Do Teams Alleviate or Exacerbate Behavioral Biases? Evidence from Extrapolation Bias in Mutual Funds

Ricardo Barahona[1], Stefano Cassella[2], and Kristy A.E. Jansen[23]

[1]Banco de España [2]Tilburg University [3]De Nederlandsche Bank

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Do teams attenuate or exacerbate individual behavioral biases?

- Teams play a central role in many areas of decision-making.
- Most studies on decision-making in teams are in experimental or theoretical settings.
- In these studies, whether teams outperform individuals is a function of the nature of the task at hand.

Do teams attenuate or exacerbate individual behavioral biases?

- Teams are showed to improve decision making insofar as team members spot each others' mistakes (e.g., Charness and Sutter 2012).
- In key areas of decision making, e.g., choice under uncertainty, individuals share common heuristics (e.g., Kahneman and Tversky 1974).
- Common use of heuristics and groupthink can amplify decision biases exhibited at the individual level (e.g., Kahneman 2003, Janis 1972, Bénabou 2013).
- Whether teams attenuate or exacerbate the cognitive biases which are pervasive at the individual level is an open question.

Our setting

- We study whether teams attenuate behavioral biases using field data.
- We focus on the mutual fund industry.
  - Classical example judgment under uncertainty (Kahneman and Tversky 1974).
  - We can compare behavioral biases in team-managed funds with the biases members display in their solo-managed funds.
- We concentrate on the extrapolation bias

  De Bondt (1993), Barberis and Shleifer (2003), Greenwood and Shleifer (2014), Barberis et al. (2015), Barberis et al. (2018), Cassella and Gulen (2018), Jin and Sui (2019), Da et al. (2020).

What we do

- We show that return extrapolation leads to suboptimal managerial investment outcomes.
- We compare extrapolative behavior of teams with the extrapolative behavior of the individual members of the team.
- We ask what mechanism generates the documented impact of teams on the extrapolation bias.

Data and Sample

- The sample is made of active US equity funds in the United States.
- We merge data from five distinct sources:
  - CRSP Mutual Funds data (fund holdings and fund characteristics).
  - Morningstart Direct (fund manager information and fund style).
  - Compustat Annual file (firms' accounting information).
  - Thomson Reuters (fund holdings).
  - CRSP monthly stock file (stock price, stock return).
- We merge these datasets following Pastor, Stambaugh, and Taylor(2015) and Berk and Binsbergen (2015).
- We obtain a dataset of 2,630 mutual funds.

How we measure extrapolation

For managers and teams we estimate the following regression:

$$\Delta w_{s,j,t+1} = \alpha_j + \beta_j^X r_{s,t-4\to t} + \gamma_j C_{s,t} + \lambda_t + e_{s,j,t+1}$$

where $\Delta w_{s,j,t+1}$ is the active portfolio weight change of stock s between the end of quarter t and the end of quarter $t+1$, $r_{s,t-4\to t}$ the stock's past yearly return, $C_{s,t}$ stock characteristics, and λ_t time fixed effects. weights

- We refer to β_j^X as the extrapolation beta of team/manager j.
- We define $\beta_j^X > 0$ as extrapolators and $\beta_j^X \leq 0$ as contrarians.

Why we are not simply capturing momentum

- We show that our extrapolation metric leads to worse as opposed to better performance.
- We measure extrapolation over the entire cross-section, not just momentum winners and losers.
- We redo the analyses while excluding momentum stocks and momentum crashes (Jegadeesh and Titman 1993, Daniel and Moskowitz 2016).

How is extrapolation related to managerial outcomes?

- The compensation structure for the majority of US mutual funds is variable and tied to (Ma et al. 2019):
  - Investment performance
  - Whether the fund places in the top performance distribution
  - Total Net Assets (TNA)

- Therefore, return extrapolation is a bias if it leads to lower:
  - Investment performance
  - Probability that a fund achieves a top performance status
  - Fund flows which lead to lower TNA

Extrapolative managers are worse off

- Regressions of future fund performance on fund managers' extrapolative behavior (D_E).

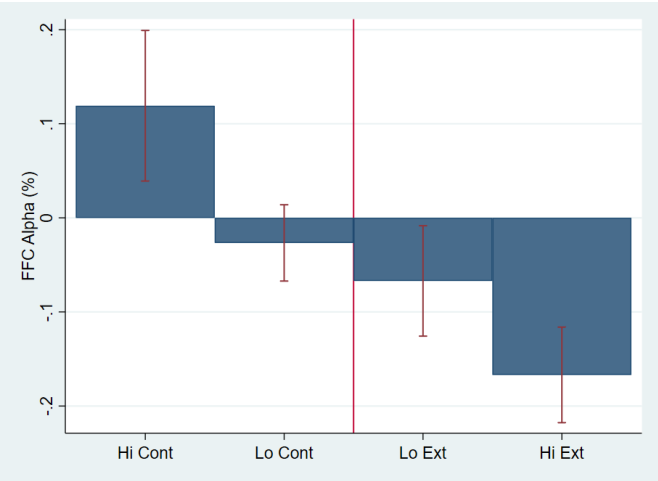
	Alpha		Top 10% Fund		Flow	
	(1)	(2)	(3)	(4)	(5)	(6)
D_E (t-1)	-0.134***	-0.117***	-0.014***	-0.015***	-1.003***	-1.226***
	[0.043]	[0.042]	[0.004]	[0.004]	[0.261]	[0.265]
Controls	No	Yes	No	Yes	No	Yes
Time × Style FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	78,911	71,555	89,937	77,889	89,937	75,713
Adj. R-squared	0.07	0.07	0.00	0.01	0.01	0.01

