Active Machine-Learning-Based Trading and Mutual Fund Performance

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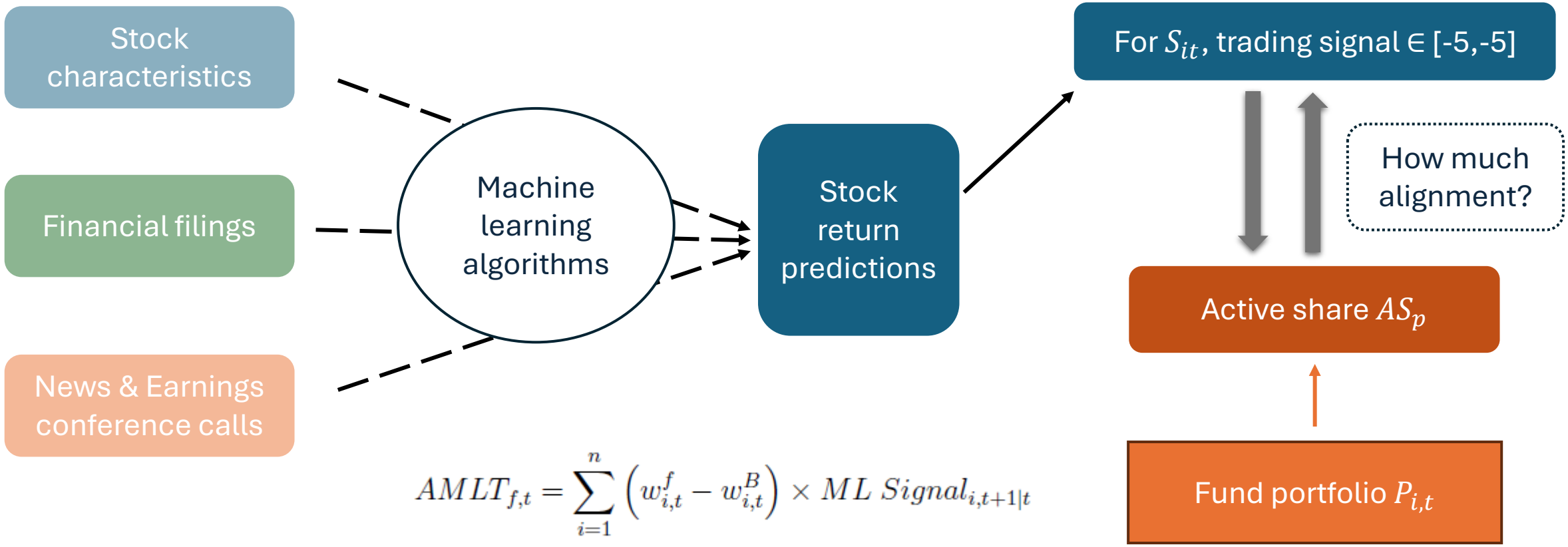
Paper in a nutshell

Do professional asset managers use Machine Learning-based tools? If so, does using AI/ML enhance fund performance?



$$AMLT_{f,t} = \sum_{i=1}^{n} \left(w_{i,t}^{f} - w_{i,t}^{B} \right) \times ML\ Signal_{i,t+1|t}$$

Measuring asset manager AI/ML use is HARD

Ideally, we would like to talk our friends in the asset management businesses:

- Deployment of AI/ML tools
- Technological spending (token use?)
- Industry reports

Figure 2. Which of the following is currently used, and which may be used in the future?

