Narrative Persuasion

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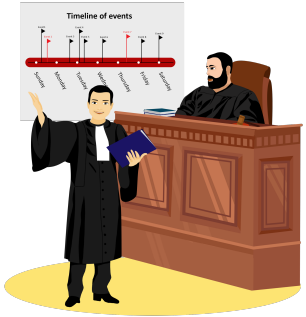
Introduction

- We study how individuals can shift how others interpret objective data.
- Individuals can do this by providing an explanation of the process that generated the data.
- We call such explanations narratives.

Introduction



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- **Narrative:** Arguments of plaintiff and defendant

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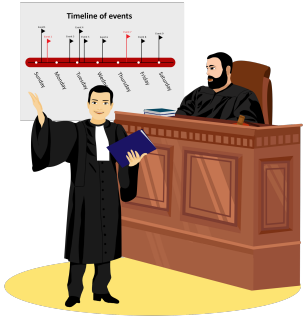

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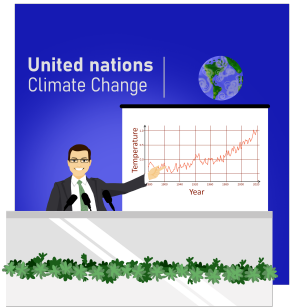


- **Data:** Historical time series on temperature, rainfall, etc.
- **Narrative:** Climate models

Introduction

Source: https://www.contracts-for-difference.com/strategies/Elliot-Wave.html

- **Data:** Past asset prices
- **Narrative:** Asset price model (here: Elliot wave principle)

Research questions

- We conduct a financial advice experiment to study how (aligned or misaligned) **financial advisors** can use narratives to influence investor beliefs.

Questions:

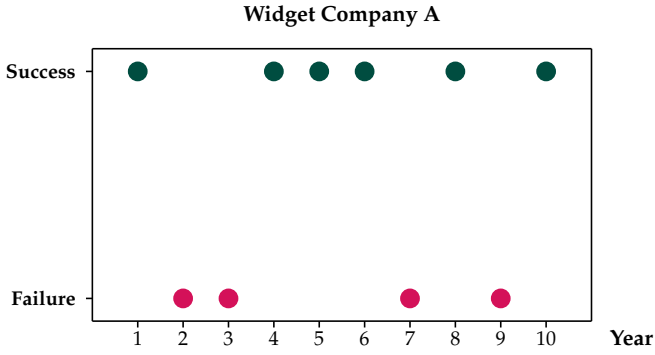
1. Can advisors change how investors interpret data?
2. What are features of narratives that make them persuasive?
3. What kinds of narratives do advisors send?

Related literature

- **Narratives & misspecified models (theory):**
  - Schwartzstein & Sunderam (2021), Aina (2023), Ispano (2023), Becker & Murphy (1993), Mullainathan, Schwartzstein, & Shleifer (2008), Froeb, Ganglmair, & Tschantz (2016), Spiegler (2016), Shiller (2017), Benabou, Falk, & Tirole (2020), Eliasz & Spiegler (2020), Ellis & Thysen (2021), Olea, Ortoleva, Pai & Prat (2022), Ba (2024).
- **Narratives & subjective models (empirical):**
  - Morag and Loewenstein (2021), Hagmann, Minson, & Tinsley (2021), Harrs, Müller, Rockenbach (2021), Hillenbrand & Verrina (2022), Kendall & Oprea (2022), Andre, Pizzinelli, Roth, & Wohlfahrt (2022), Andre, Haaland, Roth, & Wohlfahrt (2023), Gehring, Adema, Poutvaara (2022), Graeber, Roth and Zimmermann (2023), Charles & Kendall (2024), Ambuehl & Thysen (2024).
- **Sender-receiver games & disclosing conflicts of interest:**
  - Crawford & Sobel (1982), Cain, Loewenstein and Moore (2005, 2011), Loewenstein, Cain and Sah (2011), Ismayilov & Potters (2013), Blume, Lai, & Lim (2020).

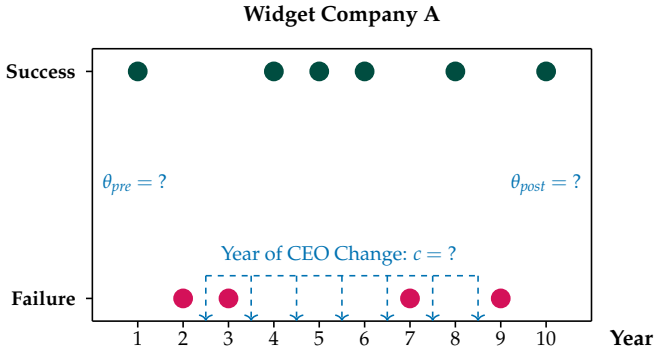
Experimental design

Design: The task



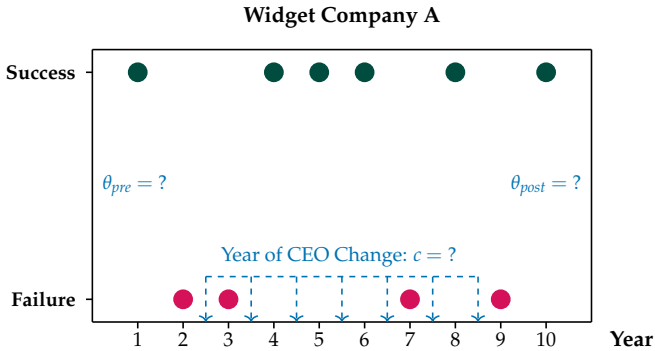
- Investor and advisor observe historical data which is a sequence of successes and failures, $h \equiv (s)_{t=1}^{10}$.

