

# Luck versus Skill in the Cross section of Mutual Fund Returns

## Abstract

This document summarizes the main points from the paper by Fama & French, “Luck vs Skill in the Cross section of Mutual Fund Returns”.

The authors analyse all the active mutual funds between Jan 1984 to Sept 2013. The monthly returns of each of the funds are tabulated and so are factor returns for each of the month between the analysed time period. For each month, a value weighted monthly return (VW) and an equally weighted monthly return (EW) is computed. Thus the resulting dataset contains monthly returns for the following variables :

- Excess of Value weighted monthly return over Risk free return, ( $R_{VWt} - R_{ft}$ )
- Excess of Equally weighted monthly return over Risk free return, ( $R_{EWt} - R_{ft}$ )
- Excess of Market monthly return over Risk free return, ( $R_{Mt} - R_{ft}$ )
- Size factor return ( $SMB_t$ )
- Value-growth return ( $HML_t$ )
- Momentum factor return ( $MOM_t$ )

## What models are tested ?

Given the above variables, the following regressions are run :

French-Fama three factor model (Val Wt):  $R_{VWt} - R_{ft} = a + b \cdot (R_{Mt} - R_{ft}) + s \cdot SMB_t + h \cdot HML_t + e_{it}$

French-Fama three factor model (EQ Wt) :  $R_{VWt} - R_{ft} = a + b \cdot (R_{Mt} - R_{ft}) + s \cdot SMB_t + h \cdot HML_t + e_{it}$

Carhart’s four factor model (EQ Wt):  $R_{EWt} - R_{ft} = a + b \cdot (R_{Mt} - R_{ft}) + s \cdot SMB_t + h \cdot HML_t + m \cdot MOM_t + e_{it}$

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What parameter is to be analyzed ? The intercept captures the skill level of the fund managers. The intercept in the EW returns tell us whether funds on average produce returns different from those implied by their exposures to common factors in returns, whereas VW returns tell us about the fate of aggregate wealth invested in funds. The above regressions are run on gross returns and net returns.

## What can be inferred from the regression output ?

The intercept of net returns for EW and VW regressions shows a negative value indicating an under performance with respect to three factor and four factor returns. Gross returns regressions are a better judge of discerning skill and luck of an active manager. The intercept of the gross return regressions show a small positive value but the standard error of the estimates show that they can as well be considered 0. Another way to look at this result is that the intercept values are slightly positive and hence factoring in the management costs, the gross active returns are close to zero. The takeaway is that active mutual funds in aggregate hold a portfolio that, before expenses, mimics market portfolio returns.

## Are there superior and inferior fund managers ?

The authors divide the funds in to three buckets based on AUM, < \$5M AUM, < \$ 250M AUM and < \$1B AUM funds. There are 3156 funds in the first category, 1422 in the second and 660 in the third category. For each of the three groups of funds, three factor and four factor regressions are run both on gross returns and net returns. Thus in total one has 12  $\alpha$  estimates - 3 buckets  $\times$  (three|four factor)  $\times$  (gross|net) returns. How do we use bootstrapping to get an estimate of true  $\alpha$ ? Here are the steps used in the paper

- Create a random sample of 273 calendar months from 1984 to 2006.
- Tabulate the firms in a specific category, let's say < \$5M AUM
- For each fund in the category, for each of the month from the random sample, compute excess of gross monthly returns over three factor returns, gross monthly returns over four factor returns, net monthly returns over three factor returns, net monthly returns over four factor returns
- Compute the 12  $\alpha$  estimates.

The above procedure is repeated 10,000 times so as to obtain the distribution of 12  $\alpha$  estimates. The analysis comprises

1. comparing the  $t(\alpha)$  values of the simulation and actual values.
2. comparing the likelihood of seeing the actual value based on the simulated distribution

The authors also use another type of simulation where instead of sampling months, returns are generated from a distribution so as to match the observed  $t(\alpha)$ .

## What are the findings ?

- The results show that the observed  $t$  values values are much more extreme than that has been observed via simulations.
- The likelihoods suggest that skill sufficient to cover costs is rare. At each percentile, one can look at the % of simulations that are below the actual value. The values show that most fund managers do not have enough skill to produce benchmark adjusted net returns that cover costs.
- The right tail of actual  $t(\alpha)$  suggest that there are some fund managers who have sufficient skill to cover costs. However the estimate of true  $\alpha$  is close to 0.
- Based on gross return analysis, there is an evidence of an alpha of 10 basis points per month.

Overall, this paper gives a systematic approach that one can use to analyze the performance of actively managed funds.