Cognitive Origins of Extrinsic Sentiment

A Cued-Memory Account of Household Portfolio Choice

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Overview

- This paper provides a cognitive microfoundation for extrinsic sentiment.
- We show that non-fundamental ideology can move financial decisions through associative memory: a salient ideological cue increases the retrieval probability of content-matched past experiences and thereby shifts subjective beliefs.
- We identify this channel by instantiating the framework with Dobbs (2022) as a non-fundamental sexism cue.
- An observable identity exposure to an objective historical event window, by gender and birth cohort, grounds our hypothesis of a memory-based mechanism, cued retrieval in associative memory: a current identity-specific legal cue (Dobbs 2022) that resembles that history enters an individual's judgement of bad states through her memory base.
- This work provides testable cognitive behavioural evidence.

Microfoundation

Dobbs (2022) · SIPP 2017–2024 · 147,531 individuals · ETA: equity / financial wealth

$$y_{isct} = \tau T_{isct} + \underbrace{\alpha_i + \lambda_t}_{\text{1. DiD}} + \underbrace{\mu_{st} + \eta_{ct}}_{\text{2. DDD}} + \underbrace{\theta_{sct}}_{\text{3. RD–DiD}} + X_{it}'\gamma + \varepsilon_{isct}.$$

i: individual · s: baseline state · c: cohort · t: year · X_{it}: observable controls

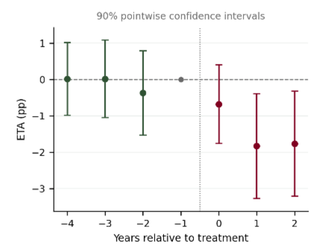
1. DiD $y_{ist} = \beta D_{st} + \alpha_s + \lambda_t + X_{it}'\gamma + \varepsilon_{ist}.$

Baseline DiD

ETA (percentage points)

	(1) OLS	(2) TWFE	(3) TWFE	(4) TWFE
$Treat_{st}$	−1.93···	−1.28···	−0.93··	−0.93···
	(−4.83)	(−2.81)	(−2.11)	(−2.79)
Controls	Yes	No	Yes	Yes
State FE	No	Yes	Yes	Yes
Year FE	No	Yes	Yes	Yes
Clustering	State	State	State	Indiv.
N	183,782	183,782	183,782	183,782
Adj. R^2	0.06	0.00	0.07	0.07

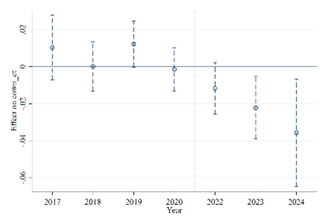
Callaway–Sant'Anna DiD



Bacon decomposition

Comparison	Weight	DD Est.
Earlier T vs. Later C	0.089	−0.036
Later T vs. Earlier C	0.007	0.010
T vs. Never-treated	**0.905**	−0.381

Extensive robustness:
eown_et, a dummy for ever holding equity.



Decomposition: An active withdrawal from equity

$w \in [0, 100], \quad z = \Pr(w = 0)$
$s = \mathbb{E}[w \mid w > 0], \quad \bar{w} = \mathbb{E}[w]$

1. Exact identity
$\bar{w} = z \cdot 0 + (1 - z)s = (1 - z)s.$

2. Exact change
$\Delta\bar{w} = (1 - z_1)s_1 - (1 - z_0)s_0$
$= -s_0\Delta z + (1 - z_0)\Delta s$
$-\Delta z\,\Delta s.$

3. First-order approximation
$\Delta\bar{w} \approx -s_0\Delta z + (1 - z_0)\Delta s$
Zero-equity margin · Holder-share margin

Descriptive DiD plug-in
$\hat{\beta}_w \approx -\bar{s}_0\hat{\beta}_z + (1 - \bar{z}_0)\hat{\beta}_s.$

Zero equity and holder share

	w	z	s
Treat	−1.278***	0.017**	−1.424**
SE	0.455	0.007	0.626
N	183,782	183,782	46,135

First-order approximation; holder composition and regression samples differ.

Dobbs triggered active financial **RETREATS** from the market; **PESSIMISTIC** sentiment.
No new market information; no detectable change in job-loss or wage expectations.
A candidate channel is **ASSOCIATIVE MEMORY**.

