Generative AI and Asset Management

Jinfei Sheng (UC Irvine)
Zheng Sun (UC Irvine)
Baozhong Yang (Georgia State U)
Alan Zhang (Iowa State U)

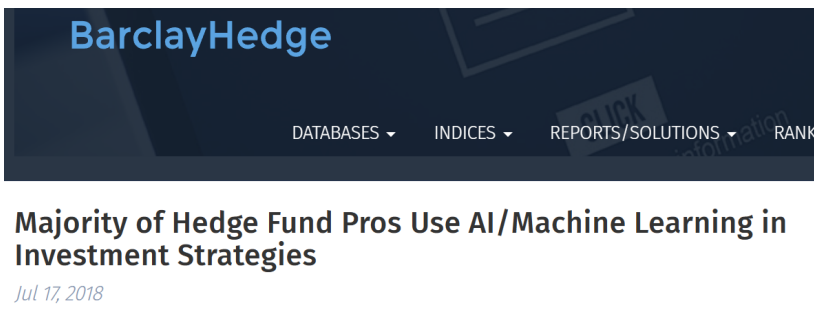
ABFER Annual Conference
May 21, 2025

Motivation

- Information is the key to success in the asset management industry.
- Classic model (Grossman and Stiglitz, 1980) shows that sophisticated investors earn alphas by:
  $\Rightarrow$ engaging in costly searches for new information
  $\Rightarrow$ accurately processing it in a timely manner
- However, effectively doing so is challenging due to the vast amount and complexity of potentially useful information for asset pricing (Chen et al., 2020; Martin and Nagel, 2022).

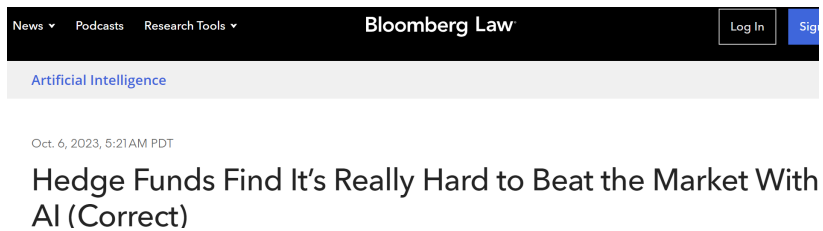
Motivation

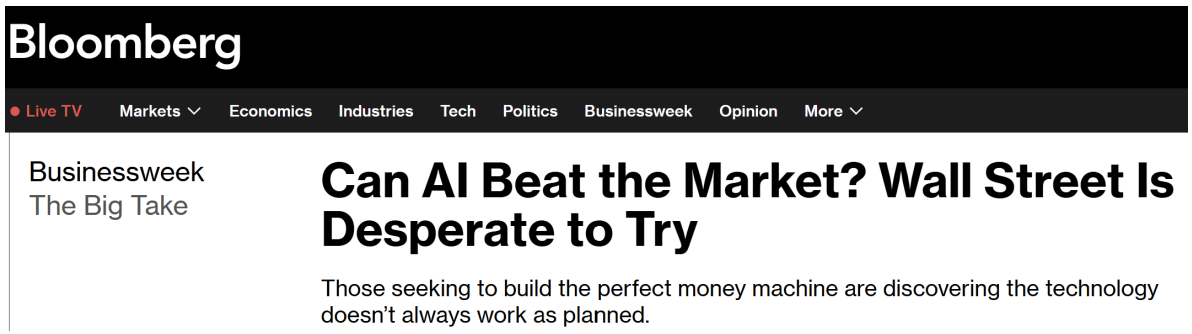
- Artificial intelligence (AI) has experienced substantial advancement in the past two decades.
- It leads to a large number adoptions of the technology by industrial and investment companies to process data and aid their decision-making (Babina, Fedyk, He and Hodson, 2024; Abis and Veldkamp, 2024).



Motivation: The AI wave

- However, AI has been highly technical and its applications require special talents, which leads to a scarcity of human capital in this area and a challenge in generating returns on investment with AI.





ChatGPT

- Generative AI, exemplified by ChatGPT, is a significant, disruptive revolution in AI techniques.
  $\Rightarrow$ Their performance in understanding texts, solving problems, and producing answers is truly remarkable and, in certain tasks, comparable to or exceeds human performance.

- More importantly, different from previous AI tools, generative AI does not require complicated training and tuning, and can be intuitively used by the general public, leading to their rapid adoption.
  $\Rightarrow$ ChatGPT is the fastest app to reach 100 million users (2 months).

- Thus, it is important to understand how it is used by investors and its impact on investing.

- However, such studies are challenging due to the lack of observable data on the use of generative AI by companies and investors.

This paper

- We propose a novel measure of investment companies' reliance on generative AI.
- We mostly focus on hedge funds
  - They are typically regarded as the most informative investors and earliest adopters of new technologies.
- **Research questions:**
  - Are generative AI tools widely adopted by hedge funds?
  - What are the impacts of generative AI usage?

Results Preview

1. A novel measure on AI adoption by hedge funds: Reliance on Generative AI (*GenAI Reliance*)
   - The degree to which fund managers' portfolio decisions are influenced by AI information in addition to existing fundamental variables.
   - Validated by various methods

2. *GenAI Reliance* and hedge fund performance
   - DiD test: hedge funds with a higher *GenAI Reliance* earn better raw and risk-adjusted returns of 1.8% to 3.5% per year.

3. How does AI help hedge fund performance?
   a. Combine with AI talents ✔
   b. Good at analyzing firm-level rather than macro information ✔

4. Survey: direct evidence, validation, and new insights.

Outline

- **Institutional Background and Data**
- **Reliance on Generative AI (GenAI Reliance)**
- **GenAI Reliance and Fund Performance**
- **How does AI Help Hedge Fund Performance?**
- **Evidence from Our Survey**

Data

1. Capital IQ: conference call transcripts, which are used to generate AI information.

2. Thomson Reuters/Refinitiv: 13F holdings

3. CRSP, Compustat, and I/B/E/S: fundamental and market information data about portfolio firms.

4. Open AI: ChatGPT release dates and outage time windows

5. Survey data: novel data from our survey among hedge funds in 2025.

6. Given that generative AI is a recent phenomenon, we restrict our sample period from 2016Q1 to 2024Q2.

Reliance on Generative AI (GenAI Reliance)

AI-generated Information

- Following Jha, Qian, Weber and Yang (2023, 2024), we let ChatGPT read conference call scripts and ask ChatGPT questions about firms' future policies in various areas, such as investment, employment, etc.
- For instance, one question we ask is *"Over the next quarter, how does the firm anticipate a change in its employment."*
- ChatGPT answers this question based on earnings conference call transcripts.
- A total of 14 signals (*GPT Scores*), covering firms' expectations about macroeconomic, industry, and firm-specific performance and policy outcomes.

List of 14 signals

GenAI Reliance: Measure Construction

- We construct our measure of generative AI adoption in two steps as in (Kacperczyk and Seru, 2007).

- Step 1: get the explanatory power (R^2) of financial variables and GPT Score on hedge funds' trades.
- Specifically, we run two regressions across a fund's holdings changes in quarter t:

$$HoldingChange_{i,j,t} = \gamma_{i,t} \cdot X_{j,t-1} + \varepsilon_{i,j,t} \quad (1)$$

$$HoldingChange_{i,j,t} = \Sigma_{j=1}^{J} \beta_{i,t} \cdot GPT\ Score_{j,t-1} + \gamma_{i,t} \cdot X_{j,t-1} + \varepsilon_{i,j,t} \quad (2)$$

where $HoldingChange_{i,j,t}$ is a percentage change in stock holdings j held by a fund i from t - *1* to t. $X_{j,t-1}$ includes firm fundamentals and analyst forecasts. *GPT Score* includes 14 signals generated by ChatGPT.

- We get $R^2_{fundamental}$ and R^2_{AI} from these two regressions, respectively.

GenAI Reliance: Measure Construction

- Step 2: calculate the incremental explanatory power from *GPT Score*.
- We call this measure "Generative AI Reliance" (GenAI Reliance):

$$GenAI\ Reliance_{i,t} = R^2_{AI,i,t} - R^2_{fundamental,i,t} \tag{3}$$

- GenAI Reliance quantifies the degree to which changes in portfolio holdings are influenced by AI-generated information, in addition to the existing set of fundamental variables and public information.

Pros and Cons of *GenAI Reliance*

- Ideal data: know whether a hedge fund actually uses ChatGPT to aid their portfolio decision.
  - Problem: we do not observe that information.

- Advantage 1 of GenAI Reliance: based on hedge funds' portfolio changes and captures the usage by managers for investment purposes rather than other reasons.
  - Other option: the subscription data of ChatGPT web or API services.
  - Problem: do not observe whether ChatGPT is used for investment or other purposes (marketing, copy editing).