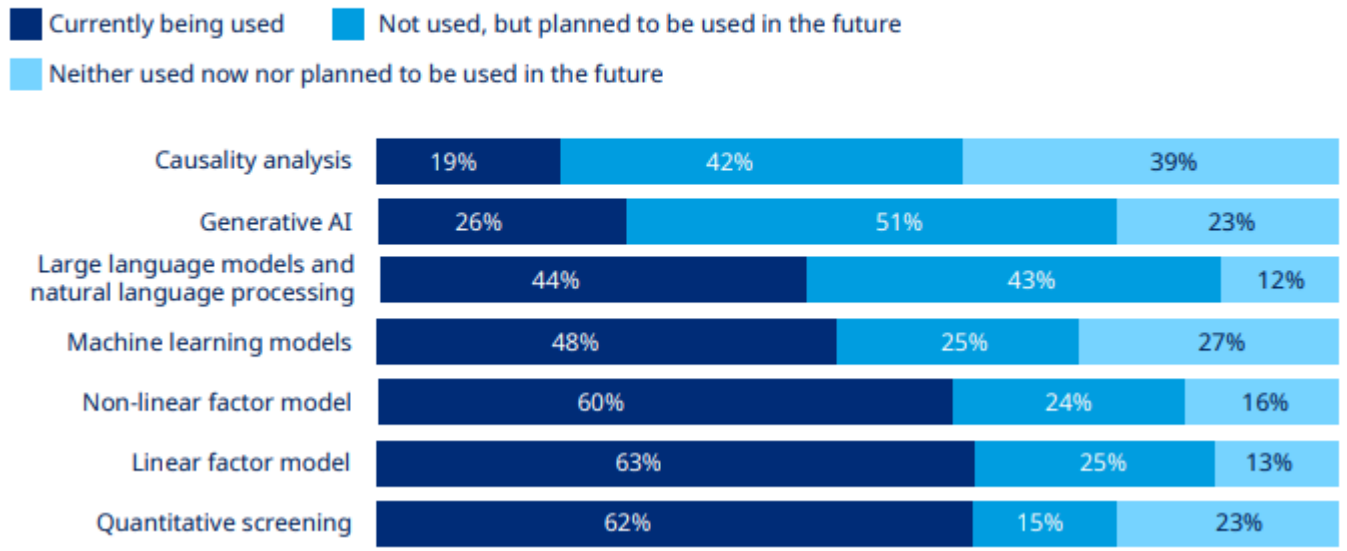
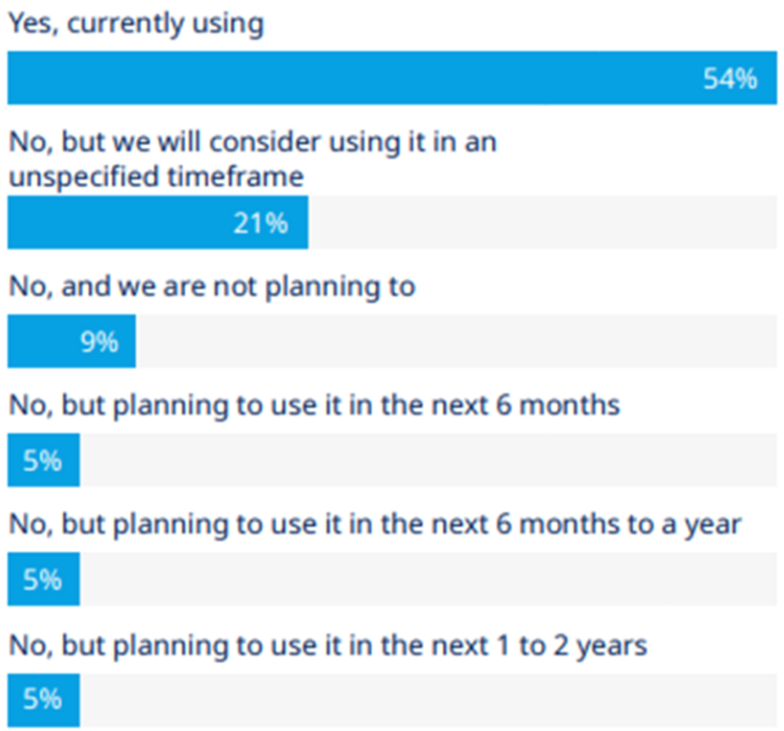


Figure 1. Which of the following do you consider to be "AI"?

Figure 3. Are companies using AI for investment strategies or asset-class research?



