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Research on the characteristics of sizeand its impact on the performance of the fund in China

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ABSTRACT

The research on the relationship between fund size and its performance has always been a hot topic, while, there are no consensus viewed from the present study on it. Compared with it in foreign countries, China's securities market started late and the fund's establish had a shorter operation. With the aid of foreignresearch experience, the author tested the effectsof China's fund size on its performance and concluded that in a bull market, bear market and shock, the performance of the lager funds' is not optimal. On the contrary, small funds, in terms of revenue and risk, all showed a clearer advantage than that of the large fundsin a bear market condition.

KEYWORDS

Fund size fundperformance relationship between fund size and its performance.

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INTRODUCTION

Fund size characteristics of fund management and fund investment has important guiding significance. In recent years, the development and prosperity of Chinese open-end fund, some fund is worth billions, such as harvest csi 300 even reached more than 400 one hundred million yuan. How to correctly recognize the growth of the fund size and distribution, and the degree of the correlation of measure scale and return on investment, it is of particular concern for the academic and financial circles. Therefore, this article probes into Chinese fund size characteristics study of the above issues.

In fund size growth research, we usually look the fund market, development and delisting as stochastic process, by establishing the random model to describe. Anthony W.Gabaix et al.[2]. By Brownian motion to depict the development of fund, results show that when the random process achieve stability, the fund size obey power-law distribution. Bollen and J.Busse[3] and W.Montroll and M.F.Shlesinger[9] also got similar results. By the method of a new time correlation, the fund size distribution were studied. Studies show that even if the random process achieve stability, the fund size refused to obey power-law distribution, but subject to a variety of the long tail of logarithmic normal distribution. Finally, a more accurate size related model, using empirical data to test the above conclusion, the results and the statistically significant theory agreed. Many experts have been exploring whether the fund size and its performance is closely related, but they got different conclusions. Part of the study[5,6] through a large number of empirical analysis, revealed no significant correlation between fund size and return. Some literature[7,8] also concluded that the open mold has the optimal scale effect, that is to say, there exist the critical value, and the fund size and their results showed a positive correlation before reaching that value; Once over the critical value, the diminishing marginal returns. Grinblatt and Titman[10] found that large-scale fund has no economic phenomenon, the reason may be that the scale, the greater the fund transaction cost is higher, the lower the liquidity, and therefore the more poor performance, they also suggested that we can use portfolio turnover to measure costs. Institute of existing research methods is also very widely used, such as TM model, HM model, and the three factor model, the risk index adjustment method, multiple regression and so on. The domestic many scholars have done the similar attempts, such as Shen Weitao and Hung Xingnuan, 2001, Lin Jian etc., 2002; Yang Xin and Wang Xiaozheng, 2003; LuHui and CaiDongmei, 2007; GaoShiliang, 2009; SheYueFei and Deng chao, 2010; Zhu Bing and Zhu Hongliang, 2011.

Although the study has made great contributions to meet the fund size characters, there are also some deficiencies as follows, such as growing fund size and distribution of research, mainly foreign scholars of the existing research results, to verify whether the research conclusion apply to China fund market; Fund size and the correlation research of the performance, few explore market environment on the mutual influence of fund scale and performance. For this reason, this study aimed at the shortcoming, proposed from the perspective of system dynamics and empirical studies two, to solve the following problems: China fund size and fund performance is what kind of relationship? Under different market conditions, how to change these relations?

THE TEST OF FUND SIZEEFFECTS ON FUND PERFORMANCE

This paper adopts empirical method to research fund's impact on fund performance. Arguably the fund scale has the following advantages: one is the overall commission, saving transaction costs; Second, the asset allocation portfolio, disperse investment risk; Third, professional operation, increase income. On the other hand, increase the size of it is harder to bring more management expenditure and capital turnover. In terms of actual Chinese capital market, whether we can pursue the bigger scale, the higher yield and the lower risk? Whether there exist the optimal fund size, and how big this scale? If market conditions have influence on these issues? We hope that through the empirical research to answer the above questions.

