Beyond bad luck... Macroeconomic implications of persistent heterogeneity in optimism

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Q: Are there belief differences across households?

Q: Do they help us understand differences in savings behavior and financial situations?

Q: If so, does it matter for macroeconomic outcomes and policies?

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- Using new micro data, we show that ...
  - ... there is belief heterogeneity which is linked to people's behavioral biases
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  - ... to derive implications of belief heterogeneity for fiscal policy:
    1. income targeted transfers less effective (conditional on same average MPC)
    2. different implications for public vs. private insurance policies

Literature Review

- Subjective expectations about future financial situations: Rozsypal and Schlafmann (2023), Claus and Nguyen (2023), Souleles (2004) ...

⇒ Contribution: show that financial-situation forecasts not sufficient, link to behavioral biases, link to financial constraints, GE model, insurance policies...

- HA(NK) models deviating from FIRE: Farhi and Werning (2019), Pfäuti and Seyrich (2023), Ilut and Valchev (2023) ...

⇒ Contribution: focus on beliefs about idiosyncratic variables, disciplined by new micro data, implications for insurance policies

- Permanent heterogeneity in HA(NK): Aguiar et al. (forthcoming), Krueger et al. (2016), ...

⇒ Contribution: disciplined by new micro data, luck vs. decisions, insurance policies

Outline

1. Empirics
2. Model
3. Belief Heterogeneity Improves Model Fit
4. Fiscal Policy

2-period consumption/savings model to build intuition

$$\max_{c_1, b_1, c_2} u(c_1) + \beta \tilde{E}_1 u(c_2)$$

$$\text{s. t.} \quad c_1 + \frac{b_1}{R_1} = w_1 z_1 n, \quad c_2 = \underbrace{w_2 z_2 n - \Xi_2 + b_1}_{= \text{Future financial situation}}$$

- CRRA preferences; future productivity z_2, wages w_2, expenses Ξ_2 are stochastic, hours n and interest rate R_1 are given; $\tilde{E}$: subjective expectations

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- How can we measure optimism/belief heterogeneity?

  1. $\tilde{E}_1(w_2 z_2 n - \Xi_2) > E_1(w_2 z_2 n - \Xi_2)$? But rational expectations are unobserved!
  2. $\tilde{E}_1(w_2 z_2 n - \Xi_2) > (w_2 z_2 n - \Xi_2)$? But could be due to bad shocks ("bad luck")!

A way to identify households with optimistic-biased beliefs

- We use an identifier of optimism that is correlated with financial-situation optimism

... but unlikely to be caused by financial-situation optimism

... and not driven by shocks

\+ conceptually related to over-optimism

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$\Rightarrow$ "overconfidence" about own abilities (Stango and Zinman (2023)):

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- Estimate correlation between overconfidence and proportion of overly-optimistic forecast errors as well as likelihood of being hand-to-mouth

Data: American Life Panel (ALP) between 2010 and 2022

- Two "behavioral" rounds (2014 & 2017) to elicit overconfidence, cognitive skills, other behavioral biases and preferences. 1500 completed one, 845 both rounds.

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    - highly correlated with income- and spending-growth forecasts; persistent within persons

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  - \+ controls: gender, education, income, wealth, age, ethnicity, cognitive abilities, financial literacy, preferences, behavioral common factors

Key empirical results

We find ...

... overconfidence about abilities statistically significantly correlated with future financial situations errors:

⇒ 2 std more overconfident ↔ 10-16pp more over-optimistic FFS errors

▸ Regression and regression results

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... overconfidence about abilities statistically significantly correlated with being hand-to-mouth:

⇒ 2 std more overconfident ↔ 11-16pp higher likelihood of being HtM

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... overconfidence about abilities statistically significantly correlated with being hand-to-mouth:

$\Rightarrow$ 2 std more overconfident $\leftrightarrow$ 11-16pp higher likelihood of being HtM

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... no clear correlations between HtM status and patience and risk aversion.

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1. Empirics
2. **Model**
3. Belief Heterogeneity Improves Macro Moments
4. Fiscal Policy

Standard HANK augmented by belief heterogeneity

Households

- idiosyncratic income risk and incomplete markets
- Households permanently belong to different groups—rational, mild optimists, strong optimists. Groups only differ in optimism w.r.t. to own future financial situation.
  - Baseline: optimism as upwards bias in expectations about future idiosyncratic productivity; robustness with expectations about aggregates and about expenses.
- Belief differences calibrated to match optimism heterogeneity in micro data

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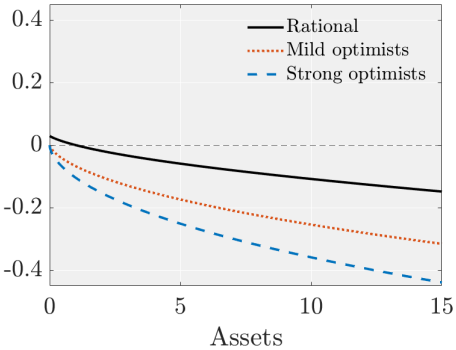
+ standard NK firms

+ monetary and fiscal policy. ▸ Model details

The Key Intuition: Savings policy and MPCs for median income state

Net savings



MPC

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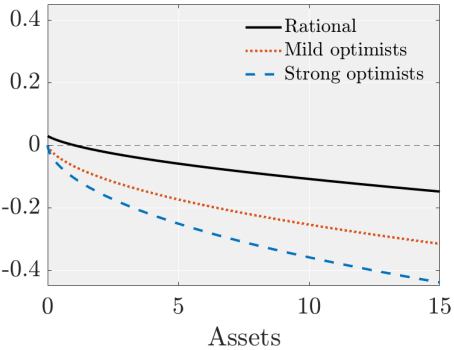

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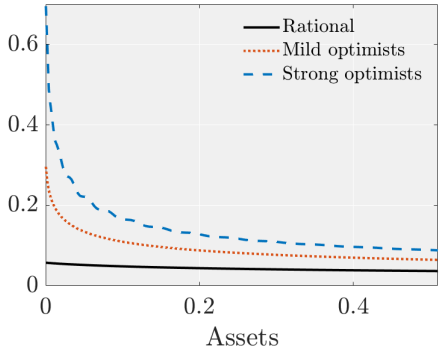

- Optimists build smaller buffer stock ⇒ ex-post more likely to be HtM
- Model predicts unobserved savings and MPC heterogeneity (Lewis et al. 2024, ...)