Source: US active domestic equity mutual funds (CRSP, COMPUSTAT, Morningstar Direct, and Thomson Reuters)

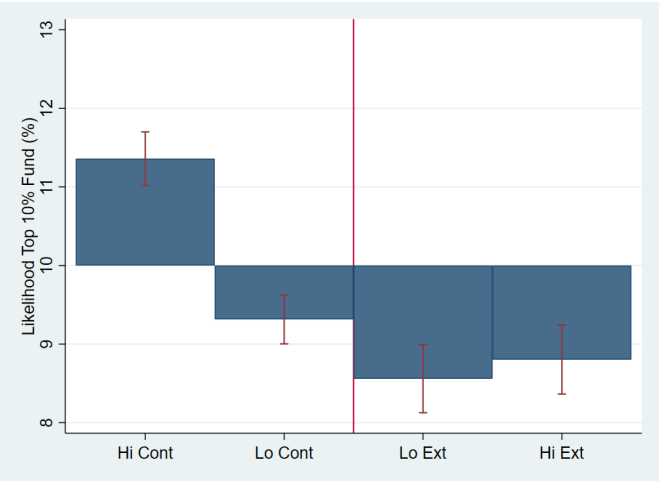
- Extrapolative funds underperform peers, have a lower probability of achieving top status, and grow less.
- Evidence consistent with extrapolation being a bias in belief formation.

▸ All regression estimates

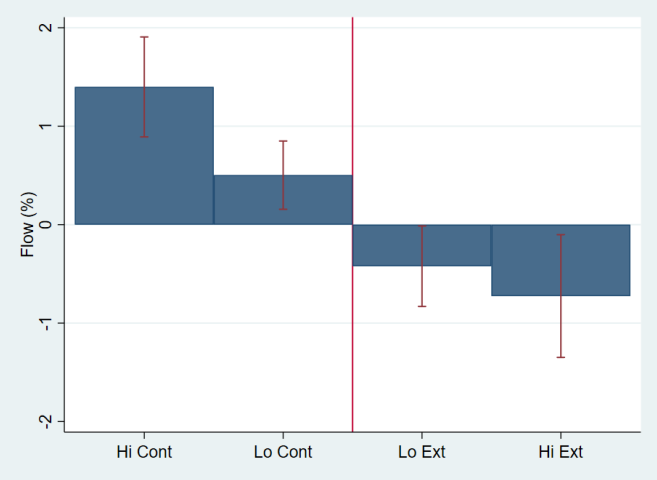
Extrapolation and performance: graphical evidence



(a) Alpha



(b) Probability Top 10% Fund



(c) Flows

▸ Extrapolation Bias and investor preferences

Teams and Extrapolation Bias

"Do teams alleviate or exacerbate extrapolation bias?"

The most common approach in the literature is to compare teams and single-managed funds:

- Prather and Middleton (2002), Bar et al. (2011), Patel and Sarkissian (2017, 2021) Fedyk et al. (2020), Harvey et al. (2020).

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2. Managerial contracts can induce high-skilled managers not to join a team (Huang et. al. 2019).

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Managers in teams can be fundamentally different from managers who manage alone:

1. Self-selection into teams (Kocher, Strauss, and Sutter 2006).
2. Managerial contracts can induce high-skilled managers not to join a team (Huang et. al. 2019).
3. High-skilled fund managers may prefer to manage individually to ease investors' learning (Choi,Kahraman, and Mukherjee 2016).

Teams and Extrapolation Bias

- This concern can be addressed in a within-subject approach, where trading behavior of teams is compared with behavior that members of that same team show when they manage alone.

- This is the approach we follow.
  - We identify the subset of management teams whose members all have managed a fund alone at some point in time.
  - We identify 350 teams and 549 managers (cover 37% of our sample).

Restricted Sample: Summary Statistics

Panel A: Single-managed funds

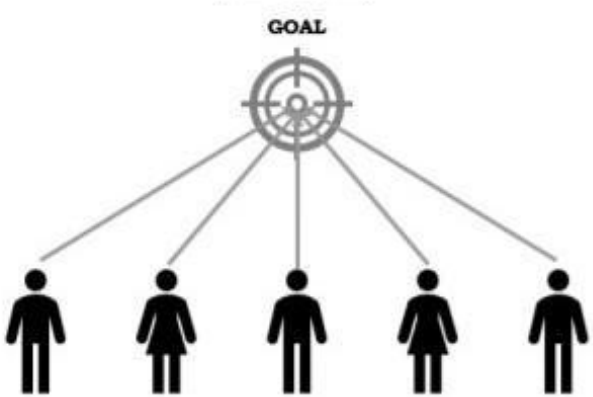
	Mean	St. Dev	5th Pct.	Median	95th Pct.
Fund TNA	1332	5333.000	4.000	166.000	4877.000
Number of managers	1.000	0.000	1.000	1.000	1.000
Manager Experience	39.000	26.000	5.000	34.000	89.000
Number of stocks	92.000	220.000	2.000	56.000	228.000
Extrapolation Beta	-0.053	0.169	-0.336	-0.032	0.196
D_E	0.360	0.480	0	0	1
Expense Ratio	0.012	0.005	0.006	0.012	0.020
Disposition	-0.031	0.152	-0.294	-0.014	0.192
Fund Return	0.030	0.095	-0.140	0.023	0.176