Here we choose open-end fund (non monetary and QDII) as the research object, the data from Wind financial database. This article looks at times elected since the first quarter of 2006 (2006 q1) and

in the fourth quarter of 2011 (2011 q4), so that we can continuously covers three typical market conditions, namely the bear market (q4 2007 q4-2007), the bull market (q3 2006 q1-2006, 2006 q1-2009 q2) and shock city (q4 q3 2009-2009). This helps to a more detailed analysis of characteristics of different market conditions, the fund performance and the relationship between the fund size. This paper defined the unit of net week yields (hereinafter referred to as the weekly return) on behalf of the fund performance, define quarterly net value of fund assets on behalf of the fund size.

1. Index selection

This article selects the fund return and income risk level and the three major indexes such as the excess profit to comprehensive measure of fund performance.

(1) The Average Weekly Return Index

In the case of temporary not consider risk adjustment, define the average weekly return (the average income rate per week of fund value $E(R)$), as one of the basic indexes of fund performance measurement, it can intuitively reflect the fund return level during an investigation.

$$E(R) = 1/M \sum R_t \qquad (1)$$

Among them, M. t respectively said the total number of weeks and the order in the sample interval, R_t said the profitability rate of funds in the t week.

(2) Standard Deviation Index of Weekly Income Rate

To measure the risk of fund income index (value at risk) value, β value, sensitivity, etc., this paper consider the volatility of returns, and define the standard deviation σ as the weekly return rate of fund to measure the risk of fund income. The index sum up the fund system risk and non-system risk faced by the strong representativeness.

$$\sigma = [1/M \sum (R_t - E(R))^2]^{1/2} \qquad (2)$$

In the equation, the definition of M, R_t and $E(R)$ keeps Consistent with above.

(3) The Unit Risk Excess Profit Index

To comprehensivly measure fund income, risk, market portfolio returns and the influence of various factors, this article selects the unit risk excess profit index to calculate the ratio between non-profit rate than fund mark management combination profit and the standard deviation of returns, the greater its value according to fund returns, the better.

$$S_p = (E(R) - R_m)/\sigma \qquad (3)$$

In the equation, σ is the standard deviation of the week of yield above.

2. The empirical steps

As mentioned above, this article will use open mode to analysis in each market between fund performance and the fund size,that concludes fund in 2006 q1-2011 q4 average weekly returns, weekly returns of the standard deviation and the excess risk of profit, and quarterly fund asset net value that is divided into three stages according to the type of market. The empirical steps are as follows:

Step 1: On a certain market period, we can average each fund's rate of return on equity, standard deviation of the weekly income rate, the excess risk of profit, and quarterly average fund asset net value, using the average data for further analysis.

Step 2: The average fund asset net value of the said fund (S), and funds were classified according to the fund, and is divided into 5 levels.

Step 3: Average the same level fund weeks yields, weekly earnings of standard deviation, the excess risk earnings, and the average fund size, and get each weekly level of the fund yield, standard deviation of weekly returns, the excess risk of profit and fund size.

Step 4: Analysis on the relationship between the fund performance and fund size.

