

Microeconomic Heterogeneity and Macroeconomic Shocks

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Introduction

- Micro data reveal pervasive **household heterogeneity** in income, wealth and other dimensions, all salient for economic behavior
- Cross-sectional heterogeneity has changed the theory and practice of applied microeconomics (Heckman, 2001)

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Introduction

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- Cross-sectional heterogeneity has changed the theory and practice of applied microeconomics (Heckman, 2001)
- But, is household heterogeneity equally relevant for macroeconomics, in particular for **quantitative study of economic fluctuations**?
 1. To what extent has heterogeneity been incorporated into business cycle models, so far?
 2. What new insights are emerging from new class of models?
 3. Looking ahead, what challenges are these models facing?

Outline of the paper

1. Brief historical account of heterogeneity in macroeconomics
- 2.a New framework: Heterogeneous Agents + New Keynesian
- 2.b Role of household heterogeneity in the response of the macroeconomy to aggregate shocks: HANK vs RANK
 - Metric to assess equivalence between models and examples with canonical shocks (demand, productivity, monetary)
 - Fiscal stimulus differs greatly between two models
 - Questions where heterogeneity is essential: (i) aggregate shocks that require a distribution; (ii) distributional implications of aggregate shocks
3. Shortcoming of current framework and new directions

Modern Macroeconomics

- Common core: DSGE approach with microfoundations
- Two branches that advanced in parallel for past two decades

1. Cross-sectional macroeconomics

- Workhorse: Bewley model (HA + incomplete markets)
- Questions: inequality, economic mobility, tax reforms, redistribution, etc., **but not business cycles**

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- Why?
 - (a) Computational complexity: problem of the **distribution as a state variable**
 - (b) **Quasi-aggregation** has been (mistakenly) interpreted as equivalence with RA model

Modern Macroeconomics

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- Workhorses: RBC and NK model (RA + complete markets)
- Questions: impulse and propagation mechanism —unable to deal with distributional issues, but never seen as a problem

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 - ▶ Key elements: housing equity, credit, liquidity, portfolio composition, propensity to spend, labor market risk
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 - ▶ Importance of aggregate demand effects

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⇒ Emergence of a new macro framework that combines heterogeneous agents (HA) and New Keynesian (NK) models

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- **Why do we care?** Different transmission mechanism of macro shocks and hence their effect on economy

HANK as in Kaplan-Moll-Violante (2017)

- Continuum of households:

$$\max_{c_t, d_t} \mathbb{E}_0 \int_0^{\infty} e^{-\rho t} \left[\log c_t - \phi \frac{h_t^{1+1/\eta}}{1+1/\eta} \right] dt$$

s.t.

$$\dot{b}_t = (1 - \tau_t) w_t z_t h_t + r_t^b(b_t) b_t + T_t - d_t - \chi(d_t, a_t) - c_t$$