Panel B: Teams

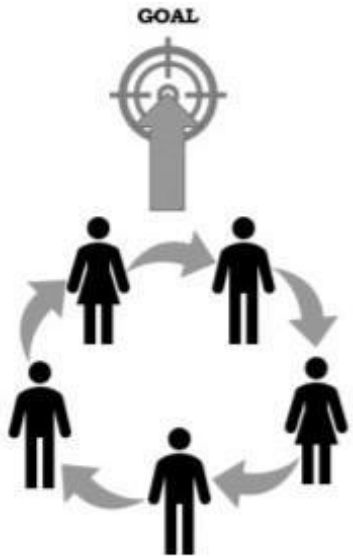
	Mean	St. Dev	5th Pct.	Median	95th Pct.
Fund TNA	865.000	2330.000	7.000	230.000	3231.000
Number of managers	2.160	0.400	2.000	2.000	3.000
Manager Experience	36.000	26.000	4.000	31.000	88.000
Number of stocks	88.000	187.000	4.000	56.000	222.000
Extrapolation Beta	-0.063	0.164	-0.351	-0.043	0.135
D_E	0.300	0.460	0.000	0.000	1.000
Expense Ratio	0.012	0.004	0.006	0.012	0.020
Disposition	-0.022	0.155	-0.280	-0.006	0.201
Fund Return	0.027	0.089	-0.136	0.025	0.161

Teams and Extrapolation Bias: Empirical Approach

- Experiments use counterfactuals in tests of team decision-making.
- We follow this approach and construct a team counterfactual.



Counterfactual Team



Actual Team

$\hat{\beta}_j^{CF}$ VS $\hat{\beta}_j^{TM}$

Teams and Extrapolation Bias: Introductory Evidence

Panel A: All teams

	Mean	s.e.	t-stat	Obs.
$\hat{\beta}_j^{CF}$	-0.051	0.007	-7.730	350
$\hat{\beta}_j^{TM}$	-0.063	0.009	-7.171	350
Difference $\hat{\beta}_j^{CF}$ - $\hat{\beta}_j^{TM}$	**0.012**	0.009	**1.369**	350

Panel B: Contrarian teams

	Mean	s.e.	t-stat	Obs.
$\hat{\beta}_j^{CF}$	-0.105	0.007	-15.025	236
$\hat{\beta}_j^{TM}$	-0.094	0.011	-8.914	236
Difference $\hat{\beta}_j^{CF}$ - $\hat{\beta}_j^{TM}$	**-0.011**	0.011	**-1.066**	236

Panel C: Extrapolative teams

	Mean	s.e.	t-stat	Obs.
$\hat{\beta}_j^{CF}$	0.062	0.006	11.082	114
$\hat{\beta}_j^{TM}$	0.002	0.014	0.122	114
Difference $\hat{\beta}_j^{CF}$ - $\hat{\beta}_j^{TM}$	**0.060**	0.015	**3.958**	114

Transmission of Extrapolation Bias from Individuals to Teams

- We formally test how individual behavioral biases transmit to teams:

$$\hat{\beta}_j^{TM} = \alpha + \delta_0 \hat{\beta}_j^{CF} + \delta_1 \hat{\beta}_j^{CF} \times D_j^E + \delta_2 D_j^E + \delta_3 C_j + \epsilon_j,$$

- $\hat{\beta}_j^{TM}$ is the extrapolation metric of the team.
- $\hat{\beta}_j^{CF}$ is the extrapolation metric of the counterfactual team.
- D_j^E is a dummy variable equal to one if the team members extrapolate on average (i.e., $\hat{\beta}_j^{CF} > 0$)
- C_j is a set of team controls.

Transmission of Extrapolation Bias from Individuals to Teams

	OLS		IV	
	(1)	(2)	(3)	(4)
$\delta_0 : \hat{\beta}_j^{CF}$	0.413***	0.437***	0.578***	0.755**
	[0.069]	[0.095]	[0.167]	[0.352]
$\delta_1 : \hat{\beta}_j^{CF} \times D_j^E$		**-0.641****		**-0.621****
		[0.261]		[0.314]
$\delta_2 : D_j^E$		0.051**		0.009
		[0.025]		[0.101]
Style fixed effects	Yes	Yes	Yes	Yes
Team controls	Yes	Yes	Yes	Yes
Observations	350	350	350	350
Adj. R-squared	0.165	0.178	0.090	0.087
$\delta_0 + \delta_1$		**-0.184**		**0.134**
Hypothesis testing:				
p-value H_0 : full transmission contrarian behavior $\delta_0 = 1$		0.000		0.614
p-value H_0 : full transmission extrapolation bias $\delta_0 + \delta_1 = 1$		**0.000**		**0.043**
p-value H_0: no transmission extrapolation bias $\delta_0 + \delta_1 = 0$		**0.537**		**0.614**

- Individual extrapolative behavior is attenuated in teams by more than 80%.

IV methodology based on Jegadeesh et al. (2019). ▸ Full Table

Alternative Interpretations

1. Are we truly capturing extrapolation bias?
   - Extrapolation bias or momentum? Results
   - Biased beliefs or investor preferences? Results
   - Whose extrapolation bias? Results
2. Are the managers of single-managed and team-run funds truly the same?
   - Learning and experience. Results
3. Are funds managing individually and in team comparable? Is the work environment comparable?
   - Manager compensation. Results
   - Style migrations. Results
   - Workload. Results

Mechanism

- Framework of cognition: dual system model (Epstein 1994, Sloman 1996, Stanovich and West 2000, Kahneman 2003, 2011).
  - System I (fast and intuitive) and System II (slow and effortful).
  - Cognitive reflection: ability to engage System II to override mistakes of System I (Frederick 2005, Ilut and Valchev 2022).

- Teams may achieve successful cognitive reflection by providing cues:
  - Internal reflection hypothesis: convey/motivate choices to others.
  - External screening hypothesis: critical assessment of each others' ideas.