It is worth to mention that, an important characteristic of open-end fund is that its size will change according to the cash flow, and how to give the size of the fund size,it is often a artificial boundary values, and there is no clear law of economics. Considering the influence of above factors on the empirical analysis, exploratory in step 2 to grading of fund, we has taken a k-means clustering algorithm that is commonly used in data mining. K-means clustering algorithm (K - means) is put forward by McQueen show in 1967, it is the most widely used in academic and industrial application of one of the algorithm. Using k-means clustering algorithm has the following advantages: (1) the k-means clustering algorithm fully consider the internal structure characteristics of the data, avoiding the use of such law or equivalent method such as classifying funds which led to the disadvantages of big differences in class; (2) the k-means clustering algorithm get the number of each class of funds that is relatively uniform, reducing the amount due to the fund in class differences influence on subsequent analysis, that is more conducive to the analysis of the steps 3 and 4; (3) using this method to cluster the scale of fund,it has a big reliability on technology and applicability; (4) K-means clustering algorithm, only needs to set the desired level number K. K is set to play a decisive impact on the quality of classification, not only makes the difference between different levels of the fund as large as possible, the fund within the same class as similar as possible, but also in line with industry consensus fund sector. Fully consider the above two points, where the use of the K squared Euclidean distance is set to 5, intended to match open-end funds in the stock, bond, guaranteed the type, configuration, type and currency top-five. What should be mentioned is: do not use standard industry classification above is because many types of funds are not clear, such as bond funds exhibit the characteristics of the insurance fund and so on.

3. The empirical results and analysis

Figure 1 shows the relationship between fund performance and fund size of. Through the analysis of the calculation of the indicators, you can get the following conclusions:

(1) In the bear market conditions, fund performance and size did not show significant economies of scale. That fund size is smaller, the average weekly earnings, standard deviation and excess profits and other indicators of risk units more excellent; because it is easier to change the allocation of funds in a bear market fund small-scale short time, showing strong liquidity, strong liquidity, earnings high, low risk and other characteristics; while massive funds, flexibility is low, the fund manager is difficult to achieve the freedom of securities traded on their price expectations, thus affecting the Fund's performance.

(2) In the bull market conditions, the fund size and performance have a stronger optimal effect, that there is a critical value of an optimal size, less than before this value, the fund size and performance are related, but the super-critical performance decreased. On average weekly earnings, standard deviation and excess profits and other indicators of risk units, the fund size and performance are due to appear class inverted curve, indicating the presence of strong economies of scale. In considering the benefits and risks of the condition, known by the fitted curve values, the optimal size should be between 80-110 million. Flexibility of these funds both small-scale fund high mobility and other characteristics, but also the basis of large-scale capital fund. These funds outstanding performance in a bull market; while the small size of the fund of funds due to restrictions by the performance is far bad than a large-scale fund.

(3) In the volatile city market conditions, fund performance and fund size exists a certain scale. From the average weekly earnings, the standard deviation of view, fund performance and fund size class was inverted curve; However, when taking into account the benefits and risks, the risk of excess profit per unit, the size of fund performance and fund size effect disappeared, compared to the in shock market, small-scale fund its flexibility, its consolidated results have obvious advantages over large-scale funds.

Through empirical testing, the study found that the relationship between the size and performance of open-end funds under the cow, bear and three market volatility environment. Figure 2