Design: The task



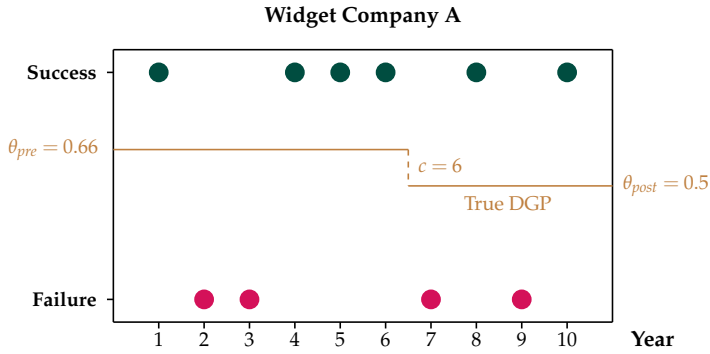
- Investor and advisor observe historical data which is a sequence of successes and failures, $h \equiv (s)_{t=1}^{10}$.
- A true data generating process $m^T = (\theta_{pre}^T, \theta_{post}^T, c^T) \in \mathcal{M}$ generated the data.
- The investor is incentivized to make an accurate assessment of θ_{post}.

Design: The task



- Advisor sends a narrative consisting of $(c, \theta_{pre}, \theta_{post})$.
- Three advisor types:
  - Aligned advisor wants investor to make an accurate assessment.
  - Up-advisor wants investor to make the highest possible assessment.
  - Down-advisor wants investor to make the lowest possible assessment.

(Some) Theory: The advisor's narrative construction



- Consider an upwards biased advisor, who wants the investor to believe that θ_{post} is large.

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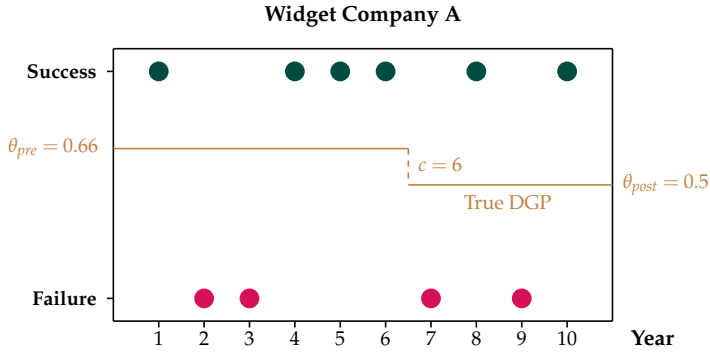

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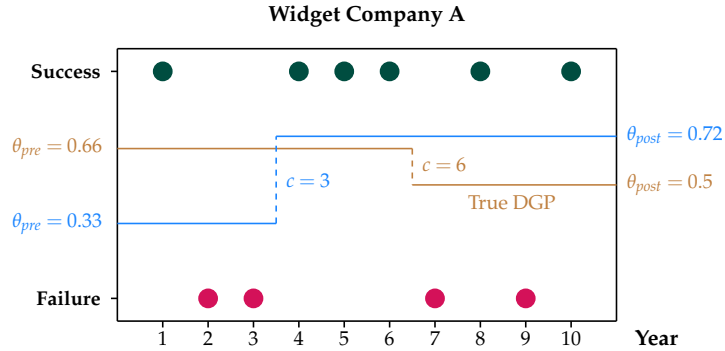

- Consider an upwards biased advisor, who wants the investor to believe that θ_{post} is large.
- Key assumption in Schwartzstein and Sunderam (2021): Investors adopt a narrative if it has a sufficiently high empirical fit.

→ The advisor chooses a narrative that trades off *empirical fit* and *investor belief movement*.

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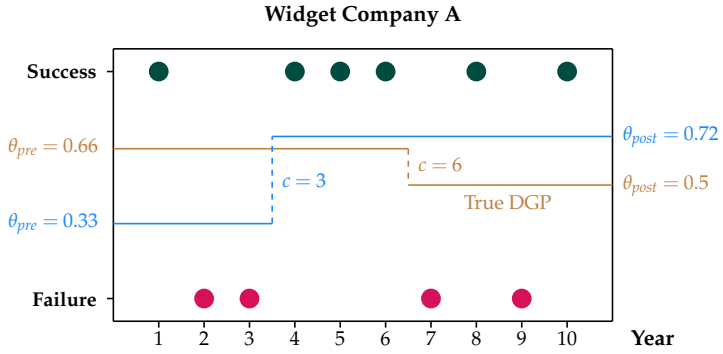


Rational benchmark

- Empirical fit is not a decision criterion for investors.
- Auxiliary parameters (c, θ_{pre}) are uninformative in a cheap talk equilibrium (pure babbling).

Design: Details

- Groups of six: three advisors and three investors.
  - Each group has one of each advisor type.
  - Investors know this $\implies$ 1/3 chance of match with each type.
- Ten rounds with random re-matching within groups.
- True data generating process drawn once in each round for all participants.
- Historical data drawn for each advisor-investor pair.

