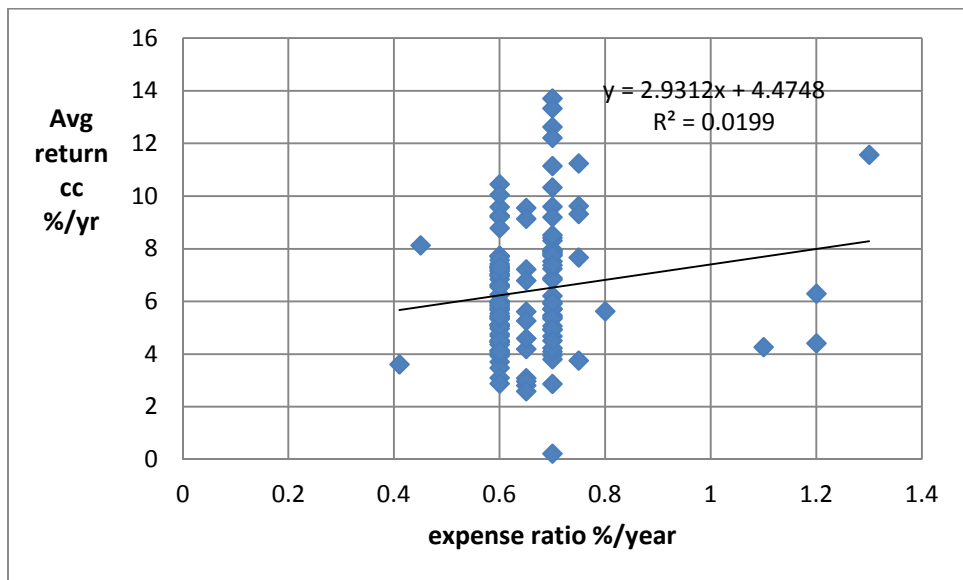
For Blend:	Return = 3.82 + 1.70 * SDReturn - 2.53 * ExpenseRatio
	t=(0.58) (2.35) (-0.49)
	p=(0.562)(0.023) (0.630)

For Index:	Return = 6.44 - 0.19 * SDReturn + 0.46 * ExpenseRatio
	t=(2.67) (0.59) (0.35)
	p=(0.015)(0.564) (0.731)

For Value:                       $\text{Return} = 3.82 - 0.19 * \text{SDReturn}$   
                                           $t=(1.69) (0.51)$   
                                           $p=(0.106)(0.615)$   
 (expense ratio is omitted because all of them are 1.5%)

For Bond:                          $\text{Return} = 2.59 + 2.27 * \text{SDReturn} + 0.329 * \text{ExpenseRatio}$   
                                           $t=(0.25) (11.55) \quad (0.25)$   
                                           $p=(0.004)(0.000) \quad (0.801)$

For each of the fund types, we graph the relationship between the expense ratio and the net return.