Outline

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3. **Belief Heterogeneity Improves Model Fit**
4. Fiscal Policy

Heterogeneity in optimism enables model to match average MPC

	HANK w/ Belief Het. (1)	Rational HANK (2)
HtM Share	0.23	
Avg. MPC	0.19	

Our model with heterogeneity in optimism does well in matching (untargeted) moments:

- HtM share of 23%
- Average MPC of 19% (consensus estimates of quarterly average MPCs: 15-25%)

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	HANK w/ Belief Het. (1)	Rational HANK (2)
HtM Share	0.23	0.03
Avg. MPC	0.19	0.04

Rational HANK performs poorly when targeting total wealth in the economy (Kaplan/Violante, 2022; Auclet et al., 2024)

- HtM share of 3%
- Average MPC of 4%

Heterogeneity in optimism enables model to match average MPC

	HANK w/ Belief Het. (1)	Rational HANK (2)
HtM Share	0.23	0.03
Avg. MPC	0.19	0.04

Our model with heterogeneity in optimism does well in matching (untargeted) moments:

- HtM share of 23%
- Average MPC of 19% (consensus estimates of quarterly average MPCs: 15-25%)
- Also better matches median wealth, Top 10% and Bottom 50% wealth shares.

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4. **Fiscal Policy**

Income-targeted transfers are less stimulating

- Transfers to bottom 25%: 1% of steady-state GDP, persistence 0.8
- Compare 3 models: Belief Het., Rational, and Rational with same average MPC as our model ("low wealth")

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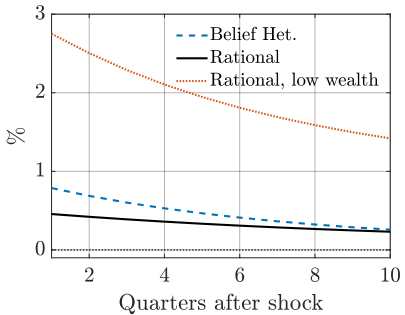

Where are these differences coming from?

1. average MPC vs. average MPC of transfer recipients ▸ MPC/income distribution
2. relaxation of precautionary-savings channel is dampened

Additional fiscal policy results

1. Public insurance (i.e., minimum-income benefits) leads to less crowding out of private insurance ▸ Details

2. Incentivizing self insurance via more liquid public debt is not as effective: optimal government debt level is lower ▸ Details

Further results and extensions

1. results robust when accounting for share of pessimistic households ▸ Details
2. two-asset HANK with optimism-heterogeneity improves upon existing two-asset models ▸ Details
3. data "prefers" belief heterogeneity over heterogeneity in patience (and risk aversion) ▸ Details
4. other microfoundations of over-optimism (expense neglect, too optimistic about aggregates)

Conclusion

- We identify belief heterogeneity w.r.t. to own future financial situation:
  - optimistic-biased beliefs $\leftrightarrow$ financial constraints

  $\Rightarrow$ Belief heterogeneity helps us to understand heterogeneity in savings behavior ("not just bad luck")

- Standard HANK extended by heterogeneity in optimism:
  - rationalizes our findings and improves fit to macro data
  - produces several novel implications for fiscal, stabilization, and social insurance policy

  $\Rightarrow$ Reason for why households differ in their savings behavior matters for macro aggregates and macro policies

Appendix

Literature I

Aguiar, M. A., M. Bils, and C. Boar (forthcoming): "Who are the Hand-to-Mouth?," *Review of Economic Studies*.

Andreou, E., M. Demetriadou, and A. Tryphonides (2023): "The Cross Section of Household Preferences and the Marginal Propensity to Consume: Evidence from high-frequency data," *Working Paper*.

Auclert, A., M. Rognlie, and L. Straub (forthcoming): "The intertemporal Keynesian cross," *Journal of Political Economy*.

Barsky, R. B., F. T. Juster, M. S. Kimball, and M. D. Shapiro (1997): "Preference parameters and behavioral heterogeneity: An experimental approach in the health and retirement study," *The Quarterly Journal of Economics*, 112, 537–579.

Bayer, C., R. Lütticke, L. Pham-Dao, and V. Tjaden (2019): "Precautionary savings, illiquid assets, and the aggregate consequences of shocks to household income risk," *Econometrica*, 87, 255–290.

Literature II

Boehm, J., E. Fize, and X. Jaravel (2023): "Five facts about MPCs: Evidence from a randomized experiment," .

Claus, E. and V. H. Nguyen (2023): "Biased expectations," *European Economic Review*, 154, 104424.

Dohmen, T., A. Falk, D. Huffman, and U. Sunde (2010): "Are risk aversion and impatience related to cognitive ability?" *American Economic Review*, 100, 1238–1260.

Farhi, E. and I. Werning (2019): "Monetary policy, bounded rationality, and incomplete markets," *American Economic Review*, 109, 3887–3928.

Gillen, B., E. Snowberg, and L. Yariv (2019): "Experimenting with measurement error: Techniques with applications to the Caltech cohort study," *Journal of Political Economy*, 127, 1826–1863.

Ilut, C. and R. Valchev (2023): "Economic agents as imperfect problem solvers," *The Quarterly Journal of Economics*, 138, 313–362.

Kaplan, G., B. Moll, and G. L. Violante (2018): "Monetary Policy According to HANK," *American Economic Review*, 108, 697–743.

Literature III

Kaplan, G. and G. L. Violante (2022): "The marginal propensity to consume in heterogeneous agent models," *Annual Review of Economics*, 14, 747–775.