Measuring asset manager AI/ML use is HARD

Existing studies have taken various indirect approaches:

- Sheng, Sun, Yang, and Zhang (2026 RFS): How much does **AI-generated signals explain hedge fund portfolio holdings**? + small survey of fund managers
- Chen, Sialm, and Xu (2026 wp): Textual analysis of disclosed investment strategies + **AI-related job postings**
- Aragon, Kim, and Nanda (2026 wp): **AI-related personals from LinkedIn profile**

This paper: alignment between mutual fund portfolios and AI-generated signals

- Externally cross-validate with AI-related job postings

Measuring asset manager AI/ML use is HARD

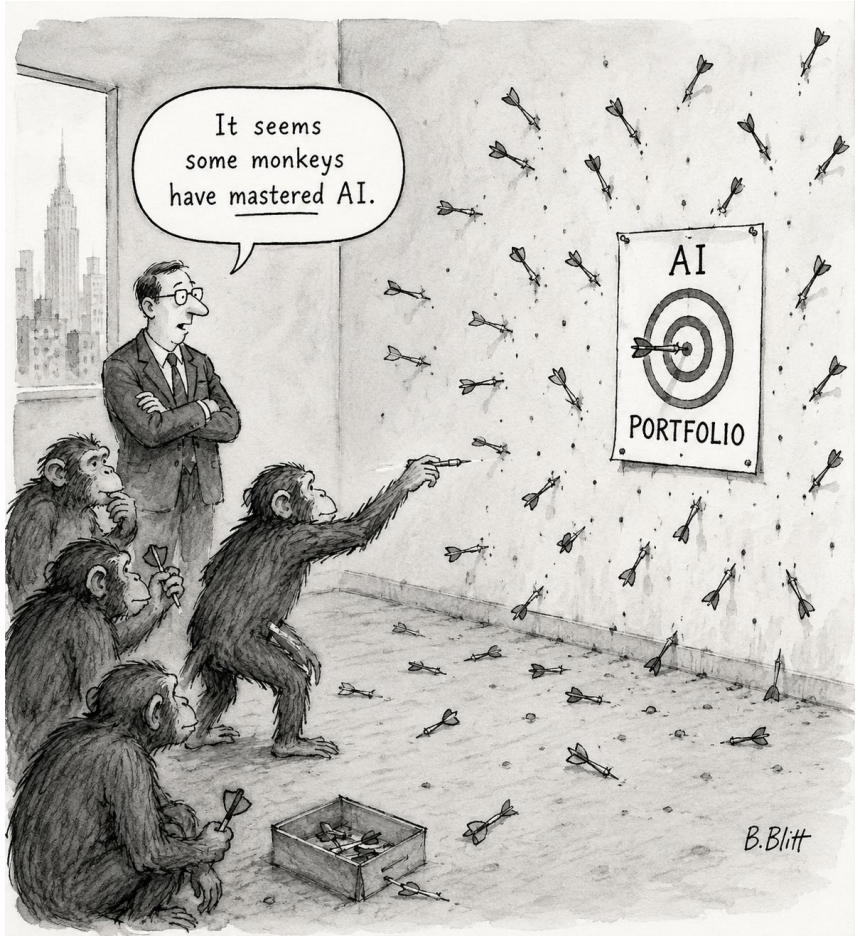
The challenge of using alignment between AI signals and portfolio holdings:

➢**What if AI-generated signals just represent (general) good investment ideas?**