**Figure 2: Expenses and Net Returns for Bond Funds**

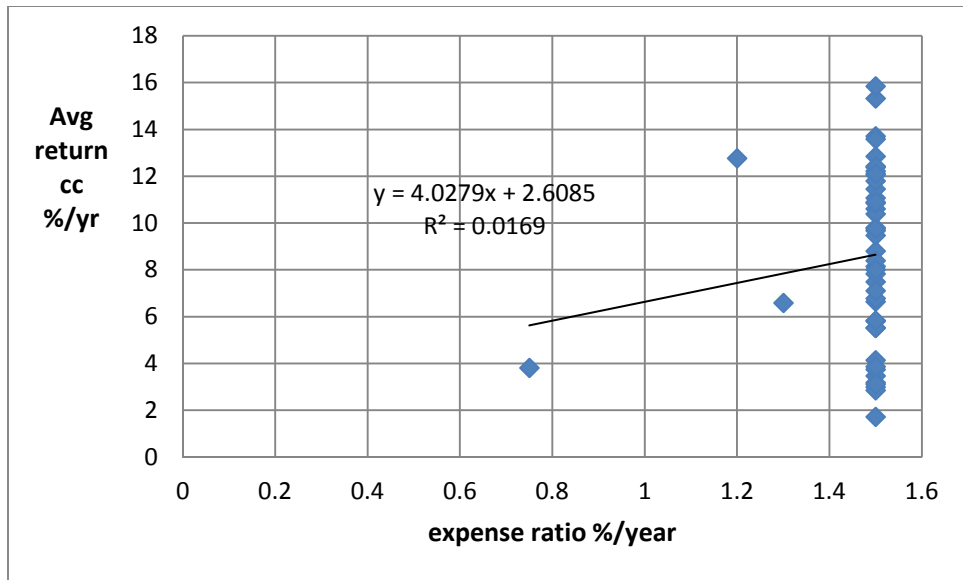


Figure 3: Expenses and Net Returns for Blend Funds

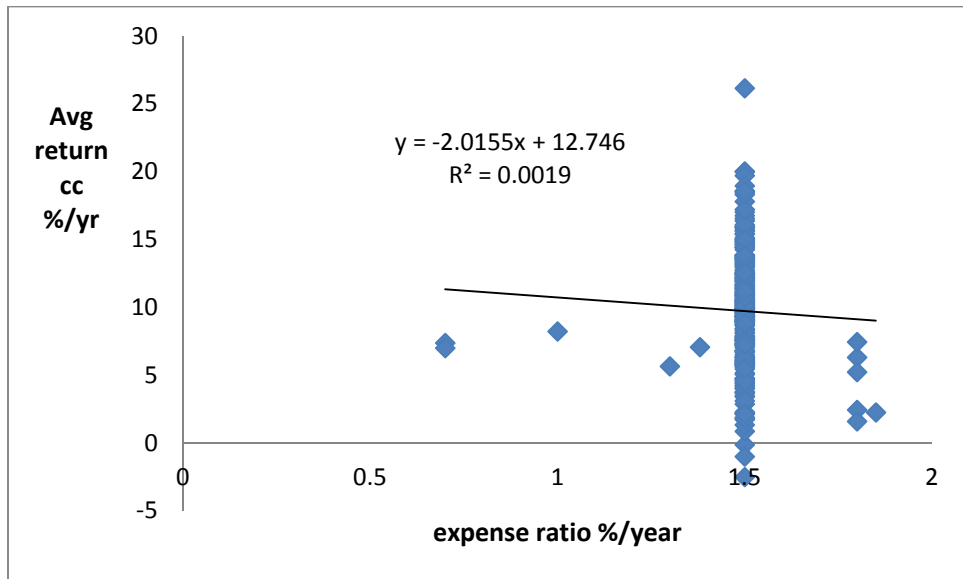
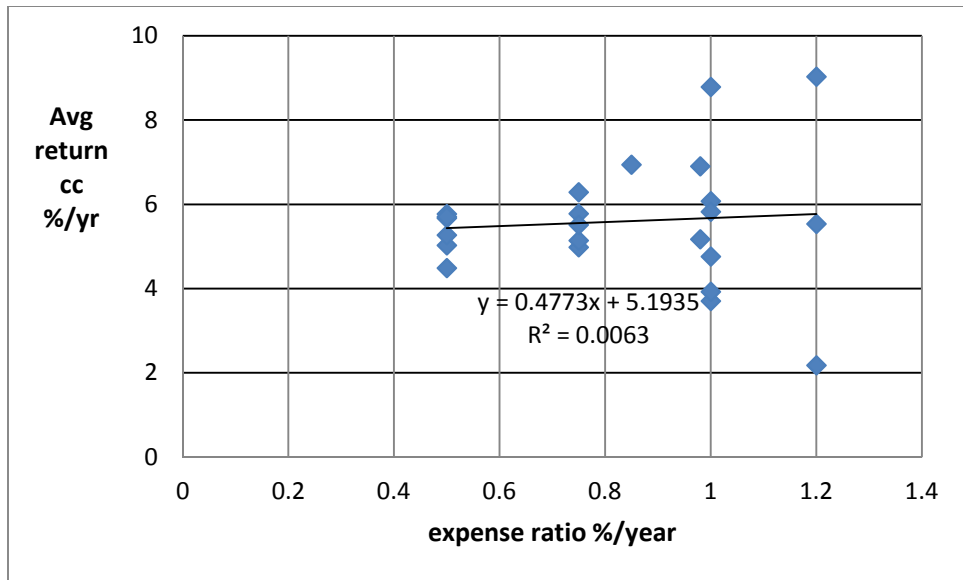
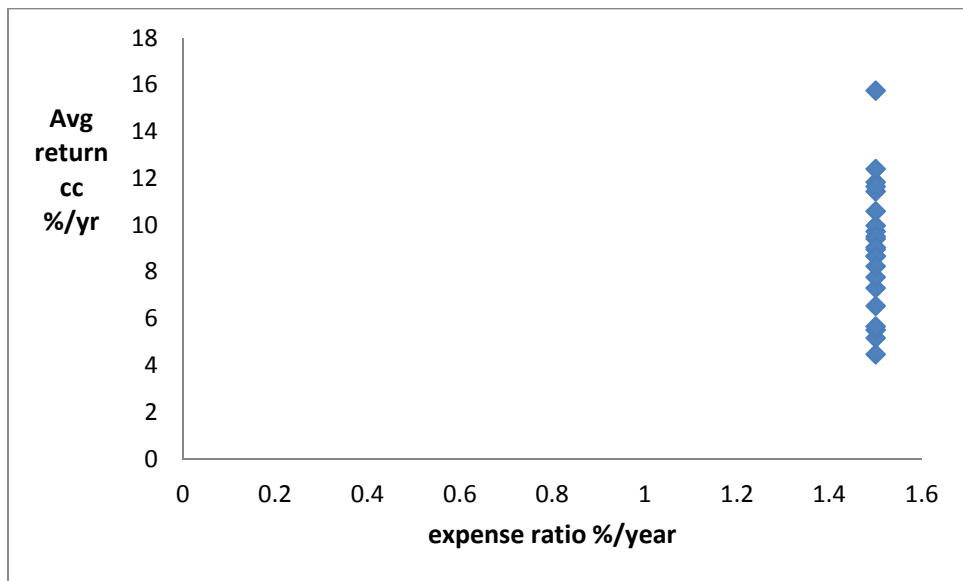


Figure 4: Expenses and Net Returns for Growth Funds



**Figure 5: Expenses and Net Returns for Index Funds**



**Figure 6: Expenses and Net Returns for Value Funds**

Therefore, for each fund type, the return and expense ratio are not significantly positively related any more. We note that the coefficients of risk measurements in all of the five regressions are not significant either. Only for growth funds is the expense ratio

negatively related to net return. For growth, blend and value many of the expense ratios are precisely 1.5%/year. Why there is such conformity is a puzzle to us. The fact that the variation of the expense ratio is very small, explains in part the lack of insignificance. This leads us to another question: Is return the best way of measuring the performance of a fund? In fact, the answer is no. The return of a fund is not only related to its risk and the manager's selection skills. It also highly depends on the style of the mutual fund. Thus, this section combined with the previous one leads us to conclude that the previous section's finding that high expense ratios contribute to high returns should be restated as it just so happened that the high expense type of assets had high returns during the period examined.