Krueger, D., K. Mitman, and F. Perri (2016): "Macroeconomics and household heterogeneity," in John Taylor and Harald Uhlig (eds) *Handbook of Macroeconomics*, Elsevier, vol. 2, 843–921.

Pfäuti, O. and F. Seyrich (2023): "A behavioral heterogeneous agent new keynesian model," *Working Paper*.

Rozsypal, F. and K. Schlafmann (2023): "Overpersistence bias in individual income expectations and its aggregate implications," *American Economic Journal: Macroeconomics*, 15, 331–371.

Souleles, N. S. (2004): "Expectations, heterogeneous forecast errors, and consumption: Micro evidence from the Michigan consumer sentiment surveys," *Journal of Money, Credit and Banking*, 39–72, Vol. 36(1).

Stango, V. and J. Zinman (2023): "We Are All Behavioural, More, or Less: A Taxonomy of Consumer Decision-Making," *The Review of Economic Studies*, 90, 1470–1498.

Data: American life panel, 2010 - 2022

- construct financial-situations forecast errors:
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  - these forecasts are persistent within person: learning over time is modest and there is little evidence for over-correction

$\Rightarrow$ compute proportion of overly-optimistic FS forecast errors for all panelists for which we have at least two pairs of expectations and realizations

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  - rank consumers by their over-optimism and use average percentile as our measure of over-optimism about abilities
- Financial constraint measures: financial distress (2014 & 2017, saying yes to severe financial distress, i.e., hunger, foregone medical payments, eviction, could not make payments), and a summary measure from 9 Covid modules

back

Main regression

Empirical specification:

$$fs\_opt_i = \alpha + \beta \cdot ability\_OC_i + \Gamma X_i + \epsilon_i$$

- fs_opt_i: proportion of overly-optimistic future financial situations
- $ability\_OC_i$: average percentile of overconfidence about own abilities
- X_i: controls
  1. Controls 1: gender, education, income, age, ethnicity
  2. Controls 2: + cognitive abilities and financial literacy
  3. Controls 3: + preferences (patience and risk aversion)
  4. Controls 4: + 3 behavioral common factors
  5. Controls 5: + additional fourth behavioral common factor

back

Overconfidence and future financial situations are correlated

	(1) FS Optimism	(2) FS Optimism	(3) FS Optimism	(4) FS Optimism	(5) FS Optimism
$\widehat{\beta}$	0.00233**	0.00217**	0.00252***	0.00267***	0.00176**
	(0.000932)	(0.000913)	(0.000867)	(0.000886)	(0.000827)
Controls 1:	Yes	Yes	Yes	Yes	Yes
Controls 2:	Yes	Yes	Yes	Yes	No
Controls 3:	Yes	Yes	Yes	No	No
Controls 4:	Yes	Yes	No	No	No
Controls 5:	Yes	No	No	No	No
N	424	424	424	446	474

Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

- Being two standard deviations more overconfident is associated with an increase of over-optimism about future financial situations by about 10-16pp

▸ back

Overconfidence and financial constraints are correlated

	(1) FD in both	(2) FD in round 1	(3) FD in round 2	(4) HtM COVID
Overconfidence	0.00259**	0.00263**	0.00303**	0.00211*
	(0.00127)	(0.00132)	(0.00138)	(0.00115)
Controls 1:	Yes	Yes	Yes	Yes
Controls 2:	Yes	Yes	Yes	Yes
Controls 3:	Yes	Yes	Yes	Yes
Controls 4:	Yes	Yes	Yes	Yes
Controls 5:	Yes	Yes	Yes	Yes
N	756	756	758	481

Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

- Being two standard deviations more overconfident about abilities is associated with a 11-16pp higher likelihood of being financially constrained

▸ back

Relationship to IV

We want to answer the question whether belief differences explain differences in savings behavior / HtM status. But, FFS forecast errors (= belief differences) may arise due to bad luck which would also render you to be more likely to be HtM. So, we want an instrument for FFS forecast errors that does not suffer from this endogeneity problem. Thus, we need an instrument that is correlated with FFS FCEs but does not have a direct effect on HtM status.

When we do IV, we get that when you are 2 sd more often sfc optimist, then you are 44pp more likely to be HtM ‣ back

FS optimism and income expectations are correlated

	(1) FS Optimists	(2) FS Optimists
Subjective prop. of income increase	0.00484***	
	(0.000195)	
Subjective prop. of real income increase		0.00546***
		(0.000239)
N	15047	15049

Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

- Consumers that assign a two standard deviations higher probability that their income will go up, are 30-35pp more likely to be overly-optimistic about their future financial situations

back

Relationship to Sergeyev et al. 2024 (SLG)

Empirical differences:

- Only Covid-time could lead to overestimation of importance of stress

Differences of models:

- SLG also provide a theory how certain households are more likely to be HtM yet require two changes to the standard model
  1. financial stress as a direct utility cost with costs decreasing in wealth and
  2. "naive" households neglect these costs in the future $\Rightarrow$ save less and end up in "poverty traps".
- Beliefs are key for both but two important differences:
  1. We have direct micro evidence to discipline our belief parameters wheras SLG use share of naive households as free parameter to target financial constraints households.
  2. In their model, sophisticated households are counterfactually never HtM
- They do not share our focus matching key moments for HANK models (Their model does not match average MPC and average wealth simultaneously, HtM income distribution,...)
- Fiscal policy exercise: SLG focus on labor supply channel of lump-sum transfers vs. our focus on targeted transfers and insurance fiscal policies back