Design: Procedures

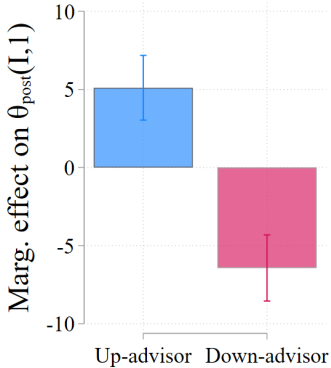
- Experiment run on Prolific, March 2022 and June 2023.
- Sample size: N=1620
  - 360 in ASYMMETRIC.
  - 360 in SYMMETRIC and COMPETITION.
- Payments:
  - Participation fee of £3.50.
  - 1 of 10 rounds: belief payment for both players (chance of £3.75).

- The design and main analysis were pre-registered.

Results

Results: Persuasion of investors

- Are advisors successful in distorting investor beliefs?



- Up-advisors induce higher θ_{post} assessments than aligned advisors.
- Down-advisors induce lower θ_{post} assessments than aligned advisors.

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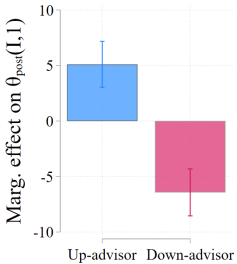
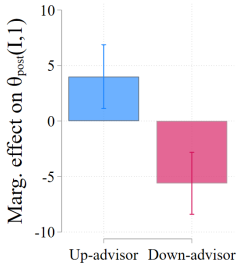


(i) ASYMMETRIC



(ii) SYMMETRIC

- Similar effects of meeting a misaligned advisor in SYMMETRIC, where advisors do not know the truth.
  - Narratives persuade even if investor and advisor hold the same information.

Results: Persuasion of investors

Narratives that fit data better are more persuasive:

- Investor's beliefs are shifted more by better-fitting narratives. ▸ Belief upd. analysis

	$\lvert\theta^I_{post} - \theta^A_{post}\rvert$
Advisor message fit (EPI)	-14.59***
	(1.892)
Misaligned advisor	0.691
	(0.668)
Observations	1800
Round FE	Yes

Results: Introducing competition

- To cleanly identify the causal effect of empirical fit on persuasion, we introduce COMPETITION, where the investor chooses between different narratives.

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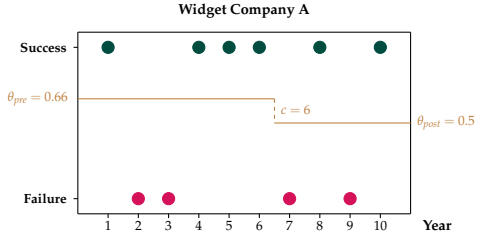

- The advisor knows the competing narrative when deciding which narrative to send.

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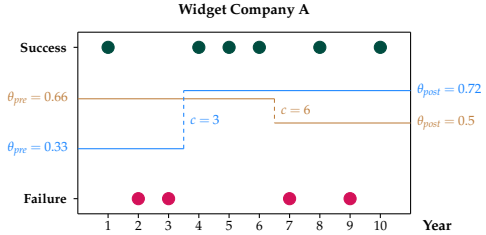

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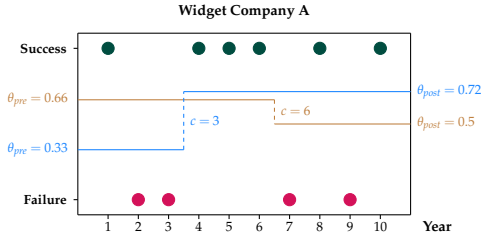
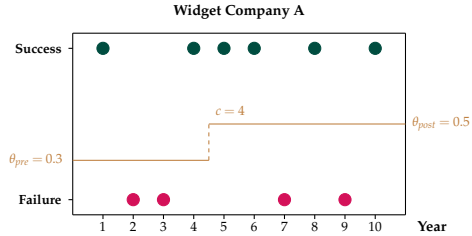




- The advisor knows the competing narrative when deciding which narrative to send.
- We exogenously vary the empirical fit of the competing narrative.

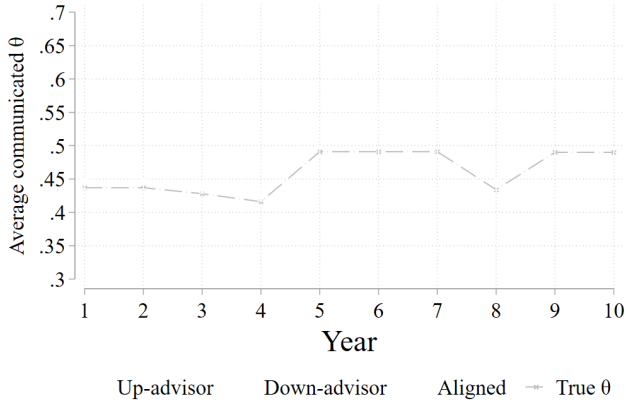
Results: Effect of competition on adoption

- Decresing the competing narrative fit causes the investor to adopt the human advisor's narrative.

	(1) I(adopt m^A)
Competing EPI	-0.139***
	(0.0457)
Round × History × θ^R_{post} FE	Yes
Observations	900

Results: Advisor narrative construction

- What drives narrative construction?