## 5. How Do Fees Affect Excess Returns?

Sharpe (1992) and Tower and Zheng (2008) demonstrate that comparing the fund return with its tracking index basket is a good way to evaluate the manager's selection skills, where the tracking index basket is the portfolio of stock and bond indexes whose returns most closely matches the return of the mutual fund. This procedure means that we compare the mutual fund with a portfolio of indexes that has the same style. Since indexes are accessible for investors, the excess earning of a fund compared with index basket return measures how well the fund managers select assets within their chosen style. We choose the funds in growth, value, blend and index types, and then compared them with their corresponding index baskets. Here I also used the continuously compounded return for both funds and indexes.

For growth funds, we choose the growth indexes from the composite indexes of the Shanghai and Shenzhen stock markets. We also include the Growth Enterprise Market and the Mid&Small Cap Index.

For value funds, we choose the value indexes from the same composite indexes as for the growth funds. We also choose the China Securities Index 300, which is the index that includes the 300 largest companies in China and covers 70% of the market value of both Shanghai and Shenzhen stock markets.

For blend funds, we choose the composite indexes where the value and growth indexes come from. Also we chose certain indexes that appears most frequently, when we tracked growth and value funds.

For Index funds, it is not necessary to create an index basket. Since the return of a fund for investors is achieved after the expense ratio has been deducted from the gross return, the excess earning from the index should be the expense ratio. Thus, index funds should have the same performance as the index, minus the expense ratio, and the excess earning for investors should be minus the sum of the expense ratio and transactions costs.

The table below shows the index basket we use in our following analysis.

**Table 2: Composition of Index Basket by Fund Type**

Fund Type	Index Basket
Growth	SSE Large&Mid&Small Cap Growth Index, SZSE Growth Index, SSE Mid&Small Cap Index, SZSE SME Composite, Growth Enterprise Index
Value	SSE Large&Mid&Small Cap value Index, SZSE Value Index, CSI300 Index
Blend	SSE Composite Index, SZSE Component Index, SSE Mid&Small Cap Index, SZSE SME Composite, Growth Enterprise Index, SZSE Value Index, CSI300 Index

Note: SSE= Shanghai Stock Exchange, SZSE =Shenzhen Stock Exchange, SME=small and medium-sized enterprises, CSI=China Securities Index

How do we create the tracking index which is closest to the fund's performance by the index basket? We regress each fund's monthly continuously compounded return on the monthly continuously compounded returns of its index basket, constraining the



coefficients to be greater than or equal to zero, and the sum of the coefficients constrained to lie between zero and one. Then we augment the coefficients by the same proportion and make the sum of the augmented coefficients to equal one. The augmented coefficients can be regarded as the weight of each index in the tracking basket for the mutual fund. In our study we use Stata to perform the regression and put the coefficients in Excel to get the portfolio shares of the tracking basket.

For example, the regression coefficients for one growth fund are zeros except 0.36 for SSE Mid&Small Cap Index and 0.10 for Growth Enterprise Index, and the constant coefficient is 4.2. So the fund can be regarded as an asset portfolio composed of 36% the SSE Mid&Small Cap Index and 10% Growth Enterprise Index. In this case, the sum of the stock indexes weights in the tracking portfolio is 0.46. We multiply each of the stock index weights in the tracking portfolio by  $1/0.46$  to make the sum become 1, and the new coefficients are the final weights of the tracking index, which are 0.78 for SSE Mid&Small Cap Index and 0.22 for Growth Enterprise Index.

With the tracking index baskets of each fund and their return value, we easily calculate the excess earning of each fund above its tracking index. For the example above, assuming that the average annual return of the fund is 8.1%, and the return for SSE Mid&Small Cap Index and Growth Enterprise Index are 5.1% and 6.3%, then the excess earning of this fund is:  $8.1\% - (5.1\% * 0.78 + 6.3\% * 0.22) = 2.74\%$ .

Based on the calculated excess return values, we constructed Table 3 to examine the relationship between excess return and expense ratio as well as sale loads. Since there are only two funds which only charge either front end or back end load in our data set, and both of them have expense ratio lower than 1.5%, the excess return values for the funds whose expense ratios are equal or greater than 1.5% with only either front end or back end load being charged are not available. To our surprise, the excess earning is significantly diminished when the expense ratio is increased and the sale loads are charged more. In other words, the more the investors pay for fund management, the less they will get compared with the comparable tracking index basket.

**Table 3: Average Excess Return**

	expense ratio		
	< 1.5%	=1.5%	>1.5%
Either front end or back end load	0.922	N.A.	N.A.
Both front end and back end load	-0.630	-1.214	-4.484

Next we group and analyze those excess earnings in two ways: by investment type and by mutual fund family.