Cognitive skills, overconfidence and HtM status

	CS rank: cf		1=Oc both rounds		Oc pctile rank		Row var., unw.	Row var., w.
	Unw.	W.	Unw.	W.	Unw.	W.	Pop. share	Pop. share
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Severe financial distress	-0.335	-0.287	0.176	0.273	0.194	0.180	0.277	0.305
s.e.	0.040	0.073	0.059	0.119	0.039	0.078	0.016	0.035
N	841	841	813	813	813	813	813	813
Low net worth	-0.397	-0.368	0.250	0.198	0.226	0.086	0.397	0.468
s.e.	0.038	0.061	0.057	0.097	0.041	0.073	0.018	0.032
N	788	788	760	760	760	760	760	760
paycheck-to-paycheck, 2012	-0.292	-0.503	0.151	0.008	0.154	0.168	0.588	0.560
s.e.	0.065	0.083	0.099	0.238	0.074	0.121	0.031	0.077
N	263	263	255	255	255	255	255	255
paycheck-to-paycheck, COVID	-0.383	-0.275	0.224	0.204	0.301	0.292	0.400	0.437
s.e.	0.020	0.021	0.053	0.090	0.049	0.079		
N	527	527	516	516	516	516	516	516
1=(Lacks prec. savings)	-0.300	-0.304	0.112	0.086	0.181	0.188	0.634	0.718
s.e.	0.070	0.123	0.101	0.162	0.071	0.105	0.030	0.043
N	272	272	262	262	262	262	262	262
Difficult covering 2k	-0.398	-0.426	0.230	0.314	0.222	0.253	0.512	0.590
s.e.	0.041	0.060	0.065	0.093	0.050	0.069		
N	499	499	485	485	485	485	485	485

Note: CS = cognitive skills, measured as the common factor of four standard tests; OC= overconfidence re: relative performance in a cognitive skills test (see Section 2.1 for details). Weighted estimates use the sampling probability for the last SZ module. In Columns 5 and 6, we use Obviously Related Instrumental Variables to account for measurement error by having the two measurements of o/c rank (taken in 2014 and 2017) instrument for each other (Gillen et al. (2019); Stango and Zinman (2023)).

▸ back

Persistent overconfidence: prevalence and relationship to income

	Overconfident in both survey rounds?			
	Yes Unweighted	No Unweighted	Yes Weighted	No Weighted
Population share	0.34		0.38	
	(0.02)		(0.04)	
Mean Income	51,182$	79,765$	42,035$	77,145$
N	817	817	817	817

Note: Standard errors in parentheses. Weighted estimates use the sampling probability for the last SZ module.

▸ back

Subjective financial condition forecasts are strongly positively correlated with income forecasts

	Forecasted probability of increase in:			
	Nominal income		Real income	
	Unweighted	Weighted	Unweighted	Weighted
	(1)	(2)	(3)	(4)
1= Optimistic forecast of sfc	0.00487	0.00484	0.00576	0.00546
s.e.	(0.00015)	(0.00020)	(0.00018)	(0.00024)
N	15,047	15,047	15,049	15,049
N panelists	3057	3057	3056	3056

Notes: Each column presents results from a single OLS regression of the row variable on the column variable and a constant. Standard errors, clustered on panelist, in parentheses. Weighted estimates use the ALP sampling probability weight for each observation. Income forecasts in percentage point units, so e.g., a point estimate of 0.005 indicates a 1/2 percentage point increase in sfc optimism per 1 pp increase in the probability of an income increase. SFC forecast optimism is indicated by responding to the question "Now looking ahead - do you think that a year from now you will be better off financially, or worse off, or just about the same as now?" with "Will be better off".

Household financial condition forecasts and forecast errors tilt optimistic

Panel A. All forecasts, unweighted	Realization this year			
Forecast last year	Better	Same	Worse	Total
Better	0.10	0.13	0.04	0.27
Same	0.06	0.45	0.10	0.61
Worse	0.01	0.05	0.07	0.12
Total	0.16	0.63	0.21	1
Panel B. July 2009 & 2010, unweighted	Realization this year			
Forecast last year	Better	Same	Worse	Total
Better	0.06	0.16	0.05	0.28
Same	0.05	0.40	0.15	0.60
Worse	0.01	0.05	0.07	0.12
Total	0.12	0.61	0.27	1
Panel C. July 2009 & 2010, weighted	Realization this year			
Forecast last year	Better	Same	Worse	Total
Better	0.07	0.18	0.05	0.30
Same	0.04	0.38	0.14	0.56
Worse	0.01	0.07	0.06	0.14
Total	0.12	0.63	0.25	1

Note: Cells report sample proportions. Forecasts: "Now looking ahead - do you think that a year from now you will be better off financially, or worse off, or just about the same as now?" Response options: Will be better off/About the same/Will be worse off. Realizations: "We are interested in how people are getting along financially these days. Would you say that you are better off or worse off financially than you were a year ago?" Response options: Better off/About the same/Worse off. Weighted estimates use sampling probabilities from the realization survey(s), which are correlated 0.90 and 0.93 with the weight from the paired forecast survey. Sample size is 21,586 in Panel A, 1,679 in Panels B and C, and 1,882 in Panels D and E.

Household financial condition forecasts and forecast errors tilt optimistic

Panel D. January 2015 & 2016, unweighted	Realization this year			
Forecast last year	Better	Same	Worse	Total
Better	0.10	0.14	0.04	0.28
Same	0.06	0.47	0.08	0.61
Worse	0.01	0.05	0.06	0.12
Total	0.17	0.66	0.18	1
Panel E. January 2015 & 2016, weighted	Realization this year			
Forecast last year	Better	Same	Worse	Total
Better	0.11	0.13	0.03	0.27
Same	0.05	0.50	0.08	0.63
Worse	0.01	0.04	0.05	0.10
Total	0.17	0.67	0.16	1

Note: Cells report sample proportions. Forecasts: "Now looking ahead - do you think that a year from now you will be better off financially, or worse off, or just about the same as now?" Response options: Will be better off/About the same/Will be worse off. Realizations: "We are interested in how people are getting along financially these days. Would you say that you are better off or worse off financially than you were a year ago?" Response options: Better off/About the same/Worse off. Weighted estimates use sampling probabilities from the realization survey(s), which are correlated 0.90 and 0.93 with the weight from the paired forecast survey. Sample size is 21,586 in Panel A, 1,679 in Panels B and C, and 1,882 in Panels D and E.