▸ Regression results ▸ Fit-movement tradeoff

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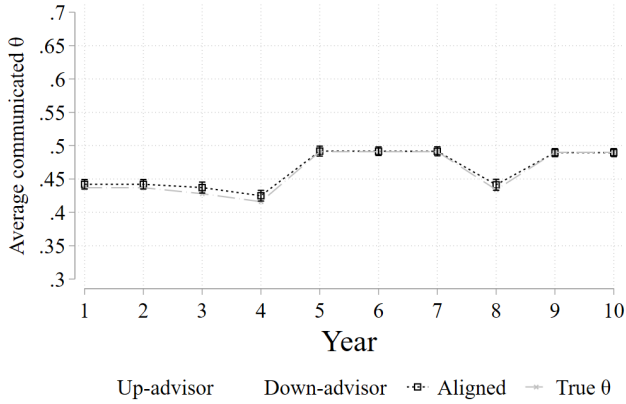

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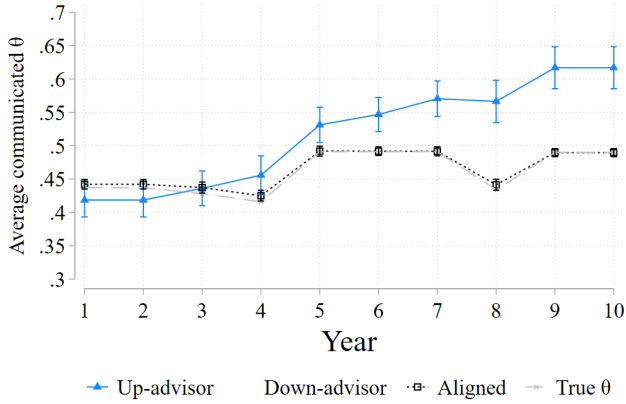

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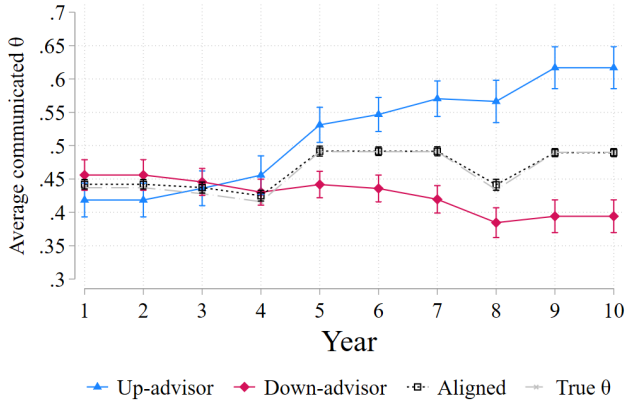

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Results: Advisor narrative construction

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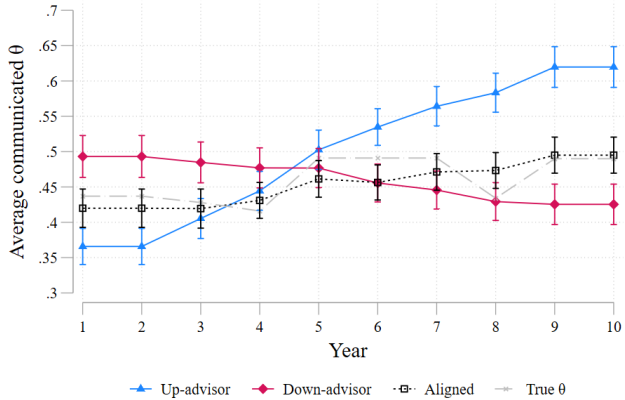

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Results: Effect of competition on narrative construction

If advisors trade off belief movement/bias and empirical fit:

- As the fit of the competing narrative increases, so does the fit of their own narrative.
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	(1) EPI^A	(2) EPI^A	(3) *Bias*
Competing EPI	0.286***	0.301***	-5.260**
	(0.0264)	(0.0353)	(2.516)
Round FE	Yes	Yes	Yes
History FE	Yes	Yes	Yes
Inluded advisor types	All	Misaligned	Misaligned
Observations	900	600	600

Further results

- We consider three interventions aimed at protecting investors. ▸ Detailed results
  - We ask whether interventions (disclosing incentives, a nudge, private info.) protect investors.
  - → The average investor is no closer to the truth, but there is some interesting heterogeneity.

- We explore the influence of explanations on investor beliefs.
  - We compare a treatment where investors see all three narrative parameters to a treatment where they only see the investor's assessment of θ_{post}.
  - → The quality of the explanation matters; investors are sensitive to *auxiliary parameter fit* if and only if auxiliary parameters are provided.

- We estimate decision noise of investors and advisors using data from COMPETITION.
  - Investors do not always adopt the narrative with the highest empirical fit.
  - Advisors do not always send the optimal narrative.
  - → Noise of investors makes sending a narrative risky, and the optimal bias of advisors depends on *fit* and *bias* of the competing narrative.

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  - The balance *movement* and *fit* when constructing narrative.
  - Bias claim, θ_{post} , towards persuasion goal; use explanation, c and θ_{pre}, to improve fit.

