Machine-learning the skill of mutual fund managers

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1 Research questions

Can ML help to identify the characteristics of mutual funds and predict and funds' performance?

2 Why are the research questions interesting?

• Mutual funds have a significant impact on the economy, it is important to study their performance.
• ML as a tool to re-examine the performance of mutual funds:
  - ML helps understand the skills and market efficiency of fund managers.
  - ML distinguishs between high/low performing funds, and more accurately predict the future performance.

3 What is the paper's contribution?

***(1)* Literature on mutual fund performance persistence**
Previous: A considerable number of fund managers are able to surpass the benchmark before deducting expenses.
This: Using neural networks to find that fund flow and fund momentum are the most important predictors.

***(2)* Literature on the role of fund flows and market timing**
Previous: Compensation of fund managers relates to components of asset size, which orthogonal to performance.
This: ML restores the predictability of fund flow on performance and demonstrated a positive predictive effect.

***(3)* Literature on impact of sentiment and market conditions on fund performance**
Previous: The exposure level of funds to high sentiment beta stocks indicates lower future returns.
This: Correlation between flow, momentum, and fund performance is stronger during periods of high sentiment.

***(4)* Literature on machine learning in finance**
Previous: Using a large number of return predictiors to analyze the cross-section of stock returns.
This: Using ML to predict abnormal returns of mutual funds； New method for measuring interaction effects.

4 What hypotheses are tested in the paper?

H1: A significant predictability between fund characteristics and future risk adjusted fund performance.
H2: Neural networks can reveal the interactive effects between emotions and fund characteristics.

a) Do these hypotheses follow from and answer the research questions?
• Expanding people's understanding of mutual fund managers' investment skills through ML techniques.
Do these hypotheses follow from theory or are they otherwise adequately developed?
• Fund flow and fund momentum have been widely studied as predictors for future performance in literature.
• The author used neural networks to test the complex nonlinear relationships and interaction effects.

5 Sample: comment on the appropriateness of sample selection procedures.

The three fold cross validation method helps reduce sample selection bias and improve the reliability of the results.

6 Dependent and independent variables: comment on the appropriateness.

Abnormal returns as a prediction target can focus on the relative performance of fund managers rather than absolute performance, which is more important for investment decisions.

7 Regression model specification: comment on the appropriateness.

NN model captures interaction effect between fund characteristics and investor sentiment.

8 What difficulties arise in drawing inferences from the empirical work?

Changes in macroeconomic and market conditions may affect the predictive ability of models, making models that were effective during a specific period no longer applicable in other periods.

9 Describe at least one publishable and feasible extension of this research.

Do the investment skills of hedge funds, pension funds, and endowments exist and can they be predicted?
What are the similarities and differences in market performance between these funds and mutual funds?
How do fund managers perform in different market cycles, such as economic downturns and expansions?