Household financial condition forecast errors are persistent

	Forecast error this survey			
FCE previous survey	Optimist	Realist	Pessimist	Total
Optimist	0.10	0.09	0.01	0.19
Realist	0.08	0.61	0.04	0.73
Pessimist	0.01	0.04	0.03	0.08
Total	0.18	0.74	0.07	1

Note: Sample is 10,546 forecast error pairs from 2,469 panelists. Here we require $\geqslant 2$ forecast-realization pairs per panelist and only include realizations of "about the same", to allow for the sharpest feasible test of persistence, by holding realizations constant and allowing for forecast errors in either direction (thereby minimizing measurement error from censoring).

Household financial condition forecast learning?

Panel A. First forecast - realization pair	Realization this year			
Forecast last year	Better	Same	Worse	Total
Better	0.09	0.16	0.06	0.31
Same	0.05	0.40	0.12	0.57
Worse	0.01	0.05	0.06	0.12
Total	0.15	0.61	0.23	1
Panel B. Last forecast - realization pair	Realization this year			
Forecast last year	Better	Same	Worse	Total
Better	0.10	0.13	0.04	0.28
Same	0.06	0.46	0.09	0.61
Worse	0.01	0.05	0.06	0.11
Total	0.17	0.65	0.18	1

Note: Sample includes only the 3073 panelists with multiple forecast-realization pairs.

Pairwise correlations between persistent overconfidence about cognitive skills and persistent optimistic forecast errors

	1 = oc both rounds		oc percentile rank		Mean(row var)	
	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted
	(1)	(2)	(3)	(4)	(5)	(6)
1=(Prop. opt. FEs $>$ 0.5)	0.120	0.037	0.098	0.077	0.299	0.270
s.e.	0.078	0.129	0.054	0.086		
N	462	462	462	462	462	462
1=(Prop. opt. FEs $\geqslant$ 0.5)	0.120	0.035	0.109	0.080	0.400	0.380
s.e.	0.075	0.127	0.054	0.095		
N	462	462	462	462	462	462
Prop. opt. FEs	0.063	0.011	0.093	0.104	0.403	0.390
s.e.	0.059	0.094	0.053	0.085		
N	462	462	462	462	462	462

Note: Overconfidence re: relative performance in a cognitive skills test. Forecast errors re: household financial condition. Weighted estimates use the mean of each panelist's: (sample probably weight from the last SZ module, mean sampling weight across the survey(s) with the realization component of the forecast error(s) used here). In Columns (3) and (4), we use Obviously Related Instrumental Variables to account for measurement error by having the two measurements of o/c rank (taken in 2014 and 2017) instrument for each other (Gillen et al. (2019), Stango and Zinman (2023)). We do not take the same approach to the overconfidence indicator in Columns (1) and (2), because measurement error-IV does not work well on misclassification error. Fully non-IV correlations estimated using tetrachoric or Pearson.

Pairwise correlations between persistent optimism about financial condition and HtM measures, using all data for non-SZ modules

	Proportion optimistic forecast errors 1=(⩾ 0.5)		1=(> 0.5)				Row variable pop. share	
	Unw.	Weighted	Unw.	Weighted	Unw.	Weighted	Unw.	Weighted
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1=(lives paycheck-to-paycheck c. 2012)	0.143	0.207	0.137	0.133	0.138	0.168	0.482	0.495
s.e.	0.048	0.069	0.051	0.070	0.038	0.053	0.015	0.022
N	1068	1068	1068	1068	1068	1068	1068	1068
Lives paycheck-to-paycheck, COVID era	0.185	0.160	0.168	0.105	0.153	0.103	0.382	0.386
s.e.	0.037	0.049	0.039	0.053	0.030	0.030		
N	1086	1086	1086	1086	1086	1086		
1=(Lacks precautionary savings in 2012 and 2018)	0.338	0.317	0.340	0.309	0.297	0.271	0.355	0.385
s.e.	0.051	0.067	0.053	0.069	0.038	0.054	0.016	0.022
N	864	864	864	864	864	864	864	864
1=(Lacks precautionary savings in 2012 or 2018)	0.364	0.336	0.385	0.332	0.363	0.347	0.581	0.615
s.e.	0.050	0.064	0.052	0.068	0.038	0.054	0.017	0.021
N	864	864	864	864	864	864	864	864
Difficulty covering $2k emergency expense	0.166	0.143	0.189	0.151	0.162	0.120	0.476	0.515
s.e.	0.030	0.042	0.031	0.043	0.023	0.033		
N	2480	2480	2480	2480	2480	2480		

Note: Here we combine all the data we have on sfc forecast errors and HtM measures. Weighted estimates using the mean sampling weight across all sfc realizations per panelist.

Persistent overconfidence: Correlations with cognitive skills

	1 = oc both rounds		oc percentile rank	
	Unweighted	Weighted	Unweighted	Weighted
	(1)	(2)	(3)	(4)
Cognitive skill measures				
Summary: 1st common factor	-0.637	-0.629	-0.770	-0.743
s.e.	0.025	0.050	0.035	0.061
N	817	817	817	817
Summary: 1st principal component	-0.546	-0.542	-0.818	-0.830
s.e.	0.030	0.045	0.032	0.049
N	733	733	733	733
Component: Fluid intelligence	-0.718	-0.734	-1.049	-1.065
s.e.	0.026	0.047	0.026	0.055
N	817	817	817	817
Component: Numeracy	-0.362	-0.453	-0.573	-0.656
s.e.	0.040	0.068	0.046	0.077
N	798	798	798	798
Component: Financial literacy	-0.321	-0.242	-0.467	-0.362
s.e.	0.038	0.087	0.041	0.087
N	813	813	813	813
Component: Executive function	-0.316	-0.407	-0.444	-0.600
s.e.	0.045	0.072	0.052	0.090
N	749	749	749	749

Note: Overconfidence re: relative performance in a cognitive skills test. All cognitive skills measures are percentile ranks. of each of the component measures shown in the table (see Stango and Zinman (2023) for details on component measures). Weighted estimates use the sampling probability for the last SZ module. All cognitive skills measures, and overconfidence percentile rank, use Obviously Related Instrumental Variables to account for measurement error by having the two rank measures (taken in 2014 and 2017) instrument for each other (Gillen et al. (2019), Stango and Zinman (2023)).