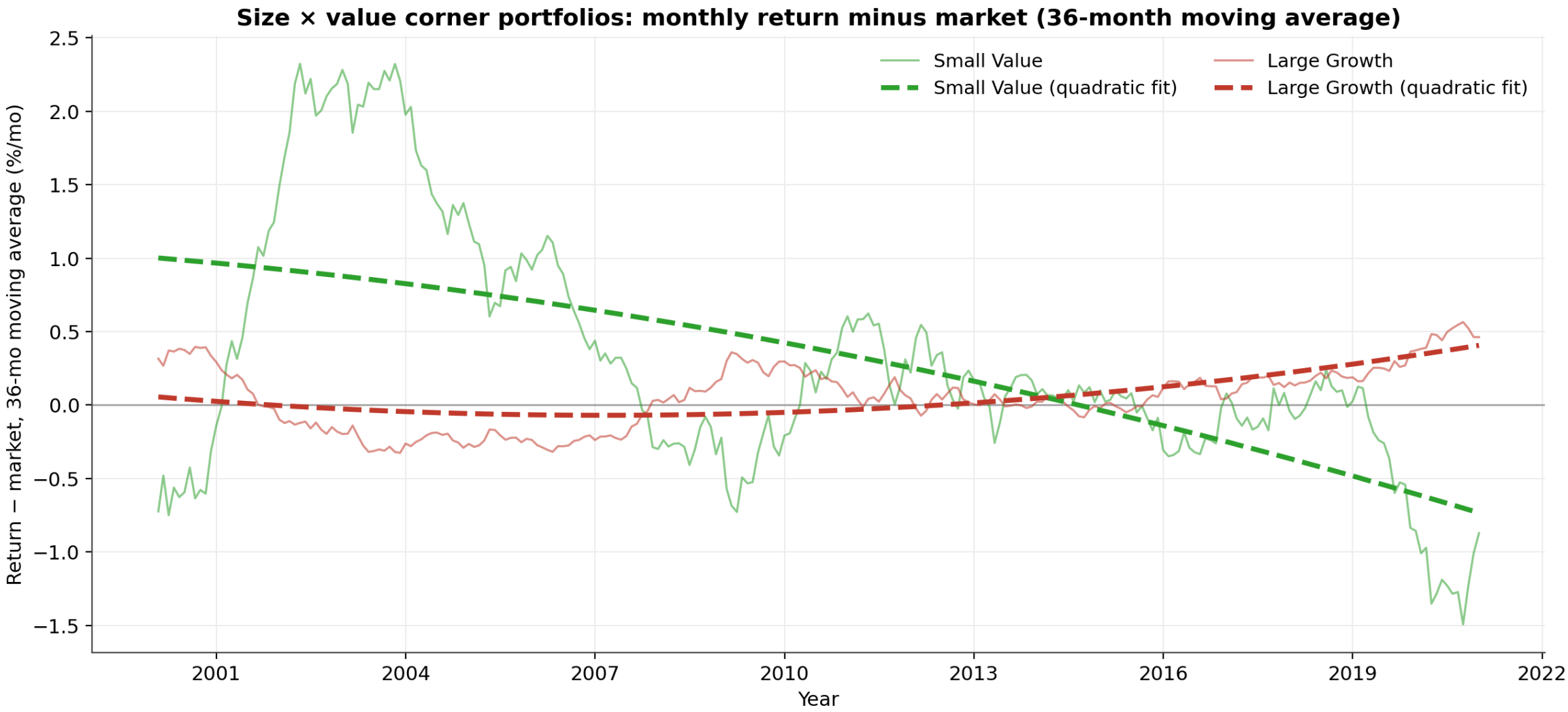
Paper finds:

- The median fund has AMLT ≈ 0
- High AMLT generates better performance than low AMLT
- …but we know ML-based strategies generate high abnormal profit.

Suppose asset managers allocate their active share randomly…



Measuring asset manager AI/ML use is HARD



Source: Kenneth R. French Data Library, 6 Portfolios (2×3) value-weighted, minus the market return (Mkt-RF + RF).

of portfolio holdings using NYSE breakpoints for market capitalization and book-to-market ratios.

AI-generated good ideas and human-generated good ideas

Are they any different?

Do skilled fund managers independently come up with good investment ideas that overlap with AI-generated one?

Two suggestive tests:

1. Examine active holdings of high-AMLT funds that do not agree with ML-based signals:
   - Conditional on ML-based signals, does higher abnormal weighting by high-AMLT funds (relative to holdings of low-AMLT funds) predict future stock returns?
2. Repeat the analysis in a pre-AI/ML sample
   - Use a sample period of 1970-1990(?). Train the ML model to generate signal; define high vs. low AMLT funds.
   - To the extent that high-AMLT funds were generating alphas back then, we should definitely give credits to humans!

Stepping back…

Why do we care about whether or not asset managers are able to improve performance using AI/ML tools?

- Large set of work in asset pricing demonstrating the ability of AI/ML/LLM-aided methodologies to generate abnormal return (see that works of Bryan Kelly, Dacheng Xiu, etc.)
- It is not surprising that asset managers would adopt AI/ML to some extent and benefit from the adoption.

In my humble opinion, it is more interesting to ask:

- Whether AI/LLM-based tools "level the playing field" between institutional and retail investors (e.g., Chang, Dong, Martin, Zhou 2026 JAR "AI Democratization…")

- How does AI change the competition landscape of asset management?

Technology spending in asset management has grown disproportionately compared to other functions.