- The mechanisms can be empirically distinguished in the data.
  - Internal reflection (external screening) predicts largest bias attenuation in teams with only extrapolators (extrapolators and contrarians).

We find evidence for the internal reflection hypothesis

Regression:

$$\hat{\beta}_j^{TM} = \alpha + \delta_0 \hat{\beta}_j^{CF} + \delta_1 \hat{\beta}_j^{CF} \times D_j^{AE} + \delta_2 \hat{\beta}_j^{CF} \times D_j^{M} + \delta_3 D_j^{AE} + \delta_4 D_j^{M} + \delta_5 C_j + \epsilon_j,$$

where D_j^{AE} (D_j^{M}) is a dummy that indicates all extrapolator teams (mixed teams; extrapolators and contrarians).

	(1)	(2)	(3)
$\hat{\beta}_j^{CF}$	0.5841***	0.5865***	0.5089***
	[0.1100]	[0.1108]	[0.1157]
$\hat{\beta}_j^{CF} \times D_j^{AE}$	-0.9805***	-1.0019***	-0.9193**
	[0.3588]	[0.3626]	[0.3636]
$\hat{\beta}_j^{CF} \times D_j^{M}$	-0.2055	-0.2135	-0.1655
	[0.1902]	[0.1907]	[0.1905]
D_j^{AE}	0.0614	0.0604	0.0643
	[0.0405]	[0.0406]	[0.0406]
D_j^{M}	-0.0026	-0.0037	0.001
	[0.0233]	[0.0234]	[0.0241]
Team controls	No	Yes	Yes
Style FE	No	No	Yes
Observations	350	350	350
Adj. R-squared	0.1428	0.1402	0.1706

Conclusion

- Its an open question whether teams attenuate behavioral biases.
- We focus on how return extrapolation influences trading behavior of teams vis-a-vis the members of the team when they manage alone.
- We show that teams attenuate the adverse impact of return extrapolation.
- Our results highlight a potential benefit of team-based asset management.

Active weight changes

$$\Delta w_{s,j,t+1} = w_{s,j,t+1} - \frac{(1 + r_{s,t\to t+1})}{(1 + r^{P}_{j,t\to t+1})} w_{s,j,t}, \tag{1}$$

where $r^{P}_{j,t\to t+1}$ is the total portfolio return for fund j in quarter $(t, t+1]$, and $r_{s,t\to t+1}$ is the stock-return over the same quarter.

back

Robustness: Manager Compensation

- Manager compensation could be different in single-managed funds compared to team-based funds.
- For instance it is possible that incentives are more tightly linked to performance in team-based funds.
- A stronger sensitivity of managerial pay to investment outcomes can prompt managers to exert more effort.
- With higher stakes, more effortful deliberation can replace heuristic intuitive judgment (e.g., Kahneman 2003).
- Extrapolation bias is attenuated in teams, not because of teams.

Robustness: Manager Compensation

- Since 2006, the SEC mandates that mutual funds' prospectus includes fund managers' compensation information as part of a Statement of Additional Information(SAI).
- We hand-collect data from the SEC website, and construct statistics on:
  - fixed compensation.
  - performance-based compensation.
  - AUM-based compensation.
  - fund shares' ownership.
- We compare compensation structures of team and solo-managed funds.

Robustness: Manager Compensation

Panel A: All teams

	Extrapolation beta		**Fixed pay**		**Performance pay**		**AUM pay**		**Ownership**	
	CF	team	CF	team	CF	team	CF	team	CF	team
Mean	-0.057	-0.070	0.031	0.039	0.837	0.858	0.197	0.176	0.694	0.579
CF - team		0.013		-0.009		-0.021		0.021		0.115
t-stat		1.054		-1.014		-1.211		0.966		3.420
Obs.		133		131		130		130		126

Panel B: Contrarian teams

	Extrapolation beta		**Fixed pay**		**Performance pay**		**AUM pay**		**Ownership**	
	CF	team	CF	team	CF	team	CF	team	CF	team
Mean	-0.115	-0.110	0.034	0.037	0.820	0.852	0.204	0.179	0.708	0.615
CF - team		-0.006		-0.004		-0.032		0.025		0.093
t-stat		-0.349		-0.488		-1.394		0.910		2.234
Obs.		90		89		89		89		86

Panel C: Extrapolative teams

	Extrapolation beta		**Fixed pay**		**Performance pay**		**AUM pay**		**Ownership**	
	CF	team	CF	team	CF	team	CF	team	CF	team
Mean	0.066	0.013	0.024	0.044	0.872	0.870	0.181	0.171	0.662	0.500
CF - team		0.053		-0.020		0.002		0.010		0.162
t-stat		3.084		-0.896		0.103		0.334		2.865
Obs.		43		42		41		41		40

- Managers in teams have, if anything, weaker incentives. Back

Robustness: Learning and experience

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- We do a number of checks:
  1. Perform the analysis separately for cases in which single-management occurs before team-based management and cases in which the opposite occurs.
  2. Test whether the attenuation of extrapolation bias is larger when the managers in the team have accumulated larger experience prior to team management.