- Advantage 2 of GenAI Reliance: covers all hedge funds with holdings information, allowing a systematic analysis.
  - Other option: a survey to ask what a hedge fund uses ChatGPT for.
  - Problem: costly and logistically challenging to implement on a large scale.
  - We conduct a survey as direct evidence and a validation test.

Pros and Cons of *GenAI Reliance*

Limitations of GenAI Reliance:

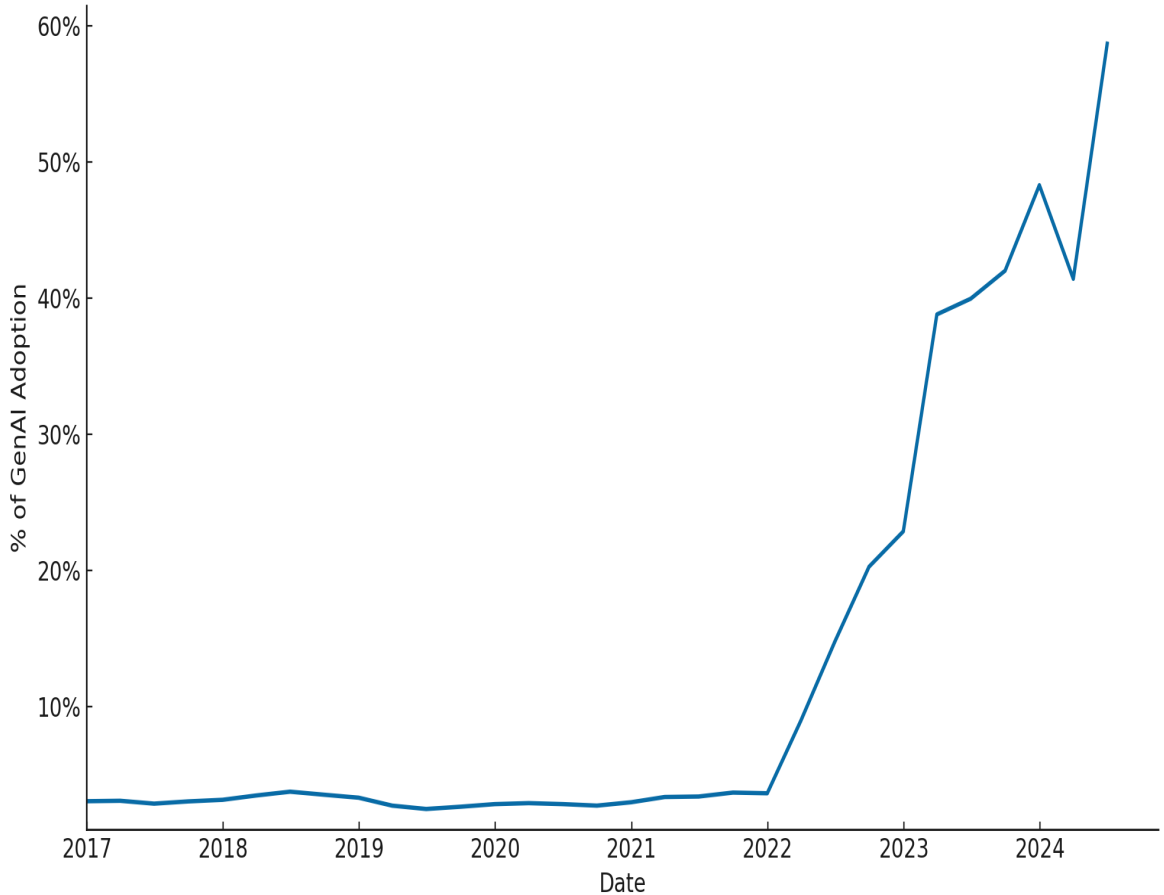
- False negative: managers use signals other than conference calls. This is NOT a concern because our estimate is a lower bound.

- False positive: a fund happens to obtain information that correlates with AI signals, but does not actually use ChatGPT, then their *GenAI Reliance* may be overestimated.

Validations

1. Time trend of GenAI Adoption
2. Survey Evidence

GenAI Adoption over Time



- % of GenAI Adoption from partial F-test.
- low from 2016 to 2021; surge in 2022; more pronounced in 2023 & 2024.
- The surge corresponds with the release of GPT 3.5 and ChatGPT in 2022.

Partial F-test

Characteristics of Early Adopters

	(1)	(2)	(3)
Model	Logit	Probit	Linear
Dep. Var.		*Early Adopter*	
AI Hedge Fund	1.702*	1.035**	0.236***
	(1.74)	(2.05)	(2.78)
Size	0.367***	0.220***	0.079***
	(4.76)	(4.78)	(5.37)
Age	-0.007	-0.004	-0.001
	(-0.49)	(-0.43)	(-0.36)
Average Turnover	1.632**	0.970*	0.354**
	(1.97)	(1.92)	(2.01)
Risk	-5.618**	-3.375**	-1.160**
	(-2.29)	(-2.25)	(-2.26)
Average Past Return	0.100**	0.055**	0.019**
	(2.11)	(2.21)	(2.27)
Observations	372	372	372
Pseudo R-squared	0.109	0.108	
R-squared			0.136

- Hedge funds with AI talent, larger AUM, and better performance.

GenAI Reliance and Fund Performance

GenAI Reliance and Hedge Fund Performance: DiD

Test 2: consider the new development in generative AI as an exogenous shock to hedge fund investment companies and conduct a difference-in-differences (DiD) test as follows:

$$\begin{aligned} \textit{Return}_{i,t} = \beta_1 \cdot \textit{GenAI Reliance}_{i,t-1} \times \textit{Post GPT}_t + \beta_2 \cdot \textit{GenAI Reliance}_{i,t-1} \\ + \gamma \cdot \textit{Control}_{i,t-1} + \alpha_t(\beta_3 \cdot \textit{Post GPT}_t) + \varepsilon_{i,t} \end{aligned}$$

where *Post GPT* is an indicator variable equal to one if the fund performance is measured in and after the third quarter of 2022 and zero otherwise.

- Sample period: the beginning of 2016 to the second quarter of 2024.
- A *positive* coefficient on the interaction term if generative AI has a positive effect on hedge fund performance.

Performance Result 2: DiD

Dep. Var.	(1)	(2)	(3)	(4)
	Return			
GenAI Reliance × *Post GPT*	2.873***	3.703***	1.171**	1.224**
	(3.86)	(4.75)	(2.03)	(2.25)
GenAI Reliance	0.824*	-0.854*	0.351	-0.278
	(1.95)	(-1.82)	(1.30)	(-1.01)
Size		-0.132***		-0.078***
		(-2.77)		(-3.24)
Age		-0.057***		0.014***
		(-6.64)		(3.03)
Turnover		1.150**		0.198
		(2.38)		(0.84)
Risk		27.772***		11.438***
		(13.11)		(5.48)
Past Return		-0.162***		0.092***
		(-14.96)		(5.74)
Post GPT	-0.053	-1.047***		
	(-0.30)	(-5.04)		
Observations	11,921	11,921	11,921	11,921
R-squared	0.002	0.045	0.787	0.790
Time FE	No	No	Yes	Yes

- Funds with higher GenAI Reliance outperform after ChatGPT was introduced.

Results with Abnormal Returns: DiD

Dep. Var.	(1)	(2)	(3)	(4)	(5)	(6)
	CAPM Alpha		*FF3 Alpha*		*FF4 Alpha*	
GenAI Reliance × *Post GPT*	1.411**	1.633***	2.629***	2.445***	2.725***	2.537***
	(2.39)	(2.83)	(4.81)	(4.46)	(4.69)	(4.46)
GenAI Reliance	-0.536*	-0.396	-0.673***	-0.538**	-0.608**	-0.511*
	(-1.77)	(-1.27)	(-2.62)	(-2.00)	(-2.32)	(-1.85)
Size	-0.118***	-0.115***	-0.112***	-0.108***	-0.112***	-0.113***
	(-3.28)	(-3.23)	(-3.50)	(-3.32)	(-3.60)	(-3.52)
Age	0.002	0.004	0.002	0.002	-0.001	0.002
	(0.32)	(0.54)	(0.35)	(0.35)	(-0.19)	(0.33)
Turnover	-0.444	-0.447	-0.633**	-0.558*	-0.658**	-0.547*
	(-1.35)	(-1.37)	(-2.19)	(-1.86)	(-2.28)	(-1.82)
Risk	0.359	-2.541	-5.556***	-8.684***	-5.878***	-8.069***
	(0.19)	(-0.79)	(-4.03)	(-3.43)	(-3.96)	(-2.95)
Past Return	-0.032***	0.048***	-0.018***	-0.016	-0.017***	-0.018
	(-5.25)	(3.02)	(-3.44)	(-1.19)	(-3.01)	(-1.31)
Post GPT	-1.168***		-0.592***		-0.556***	
	(-8.04)		(-4.20)		(-3.72)	
Observations	11,921	11,921	11,921	11,921	11,921	11,921
R-squared	0.009	0.096	0.011	0.066	0.011	0.063
Time FE	No	Yes	No	Yes	No	Yes

- Similar results with alpha.