▸ back

Pairwise correlations between persistent optimistic forecast errors and patience and risk aversion

	Patience		Risk aversion			
	Unw. (1)	Weighted (2)	Unw. (3)	Weighted (4)	Unw. (5)	Weighted (6)
Panel A. Main sample: Considering all potentially optimistic FCEs						
1=(Prop. optimistic FCEs¿0.5)	-0.051	-0.109	-0.051	-0.119	-0.069	-0.198
s.e.	0.070	0.132	0.059	0.099	0.054	0.089
N	447	447	468	468	465	465
1=(Prop. optimistic FCEs⩾ 0.5)	-0.011	-0.013	-0.056	-0.117	-0.055	-0.146
s.e.	0.071	0.136	0.059	0.104	0.054	0.092
N	447	447	468	468	465	465
Prop. optimistic forecast errors	-0.117	-0.133	-0.087	-0.146	-0.048	-0.157
s.e.	0.072	0.139	0.060	0.108	0.054	0.084
N	447	447	468	468	465	465
Panel B. Other sample: Considering only potentially symmetric FCEs						
1=(Prop. optimistic FCEs¿0.5)	-0.080	-0.087	-0.054	-0.091	-0.094	-0.210
s.e.	0.075	0.133	0.065	0.094	0.058	0.085
N	387	387	403	403	402	402
1=(Prop. optimistic FCEs⩾ 0.5)	-0.003	-0.037	-0.079	-0.144	-0.071	-0.141
s.e.	0.076	0.135	0.063	0.095	0.058	0.101
N	387	387	403	403	402	402
Prop. optimistic forecast errors	-0.086	-0.067	-0.070	-0.060	-0.102	-0.193
s.e.	0.075	0.141	0.065	0.102	0.058	0.091
N	387	387	403	403	402	402

▸ back

Pairwise correlations between persistent HtM measures and patience and risk aversion

	Patience		Risk aversion			
	Unw.	Wtd.	Unw.	Wtd.	Unw.	Wtd.
	(1)	(2)	(3)	(4)	(5)	(6)
1=(Severe financial distress)	-0.014	-0.081	0.107	0.029	0.036	0.077
s.e.	(0.057)	(0.143)	(0.042)	(0.091)	(0.049)	(0.123)
N	780	780	818	818	832	832
1=(Low net worth)	-0.025	-0.073	0.057	0.080	0.136	0.032
s.e.	(0.058)	(0.098)	(0.042)	(0.074)	(0.050)	(0.090)
N	734	734	765	765	778	778
1=(paycheck-to-paycheck c. 2012)	0.062	0.377	0.010	0.069	0.048	-0.157
s.e.	(0.100)	(0.167)	(0.073)	(0.164)	(0.088)	(0.311)
N	233	233	256	256	260	260
paycheck-to-paycheck, COVID era	-0.126	-0.014	0.084	0.051	0.130	0.007
s.e.	(0.073)	(0.120)	(0.051)	(0.075)	(0.057)	(0.098)
N	493	493	516	516	519	519
1=(Lacks prec. saving in 2012 & 2018)	-0.218	-0.186	0.114	0.051	0.068	-0.078
s.e.	(0.083)	(0.127)	(0.070)	(0.114)	(0.077)	(0.140)
N	254	254	264	264	269	269
Difficult covering $2k emerg. expenses	-0.154	-0.039	0.136	0.146	0.108	0.133
s.e.	(0.065)	(0.117)	(0.051)	(0.078)	(0.058)	(0.108)
N	462	462	487	487	491	491

▸ back

Correlations between overconfidence and patience and risk aversion

	Patience		Risk Aversion			
	Unwtd.	Weighted	Unwtd.	Weighted	Unwtd.	Weighted
	(1)	(2)	(3)	(4)	(5)	(6)
1=Oc both rounds	0.035	-0.011	-0.082	-0.198	0.164	0.242
s.e.	(0.056)	(0.141)	(0.040)	(0.074)	(0.050)	(0.120)
N	758	758	813	813	807	807
Oc percentile rank	0.001	-0.010	-0.146	-0.315	0.237	0.306
s.e.	(0.066)	(0.118)	(0.049)	(0.079)	(0.056)	(0.116)
N	758	758	813	813	807	807

Notes: Weighted estimates use sampling probability from the last SZ module. Discrete measure of overconfidence defined as exhibiting above-median confidence in relative performance on a fluid intelligence test in both 2014 and 2017. Patience is the average savings rate across 24 convex time budget choices. Risk aversion in Columns (3) and (4) is based on the Dohmen et al. (2010) financial risk-taking scale, and in Columns (5) and (6) on the Barsky et al. (1997) lifetime income gamble elicitation. We use Obviously Related Instrumental Variables to account for measurement error in the column variables, and in overconfidence percentile rank, by using the two measures of each (taken in 2014 and 2017) to instrument for each other (Gillen et al., 2019; Stango and Zinman, 2023).