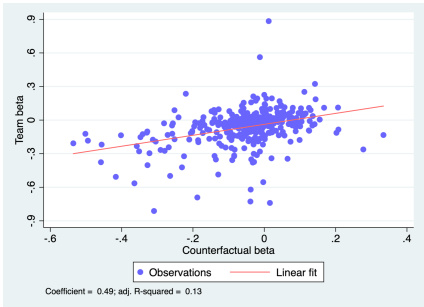
Robustness: Learning and experience

	Panel B: Difference Experience		Panel C: Enter Single		Panel D: Enter Team	
	(1)	(2)	(3)	(4)	(5)	(6)
$\hat{\beta}_j^{CF}$	0.4987***	0.4238***	0.4964***	0.4214***	0.5071***	0.4474***
	[0.0977]	[0.1004]	[0.0999]	[0.1029]	[0.0991]	[0.1011]
$\hat{\beta}_j^{CF} \times D_j^E \times R_j$	**-0.0056**	**-0.0027**	**-0.2146**	**-0.4207**	**-0.32**	**-0.3421**
	[0.0190]	[0.0188]	[0.7486]	[0.7458]	[0.7767]	[0.7690]
$\hat{\beta}_j^{CF} \times D_j^E$	**-0.5913****	**-0.6318****	**-0.5563****	**-0.5579***	**-0.5680****	**-0.6207****
	[0.2597]	[0.2642]	[0.2775]	[0.2845]	[0.2749]	[0.2796]
$\hat{\beta}_j^{CF} \times R_j$	0.0022	0.0021	0.0125	0.0296	0.05	-0.0294
	[0.0058]	[0.0058]	[0.2684]	[0.2687]	[0.2731]	[0.2734]
$D_j^E \times R_j$	-0.0002	0.0000	-0.0075	0.008	-0.0199	0.013
	[0.0016]	[0.0016]	[0.0628]	[0.0623]	[0.0702]	[0.0710]
D_j^E	0.0491*	0.0524**	0.0514*	0.0513*	0.0509*	0.0489*
	[0.0252]	[0.0252]	[0.0279]	[0.0280]	[0.0273]	[0.0274]
R_j	0.0004	0.0001	0.032	0.0239	0.0425	0.0256
	[0.0009]	[0.0009]	[0.0340]	[0.0339]	[0.0409]	[0.0411]
Style FE	No	Yes	No	Yes	No	Yes
Team controls	No	Yes	No	Yes	No	Yes
Observations	350	350	350	350	350	350
Adj. R-squared	0.1339	0.1688	0.1381	0.1712	0.1385	0.1722

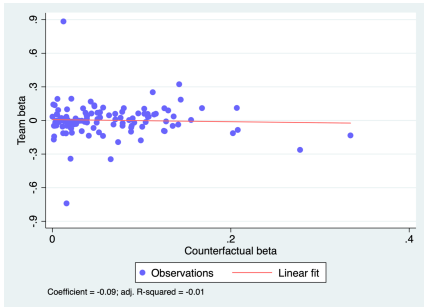
Robustness: Learning and experience

Finally, we perform the analysis on "non-learners" managers.

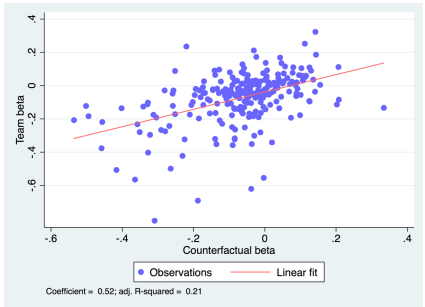
- Those managers who extrapolate individually in the early and late part of the sample.



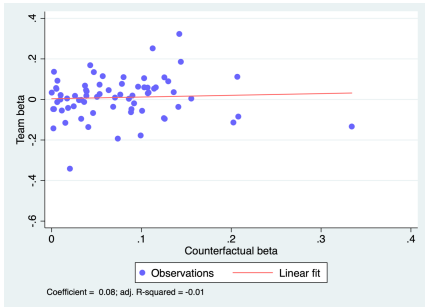
(a) All teams



(b) Extrapolators



(c) All teams

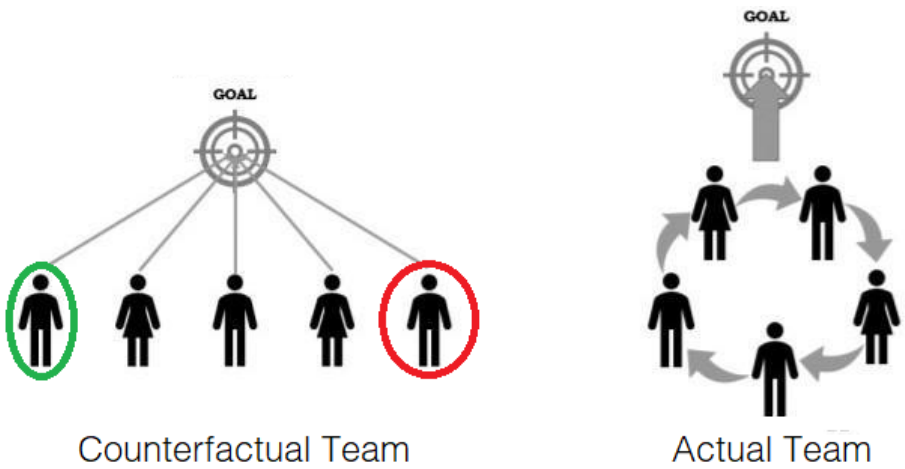


(d) Extrapolators

Panel A: Full sample **Panel B:** Non-learners sample

- Bias attenuation is equally strong in the non-learners sample. Back

Robustness: Alternative Team Dynamics



- In the main analysis, we assume implicitly that all the managers in a team have the same influence on decision.
- Can the attenuation of extrapolation bias be due to this assumption?
- We construct alternative counterfactual teams; these alternatives assign larger weight to the biases exhibited by the more senior managers on the team.