How does AI Help Hedge Fund Performance?

How does AI Help Hedge Fund Performance?

We explore two potential explanations:

1. Whether hedge funds invest more in human capital in AI so that they can use the tools better.

2. Whether generative AI helps funds to analyze certain data better.

Combination with AI Talent

- Anecdotal evidence shows that hedge funds heavily invest in human capital in the area of AI so that they can have the talent to use the tools better.
- Following (Cao, Jiang, Yang and Zhang, 2023), we classify hedge funds that have employed AI-skilled workers as *AI Hedge Fund*
- **Hypothesis**: AI hedge funds have a greater likelihood of using generative AI to produce a better performance.

Combination with AI Talent: Results

Dep. Var.	(1)	(2)	(3)	(4)
	Return			
GenAI Reliance × *Post GPT* × *AI Hedge Fund*	3.536**	4.582**	3.862**	4.902**
	(2.05)	(2.47)	(2.10)	(2.41)
GenAI Reliance × *Post GPT*	1.098*	1.090*	1.156**	1.148**
	(1.85)	(1.83)	(2.06)	(2.04)
Observations	11,921	11,921	11,921	11,921
R-squared	0.787	0.787	0.790	0.791
Control variables	No	No	Yes	Yes
Time FE	Yes		Yes	
Time × AI Hedge Fund FE		Yes		Yes

- Results hold for all hedge funds, much stronger within AI hedge funds.

Strength of Analyzing Certain Data

- Another potential channel is that ChatGPT is good at analyzing certain data and providing predictions.
- To test this idea, we further explore the granular components of AI-generated information.
- The 14 GPT scores generated by ChatGPT with earnings conference calls can be naturally separated into three groups: 1) Macro, 2) Firm Policy, and 3) Firm Performance.

Strength of Analyzing Certain Data: Results

Dep. Var.	(1) *Return*	(2) *FF4 Alpha*	(3) *Return*	(4) *FF4 Alpha*	(5) *Return*	(6) *FF4 Alpha*
GenAI Reliance Macro × *Post GPT*	1.375	4.909***				
	(0.67)	(2.88)				
GenAI Reliance Macro	-0.536	-1.651**				
	(-0.58)	(-2.32)				
GenAI Reliance Firm Policy × *Post GPT*			3.704***	4.868***		
			(2.72)	(3.91)		
GenAI Reliance Firm Policy			-0.655	-0.916		
			(-0.96)	(-1.45)		
GenAI Reliance Firm Performance × *Post GPT*					1.306**	2.031***
					(1.96)	(3.45)
GenAI Reliance Firm Performance					-0.434	-0.445*
					(-1.50)	(-1.66)
Observations	11,921	11,921	11,921	11,921	11,921	11,921
R-squared	0.790	0.080	0.790	0.081	0.790	0.080
Time FE	Yes	Yes	Yes	Yes	Yes	Yes

- GenAI Reliance on firm policy and firm performance matters more.

Evidence from Our Survey

Our Survey

- To provide more direct evidence on the use of GenAI, we collaborate with a market research firm that conducts investor surveys for financial institutions.
- In our sample, 33 hedge funds participated in the survey. Given the opaque and selective nature of the hedge fund industry, this sample size is substantial.
  - They are major players: 77% manage over $1 bn; 51% manage over $10 bn.
- To ensure that insights drawn from our sample are broadly applicable, we also collected surveys from 12 additional funds, bringing the total number of participating funds to 45.

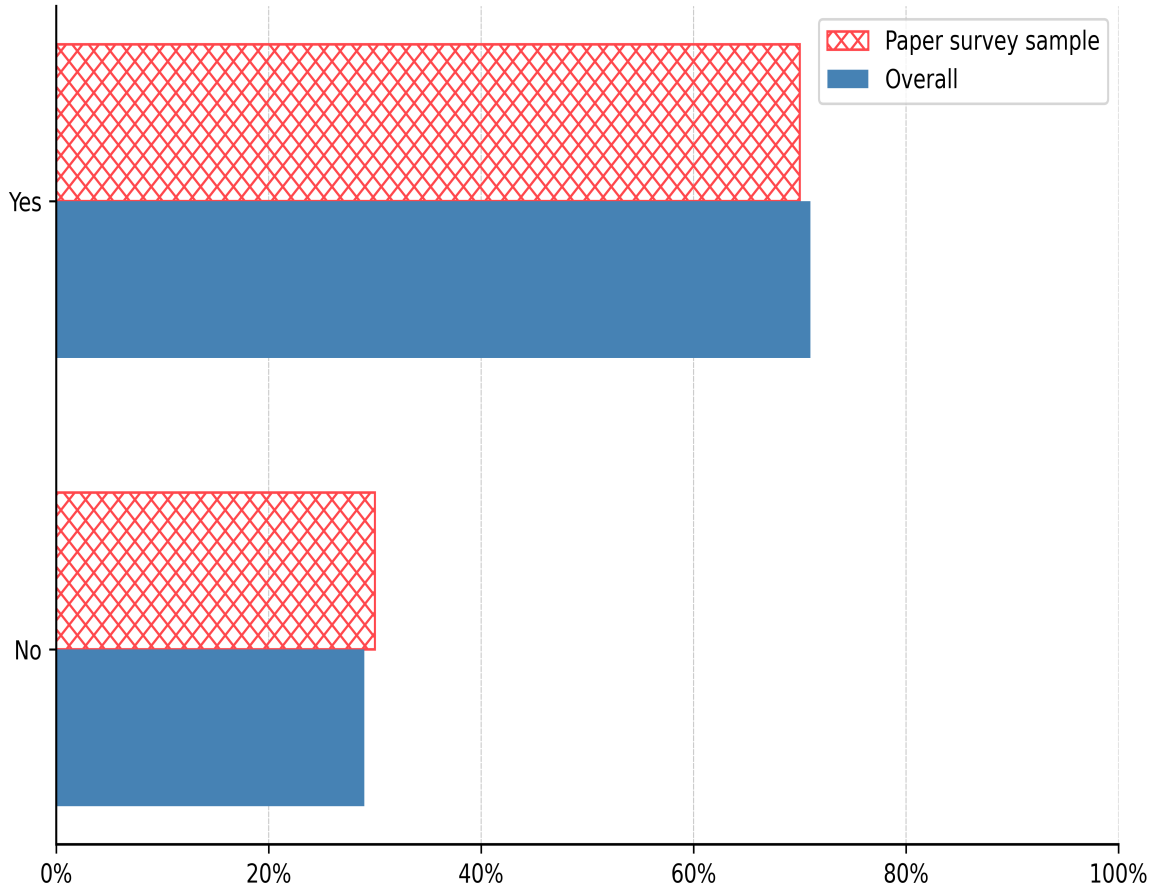
Our Survey

- We ask nine questions about the usage of GenAI in their funds, along with a few demographic questions about the fund and person who responds to the survey.

- Given the nature of this paper, the main questions are directly focused on the use of GenAI for **investment purposes**.
  - *"Q01. Does your hedge fund use generative AI tools, including in-house tools, for investment purposes (e.g., processing data, improving trading strategies)?"*

- In addition, the survey questions cover various aspects of GenAI usage, ranging from the year of adoption to the challenges funds face in implementation.