▸ back

Model Overview

Households:

- incomplete markets, idiosyncratic risk, permanent belief heterogeneity

Firms:

- representative firm, flexible prices, produces output Y_t using labor N_t: $Y_t = N_t$

Labor unions:

- sticky wages w_t, all households work same number of hours

Government:

- fiscal policy issues bonds B_t, pays interest R_t and raises taxes T_t: $B_t + T_t = R_t B_{t-1}$
- monetary policy keeps real rate constant: $1 + r_t = R_t = 1 + \bar{r}$

Households

Continuum of infinitely-lived households (permanent heterogeneity denoted by g):

$$V_{g,t}\left(b_{t-1}, e_t\right) = \max_{c_t, b_t} \left\{ \frac{c_t^{1-\gamma}}{1-\gamma} - \frac{n_t^{1+\varphi}}{1+\varphi} + \beta \tilde{\mathbb{E}}_{g,t} \Big[V_{g,t+1}\left(b_t, e_{t+1}\right) \Big] \right\}$$

subject to

$$c_t + \frac{b_t}{1+r_t} = b_{t-1} + (1-\tau_t) w_t e_t n_t$$
$$b_t \geqslant -\underline{b},$$

- c_t: consumption, n_t: hours worked, τ_t: taxes, b_t: bonds, e_t: idiosyncratic productivity
- beliefs: $\tilde{\mathbb{E}}_{g,t}$ various degrees of optimism (see next slide)
- Parameters: γ: relative risk aversion, φ: inverse Frisch elasticity of labor supply, β: time discount factor, $\underline{b}$: borrowing limit

Baseline: Biased beliefs about future idiosyncratic income

- (Discretized) Productivity states: $e_1 < e_2 < ... < e_J$
- Transition probabilities: $p_{ij} \equiv p(e_{t+1} = e_j | e_t = e_i)$

Baseline: Biased beliefs about future idiosyncratic income

- (Discretized) Productivity states: $e_1 < e_2 < ... < e_J$
- Transition probabilities: $p_{ij} \equiv p(e_{t+1} = e_j | e_t = e_i)$
- Perceived transition probabilities $\tilde{p}_{ij}$:

$$\tilde{p}_{ij} \equiv \begin{cases} \alpha_g p_{ij}, & \text{if } i < j \\ \frac{1}{\alpha_g} p_{ij}, & \text{if } i > j \\ 1 - \sum_{j \neq i} \tilde{p}_{ij}, & \text{if } i = j. \end{cases}$$

- $\alpha_g \geqslant 1$ captures belief accuracy:
  - $\alpha_g > 1$: optimists $\Rightarrow$ overestimate probability of high productivity states
  - $\alpha_g = 1$: rational

Calibration

- Belief heterogeneity with three groups matches our FCE data:
  1. 50% rational ($\sim$ 50% consumers with lowest optimism about own abilities), $\alpha_1 = 1.0$
  2. 25% mild optimists ($\sim$ 50% - 75%), $\alpha_2 = 1.6$
  3. 25% strong optimists ($\sim$ 25% highest optimists), $\alpha_3 = 2.1$

  $\Rightarrow$ avg. likelihood of optimistic FCEs increases by 10pp (Data: 9pp) and 15pp (Data: 15pp)

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  $\Rightarrow$ avg. likelihood of optimistic FCEs increases by 10pp (Data: 9pp) and 15pp (Data: 15pp)
- Rest of calibration standard HANK calibration

Parameter	Description	Value
R	Steady State Real Rate (annualized)	4%
γ	Risk aversion	2
φ	Inverse of Frisch elasticity	2
$\underline{b}$	Borrowing constraint	0
$\frac{\bar{B}}{4\bar{Y}}$	Average wealth to average income	4.1
ρ_e	Persistence of idiosyncratic risk	0.966
σ_e^2	Variance of idiosyncratic risk	0.033

Back

Why not classical preference heterogeneity? ▸ back

Others have proposed preference heterogeneity as driver of HtM status:

- patience:
  (Aguiar et al., forthcoming; Kaplan and Violante, 2022; Andreou et al., 2023)
  - even speculated that behavioral biases may be driver of heterogeneity in patience
    (Aguiar et al., forthcoming)
- risk aversion (and intertemporal elasticity of substitution) (Kaplan/Violante)

but...

- theoretical and quantitative "disadvantages" and matters for policy prescriptions
  ▸ Details
- correlations with key micro variables are weak at best ▸ SFC ▸ HtM ▸ OC

▸ back

Model with discount factor heterogeneity

- In theory: model with discount factor heterogeneity can match average MPCs and average wealth if degree of heterogeneity is free parameter
- Yet:
  - models are not equivalent
  - discount factor heterogeneity not supported by data
  - suffers from "missing middle" problem (Kaplan and Violante (2022))
  - fiscal policy implications can differ (e.g. optimal debt level even higher than in rational model)

▸ back empirics ▸ back model

The wealth distribution

- One way for the standard model to match empirical estimates of the average MPC is to reduce the amount of liquidity in the economy (Kaplan/Violante, 2022)
  - but this produces a "missing-middle problem": very polarized wealth distribution
  - reflected in too low median wealth to average income: 0.2 (1.5 in the data)

The wealth distribution

- One way for the standard model to match empirical estimates of the average MPC is to reduce the amount of liquidity in the economy (Kaplan/Violante, 2022)
  - but this produces a "missing-middle problem": very polarized wealth distribution
  - reflected in too low median wealth to average income: 0.2 (1.5 in the data)
- Our model resolves this issue: median wealth to income ratio of 1.4
- Plus: relatively good fit of (untargeted) wealth inequality statistics:
  - top 10% wealth share of 45% vs. 49% in the data
  - bottom 50% wealth share of 3% vs. 2% in the data

▸ Relationship with discount factor heterogeneity ▸ back

Extensions

We consider two extensions:

1. allow for underconfident households
   - data: 11% of consumers are underconfident in both rounds

   $\Rightarrow$ HtM share, average MPC and top 10% wealth share slightly increase (but overall results practically unchanged)

Extensions

We consider two extensions:

1. allow for underconfident households
   - data: 11% of consumers are underconfident in both rounds

   $\Rightarrow$ HtM share, average MPC and top 10% wealth share slightly increase (but overall results practically unchanged)

2. different specification of overconfidence:

$$\tilde{p}_{ij} \equiv \begin{cases} \alpha^{(e_j - e_i)} p_{ij}, & \text{if } i \neq j \\ 1 - \sum_{j \neq i} \tilde{p}_{ij}, & \text{if } i = j. \end{cases}$$