Robustness: Alternative Team Dynamics

	Experience		Number of Funds		Size of Funds	
	(1)	(2)	(3)	(4)	(5)	(6)
$\hat{\beta}_j^{CF}$	0.4714***	0.4282***	0.3945***	0.4252***	0.3818***	0.4198***
	[0.0664]	[0.0927]	[0.0678]	[0.0904]	[0.0641]	[0.0886]
$\hat{\beta}_j^{CF} \times D_j^E$		**-0.5175****		**-0.6685*****		**-0.4582****
		[0.2397]		[0.2498]		[0.2211]
D_j^E		0.0394		0.0519**		0.0334
		[0.0242]		[0.0242]		[0.0235]
Style FE	Yes	Yes	Yes	Yes	Yes	Yes
Team controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	350	350	350	350	350	350
Adj. R-squared	0.1605	0.1693	0.1610	0.1773	0.1646	0.1718
Hypothesis testing:						
p-value $H_0 : \delta_0 + \delta_1 = 0$		0.685		0.271		0.849
p-value $H_0 : \delta_0 + \delta_1 = 1$		0.000		0.000		0.000

- Results not changing when seniority in the team is accounted for. Back

Robustness: Exclusion of the momentum stocks

We exclude momentum stocks from the estimation of funds' extrapolative behavior.
Then perform again : (i) regressions linking extrapolation to performance; (ii) regressions estimating the transmission of individual-level extrapolation bias to teams.

Panel A: Fund Performance

	Alpha		**Top 10% Fund**		**Flow**	
	(1)	(2)	(3)	(4)	(5)	(6)
D_E (t-1)	**-0.076****	**-0.067****	**-0.009****	**-0.012*****	**-1.054*****	**-1.324*****
	[0.034]	[0.033]	[0.004]	[0.004]	[0.279]	[0.249]
Controls	No	Yes	No	Yes	No	Yes
Time × Style FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	78911	70287	89937	76351	89937	69936
Adj. R-squared	0.0736	0.0717	-0.0034	0.0056	0.0113	0.0043

Back

Robustness: Exclusion of the momentum stocks

Panel B: Transmission of extrapolation from single-managed to team-managed funds

	OLS		**IV**	
	(1)	(2)	(3)	(4)
$\hat{\beta}_j^{CF}$	0.3381***	0.3831***	0.3725**	0.8239***
	[0.0720]	[0.0939]	[0.1460]	[0.2630]
$\hat{\beta}_j^{CF} \times D_j^E$		**-0.6237***		**-0.9526*****
		[0.3703]		[0.3448]
D_j^E		0.0387		-0.0945
		[0.0409]		[0.1097]
Style fixed effects	Yes	Yes	Yes	Yes
Team controls	Yes	Yes	Yes	Yes
Observations	350	350	350	350
Adj. R-squared	0.1646	0.1667	0.1597	0.1494
Hypothesis testing:				
p-value $H_0 : \delta_0 = 1$	0.000	0.000	0.000	0.504
p-value $H_0 : \delta_0 + \delta_1 = 0$		0.498		0.641
p-value $H_0 : \delta_0 + \delta_1 = 1$		0.001		0.000

Back

Robustness: Style migration

- Managers could change investment styles when moving from single management to team management.

Robustness: Style migration

- Managers could change investment styles when moving from single management to team management.
- Investment-style changes are in practice not very common.

Robustness: Style migration

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- Investment-style changes are in practice not very common.

- We formally test whether the attenuation of extrapolation bias is stronger in cases of style migration:

$$\hat{\beta}_j^{TM} = \alpha + \delta_0 \hat{\beta}_j^{CF} + \delta_1 \hat{\beta}_j^{CF} \times D_j^E \times D_j^{SM} + \delta_2 \hat{\beta}_j^{CF} \times D_j^E + \delta_3 C_j + \epsilon_j,$$

  where D_j^{SM} indicates style migration for team j.

- We find that δ_1 is statistically indistinguishable from zero and δ_2 remains negative and statistically significant. back

Robustness: Workload

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Robustness: Workload

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- The drop in workload allows to relax bounded-rationality constraints.
- Managers use less heuristics and rely less on extrapolation as a result (e.g., Stanowich and West 2008).
- Less extrapolation bias would not be due to teams per se.
- We formally test the workload explanation:

$$\hat{\beta}_j^{TM} = \alpha + \delta_0 \hat{\beta}_j^{CF} + \delta_1 \hat{\beta}_j^{CF} \times D_j^E \times \Delta Workload_j + \delta_2 \hat{\beta}_j^{CF} \times D_j^E + \delta_3 C_j + \epsilon_j,$$

where $\Delta Workload_j$ equals the difference in workload when the managers operate in team j versus when they manage alone.

- We find that δ_1 is statistically indistinguishable from zero and δ_2 remains negative and statistically significant. Back

Robustness: Style Migration and workload differences

	Panel E: Style migrations		Panel F: Difference Workload	
	(7)	(8)	(9)	(10)
$\hat{\beta}_j^{CF}$	0.5666***	0.4966***	0.5347***	0.4551***
	[0.1028]	[0.1046]	[0.1018]	[0.1049]
$\hat{\beta}_j^{CF} \times D_j^E \times R_j$	**0.8028**	**0.6631**	**-0.0026**	**-0.0023**
	[0.7815]	[0.7771]	[0.0036]	[0.0036]
$\hat{\beta}_j^{CF} \times D_j^E$	**-0.7219*** **	**-0.7214*** **	**-0.7093** **	**-0.7475** **
	[0.2717]	[0.2768]	[0.3242]	[0.3327]
$\hat{\beta}_j^{CF} \times R_j$	-0.3667	-0.3641	0.0007	0.0003
	[0.2243]	[0.2248]	[0.0014]	[0.0014]
$D_j^E \times R_j$	-0.0941	-0.0639	0.0002	0.0002
	[0.0636]	[0.0643]	[0.0002]	[0.0002]
D_j^E	0.0698**	0.0658**	0.0564**	0.0592**
	[0.0276]	[0.0276]	[0.0269]	[0.0270]
R_j	0.0235	0.0112	0.0002	0.0001
	[0.0309]	[0.0316]	[0.0001]	[0.0001]
Style FE	No	Yes	No	Yes
Team controls	No	Yes	No	Yes
Observations	350	350	350	350
Adj. R-squared	0.1611	0.1874	0.1465	0.1782