Generative AI Adoption from Hedge Fund Survey

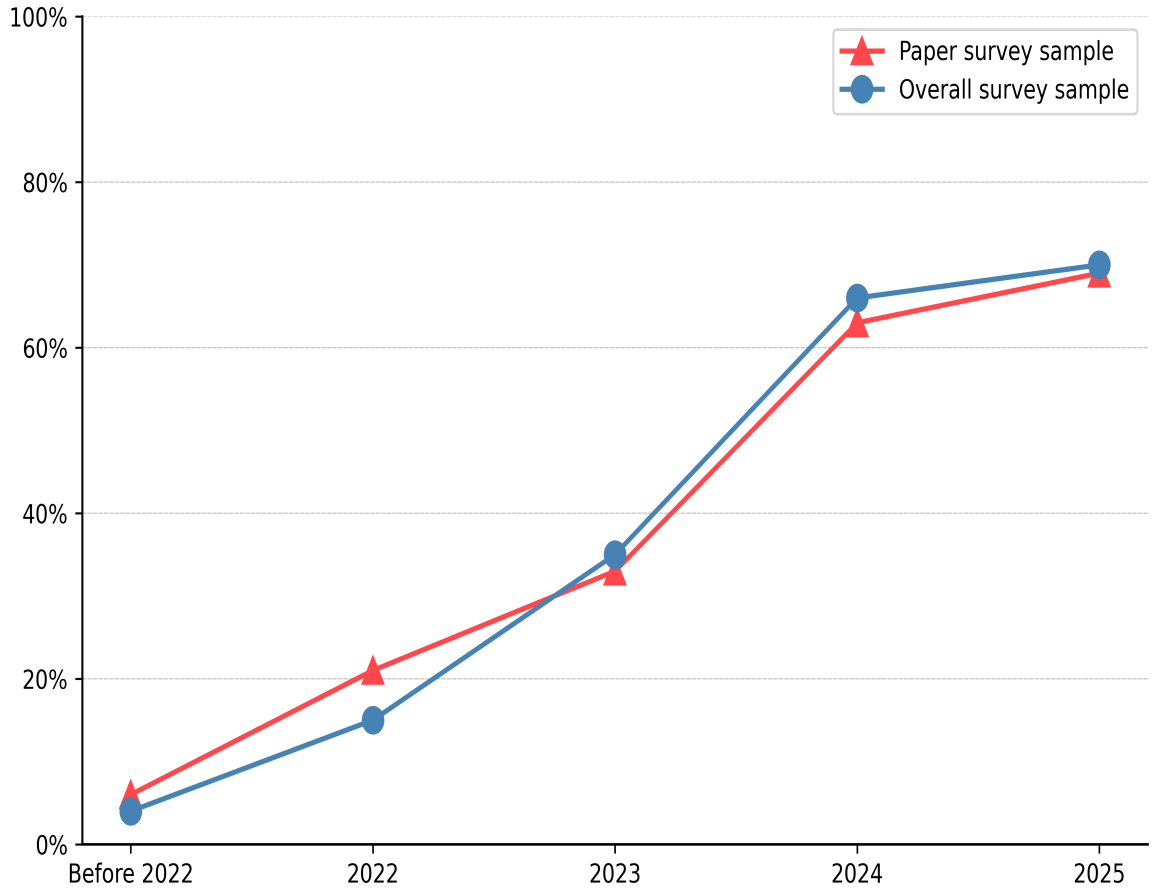


- 70% said "Yes."
- Similar patterns for our paper sample and the overall survey sample.

Validation for *GenAI Reliance*

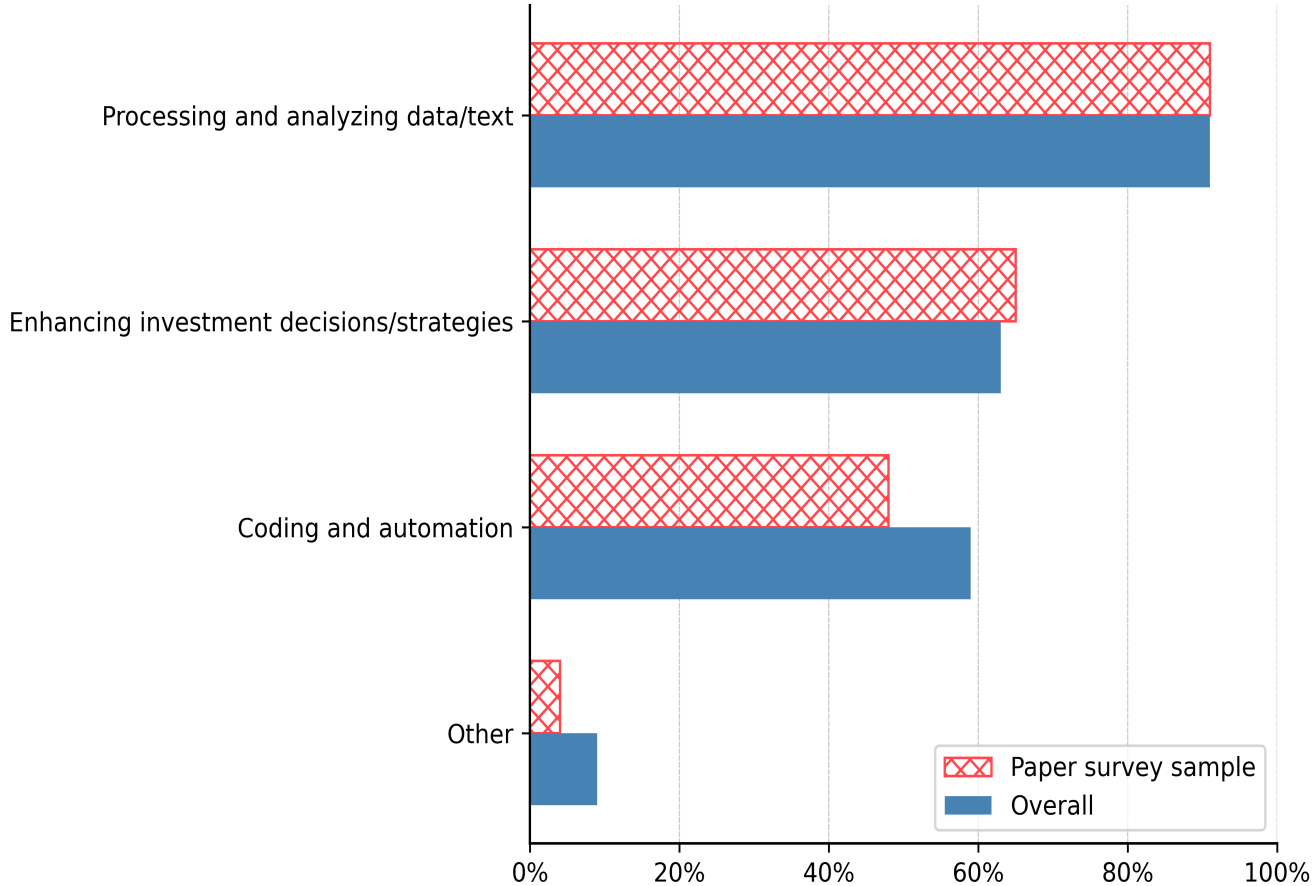
- The survey data allow us to directly learn from hedge fund managers about their GenAI usage.
- One downside is its small sample size.
  - Our GenAI Reliance measure can be applied to the entire universe of 13F hedge funds, however, it is relatively indirect.
- Thus, it is important to examine whether we can use the survey data to validate our main findings from GenAI Reliance.

Validation 1: Cumulative Adoption Rate over the Years



- A striking, consistent pattern with *GenAI Reliance*.
- 6% before 2022, 21% (2022), 33% (2023), and 63% (2024).
- Adoption percentage based on *GenAI Reliance* measure are 2%(before 2022), 21% (2022), 40% (2023), 60%(2024).

Validation 2: How Do Hedge Funds use Generative AI?



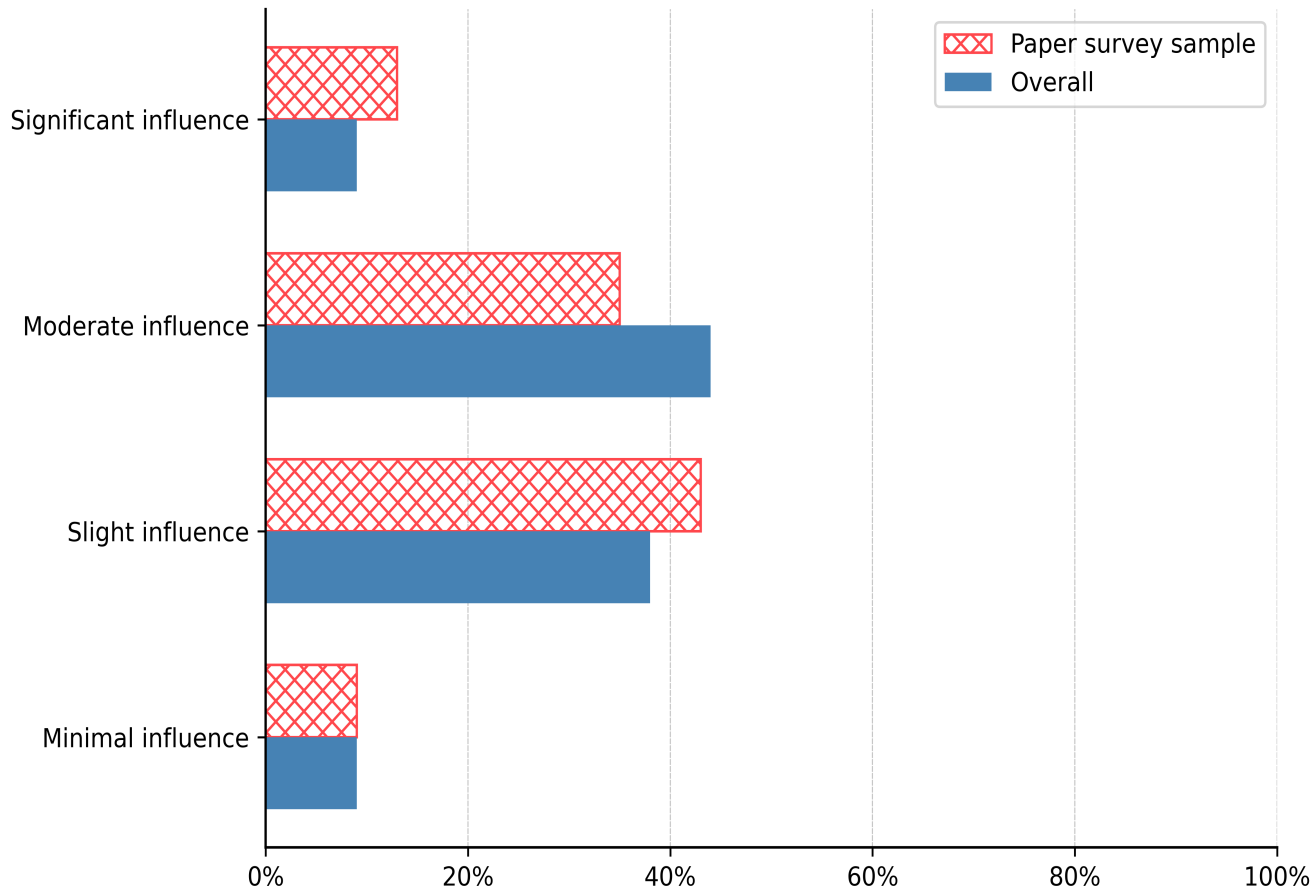
- 91% of the adopted funds said that they use GenAI tools to "*Processing and analyzing data/text (e.g., news, earnings conference call).*"
- The widespread use of GenAI for data analysis validates our approach of using financial text to measure hedge fund reliance.