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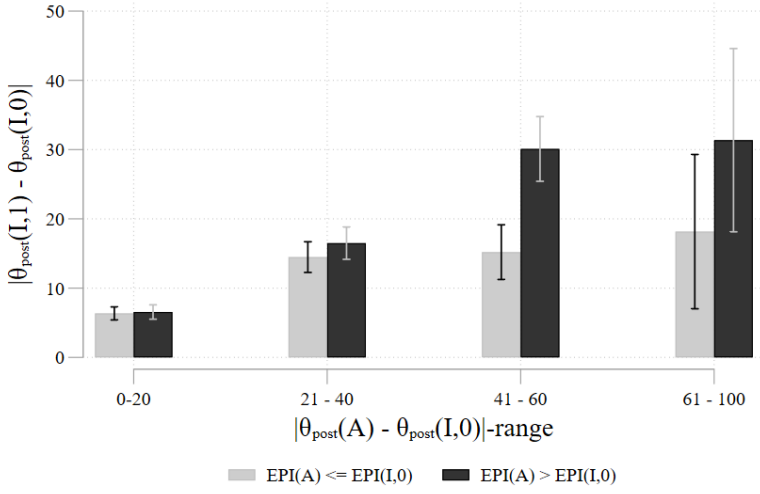
- **Advisors anticipate the importance of narrative fit.**
  - The balance *movement* and *fit* when constructing narrative.
  - Bias claim, θ_{post} , towards persuasion goal; use explanation, c and θ_{pre}, to improve fit.
- **We introduce a versatile experimental framework to study persuasion with narratives.**

No narrative benchmark

	(1) $\lvert\theta^{I,1}_{post} - \theta^{A}_{post}\rvert$
$\lvert\theta^{I,0}_{post} - \theta^{A}_{post}\rvert$	0.365***
	(0.0271)
3Parameters	3.078*
	(1.574)
3Parameters × Aux. parm. coherence	-3.855**
	(1.811)
Round× linked investor FE	Yes
Observations	3600