## 6. Controlling for Investment Type, Funds with Higher Expense Ratios have Higher Excess Returns (Figure 2 through 6 Revisited)

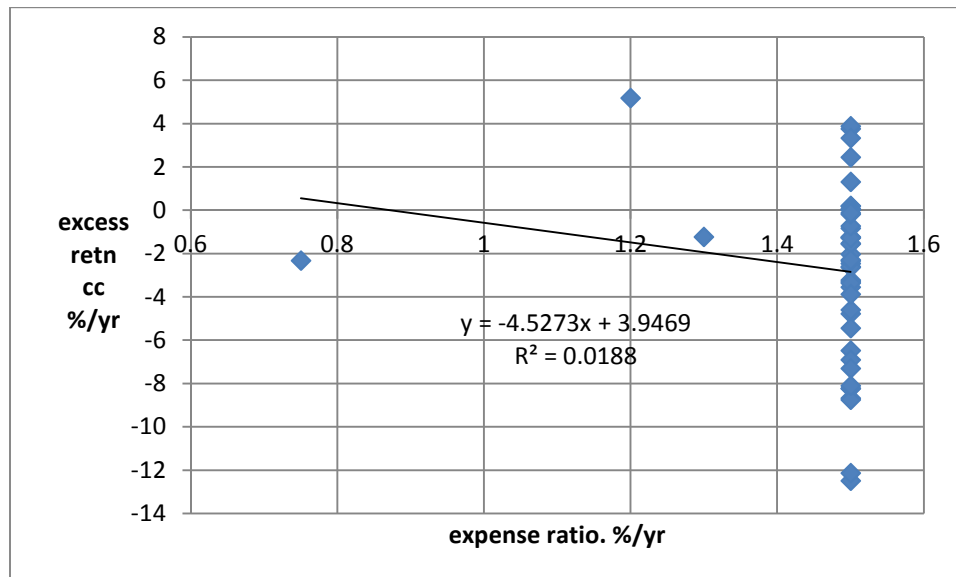


Figure 7: Expenses and Excess Returns for Blend Funds

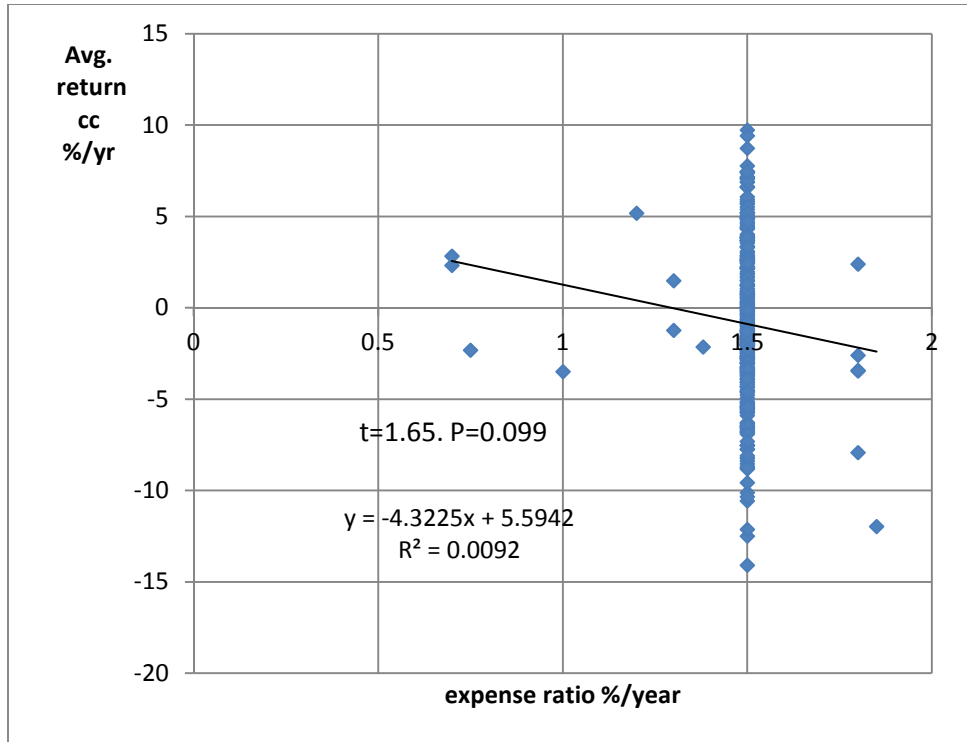


Figure 8: Expenses and Excess Returns for Growth Funds

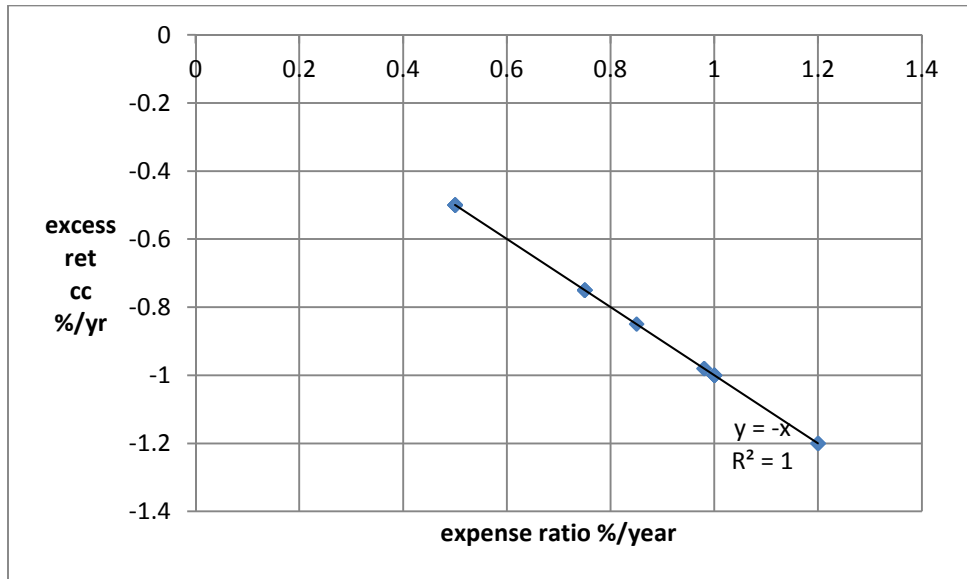


Figure 9: Expenses and Excess Returns for Index Funds

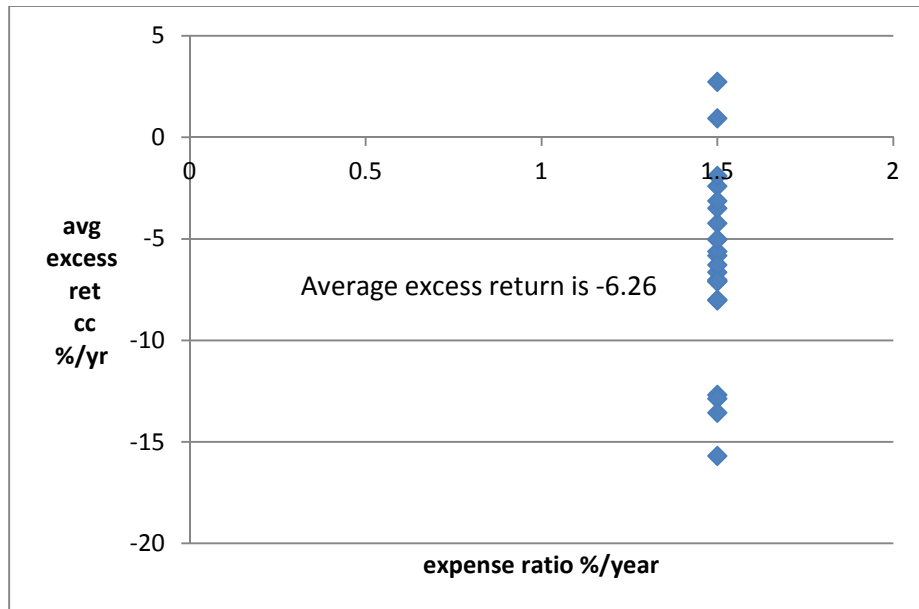


Figure 10: Expenses and Excess Returns for Value Funds

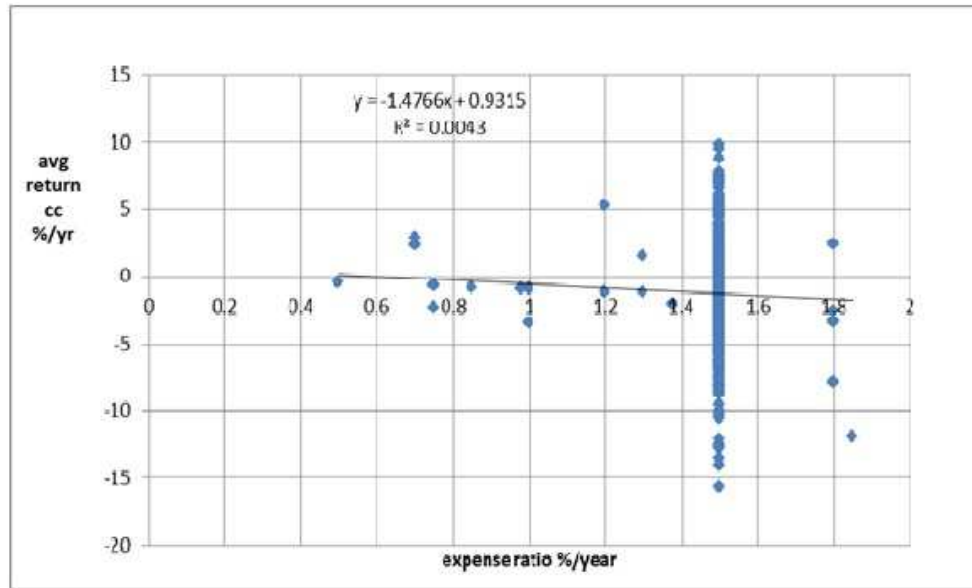
## 7. Controlling for Investment Type, Funds with Higher Excess Earnings Have Lower Expense Ratios

Now, we explore whether funds with higher excess earnings have higher expense ratios. We use three dummies equal to one for different investment types: growth, value, and blend. The "Index" type is denoted by all dummies equal to zero. The regression is:

$$\begin{aligned} \text{Expense Ratio} &= 0.83 - 0.0026\text{ExcessEarning} + 0.67\text{Growth} + 0.63\text{Value} + 0.65\text{Blend} \\ t &= (36.08) \quad (-1.84) \qquad (27.69) \qquad (22.44) \qquad (19.32) \\ p &= (0.000) \quad (0.067) \qquad (0.000) \qquad (0.000) \qquad (0.000) \\ F &= 194.07, R^2 = 0.6979 \end{aligned}$$

This is also an evidence that expense ratio is different according to different investment type. The expense ratio is slightly negatively related to the excess earning. Thus, it is not the case that higher expenses are required for mutual funds to perform relatively well or that funds which perform relatively well reward themselves with high expense ratios.

To clarify the relationship between expenses and excess return for equity funds, we provide Figures 11.