Validation 3: GenAI Reliance and Gen AI Adoption from Survey

	(1)	(2)
Dep. Var.	*GenAI Reliance*	
GenAI Adoption	0.045**	0.034**
	(2.43)	(2.09)
Size	-0.033***	-0.033***
	(-12.15)	(-13.12)
Age	-0.005***	-0.005***
	(-6.81)	(-6.90)
Turnover	-0.312***	-0.304***
	(-9.58)	(-9.74)
Risk	0.945***	0.939***
	(4.32)	(4.55)
Past Return	-0.002	-0.001
	(-1.17)	(-0.75)
Observations	829	906
R-squared	0.369	0.369
Time FE	Yes	Yes
Sample period	2016–2023	2016–2024

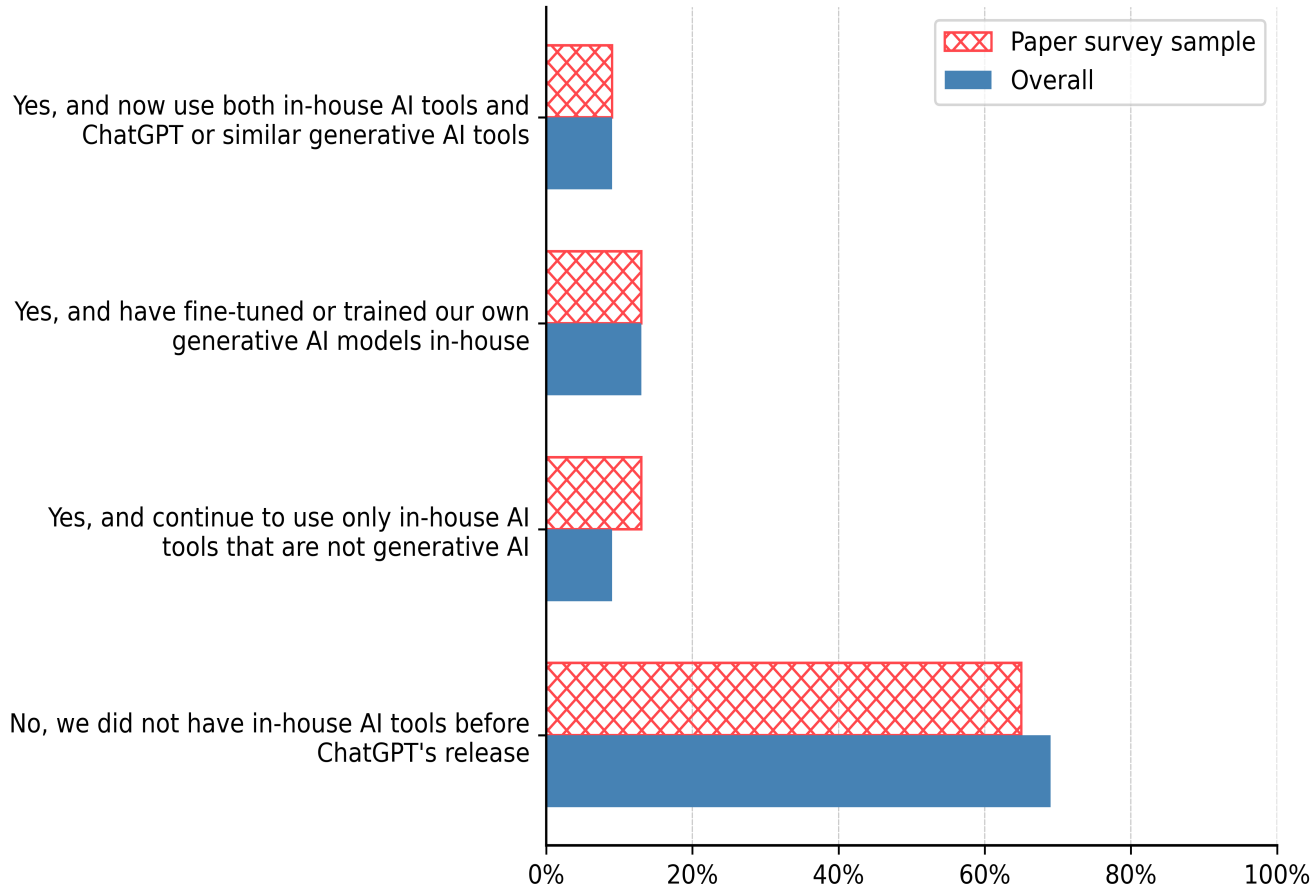
- GenAI Reliance is significantly and positively related to GenAI adoption from the survey.

New Insight 1: Does GenAI Influence Investment Decision?



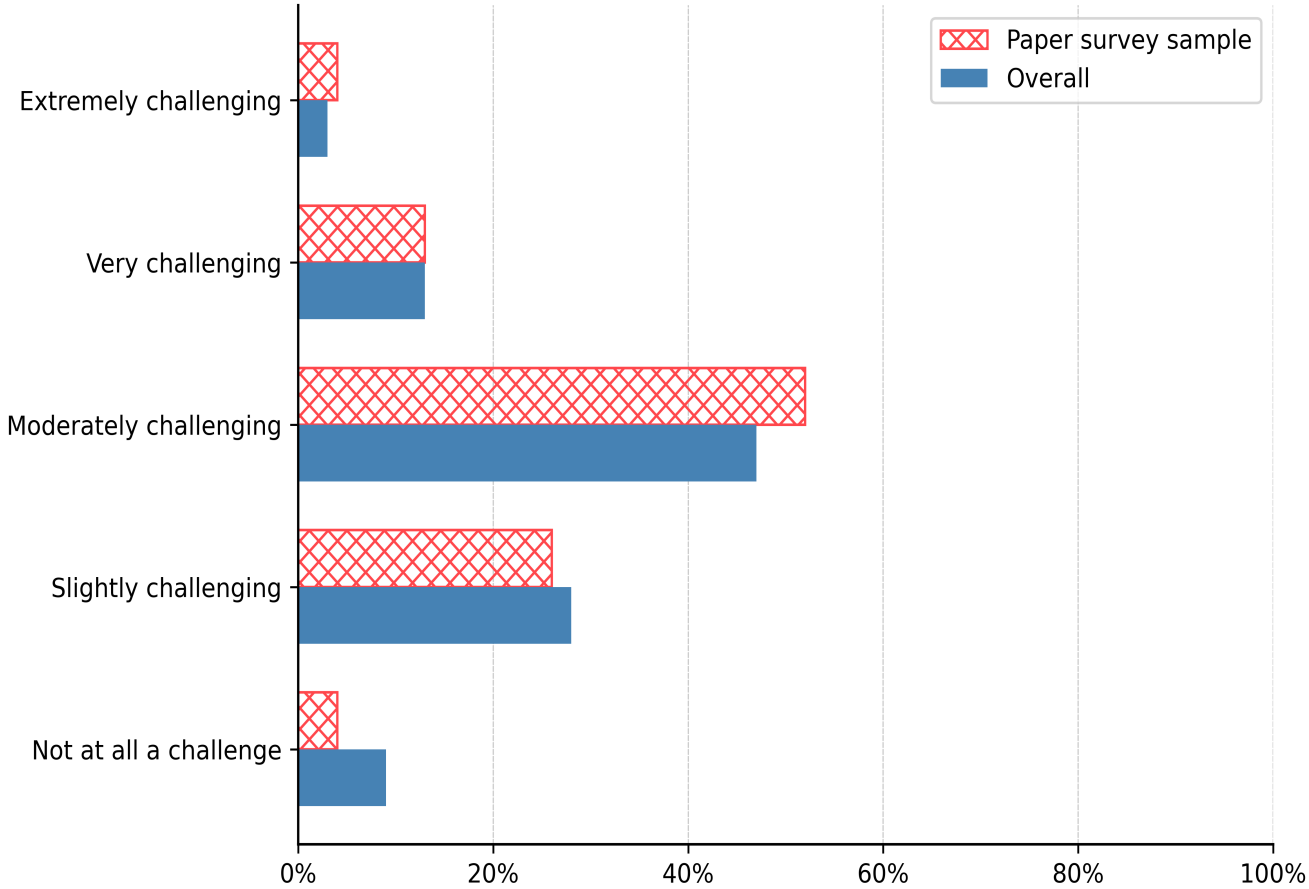
- close to 90% of them deem GenAI to have some influence.
- over 50% think the influence is either moderate to significant.