Belief updating

◂ Back

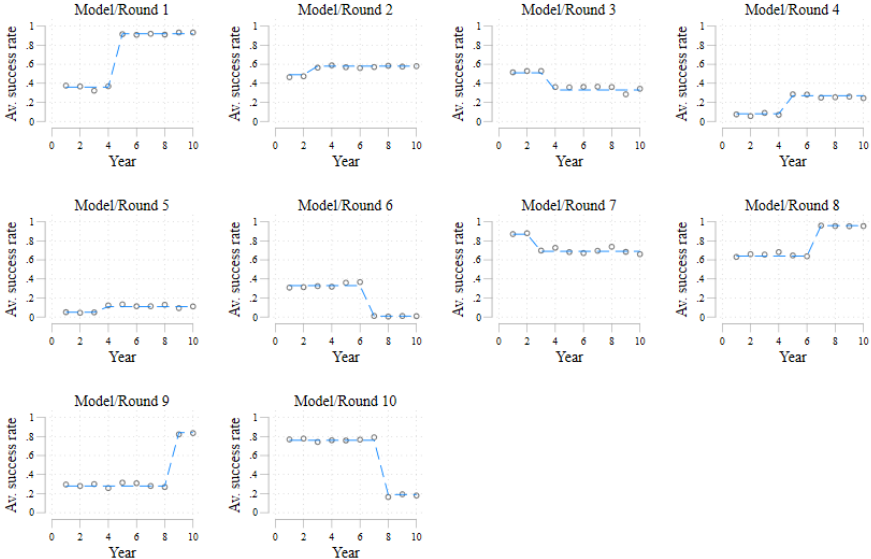


Belief updating

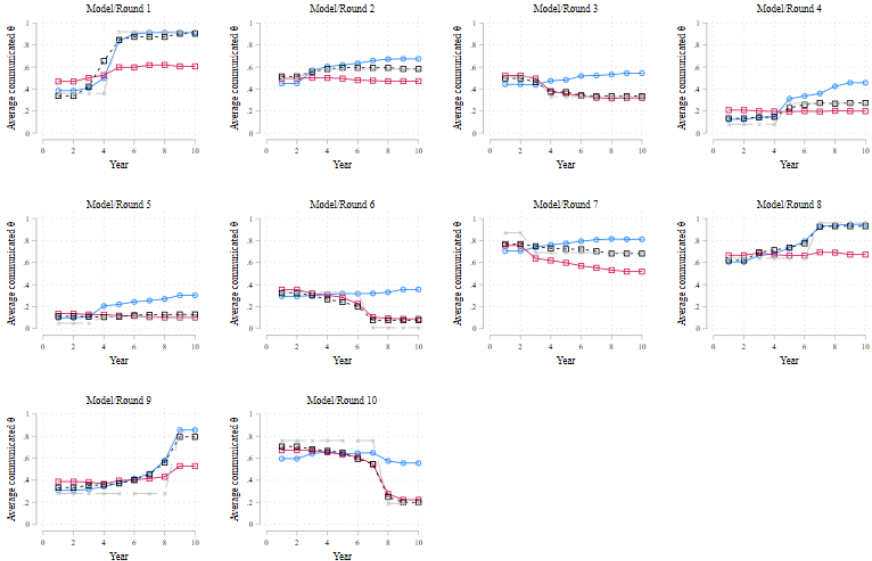
Back

	(1) $\lvert\theta^{I,1}_{post} - \theta^{I,0}_{post}\rvert$	(2) $\lvert\theta^{I,1}_{post} - \theta^{I,0}_{post}\rvert$	(3) $\lvert\theta^{I,1}_{post} - \theta^{I,0}_{post}\rvert$	(4) $\lvert\theta^{I,1}_{post} - \theta^{I,0}_{post}\rvert$
$\mathrm{I}(EPI^A > EPI^{I,0})$	3.465***	3.350***	-2.203*	-1.393
	(0.835)	(0.852)	(1.172)	(1.190)
Misaligned sender	0.0117	-0.165	-0.733	-0.681
	(1.090)	(1.204)	(0.747)	(0.810)
$\lvert\theta^{I,0}_{post} - \theta^{A}_{post}\rvert$			0.266***	0.363***
			(0.0530)	(0.0547)
$\mathrm{I}(EPI^A > EPI^{I,0}) \times \lvert\theta^{I,0}_{post} - \theta^{A}_{post}\rvert$			0.238***	0.173**
			(0.0729)	(0.0717)
Dependent variable mean	11.102	12.35	11.102	12.35
Incl. opposite updaters	Yes	No	Yes	No
Round FE	Yes	Yes	Yes	Yes
Incl. aligned advisors	Yes	Yes	Yes	Yes
Observations	900	779	900	779

True DGP and average observed data (by round)



Average narrative sent by advisors (by type)



Decision screen

◂ Back to design ◂ Back to interventions

Make your assessment — Round 1

In this round, you will assess Widget Company A. When making the assessment, you can refer to a message from your advisor for this round.

When composing the message, your advisor had access to:

- The historical data of success and failure in Widget Company A and
- Information about the **year** in which the CEO changed, the company's **Initial PoS%**, and the company's **Current PoS%**.

You can also use the historical data to inform your assessment.

Your Information

Message from advisor:

Your advisor in this round says that the CEO of Widget Company A changed at the **start of Year 5**. They say that **36** was Widget Company A's **initial** percentage probability of success. They say that **95** is Widget Company A's **current** percentage probability of success.

Year of change	Initial PoS%	Current PoS%
5	36	95

What is your assessment of the Current PoS% of Widget Company A?

Current PoS%

91

Next

Evaluating interventions to protect investors

Back

- Are the interventions successful in protecting investors?

	SKEPTICISM		SEQUENTIAL		PRIVATEDATA	
	$\lvert\theta^I_{post} - \theta^T_{post}\rvert$		$\lvert\theta^I_{post} - \theta^T_{post}\rvert$		$\lvert\theta^I_{post} - \theta^T_{post}\rvert$	
Treatment	-0.713	2.403	0.454	1.241	-0.124	-0.0775
	(1.001)	(1.549)	(0.924)	(1.117)	(0.750)	(1.192)
Advisor lied=1		9.340***		9.200***		9.419***
		(1.012)		(1.024)		(1.018)
Treatment × Advisor lied=1		-3.974**		-0.764		0.116
		(1.633)		(1.425)		(1.558)
ASYMMETRIC mean	15.274	15.274	15.274	15.274	15.274	15.274
Round FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1800	1800	1800	1800	1800	1800

Evaluating interventions to protect investors

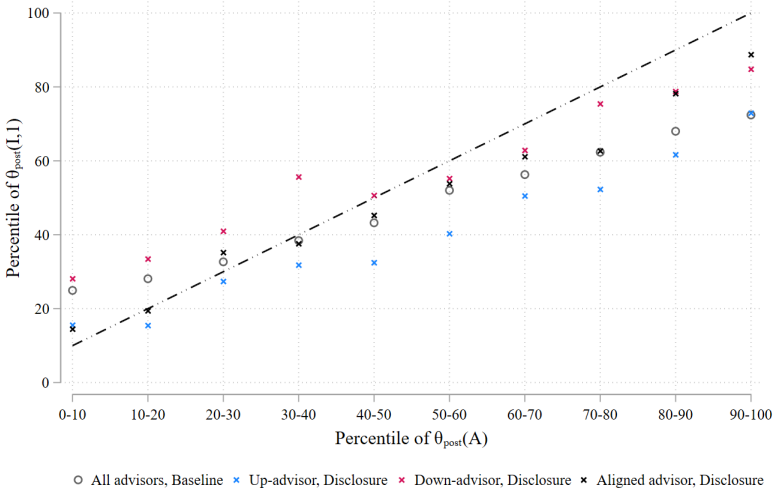
Back

- Are the interventions successful in protecting investors?

	DISCLOSURE $\lvert\theta^I_{post} - \theta^A_{post}\rvert$		INVESTORPRIOR $\lvert\theta^I_{post} - \theta^A_{post}\rvert$		PRIVATEDATA $\lvert\theta^I_{post} - \theta^A_{post}\rvert$	
Treatment	2.038*	2.488	1.730	0.914	3.020***	-0.442
	(1.088)	(1.619)	(1.044)	(1.158)	(1.090)	(1.179)
Advisor lied		3.855***		3.710***		3.685***
		(0.911)		(0.921)		(0.916)
Treatment × Advisor lied		-0.521		1.227		4.696***
		(1.825)		(1.681)		(1.624)
ASYMMETRIC mean	11.587	11.587	11.587	11.587	11.587	11.587
Round FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1800	1800	1800	1800	1800	1800

Evaluating interventions to protect investors

Back



Evaluating interventions to protect investors

Back

	DISCLOSURE $\lvert\theta^I_{post} - \theta^T_{post}\rvert$ (1a)	DISCLOSURE $\lvert\theta^I_{post} - \theta^A_{post}\rvert$ (1b)	INVESTORPRIOR $\lvert\theta^I_{post} - \theta^T_{post}\rvert$ (2a)	INVESTORPRIOR $\lvert\theta^I_{post} - \theta^A_{post}\rvert$ (2b)	PRIVATEDATA $\lvert\theta^I_{post} - \theta^T_{post}\rvert$ (3a)	PRIVATEDATA $\lvert\theta^I_{post} - \theta^A_{post}\rvert$ (3b)
Treatment	-4.597***	-5.075***	-0.0800	-0.278	0.530	0.632
	(0.994)	(0.934)	(0.972)	(1.029)	(1.110)	(1.154)
BASELINE mean	10.163	10.082	10.163	10.082	10.163	10.082
Round FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	900	900	900	900	900	900

Advisor narrative construction

Back

Attempted direct persuasion:

- Misaligned advisors send θ^A_{post}'s that are further from the truth.

