Interest Rate Risk and Household Portfolios

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Discussion by Dan Greenwald

Introduction

- **Summary:**
  - Question: how do households manage interest rate risk?
  - Approach: model of optimal interest rate hedging using bonds
    - Carefully account for labor income risk, social security
  - Main result: empirical interest rate exposures close to optimal!
- **This discussion:**
  - Background: duration and hedging
  - This paper's mechanism: why don't households fully hedge?
  - Comments and suggestions

Background: household interest rate exposure

- Financial wealth equals PV of excess consumption:

$$\underbrace{\theta_0}_{\text{financial wealth}} = \underbrace{E_0 \sum_{t=1}^{\infty} R^{-t}(c_t - y_t)}_{\text{PV of excess consumption}}$$

- If durations (exposures) of financial wealth and PV of excess consumption match → **perfect hedging**
  - Old consumption path exactly feasible following small change in R
- Duration mismatch → consumption possibilities **change with R**

Background: household interest rate exposure

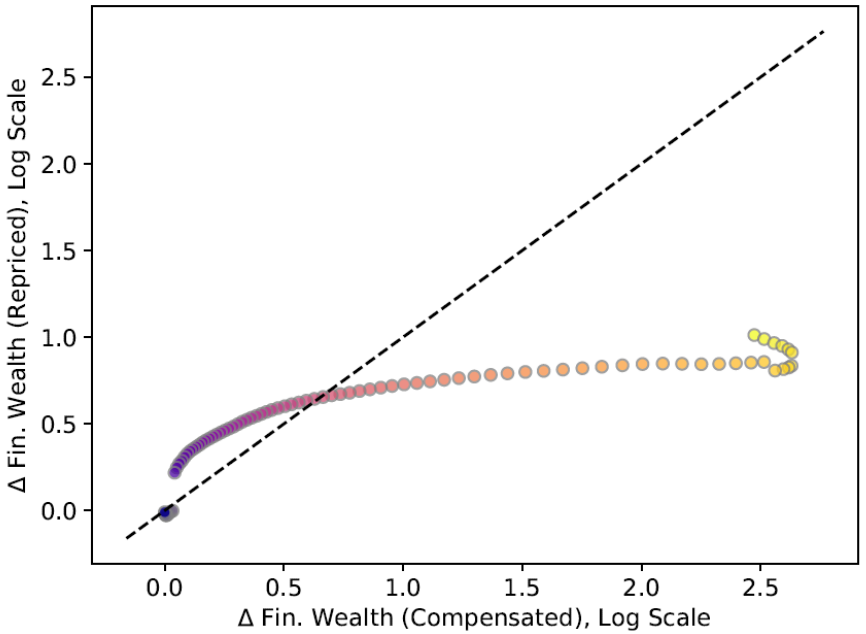
- Young typically have very long durations of excess consumption
  - Plan to save in middle age, dissave in retirement
- Three-period example: 35-year old with Year 0 wealth θ_0
  - Middle age (Year 20): save \$200k
  - Old (Year 40): consume \$800k
- If $r = 5\%$: $\theta_0 = -1.05^{-20} \times \$200\text{k} + 1.05^{-40} \times \$800\text{k} = \$38.3\text{k}$
- Duration of excess consumption:

$$D^{c-y} = -\frac{1.05^{-20} \times \$200\text{k}}{\$38.3\text{k}} \times 20 + \frac{1.05^{-40} \times \$800\text{k}}{\$38.3\text{k}} \times 40 = 79.4$$