**Figure 11: Expenses and Excess Returns for All Stock Funds**

The regression that corresponds to that figure is below. Note that the coefficient of -1.48 is significantly different from zero only at the 11% level. However, this number is close to the coefficient that Zhang and Tower (2008) found for US funds of -1.56.

$$\begin{aligned} \text{Excess Return} &= -1.48 * \text{ExpenseRatio} + 0.93 \\ t &= (-1.22) \quad (0.52) \\ p &= (0.2247) \quad (0.6003) \end{aligned}$$

$$F=1.479, R\text{-square}=0.0043$$

We looked for other markers of bad performance found by Zhang and Tower (2008). These were maximum front end and deferred loads. Our best fitting equation with our hypothesized signs of a negative or zero impact of loads is the following.

$$\begin{aligned} \text{Return} &= 3.76 - 1.31 * \text{ExpenseRatio} - 3.08 * \text{FrontEndDummy} \\ t &= (0.83) \quad (-1.05) \quad (-0.67) \\ p &= (0.4096)(0.2935) \quad (0.5005) \end{aligned}$$

$$F=0.9660, R\text{-Square}=0.0057$$



Thus according to this equation, the existence of front end loads is a marker for bad return, and every 1 %age point increase in the expense ratio now reduces return by only 1.31%/year (still a big number), and the existence of front end loads reduces it by 3.08%/year.

## 8. Excess Returns By Mutual Fund Family

In this part we group data and calculate the average return by mutual fund families. There are 341 open-end stock funds and 60 fund families in all. Table 4 shows the summary of each fund family. For each fund family the funds are equally weighted, and as stated before, we use the geometric continuously compounded return and the average expense ratio and the excess earning that we calculate with the index basket, and as before in calculating the index basket we use monthly returns. We calculate a tracking index for each fund family after the continuously compounded returns of each family's funds have been averaged. In general, most fund families' return cannot beat the index basket. The highlighted data are the expense ratios which are less than 1.5%, the annual returns which are higher than 10%, and the excess earnings which are positive.

**Table 4: Excess Earning by Mutual Fund Family**

Family Name	number of funds	Expense Ratio by Family	Return by Family	Excess Earning by Family
ABN AMRO TEDA Fund	8	1.50	11.8132	-2.8054
Aegon-Industrial	3	1.50	13.8563	1.1430
Agricultural Bank of China-Crédit Agricole Asset	3	1.50	13.9629	-0.0815
AXA SPDB Investment	3	1.50	14.3501	-1.6340
Bank of China Investment	5	1.40	11.8897	2.0918
Bank of Communications Schroder	6	1.55	7.8919	-0.5623
Baoying	5	1.50	13.9320	1.4558
Boshi	9	1.44	5.4162	-1.6445
CCB Principal Asset	4	1.50	11.2293	3.3303
Chang Xin	5	1.50	9.3805	-3.6374

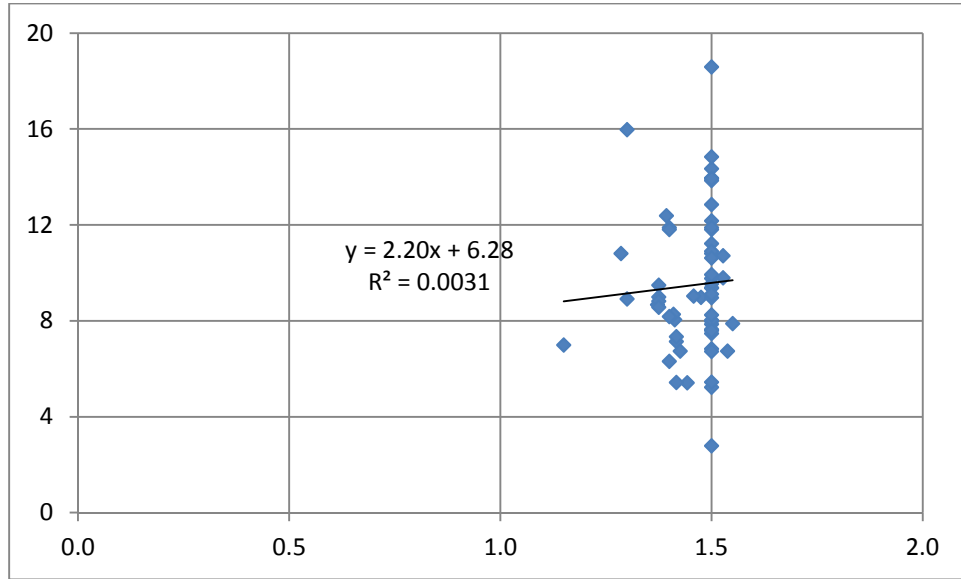
Changsheng	7	1.29	10.8137	1.5332
China Asset	13	1.53	9.7922	-2.3439
China International Fund	8	1.54	6.7423	-3.9100
China Merchants Fund	7	1.50	7.4733	-3.4868
China Nature	4	1.50	7.8600	-3.8690
CHINA POST & CAPITAL	3	1.50	6.8397	-4.1140
China Southern Fund	8	1.41	8.0548	0.1855
China Universal	7	1.39	12.3929	0.2693
Citic-prudential	4	1.50	10.8128	-1.0193
Da Cheng Fund	9	1.42	7.1414	-2.4778
E Fund	12	1.48	8.9882	-0.0027
Everbright Pramerica Fund	6	1.50	9.7674	2.7097
First State Cinda	3	1.50	9.3652	0.8452
First-Trust	4	1.50	10.9058	-3.1429
Fortis Haitong Investment	8	1.50	5.2365	-3.8909
Fortune SGAM	10	1.41	8.2757	-3.1412
Franklin Templeton Sealand	6	1.37	8.6756	-0.5230
Fuligoal	8	1.40	11.8119	0.6935
Galaxy	5	1.30	15.9824	2.8792
GF Fund	8	1.38	8.9915	-2.5085
Golden Eagle	4	1.50	7.9797	-5.8953
Goldstate Capital	2	1.50	6.7344	-2.2038
Great Wall	7	1.43	6.7467	-3.5601
GTJA Allianz Funds	7	1.50	8.9757	1.4788
Guotai	8	1.38	8.8248	-0.9939
Harvest Fund	11	1.53	10.7142	-0.1844
HSBC Jintrust	6	1.38	9.4875	-0.9500
Hua An	8	1.40	8.1810	-2.3133
Huafu Fund	5	1.30	8.9181	-2.6147
Huashang	3	1.50	18.5978	4.0402
Huatai-Pinebridge	4	1.50	12.8504	2.1730
ICBC Credit Suisse	7	1.40	6.3214	-2.5831
Invesco Great Wall	8	1.50	9.5497	0.5901
Lion	6	1.38	8.5742	-1.3666
Lombarda China	2	1.50	14.8374	3.4109
Lord Abbett China	3	1.50	10.6295	-1.2456
Minsheng Royal	1	1.50	5.4543	-5.6006
Morgan Stanley Huaxin Fund	2	1.50	7.6508	-5.8582