Back

Robustness: Experience, timing, style migrations, and workload

Panel A: Summary statistics					
	Obs.	Mean	St. Dev.	Min	Max
All teams					
$\Delta Experience_j$	350	1.73	18.16	-49.6	87.64
D_j^{ES}	350	0.21	0.42	0	1
D_j^{ET}	350	0.19	0.39	0	1
D_j^{SM}	350	0.24	0.43	0	1
$\Delta Workload_j$	350	-39	113	-408	481
Contrarian teams					
$\Delta Experience_j$	236	3.56	18.18	-45.41	87.64
D_j^{ES}	236	0.22	0.42	0	1
D_j^{ET}	326	0.16	0.37	0	1
D_j^{SM}	236	0.25	0.44	0	1
$\Delta Workload_j$	236	-36	118	-408	481
Extrapolative teams					
$\Delta Experience_j$	114	-2.07	17.58	-49.60	42.75
D_j^{ES}	114	0.20	0.40	0	1
D_j^{ET}	114	0.25	0.44	0	1
D_j^{SM}	114	0.21	0.41	0	1
$\Delta Workload_j$	114	-46	101	-406	299

Extrapolative managers are worse off: Full Table

	Alpha		Top 10% Fund		Flow	
	(1)	(2)	(3)	(4)	(5)	(6)
D_E (t-1)	-0.134***	-0.117***	-0.014***	-0.015***	-1.003***	-1.226***
	[0.043]	[0.042]	[0.004]	[0.004]	[0.261]	[0.265]
Expense Ratio (t-1)		-16.448		2.057***		25.055
		[12.072]		[0.671]		[55.110]
N Stocks (t-1)		0.0030		-0.009***		0.156***
		[0.007]		[0.001]		[0.049]
Fund Turnover (t-1)		-0.111**		0.004		-0.451
		[0.051]		[0.004]		[0.538]
Avg. Manager Experience (t-1)		0.0220		0.0010		-0.0790
		[0.020]		[0.001]		[0.070]
Log Fund TNA (t-1)		-0.093		-0.018***		-3.210***
		[0.065]		[0.005]		[1.125]
Log Fund TNA^2 (t-1)		0.007		0.001***		0.219***
		[0.005]		[0.000]		[0.081]
Disposition (t-1)		0.184		0.041***		-3.182***
		[0.188]		[0.015]		[0.982]
Flow Volatility (t-1)		0.102**		0.028***		-0.032
		[0.051]		[0.007]		[0.122]
Flow (t-1)		0.001*		0.000		
		[0.001]		[0.000]		
Alpha (t-1)						0.208
						[0.127]
Time × Style FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	78911	70287	89937	76351	89937	69936
Adj. R-squared	0.0737	0.0718	-0.0031	0.0059	0.0113	0.0043

Back

The transmission of extrapolation from individuals to teams: full table

	OLS				IV			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\hat{\beta}_j^{CF}$	0.4892***	0.4126***	0.5096***	0.4367***	0.6959***	0.5780***	0.8566***	0.7555**
	[0.0665]	[0.0691]	[0.0920]	[0.0948]	[0.1578]	[0.1686]	[0.3225]	[0.3523]
$\hat{\beta}_j^{CF} \times D_j^E$			-0.6030**	-0.6409**			-0.6974**	-0.6208**
			[0.2563]	[0.2611]			[0.3198]	[0.3104]
D_j^E			0.0480*	0.0511**			0.0176	0.0091
			[0.0248]	[0.0248]			[0.0965]	[0.1007]
Style fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Team controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	350	350	350	350	350	350	350	350
Adj. R-squared	0.132	0.1651	0.1434	0.1783	0.0173	0.0903	0.0223	0.0874
Hypothesis testing:								
p-value $H_0 : \delta_0 = 1$	0.000	0.000	0.000	0.000	0.054	0.012	0.656	0.488
p-value $H_0 : \delta_0 + \delta_1 = 0$			0.696	0.399			0.705	0.739
p-value $H_0 : \delta_0 + \delta_1 = 1$			0.000	0.000			0.045	0.032

▸ Back

Is Extrapolation a bias?

- Extrapolation leads to worse outcomes from the asset manager's viewpoint.
- This is consistent with extrapolation being a bias in belief formation.
- Could there be other explanations?

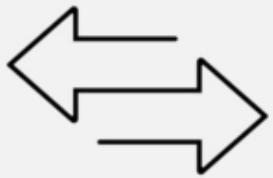
Is Extrapolation a bias?

- Extrapolation leads to worse outcomes from the asset manager's viewpoint.
- This is consistent with extrapolation being a bias in belief formation.
- Could there be other explanations?
- Extrapolation is measured via trading behavior.
- Preferences, not just beliefs, determine investment decisions.