	$\lvert\theta^A_{post} - \theta^T_{post}\rvert$
Misaligned advisor	12.72^{***}
	(0.702)
Observations	3600
Round FE	Yes

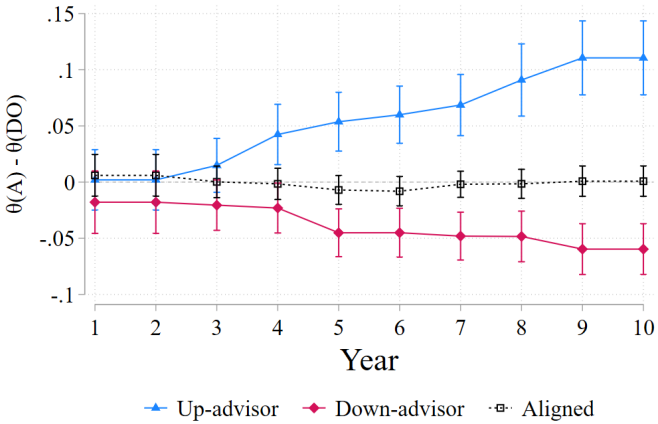
Supporting narrative component:

- Misaligned advisors send θ^A_{pre}'s that are further from the truth.

	$\lvert\theta^A_{pre} - \theta^T_{pre}\rvert$
Misaligned advisor	6.492^{***}
	(0.660)
Observations	3600
Round FE	Yes

Advisor narrative construction

Back



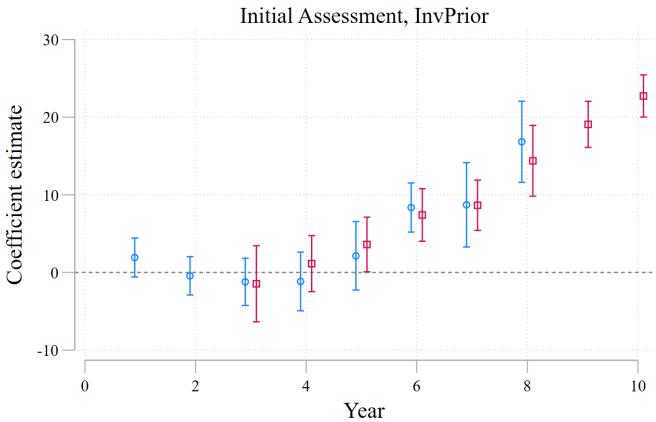
Persuasion of investors

Back

	(1) $\theta^{I,1}_{post}$	(2) $\theta^{I,1}_{post}$	(3) θ^{DO}_{post}	(4) θ^{DO}_{post}
γ_3	0.318	-1.674	-0.732	-0.693
	(1.446)	(1.235)	(1.133)	(1.140)
γ_4	-0.792	-0.539	-0.133	-0.138
	(1.505)	(1.262)	(1.078)	(1.076)
γ_5	4.551***	3.145***	0.0742	0.101
	(1.355)	(1.068)	(1.054)	(1.060)
γ_6	2.350*	1.014	0.512	0.538
	(1.305)	(1.280)	(1.102)	(1.091)
γ_7	6.586***	3.555**	2.979**	3.038**
	(1.804)	(1.680)	(1.383)	(1.400)
γ_8	5.570	5.078*	0.888	0.898
	(3.453)	(2.809)	(2.513)	(2.518)
θ^{A}_{post}		0.430***		-0.00832
		(0.0336)		(0.0127)
Dep. var. mean	48.002	48.002	47.727	47.727
H_0: $\gamma_3 = \ldots = \gamma_8 = 0$ p-value	0	.002	.283	.276
Round FE	Yes	Yes	Yes	Yes
Included $\beta_1 - \beta_{10}$	Yes	Yes	Yes	Yes
Observations	1800	1800	1800	1800

Persuasion of investors

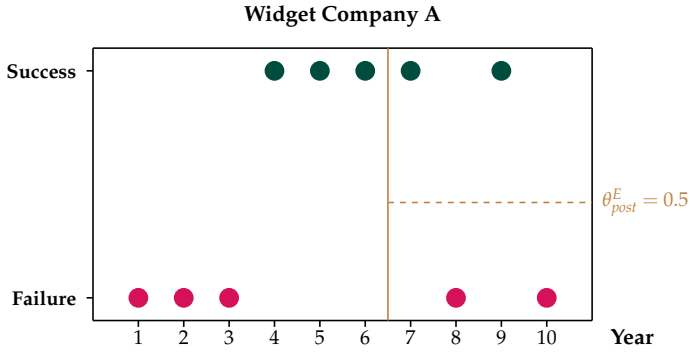
Back



Results: Advisor heterogeneity

Back

We identify the extent of narrative construction for each historical data set.