2. DDD $y_{ist} = \alpha_s + \lambda_t + \delta G_{it} + \beta D_{st} + \tau(D_{st}G_{it}) + X_{it}'\gamma + \varepsilon_{ist}.$

	Cohort difference		Gender difference		Diagonal	
	(1) F65 vs F20–40	(2) M65 vs M20–40	(3) F65 vs M65	(4) M20–40 vs F20–40	(5) F65 vs M20–40	(6) M65 vs F20–40
DDD	**−2.65*****	**−2.30****	**−0.32**	**0.11**	**−2.71*****	**−2.29****
	(0.84)	(0.91)	(0.68)	(0.46)	(0.86)	(0.90)
Baseline	0.04	0.12	−1.83**	−0.49	0.38	−0.29
	(0.58)	(0.59)	(0.73)	(0.63)	(0.51)	(0.69)
Focal group	−2.61***	−2.19***	−2.15***	−0.37	−2.33***	−2.58***
	(0.66)	(0.73)	(0.67)	(0.64)	(0.68)	(0.76)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
State + year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	56,179	53,797	59,359	50,619	57,924	52,052
	Women 65+ respond strongly; women of reproductive age do not.		No inherent gender difference		Gendered memory	

How does memory work?
Direct cue vs ✓ **Memory-based cue**

3. RD–DiD

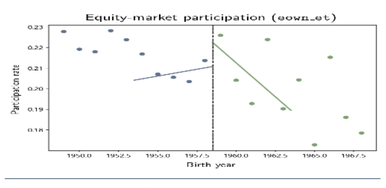
$y_{ist} = \alpha_s + \lambda_t + \beta D_{st} + \delta Z_i + \tau D_{st}Z_i + X_{it}'\vartheta + r_i(\gamma_0 + \gamma_1 D_{st} + \gamma_2 Z_i + \gamma_3 D_{st}Z_i) + \varepsilon_{ist}.$

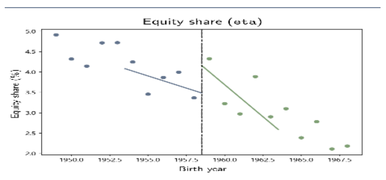
r_i = birth year − 1958.5; $Z_i = \mathbb{1}\{r_i < 0\}$; sample $|r_i| \le 5$. τ: jump in the cutoff

Cutoff: ECOA in full effect (1976) – age 18 = birth year 1958.5

Born before 1958.5
Turned 18 before ECOA.
Could be refused credit in her own name.
→ Dobbs cues this memory.

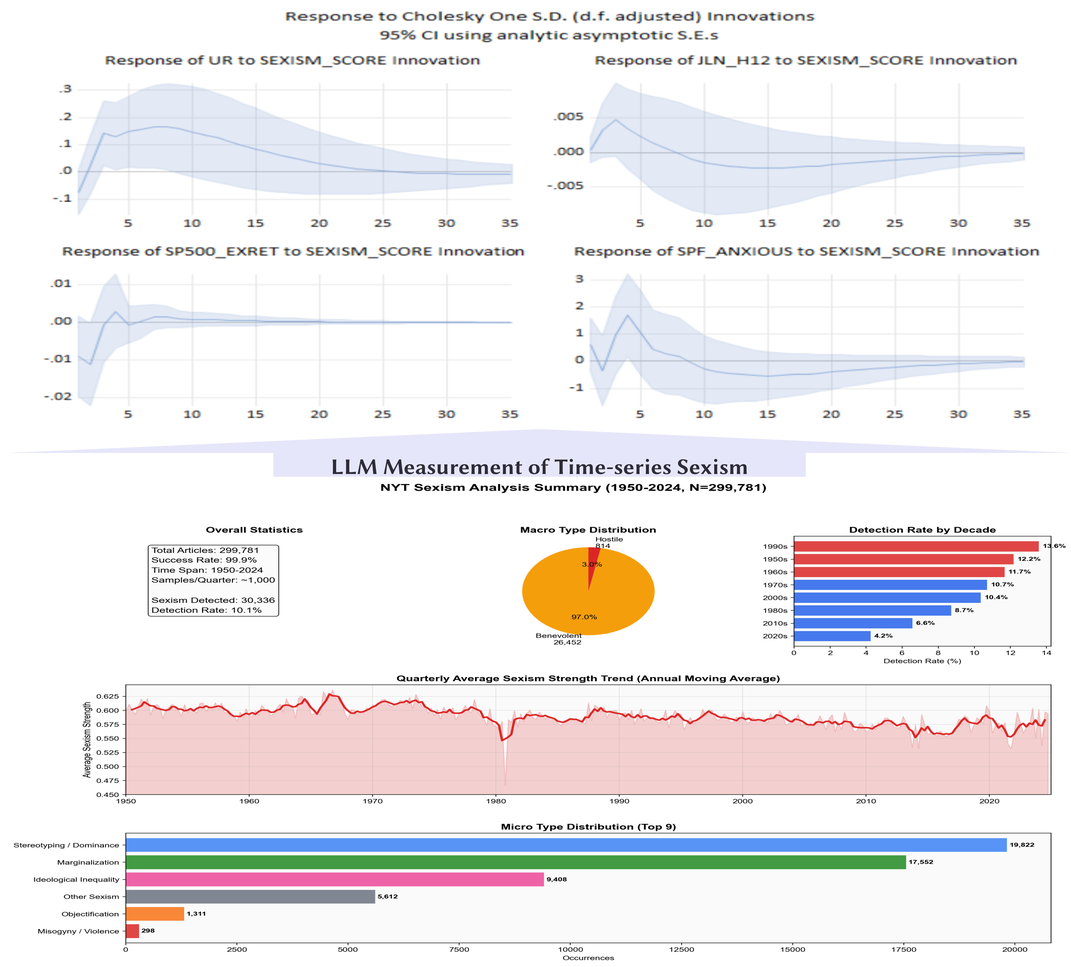
Born after 1958.5
Turned 18 after ECOA.
Entered adulthood with equal credit access.
→ No such memory to cue.