   - average MPC largely unchanged, HtM share somewhat higher

▸ back

Two-asset model

Introduce second (illiquid) asset k (Kaplan et al., 2018; Bayer et al., 2019; Auclert et al., forthcoming)

The household's budget constraint now reads:

$$c_t + \frac{b_t}{1+r_t} + k_t = b_{t-1} + (1 + r_t^k)k_{t-1} + (1-\tau_t)w_t \bar{e}_g e_t n_t$$

Asset k can only be adjusted with probability λ

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$$c_t + \frac{b_t}{1+r_t} + k_t = b_{t-1} + (1 + r_t^k)k_{t-1} + (1-\tau_t)w_t \bar{e}_g e_t n_t$$

Asset k can only be adjusted with probability λ

Aggregate production function: $Y_t = K_{t-1}^{\chi} N_t^{1-\chi}$

Two-asset model

Introduce second (illiquid) asset k (Kaplan et al., 2018; Bayer et al., 2019; Auclert et al., forthcoming)

The household's budget constraint now reads:

$$c_t + \frac{b_t}{1+r_t} + k_t = b_{t-1} + (1 + r_t^k)k_{t-1} + (1-\tau_t)w_t \bar{e}_g e_t n_t$$

Asset k can only be adjusted with probability λ

Aggregate production function: $Y_t = K_{t-1}^{\chi} N_t^{1-\chi}$

Calibration targets: total wealth to income, liquid wealth to income, average MPC

Parameter	Description	Value
χ	Capital share	0.318
δ	Depreciation rate	0.0175
λ	Capital market participation rate	0.37
β	Discount factor	0.992

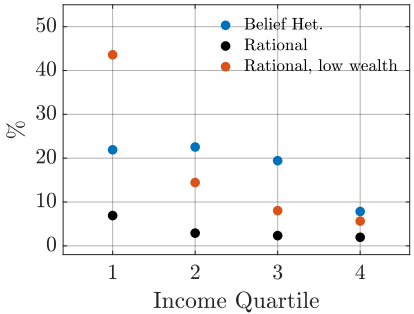
Two-asset model: stationary equilibrium predictions

	2-asset HANK: CS + OC	rational 2-asset HANK	
	(1)	(2)	(3)
		calibrated as (1)	re-calibrated
HtM	0.38	0.23	0.27
Avg. MPC	0.17	0.06	0.15
return gap	2.3%	4.4%	9.3%

- two-asset model with CS + OC matches HtM and MPC estimates
- rational model (with re-calibrated λ) also does well in matching HtM and MPC estimates, but at (unrealistically?) high return gap (Kaplan and Violante, 2022)
- empirical estimates $\approx 5\%$
- our model requires substantially lower return gap (note: no aggregate risk in models $\Rightarrow$ predictions are lower bound)

back

Targeting on income mis-targets high MPC households



- our model predicts a rather flat MPC-income distribution (in line with Boehm et al. (2023))
- rational model either have low MPCs in all income groups or, if targeting the same average MPC, totally different implications for the MPC-income distribution

▸ back

Public insurance is less distortionary

- we now consider minimum income benefits
  $\Rightarrow$ reduce precautionary savings motive...

Public insurance is less distortionary

- we now consider minimum income benefits
  ⇒ reduce precautionary savings motive... especially for rational households

	Belief Het. (1)	Rational (2)	Rational, low wealth (3)
HtM Share	0.23	0.02	0.21
Avg. MPC	0.18	0.04	0.18
Bottom50W	2.1%	12.7%	2.3%
Top10W	46%	36%	56%
Real rate	4%	4%	4%
HtM Share with PI	0.27	0.09	0.28
Avg. MPC with PI	0.17	0.06	0.28
Bottom50W with PI	3.7%	9.2%	0.9%
Top10W with PI	47%	3%	60%
Real rate with PI	4.9%	5.5%	6.9%

⇒ crowding-out effects of income insurance are dampened in model with overconfidence
  - less savings to begin with, value insurance less

back

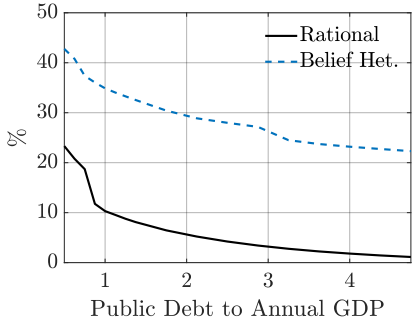
Incentivizing self-insurance is less efficient

What if government issues more debt to facilitate private insurance?

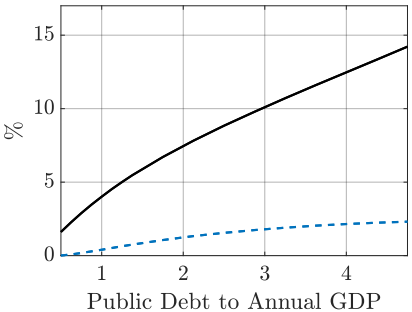
Incentivizing self-insurance is less efficient

What if government issues more debt to facilitate private insurance?

(a) HtM share



(b) Wealth share bottom 50%



- extra liquidity mainly goes to rational households
- low-wealth households are systematically different and respond less to changes in their precautionary-savings motive

Optimal government debt level

- Higher debt: more insurance but higher distortionary taxes
- Utilitarian social welfare function: average expected discounted lifetime utility

Optimal government debt level

- Higher debt: more insurance but higher distortionary taxes
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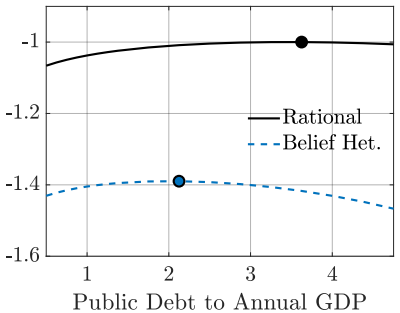

$\Rightarrow$ optimal debt level substantially lower in our model back