New China	3	1.50	12.1713	3.8337
ORIENT	4	1.50	11.8998	6.0885
Penghua	4	1.50	8.0319	-2.8737
Rongtong	6	1.42	5.4378	-5.1982
SooChow	5	1.50	7.6020	-4.4502
SWS MU Fund	5	1.50	9.9360	-1.4320
Tianhong	3	1.50	9.1184	-4.4608
UBS SDIC	6	1.42	7.3377	-1.7972
WanJia	6	1.15	6.9978	-1.7209
Yimin Fund	2	1.50	2.7883	-8.5491
Yinhua	7	1.46	9.0334	1.5242
Zhong Hai	5	1.50	8.2540	-3.0006
Average		1.46	9.49	-1.22

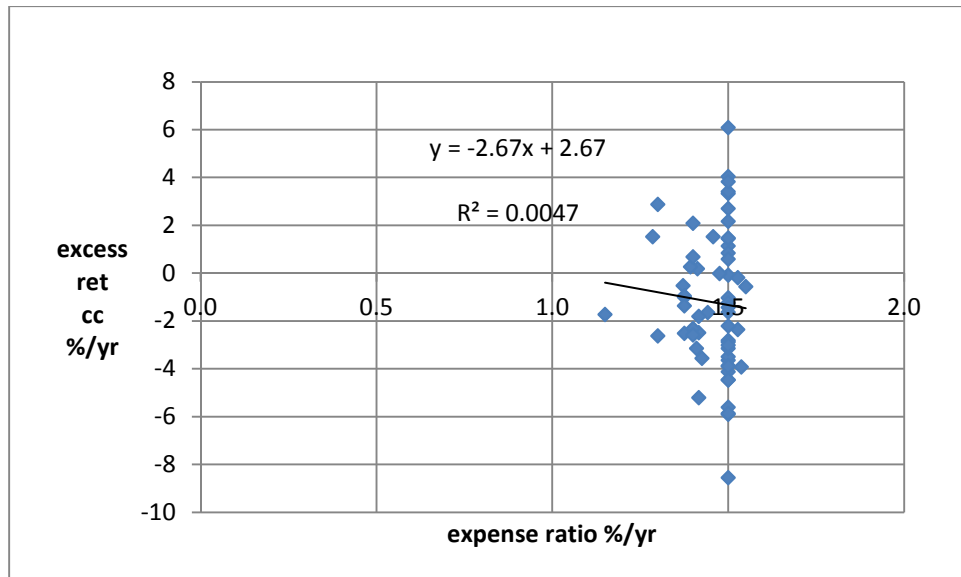
After we sort the data in the table by expense ratio, the average expense ratio and return for cheapest half of sample are 1.40 and -0.88, the average expense ratio and return for most expensive half of sample are 1.50 and -1.56412. We get the multiplier of -7.14 when dividing the difference between the two return values by the difference of the expense ratios, which means that for every one percentage point increase in the expense ratio, the average return declines by between 7.14 percentage points. We calculate the same multiplier between the bottom ten funds and the funds whose expense ratios are 1.5 or higher, as well as the multiplier between the bottom ten funds and the four most expensive funds. The results are -4.19 and -5.60. The corresponding multipliers that Tower and Zheng (2008) got for the US are around 2, much smaller than for China.

For the fund families, using the data in Table 3, we regress the excess earning on the expense ratio. Since only few funds don't have front end load and back end load, we don't include the sales loads. The coefficient for expense ratio is -2.67 with a -0.53 t value,

which is negative but not significant. This is quite close to the corresponding multipliers that Tower and Zheng (2008) got.