showing the relationship between 2006Q1-2011Q4 entire study period of fund performance and fund size. Although the entire probation period in the study period, there are a certain regularity and scale of fund performance, but compared with the laws of the three markets are completely different. For example, the value of the fitted curve from the point of view, the size of the entire study period considered good at around 10 billion fund performance results, but in a bear market, it is clear that the small size of the fund than the advantages of large-scale funds, that is, the entire study period obtained for the study period hide the inherent characteristics of the fund rule under different market conditions performance. This fully shows that when analyzing the relationship between fund performance and fund size, you need to consider this important factor in market conditions.
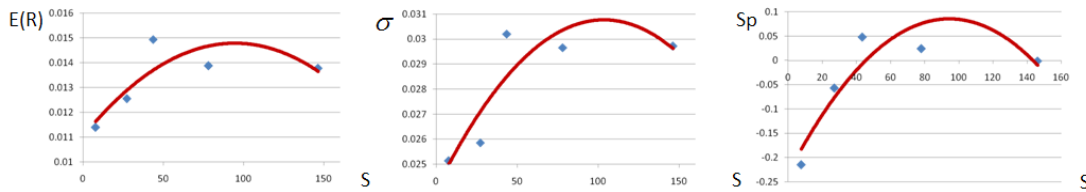
(a) The Relationship Between Fund Perforrmance and Fund Size: 2006Q1-2007Q3 and 2009Q1-2009Q2 bull phase
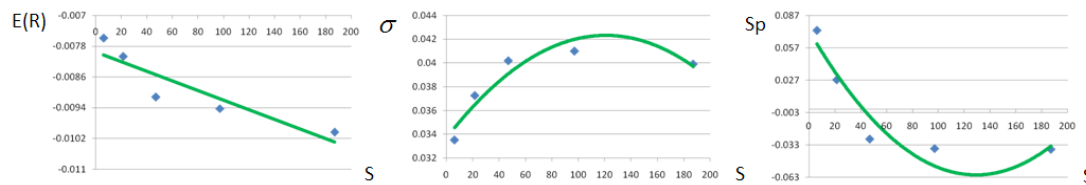
(b) The Relationship Between Fund Performance and Fund Size: 2007Q4-2008Q4 bear phase
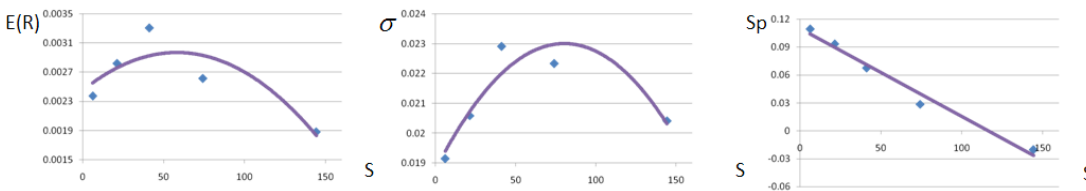
(c) Relationship Fund Performance and Fund Size: 2009Q3-2011Q4 shock phase

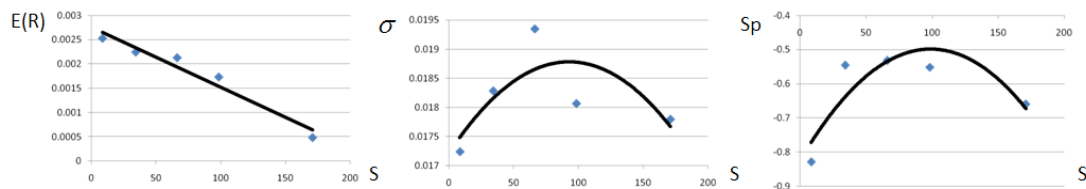**Figure 1 : The Relationship with fund size of fund performance under different market conditions**

Figure 2 : Relationship fund performance and fund size: 2006Q1-2011Q4 entire probation period

THE CONCLUSION

Through empirical analysis above, you can get the following conclusions:

First, investors should understand the market conditions, the preferred size appropriate funds, fund size should not mistakenly choose as the only index funds, blind greed. From the above analysis, market conditions in the three large-scale fund performance is not optimal. For example, the small size of the fund in a bear market conditions, in terms of return and risk than large-scale funds have shown a

distinct advantage. Of course, this does not mean a better choice for small-scale funds, because these conclusions are based on sample average basis, for the specific purposes of a single fund does not apply. Compared with the massive funds, income of small-scale funds shows a large difference in a bear market, and therefore there is a greater risk of fund choices.

Second, fund managers should understand the dialectical relationship between fund size and performance, abandon the "scale first" philosophy, to prevent the blind expansion. fund managers Should base on market trends, optimize portfolio allocation, and make ensuring the interests of customers on the basis of continuous improvement fund performance as the development of the Road.

Third, regulators should combined with the characteristics of the fund size and fund performance relationship and develop more objective and rational fund regulatory regime, scientific supervision. Foreign mature capital market of some commonly used methods such as hedging mechanisms and bond futures, has yet to launch, China's securities market and the lack of bilateral mechanisms or short mechanism, which require fund regulatory agencies, especially to play in the current period of the fund market is not yet mature important role.

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