Total North America and Europe asset management spending growth by function (estimate), index (2019 = 100)

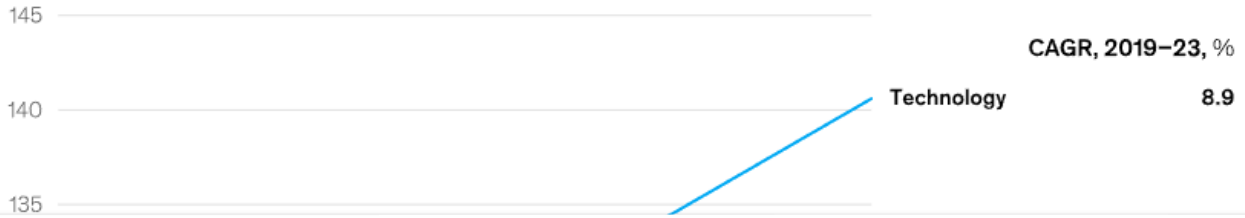
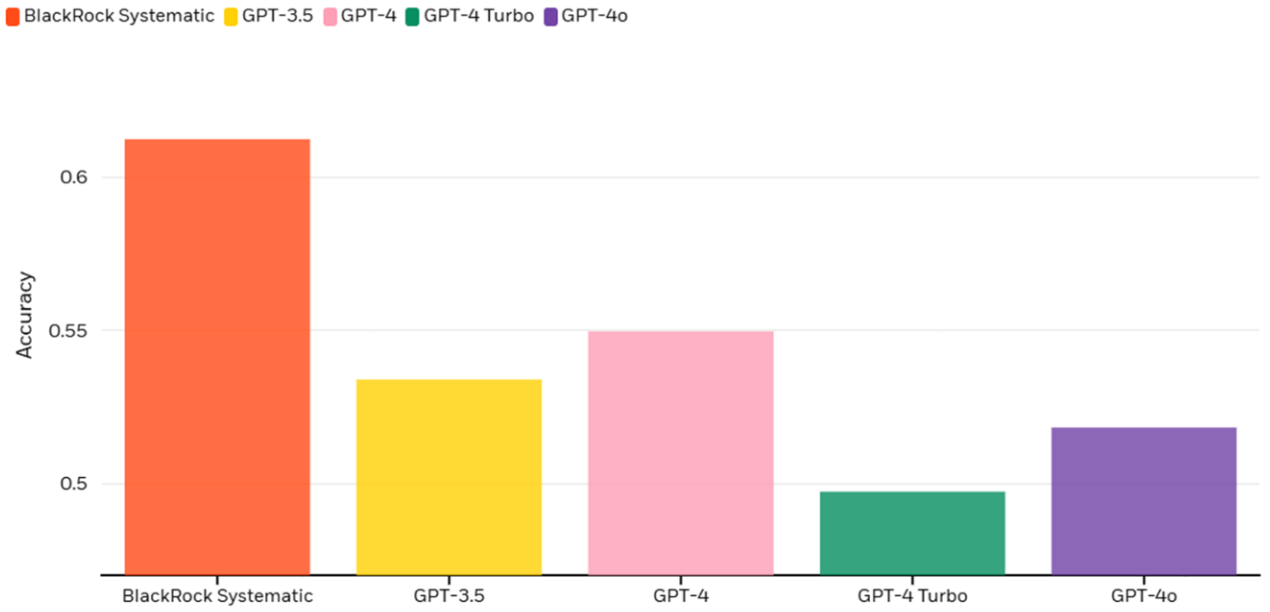


Figure 2: Our proprietary model has been fine-tuned to predict post-earnings market reactions with a high level of accuracy

Accuracy of models at forecasting 40-day post-earnings stock returns



Source: BlackRock Systematic, as of May 2024. Using a sample of 500 earnings calls, this analysis computes the prediction for each model and compares it to 40-day forward returns. The level of accuracy is the fraction of predictions that were correct for each model. The models used for the analysis are GPT-3.5 (March 2023), GPT-4 (June 2023), GPT-4 Turbo (Jan 2024), GPT-4o (May 2024), and the BlackRock Systematic model (Dec 2023).

- Do we expect to see an AI arms-race among asset managers?
- Large CAPX spending for developing/integrating AI models and use of computing power.

- AI's purported general use may or may not allow industry leaders to capture more market share.
- **Asset manager concentration** ↑or↓?

- **Important topic and interesting paper!**
- **It’s AI’s world and we are living in it.**
- **Best luck to the authors and the paper!**