New Insight 2: In-house AI Tools before ChatGPT?



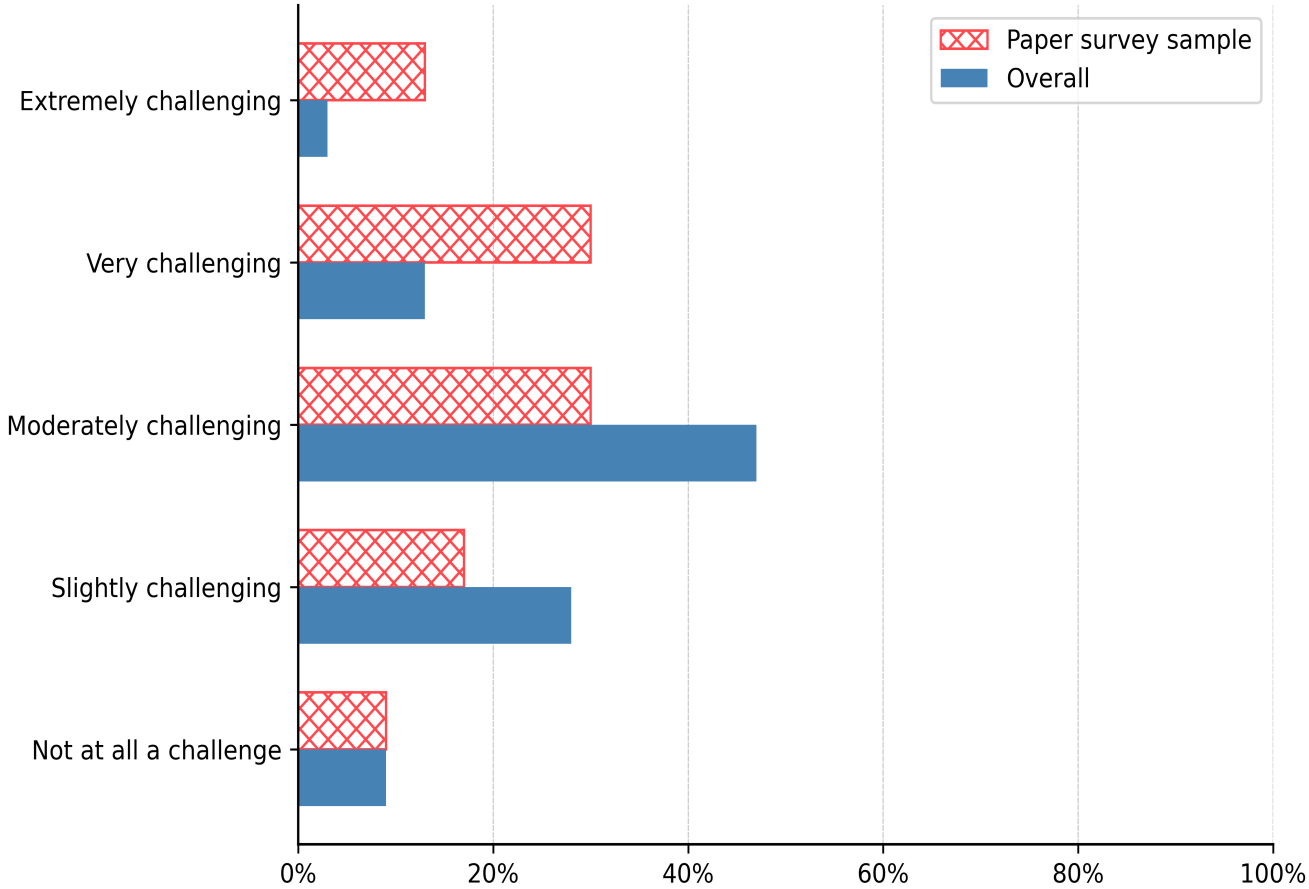
- Only about 35% have used in-house AI tools before ChaptGPT.
- After ChatGPT's release, about 10% use both in-house AI tools and ChatGPT or similar GenAI tools.
- 15% have fine-tuned or trained their own generative AI models in-house.

New Insight 3A: Challenge of Integrating GenAI with Workflow



- over 70% of the hedge funds report the task to be at least moderately challenging.

New Insight 3B: Challenge of Lacking in-house Experts



- 70% of hedge funds in our sample state that it is at least moderately challenging.

Additional Analyses

GenAI Reliance and Hedge Fund Performance: Outages

- To provide further support, we use ChatGPT outages as exogenous shocks.
- **Hypothesis**: the effect of GenAI Reliance on fund performance will be *smaller* during outages if this effect is indeed from ChatGPT.
- **Test**:

$$\begin{aligned} \textit{Return}_{i,t} = \beta_1 \cdot \textit{GenAI Reliance}_{i,t-1} \times \textit{Post GPT}_t \times \textit{Outage}_t \\ + \beta_2 \cdot \textit{GenAI Reliance}_{i,t-1} \times \textit{Post GPT}_t \\ + \beta_3 \cdot \textit{GenAI Reliance}_{i,t-1} + \gamma \cdot \textit{Control}_{i,t-1} + \alpha_t + \varepsilon_{i,t}, \end{aligned}$$

- where *Outage* is the logarithm of the number of outages in a quarter.

Outage Result

Dep. Var.	(1) *Return*	(2) *CAPM Alpha*	(3) *FF3 Alpha*	(4) *FF4 Alpha*
GenAI Reliance × *Post GPT* × *Outage*	-0.976*	-1.340***	-0.386	-0.062
	(-1.95)	(-2.74)	(-0.78)	(-0.12)
GenAI Reliance × *Post GPT*	2.746***	3.915***	3.056***	2.565***
	(2.89)	(4.09)	(3.41)	(2.77)
Observations	11,921	11,921	11,921	11,921
R-squared	0.790	0.104	0.083	0.082
Control variables	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes

- Coefficient on the three-way interaction term is negative.
- The effect is indeed smaller during major outages.

Non-Hedge Funds vs. Hedge Funds: AI Disparity

	(1)	(2)	(3)	(4)
Sampe Period	Post-GPT period		DiD	
Dep. Var.	*Return*	*FF4 Alpha*	*Return*	*FF4 Alpha*
GenAI Reliance × *Post GPT*			-0.508**	0.177
			(-2.12)	(0.78)
GenAI Reliance	-0.661**	0.510**	-0.141	0.377***
	(-2.57)	(2.42)	(-1.35)	(3.44)
Size	0.024	0.015	-0.024**	-0.042***
	(0.82)	(0.70)	(-2.37)	(-3.39)
Age	0.009	0.008	0.010***	-0.006**
	(1.23)	(1.26)	(6.69)	(-2.57)
Turnover	1.161*	1.069*	-0.705***	-1.841***
	(1.83)	(1.73)	(-3.29)	(-5.83)
Risk	29.865***	6.454**	18.011***	-13.747***
	(8.25)	(2.26)	(12.79)	(-9.31)
Past Return	-0.121***	-0.095***	0.076***	-0.033***
	(-5.00)	(-5.80)	(8.17)	(-5.89)
Observations	6,384	6,384	39,970	39,970
R-squared	0.826	0.085	0.884	0.140
Time FE	Yes	Yes	Yes	Yes

- The effect is only significant among hedge funds.

Cross Section of Hedge Funds: AI Disparity

Subsamples	(1) Size Q1	(2) Size Q5	(3) Age Q1	(4) Age Q5	(5) TO Q1	(6) TO Q5	(7) Risk Q1	(8) Risk Q5	(9) PRet Q1	(10) PRet Q5
Dep. Var.	*Return*									
GenAI Reliance × *PostGPT*	0.872	3.602***	0.576	5.674***	0.792	3.016***	0.942	-0.151	1.024	-0.623
	(0.62)	(2.71)	(0.59)	(2.92)	(0.63)	(2.72)	(0.78)	(-0.10)	(0.92)	(-0.44)
Diff in Coeff. (Q5 – Q1)	2.730*		5.098***		2.224*		-1.093		-1.647	
p-value	0.079		<0.001		0.092		0.286		0.180	
Observations	2,377	2,383	2,872	2,093	2,388	2,381	2,387	2,380	2,383	2,383
R-squared	0.760	0.862	0.760	0.850	0.815	0.831	0.879	0.720	0.784	0.689
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

- The effect is stronger for larger, older and more positive hedge funds.