ECOA: Equal Credit Opportunity Act

Macro Generality: Sexism and the SPF Anxious Index



A Cognitive Account: Associative Memory

- Memory is a network: a cue activates related experiences (Collins and Loftus 1975).
- An ideological cue makes matching bad-state experiences easier to recall for those with such memories, so they are over-weighted in beliefs.
- Expectations, thus, can shift with no news about fundamentals, within cognitive memory.
- Macro evidence shows the pattern; the Dobbs evidence identifies the mechanism.

A Model of Cued-Memory Portfolio Choice and Discussion

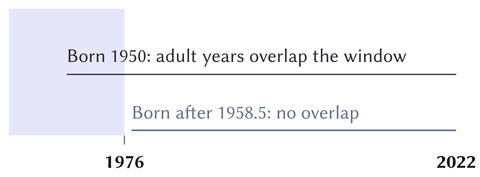
Memory. Being refused credit in her own name is a bad-state (B) experience.
Cue. Dobbs carries no economic news, but it retrieves that experience.
Choice. She puts higher odds on B and cuts her equity holdings.

1. The Match

m_i is the share of adult life inside the cue window, weighted by first-hand or second-hand memory.

$$m_i = \rho_{\text{type}(i)} \cdot \frac{\left|[\tau_i + a, t] \cap [T_c^{\text{start}}, T_c^{\text{end}}]\right|}{t - \tau_i - a + 1}$$

- Birth year fixes adult overlap; no free cohort parameter.
- Women: ρ = 1; men: ρ_v = 0.91 (second-hand).
- Born after 1958.5: no adult years in the window, so m_i = 0. The cue has nothing to retrieve.



2. Belief Formation: Cued Retrieval

A cue raises recall of matching experiences (Bordalo et al. 2023). Similarity weights retrieval:

$$S_i(e, I_t) = \exp(\lambda I_t\, a_i(e))$$

λ: cognitive sensitivity. $a_i(e)$ = 1 if experience e is bad-state and cue-activated. Averaging over the memory base gives the perceived probability of B:

$$\hat{\pi}_i(B \mid I_t) = \frac{m_i e^{\lambda I_t} + (q_i - m_i)}{m_i e^{\lambda I_t} + (q_i - m_i) + (1 - q_i)}$$

- With m_i = 0, the cue changes nothing.
- Under CARA utility, higher odds of B lower expected returns and locally raise perceived risk, so equity demand falls.

$$\alpha_i^* = \frac{\widetilde{\mathbb{E}}_t R_{t+1} - R_f}{\eta W_t \widetilde{\mathrm{Var}}_t R_{t+1}} - \frac{\widetilde{\mathrm{Cov}}_t(R_{t+1}, y_{t+1})}{W_t \widetilde{\mathrm{Var}}_t R_{t+1}}$$

Tildes denote subjective moments under cued beliefs.

3. How It Explains the Facts

The equity response scales with the match:

$$\left.\frac{\partial \alpha_i^*}{\partial I_t}\right|_{I_t = 0} = -\lambda g_i \Psi(q_i) m_i$$

- Younger cohorts with m_i = 0 do not respond; older cohorts do.
- Men respond almost as much as women: ρ_v = 0.91.
- Realised labour income does not respond: the cue shifts beliefs, not fundamentals.

4. One Parameter, Two Worlds

The same λ, calibrated only on households, implies (to second order) diagnostic expectations for forecasters (Bordalo et al. 2018):

$$E_t^\theta[X_{t+h}] = (1 + \theta)E_t[X_{t+h}] - \theta E_{t-1}[X_{t+h}]$$

- Calibrating slow internalisation to the quarter-4 Anxious Index peak implies nowcast-error predictability at h = 5.

Discussion

Where does extrinsic sentiment come from?

This paper provides a testable behavioural account: when her memory base and real events coincide, what counts as a bad or a good state for the future is judged from her own subjective experience.