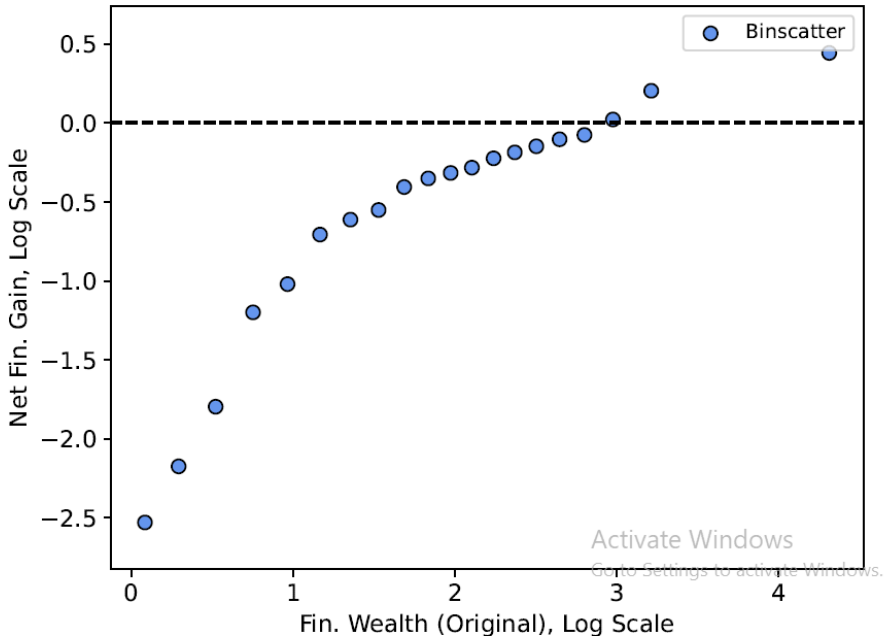
Background: household interest rate exposure

- **Greenwald et al (GLVN):** empirical durations of the young + less wealthy are not high enough to insure consumption possibilities
  - Budget set contracts when interest rates fall

(a) By Age (Medians)



(b) By Wealth



Source: Greenwald, Leombroni, Lustig, Van Nieuwerburgh (2023)

Background: household interest rate exposure

- Top-10% financial wealth share **rose by 8.3pp** from 1983 to 2019
  - GLVN: falling rates + heterogeneous durations explains ~ all of it
- Under perfect hedging, share would have needed to **fall by 3.1pp**
  - Mostly due to large financial wealth gains to low-wealth young
  - Implies large real consumption consequences to underhedging
- In contrast, this paper finds household portfolios ~ optimal
  - Not because our quantitative implications disagree
  - Instead, because **it is optimal not to perfectly hedge**
  - True even though hedging is costless. Why?

Intuition: optimal hedging

- Imagine there is a machine that turns tokens into cookies
  - Good state (50% probability): each token creates three cookies
  - Bad state (50% probability): each token creates one cookie
- How do you allocate 100 tokens across the two states?
  - **Infinitely risk-averse:** send 75 tokens to bad state, 25 to good state to ensure consumption of 75 in each state
  - **Risk-neutral:** send all tokens to good state
  - **Finitely risk-averse:** send some tokens to both states, with higher consumption in the good state
- Idea: want more tokens where the machine is more productive

Intuition: optimal hedging

- This is essentially what is going on in the model
  - Under high rates, assets create more future consumption
  - Under low rates, assets create less future consumption
- Want to tilt resources to high-rate state, consume more there
  - This means that you do not fully hedge interest rate risk
  - Instead, consumption possibilities under optimal hedging will expand when rates rise and contract when rates fall
- Young make larger bets (hedge less) than old
  - Difference in “productivity” of assets across high-rate, low-rate states is larger with more time to compound

Comment 1: risk aversion

- Results are highly dependent on risk aversion (γ)
  - For $\gamma \to \infty$, optimal to hedge perfectly
  - For $\gamma = 1$, optimal to hold only short-term bond
  - For $\gamma \to 0$, optimal to go infinitely long on short-term bond, infinitely short on long-term bond
- Implies that we can rationalize basically any observed behavior using the right level of γ
- The paper uses $\gamma = 5$, which is a reasonable baseline
  - But would really help to see robustness to this parameter

Comment 2: why is the rate moving?

- Conclusions about hedging depend on why interest rate moves
  - This paper: exogenous variation unrelated to saving demand
  - In this case, lower returns under low rates are a pure loss
- Alternative story: rates fell because discount factor rose ($\beta \uparrow$)
  - Conjecture: would now be optimal to fully hedge
  - Higher value of future consumption offsets lower return
- Other proposed mechanisms also encourage more hedging
  - Slowdown in growth increases future marginal utility
  - So does increase in uncertainty (in expectation)