Robustness

Our findings are robust to using

- An Alternative DiD Test: using Nov 2022 as the post period.

ChatGPT Release in Nov. 2022

- An Alternative Measure of *GenAI Reliance*

$$\textit{GenAI Reliance Alt}_{i,t} = \frac{R^2_{AI,i,t} - R^2_{fundamental,i,t}}{R^2_{fundamental,i,t}}.$$

Alternative GenAI Reliance Measure

- An Alternative Measure of *GenAI Reliance* controlling information from traditional textual analysis.

GenAI Reliance Controlling LM

Conclusion

- The **first systematic analysis** of AI adoption in asset management industry.
- We document a sharp increase in the generative AI usage by hedge fund companies after GPT3.5 and ChatGPT are introduced in 2022.
- Strong evidence on the positive effect of generative AI on performance using DiD tests
- The outperformance originates from funds' AI talents, and ChatGPT's strength in analyzing firm-specific information.
- **AI Disparities**:
  - Non-hedge funds (e.g., mutual funds) cannot benefit from generative AI.
  - Among hedge funds: large, older and more active ones benefit more.

Appendix

GenAI in Hedge Funds Survey Questions: Demographics

S2. Which type of hedge fund do you work for?
☐ Quantitative
☐ Fundamental

S3. Which of the following best describes your role?
☐ CEO
☐ Chief Investment Officer
☐ Chief Technology Officer
☐ Chief Operating Officer
☐ Chief Financial Officer
☐ Investment Director
☐ Portfolio Manager
☐ Investment Analyst
☐ Investment Operations Manager/Analyst
☐ Other, please specify

S4. Please select your firm's current total assets under management (USD).
☐ Less than $100 million
☐ $100 million to less than $500 million
☐ $500 million to less than $1 billion
☐ $1 billion to less than $5 billion
☐ $5 billion to less than $10 billion
☐ $10 billion or more

GenAI in Hedge Funds Survey Questions: Main (1)

Q1. Does your hedge fund use generative AI tools, including in-house tools, for investment purposes (e.g., processing data, improving trading strategies)?
☐ Yes
☐ No

Q2. Why don't you use generative AI tools? (Select all that apply)
☐ Accuracy and reliability of AI-generated outputs
☐ Compliance and regulatory concerns
☐ Data security and confidentiality risks
☐ Integration with existing hedge fund workflows
☐ Lack of in-house AI expertise
☐ Cost of AI tools
☐ Other (please specify):_____

Q3. Which generative AI tools do you use for investment purposes? (Select all that apply)
☐ ChatGPT
☐ Claude
☐ Google Gemini
☐ Llama (Meta)
☐ In-house tools
☐ Other (please specify): _____

GenAI in Hedge Funds Survey Questions: Main (2)

Q4. How do you use generative AI tools for your investment purposes? (Select all that apply)
☐ Processing and analyzing data/text (e.g., news, earnings conference call)
☐ Enhancing investment decisions/strategies (e.g., due diligence, screening, investment idea generation, alpha generation, portfolio optimization)
☐ Coding and automation
☐ Other (please specify): _____

Q5. When did your hedge fund start using generative AI tools for investment purposes?
☐ Before 2022 (e.g., BERT, GPT early versions)
☐ 2022 but before ChatGPT release (e.g., GPT API)
☐ 2022 but after ChatGPT release
☐ 2023
☐ 2024
☐ 2025

Q6. On a scale of 1–5, to what extent do you think generative AI tools influence your fund's investment decisions?
☐ 1 (Minimal influence)
☐ 2 (Slight influence)
☐ 3 (Moderate influence)
☐ 4 (Significant influence)
☐ 5 (Primary driver of decisions)

GenAI in Hedge Funds Survey Questions: Main (3)

Q7. Did your firm have in-house AI tools (including all machine and AI models, not limited to generative AI) before ChatGPT was released in November 2022?

☐ Yes, but later replaced them entirely with ChatGPT or similar generative AI tools.
☐ Yes, and now use both in-house AI tools and ChatGPT or similar generative AI tools
☐ Yes, and have fine-tuned or trained our own generative AI models in-house
☐ Yes, and continue to use only in-house AI tools that are not generative AI
☐ No, we did not have in-house AI tools before ChatGPT's release

Q8. On a scale of 1–5, how challenging are the following issues when using generative AI tools?*(1. Not at all a challenge, 2. Slightly challenging, 3. Moderately challenging, 4. Very challenging, 5. Extremely challenging)*

☐ Accuracy and reliability of AI-generated outputs
☐ Compliance and regulatory concerns
☐ Data security and confidentiality risks
☐ Integration with existing hedge fund workflows
☐ Lack of in-house AI expertise
☐ Cost of AI tools
☐ Other (please specify): _____

Q9. Have outages of ChatGPT or other generative AI tools affected your investment workflow and processes?

☐ Yes, significantly
☐ Yes, but only moderately
☐ No noticeable impact
☐ No, we have backup solutions or alternative tools

Alternative DiD Test: Release of ChatGPT

Dep. Var.	(1) *Return*	(2) *CAPM Alpha*	(3) *FF3 Alpha*	(4) *FF4 Alpha*
GenAI Reliance × *Post ChatGPT*	0.871	1.284**	2.410***	2.399***
	(1.43)	(2.11)	(4.23)	(4.12)
GenAI Reliance	-0.172	-0.218	-0.399	-0.354
	(-0.64)	(-0.80)	(-1.63)	(-1.41)
Size	-0.079***	-0.103***	-0.103***	-0.106***
	(-3.25)	(-3.13)	(-3.55)	(-3.68)
Age	0.014***	0.003	0.002	0.002
	(3.07)	(0.43)	(0.31)	(0.30)
Turnover	0.199	-0.419	-0.471*	-0.457*
	(0.84)	(-1.42)	(-1.73)	(-1.68)
Risk	11.426***	-5.686**	-11.483***	-11.053***
	(5.49)	(-2.30)	(-5.96)	(-5.32)
Past Return	0.092***	0.028**	-0.017*	-0.019*
	(5.73)	(2.29)	(-1.70)	(-1.79)
Observations	11,921	11,921	11,921	11,921
R-squared	0.790	0.102	0.082	0.081
Time FE	Yes	Yes	Yes	Yes

Back

Alternative RAI Measure: Result 1 Panel Regression

Panel A: During Post-GPT period

Dep. Var.	(1) *Return*	(2) *CAPM Alpha*	(3) *FF3 Alpha*	(4) *FF4 Alpha*
Alt RAI	0.073***	0.092***	0.094***	0.091***
	(2.73)	(3.74)	(3.93)	(3.92)
Size	-0.022	0.096	-0.055	-0.062
	(-0.25)	(1.02)	(-0.70)	(-0.80)
Age	-0.018	-0.040**	-0.025	-0.021
	(-1.04)	(-2.39)	(-1.56)	(-1.31)
Turnover	0.628	0.110	0.469	0.316
	(0.60)	(0.10)	(0.45)	(0.31)
Risk	5.458	4.821	1.008	1.668
	(1.09)	(1.16)	(0.25)	(0.39)
Past Return	-0.192***	-0.228***	-0.032	-0.037
	(-4.94)	(-6.35)	(-0.87)	(-0.98)
Observations	1,001	1,001	1,001	1,001
R-squared	0.452	0.115	0.038	0.041
Time FE	Yes	Yes	Yes	Yes

Alternative GenAI Reliance Measure: Result DiD Test

Dep. Var.	(1) *Return*	(2) *CAPM Alpha*	(3) *FF3 Alpha*	(4) *FF4 Alpha*
GenAI Reliance Alt × *Post GPT*	0.038**	0.037**	0.051***	0.053***
	(2.37)	(2.33)	(3.60)	(3.63)
GenAI Reliance Alt	-0.012	-0.008	-0.015*	-0.014*
	(-1.21)	(-0.86)	(-1.88)	(-1.75)
Size	-0.078***	-0.103***	-0.104***	-0.108***
	(-3.35)	(-3.27)	(-3.73)	(-3.93)
Age	0.014***	0.003	0.003	0.003
	(3.15)	(0.53)	(0.52)	(0.49)
Turnover	0.210	-0.407	-0.454*	-0.448*
	(0.93)	(-1.41)	(-1.69)	(-1.68)
Risk	11.352***	-5.769**	-11.600***	-11.103***
	(5.73)	(-2.47)	(-6.48)	(-5.73)
Past Return	0.092***	0.029**	-0.016*	-0.018*
	(5.73)	(2.31)	(-1.65)	(-1.74)
Observations	11,921	11,921	11,921	11,921
R-squared	0.790	0.102	0.081	0.080
Time FE	Yes	Yes	Yes	Yes