**Figure 12: Fund Families: for stock funds higher average expenses mark higher average returns**



**Figure 13: Fund Families: for stock funds higher average expense ratio marks lower excess return**

## 9. Higher Expenses and Higher Deferred Loads Reduce the Net Returns of Growth Funds

The growth funds accounted for 250 out of the 341 stock mutual funds in our sample. Here we restrict attention to these growth funds. Here we define net return as the amount the investors get after expenses and the trustee fee for bank are deducted. We regressed the geometric average return minus the trustee fee (averaging 0.25%/year) on the front end load, the deferred load, the expense ratio and the standard deviation of return, constraining the coefficients of the loads to be non-positive and the coefficient on the standard deviation of return to be non-negative. As the regression result shows, we got coefficients for the front end load, deferred load, and expense ratio of 0, -1.47 and -1.67, and the coefficient on the standard deviation of return was zero.

$$\text{FinalReturn} = 13.23 - 1.47 * \text{BackEndLoad} - 1.67 * \text{ExpenseRatio}$$

$$t = (2.9598) \quad (-0.7159) \quad (-0.56326)$$

$$p = (0.0034) \quad (0.4747) \quad (0.5738)$$

$$F = 0.061, R^2 = 0.0037$$

Thus, each one percentage point increase in the deferred load reduces expected return by 1.47 % per year and each increase in the expense ratio reduces expected return by 1.67 % per year. These results are not significant however. They are just our best guesses.

The corresponding coefficients that Edward Tower and Wei Zheng (2008) got for the US are: front end load: -0.0306, deferred load: -0.815, expense ratio: -2.56. Thus on

average the Chinese load coefficients are larger in absolute value and the expense ratio coefficient is smaller in absolute value.

## 10. Survivorship Bias

Survivorship bias is the tendency for mutual funds with poor performance to be killed and the assets to be merged into better performing ones by their mutual fund company. This phenomenon usually results in an overestimation of the returns of mutual funds, and many US researches like studies by Bogle (1998 & 2002), and Halslem, Baker and Smith (2008) have difficulties with handling survivorship bias. To test whether our study suffers from survivorship bias or not, we collect all open-end funds which entered market before 2010 and have quit the market. Table 4 shows the annual return of all of those funds.

**Table 5: Killed Funds**

Fund ID	Start Date	End Date	Type	Fund Size	Annual Return	Family Name
000051J	2009-08-31	2012-12-24	Index	2.5E+10	-11.389029	China Asset
020008	2006-06-30	2008-06-06	Growth	2.5E+09	18.7085194	Guotai
040006	2006-12-29	2008-08-29	Blend	2E+08	-3.9543321	Hua An
070007	2005-01-28	2007-12-07	Growth	1.3E+09	0.01674788	Harvest Fund
160806J	2009-06-30	2012-05-11	Growth	1.5E+10	-4.2289958	Changsheng
161902J	2004-11-26	2007-09-28	Growth	2.2E+09	1.2374273	WanJia
162602	2004-01-30	2005-07-14	Bond	4.7E+08	2.4123285	Invesco Great Wall
202015J	2009-04-30	2013-05-15	Index	1.6E+09	-0.2900976	China Southern Fund
202201	2003-10-31	2006-06-26	Growth	5.2E+09	9.4455126	China Southern Fund
310318J	2005-01-31	2013-06-06	Blend	6.9E+08	8.17122155	SWS MU Fund
620001J	2007-09-28	2010-08-16	Growth	5E+09	0.43183525	Goldstate Capital
519697J	2009-02-27	2012-02-02	Growth	5E+09	2.34127187	Bank of Communications Schroder Fund



From the table we could see that only three of the killed funds have relatively high return. However, all of the three funds were ended before the financial crisis in 2008, so the returns cannot be compared with the performance we research from 2010 to 2015. Even though those killed funds may influence our evaluation of fund performance, notice there are 12 killed funds and our research data set includes 467 funds, so the survivorship bias is not significant.

## 11. Conclusion and Reflection

Table 1 presents the average expense ratios for Chinese mutual funds. For example the average for growth funds is 1.50% and for index funds is 0.83%. The average US expense ratio (including index funds) from Tower and Zheng (2008) was 1.2%. In their study expense ratios varied from 0.07% up to 2.56%. Currently Vanguard Admiral Shares vary from a high of 1.84% for small cap value index to 0.05% for Vanguard S&P500 index fund. Admiral shares are for relatively wealthy investors. Why are the Chinese expense ratios so high? The most important reasons are investors funding resources and the market structure. The US and other mature markets have fund forms such as 401k, which support huge fund sizes. For example, Vanguard and Fidelity have AUM over thousands of billion US dollars. Except for the bull market in China this year, mutual funds in the US usually have scales of assets under management over ten times of those in China. Generally speaking, mutual fund AUM scales in China are relatively small. Especially before 2010, a fund with 1.5 billion RMB (=0.26billion USD) was relatively big. With such small scale, funds have to maintain high expense ratios to maintain solvency. On the other hand, the number of mutual fund families is relatively small. The expense ratio has stayed close to 1.5% over 12 years.

What is more, most investors in China are individual investors but not institutions, thus so far there has been little pension invested in the Chinese fund industry. (In China the commercial pension companies are extremely underdeveloped

and pensions are mostly monopolized by the government.) Individuals don't have the bargaining power. What's more, since previous Chinese market is not suitable for long-term investment, most investors want to speculate but not to hold the funds for years as long term investments. This raises the turnover and thus leads to a increase of expense ratio as well.

There are two relatively low cost types of Chinese investment vehicles. One is Chinese index funds with an average expense ratio of 0.83% per year. Another is Chinese electronically traded funds, with an average expense ratio of 0.50% per year. It is notable that the Chinese index funds with their low expenses and turnovers have under-returned the growth, value, and blend funds on average. We don't know why this is. It may be that index funds have been following bad indexes, and the construction of better indexes may be needed. We expect to see investor returns rise as mutual funds are combined to take advantage of economies of scale and expense ratios are brought down. What China needs is a home grown Jack Bogle to bring efficient and low cost mutual funds to Chinese investors.

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