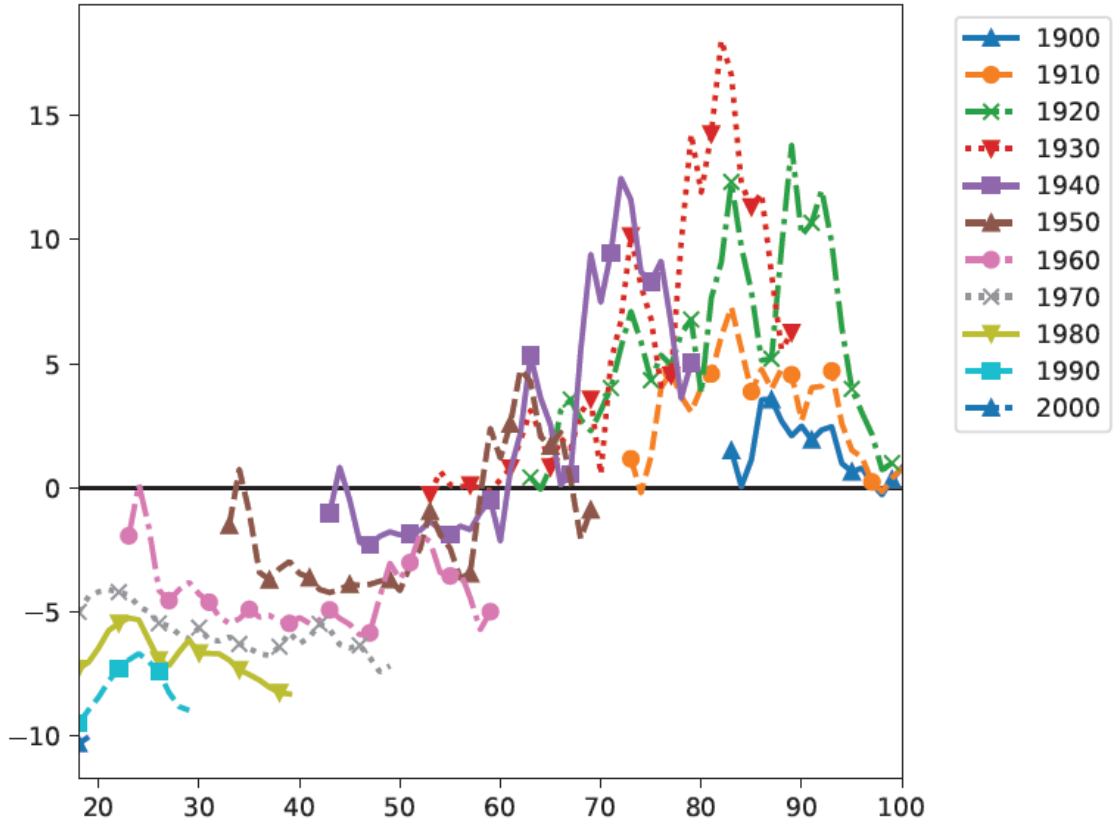
Comment 3: optimality or coincidence?

- Authors' story: households solved the optimal hedging problem
  - Decided to partially hedge interest rate risk, reserve more resources for high-rate states when yields are high
- Alternative story: near-optimal hedging is a coincidence
  - Balance sheet of typical household dominated by house, mortgage
  - Little other participation in financial markets
  - Combined with social security, happens to have right duration
- Would not overturn results, but important policy consideration
  - Policies like social security may help households manage risk
  - Optimal policy may depend strongly on risk aversion

Comment 4: what about future cohorts?

- GLVN analyze welfare gains/losses from fall in rates since 1980s
  - Cohorts born before 1960 gain
  - Cohorts born after 1960 lose
- This paper: losses for younger cohorts were ex-ante optimal
- But cohorts entering the market after rates fell also lost
  - Face challenges accumulating wealth, generating income in retirement
  - Should policy be hedging on behalf of the unborn?

PV Consumption Relative to Steady State (GLVN)



Source: Greenwald, Leombroni, Lustig, Van Nieuwerburgh (2023)

Conclusion

- Very interesting, well-executed paper
- Mechanism: optimal interest rate hedging trades off higher productivity in high-rate states against risk aversion
  - Households do not fully hedge, particularly the young
  - Consumption opportunities contract when rates fall
- My comments:
  1. Robustness to risk aversion (γ)
  2. How does the cause of rate change influence results?
  3. Is near-optimality a choice or coincidence?
  4. How should policy treat future cohorts?