Back

GenAI Reliance Measure: Controlling Loughran-McDonald Sentiment

Dep. Var.	(1) *Return*	(2) *CAPM Alpha*	(3) *FF3 Alpha*	(4) *FF4 Alpha*
GenAI Reliance$_{LM}$ × *Post GPT*	1.252**	1.720***	2.257***	2.252***
	(2.15)	(2.81)	(4.04)	(3.91)
GenAI Reliance	-0.558**	-0.388	-0.507**	-0.425
	(-1.99)	(-1.30)	(-1.99)	(-1.64)
Size	-0.080***	-0.099***	-0.096***	-0.102***
	(-3.24)	(-2.98)	(-3.40)	(-3.63)
Age	0.013***	0.002	0.002	0.002
	(2.85)	(0.26)	(0.29)	(0.27)
Turnover	0.146	-0.371	-0.418	-0.387
	(0.62)	(-1.31)	(-1.63)	(-1.51)
Risk	10.959***	-6.992***	-12.398***	-12.058***
	(5.09)	(-2.68)	(-6.08)	(-5.52)
Past Return	0.089***	0.028**	-0.016	-0.018*
	(5.57)	(2.23)	(-1.53)	(-1.66)
Observations	11,399	11,399	11,399	11,399
R-squared	0.798	0.102	0.084	0.082
Time FE	Yes	Yes	Yes	Yes

Back

Partial F Test

A partial F-test, which formally tests whether the model's explanatory power is significantly improved by adding an additional variable. Specifically, it is calculated as

$$F_{i,t} = \frac{(RSS_{fundamental,i,t} - RSS_{AI,i,t})/p}{RSS_{AI,i,t}/(n-k)}$$

- where $RSS_{fundamental,i,t}$ is the residual sum of squares of the model with firm fundamentals only, while $RSS_{AI,i,t}$ is the residual sum of squares of the full model after adding the fundamental information generated by ChatGPT.
- p is the number of predictors added to the full model and equals 14 in our case since we have 14 ChatGPT scores. n is the number of observations used to estimate equation in a given fund quarter.
- k is the number of coefficients (including the intercept) in the full model and equals 20 since we have five variables about firm fundamentals, 14 ChatGPT scores, and an intercept.

Back

List of Questions to Generate AI Information

This table reports the list of questions used to query ChatGPT and generate forward-looking information/signal based on firms' earnings conference call transcripts.

	Over the next quarter, how does the firm anticipate a change in:
No.	Topic
1	optimism about the US economy?
2	optimism about the global economy?
3	optimism about the financial prospects of their firm?
4	optimism about the financial prospects of its industry?
5	its earnings?
6	its revenue?
7	its wages and salaries expenses?
8	demand for its products or services?
9	production quantity of its products?
10	prices for its products or services?
11	prices for its inputs or commodities?
12	its cost of capital or hurdle rate?
13	its capital expenditure?
14	its employment?

Back

References I

Abis, S. and Veldkamp, L. (2024). The changing economics of knowledge production, *Review of Financial Studies* 37(1): 89–118.

Agarwal, V., Jiang, W., Tang, Y. and Yang, B. (2013). Uncovering hedge fund skill from the portfolio holdings they hide, *Journal of Finance* 68(2): 739–783.

Agarwal, V., Ruenzi, S. and Weigert, F. (2023). Unobserved performance of hedge funds, *Journal of Finance* , forthcoming.

Aragon, G. O., Hertzel, M. and Shi, Z. (2013). Why do hedge funds avoid disclosure? evidence from confidential 13f filings, *Journal of Financial and Quantitative Analysis* 48(5): 1499–1518.

Babina, T., Fedyk, A., He, A. and Hodson, J. (2024). Artificial intelligence, firm growth, and product innovation, *Journal of Financial Economics* 151.

Bai, J. J., Boyson, N. M., Cao, Y., Liu, M. and Wan, C. (2023). Executives vs. chatbots: Unmasking insights through human-ai differences in earnings conference q&a, *Working paper, Available at SSRN 4480056* .

Bonelli, M. (2023). Data-driven investors, *Working paper, HEC Paris* .

Bonelli, M. and Foucault, T. (2023). Displaced by big data: Evidence from active fund managers, *Working paper, Available at SSRN 4527672* .

Brynjolfsson, E., Li, D. and Raymond, L. R. (2023). Generative AI at work, *Working paper, National Bureau of Economic Research* .

Cao, C., Chen, Y., Liang, B. and Lo, A. (2013). Can hedge funds time market liquid-ity?, *Journal of Financial Economics* 109: 493–516.

References II

Cao, S., Jiang, W., Wang, J. L. and Yang, B. (2024). From man vs. machine to man+ machine: The art and AI of stock analyses, *Journal of Financial Economics, Forthcoming* .

Cao, S., Jiang, W., Yang, B. and Zhang, A. L. (2023). How to talk when a machine is listening: Corporate disclosure in the age of AI, *Review of Financial Studies* 36(9): 3603–3642.

Chen, H., Cohen, L., Gurun, U., Lou, D. and Malloy, C. (2020). IQ from IP: Simplifying search in portfolio choice, *Journal of Financial Economics* 138(1): 118–137.

Chen, Y., Han, B. and Pan, J. (2021). Sentiment trading and hedge fund returns, *Journal of Finance* 76(4): 2001–2033.

Chen, Y. and Liang, B. (2007). Do market timing hedge funds time the market?, *Journal of Financial and Quantitative Analysis* 42: 827–856.

Eisfeldt, A. L., Schubert, G. and Zhang, M. B. (2023). Generative AI and firm values, *Working paper, National Bureau of Economic Research* .

Fuster, A., Goldsmith-Pinkham, P., Ramadorai, T. and Walther, A. (2022). Predictably unequal? the effects of machine learning on credit markets, *Journal of Finance* 77(1): 5–47.

Griffin, J. M. and Xu, J. (2009). How smart are the smart guys? a unique view from hedge fund stock holdings, *Review of Financial Studies* 22(7): 2531–2570.

Grossman, S. and Stiglitz, J. (1980). On the impossibility of informationally efficient markets, *American Economic Review* 70(3): 393–408.

References III

Hansen, A. L. and Kazinnik, S. (2023). Can ChatGPT decipher Fedspeak?, *Working paper, Available at SSRN 4399406* .

Jha, M., Qian, J., Weber, M. and Yang, B. (2023). ChatGPT and corporate policies, *Working paper, National Bureau of Economic Research* .

Jha, M., Qian, J., Weber, M. and Yang, B. (2024). Harnessing generative AI and for economic insights, *Working paper* .

Kacperczyk, M. and Seru, A. (2007). Fund manager use of public information: New evidence on managerial skills, *Journal of Finance* 62(2): 485–528.

Kacperczyk, M., Sialm, C. and Zheng, L. (2005). On the industry concentration of actively managed equity mutual funds, *Journal of Finance* 60(4): 1983–2011.

Kacperczyk, M., Sialm, C. and Zheng, L. (2008). Unobserved actions of mutual funds, *Review of Financial Studies* 21(6): 2379–2416.

Kim, A. G., Muhn, M. and Nikolaev, V. V. (2023). Bloated disclosures: Can ChatGPT help investors process information?, *Chicago Booth Research Paper* .

Li, K., Mai, F., Shen, R., Yang, C. and Zhang, T. (2023). Dissecting corporate culture using generative AI – Insights from analyst reports, *Working paper, Available at SSRN 4558295* .

Lopez-Lira, A. and Tang, Y. (2023). Can ChatGPT forecast stock price movements? return predictability and large language models, *Working paper, University of Florida* .

Lyonnet, V. and Stern, L. H. (2022). Venture capital (mis) allocation in the age of AI, *Working paper, Ohio State University* .

References IV

Martin, I. and Nagel, S. (2022). Market efficiency in the age of big data, *Journal of Financial Economics* 145(1): 154–177.

Sialm, C., Sun, Z. and Zheng, L. (2020). Home bias and local contagion: Evidence from funds of hedge funds, *Review of Financial Studies* 33: 4771–4810.

Sun, Z., Wang, A. and Zheng, L. (2012). The road less traveled: Strategy distinctiveness and hedge fund performance, *Review of Financial Studies* 25(1): 96–143.

Titman, S. and Tiu, C. (2011). Do the best hedge funds hedge?, *Review of Financial Studies* 24(1): 123–168.

Vaswani, A., Shazeer, N., Parmar, N., Uszkoreit, J., Jones, L., Gomez, A. N., Kaiser, Ł. and Polosukhin, I. (2017). Attention is all you need, *Advances in neural information processing systems* 30.

Wermers, R. (2000). Mutual fund performance: An empirical decomposition into stock-picking talent, style, transactions costs, and expenses, *Journal of Finance* 55(4): 1655–1695.