Extrapolation and Investor Preferences

Extrapolators' lower returns could reflect a trade-off:

Expected investment returns
(variable compensation, fund size, career)



Compensation volatility
(volatility of fund alpha, volatility of fund flow)

Hedging
(performance during economic or market downturns)

Preference for Skewness
(small probability of extremely positive outcomes)

Extrapolation and Investor Preferences

	Panel A: Compensation Volatility				Panel B: Extreme Payoffs			
	Alpha Vol		**Flow Vol**		**Top 10 Fund**		**Top 5 Fund**	
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
D_E (t-1)	0.013	0.021	-11.019	-14.459	-0.0072***	-0.0074***	-0.0050***	-0.0047***
	[0.033]	[0.039]	[7.554]	[10.248]	[-3.19]	[-3.26]	[-3.57]	[-3.20]
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Time × Style FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	64744	57072	71544	57298	89937	76351	89937	76351
Adj. R-squared	0.0354	0.0672	-0.0089	-0.0087	0.0501	0.0401	0.0292	0.027

Extrapolation and Investor Preferences

Panel C: Negative Market Returns

	Alpha		**Top 10% Fund**		**Flow**	
	(1)	(2)	(3)	(4)	(5)	(6)
D_E (t-1)	-0.153	-0.151*	-0.016**	-0.017**	-0.821**	-0.927**
	[0.099]	[0.087]	[0.008]	[0.008]	[0.336]	[0.456]
Controls	No	Yes	No	Yes	No	Yes
Time × Style FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	22645	19854	26371	21840	26371	19692
Adj. R-squared	0.1333	0.1433	-0.0011	0.0083	0.0036	0.0042

Panel D: NBER Recessions

	Alpha		**Top 10% Fund**		**Flow**	
	(1)	(2)	(3)	(4)	(5)	(6)
D_E (t-1)	0.093	0.115	-0.015	-0.013	-0.546	-1.098***
	[0.154]	[0.145]	[0.015]	[0.017]	[0.545]	[0.334]
Controls	No	Yes	No	Yes	No	Yes
Time × Style FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7768	6896	8813	7385	8813	6858
Adj. R-squared	0.1551	0.1814	-0.0009	0.0141	0.018	0.0378

There is very little evidence that preferences can help explain the negative relation between extrapolation and investment outcomes.

Back to Robustness Back to Performance

Descriptive statistics

	Mean	St. Dev.	5th Pct.	Median	95th Pct.
Mutual fund characteristics					
Fund TNA	1773	6514	17	326	6996
Team-Managed	0.66	0.47	0	1	1
Number of managers	2.69	3	1	2	7
Manager Experience	34	20	8	30	73
Number of stocks	95	178	11	58	260
Extrapolation Beta	-0.094	0.226	-0.514	-0.050	0.181
Extrapolation Dummy (D_E)	0.33	0.47	0	0	1
Expense Ratio	0.012	0.004	0.006	0.011	0.019
Fund Turnover	0.753	0.704	0.110	0.570	1.980
Disposition	-0.017	0.146	-0.264	-0.003	0.200
Mutual fund performance					
Fund Return	0.022	0.108	-0.155	0.030	0.154
Alpha	-0.003	0.064	-0.045	-0.003	0.039
Flow	0.006	0.365	-0.126	-0.016	0.164
Alpha volatility	0.015	0.037	0.005	0.012	0.030
Flow volatility	0.120	7.124	0.004	0.017	0.113

Source: US active domestic equity mutual funds (CRSP, COMPUSTAT, Morningstar Direct, and Thomson Reuters) *TNA* in Millions of USD; *Team-Managed* is a dummy variable; *experience* is in quarters; *fund turnover from CRSP*; *fund return* is quarterly; *alpha*, net of fees, based on Fama-French Carhart 4-factor model; *Disposition* based on Odean(1998); *Flow* is quarterly fund inflow; *Alpha volatility* is the 12-month volatility of monthly Alpha; *flow volatility* is the 12-month volatility of monthly flows.

Descriptive statistics

Panel B: Correlation table

Fund TNA	1															
Team Managed	0.01	1														
Number of managers	0.15	0.47	1													
Manager Experience	0.11	-0.12	-0.06	1												
Number of stocks	0.08	0.06	0.2	-0.05	1											
Extrapolation Beta	-0.06	-0.02	-0.02	-0.07	0.03	1										
Extrapolation Beta (No Mom)	-0.06	-0.02	-0.03	-0.1	0.02	0.88	1									
Extrapolation Dummy (D_E)	-0.04	0.01	-0.03	-0.02	-0.06	0.6	0.55	1								
Expense Ratio	-0.23	-0.07	-0.11	-0.07	-0.19	0.07	0.08	0.01	1							
Fund Turnover	-0.12	-0.05	-0.03	-0.17	-0.01	0.2	0.23	0.07	0.17	1						
Disposition	0.01	0.04	0.04	0.02	0.00	-0.17	-0.19	-0.11	-0.03	-0.17	1					
Fund Return	0.01	-0.01	0.00	0.02	0.00	-0.01	0.00	-0.01	0.01	-0.01	-0.04	1				
Alpha	0.01	-0.01	-0.01	0.00	0.00	-0.01	-0.01	-0.02	-0.01	-0.01	-0.02	0.45	1			
Flow	0.00	-0.01	0.00	-0.02	0.00	-0.03	-0.02	-0.02	0.00	-0.01	-0.02	-0.02	-0.08	1		
Alpha volatility	-0.02	-0.03	-0.03	0.00	-0.04	-0.01	0.00	-0.01	0.08	0.05	-0.01	0.12	0.19	-0.04	1	
Flow volatility	0.00	0	0.03	0.01	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	1

Source: US active domestic equity mutual funds (CRSP, COMPUSTAT, Morningstar Direct, and Thomson Reuters)

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