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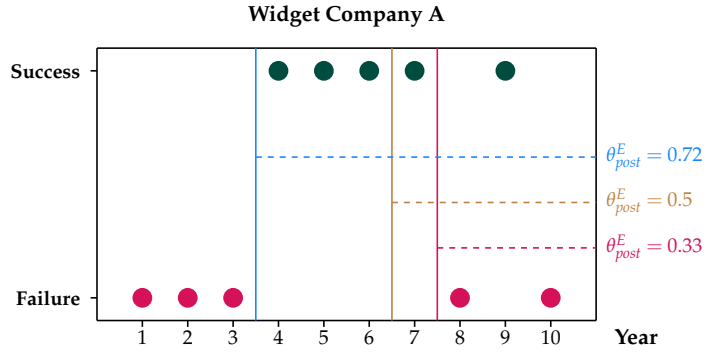

- Different values of c justify different values of θ_{post}.

Results: Advisor heterogeneity

Back

We classify up- and down-advisors based on their opportunism:

1. Never: Always transmit the true c^T.
2. Infrequent: Choose advantageous c less than 50% of the time.
3. Frequent: Choose advantageous c at least 50% of the time.

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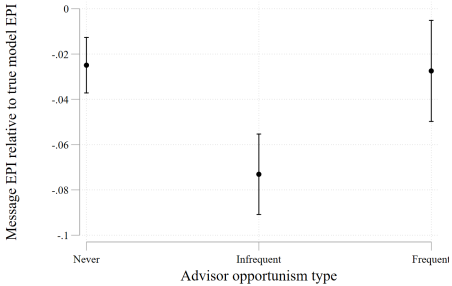

Results: Persuasion by opportunism type

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	$\theta^{I,1}_{post}$
β_1: θ^A_{post}	0.550***
	(0.0340)
β_2: θ^A_{post} × Opportunism: Infreq.	-0.0897***
	(0.0324)
β_3: θ^A_{post} × Opportunism: Freq.	-0.0222
	(0.0304)
Opportunism: Infrequ.	5.679***
	(1.623)
Opportunism: Frequent	4.159**
	(1.595)
H_0: $\beta_2 = \beta_3$ p-value	.087
Round FE	Yes
Observations	1200

Advisor heterogeneity

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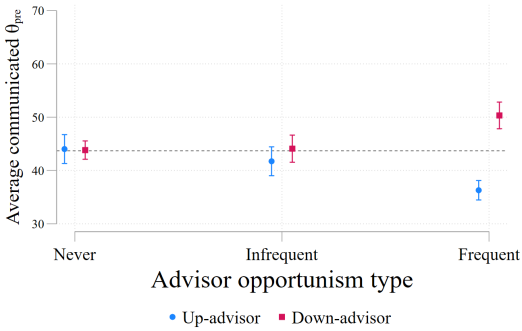
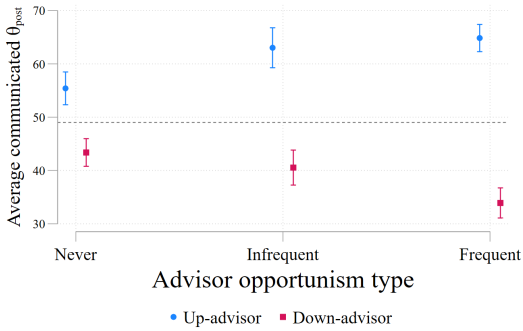


(a) Average values of sent θ_{pre}



(b) Average values of sent θ_{post}

Persuasion by opportunism type

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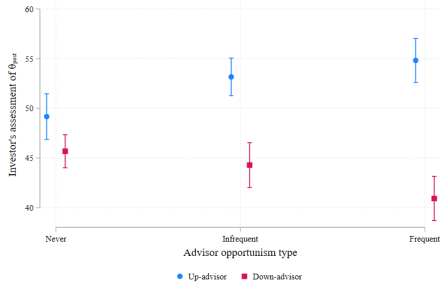

Theory: Persuasion with rational investors

Back

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- Suppose a rational investor receives a narrative m^A and does not know whether it was sent by an up-, down-, or aligned advisor.

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  - An equilibrium where the advisor conditions their narrative adoption on θ^A_{post} exists:

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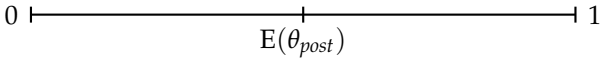

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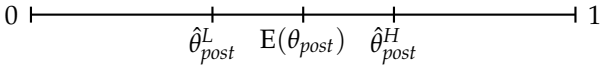

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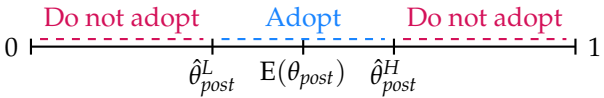

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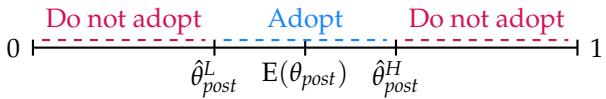

  - The advisor's equilibrium strategy in choosing c^A and θ^A_{pre} does not affect the equilibrium outcomes.

$\rightarrow$ Intuitively, a strategic investor understands that talk about θ_{pre} and c is completely cheap.