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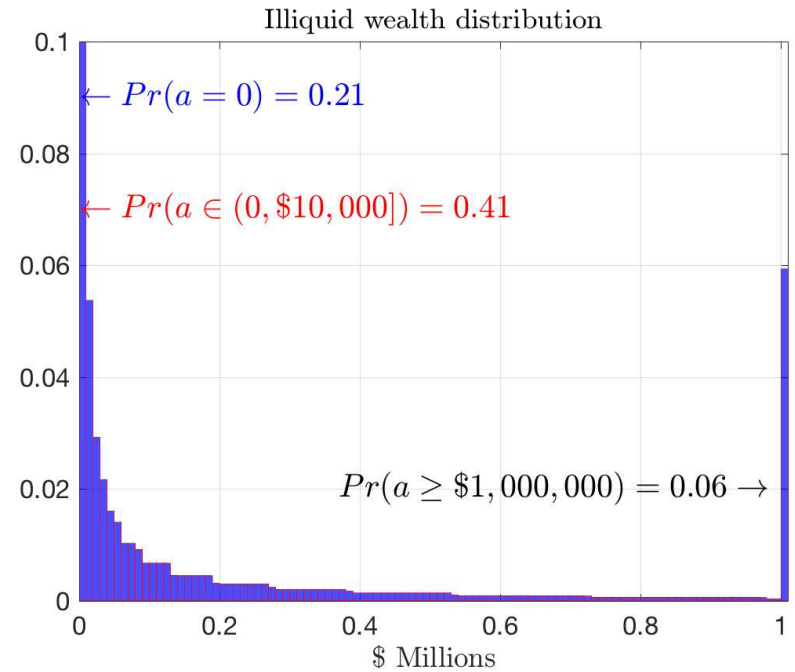
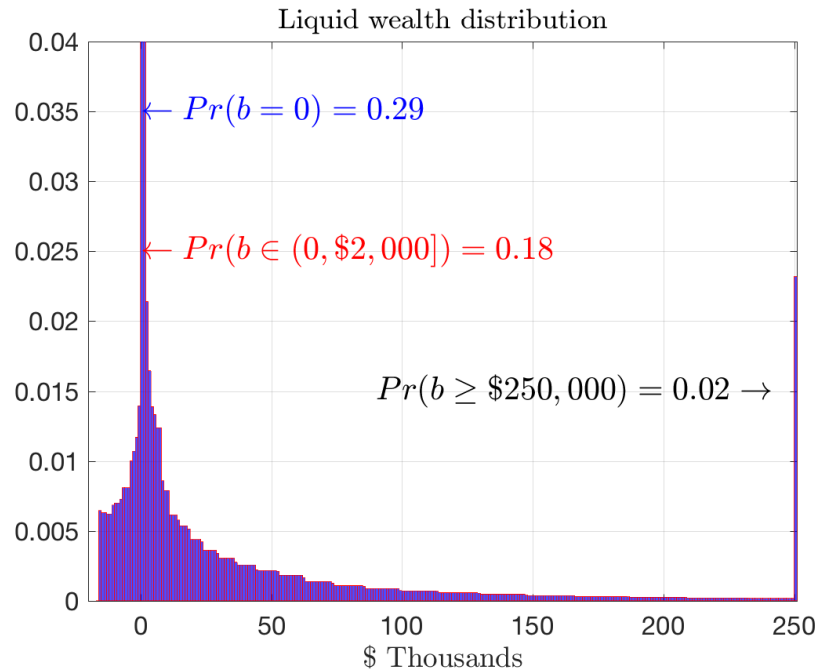
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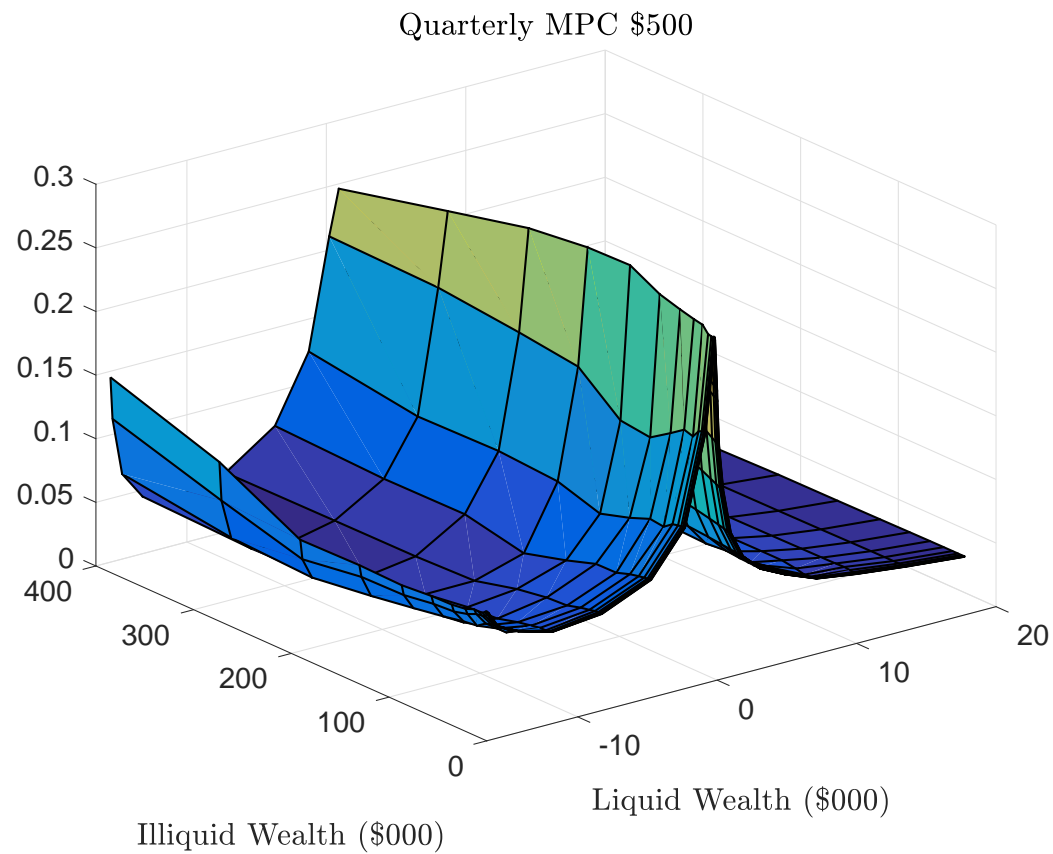
RANK: RA counterpart (same 2-asset structure)

Model liquid and illiquid wealth distributions



- **Top:** very skewed wealth distribution
- **Bottom:** share of hand-to-mouth households as in the data ($\approx 1/3$)

Model distribution of quarterly MPCs out of \$500



- RANK: 0.5% HANK-1: 5% HANK-2: 15% DATA: 20%

HANK vs RANK

Equivalence of the two models wrt a specific aggregate shock

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- Strong equivalence:
 1. Same Impulse Response Function
 2. Same transmission mechanism
 3. Both discrepancies are zero:

$$C^{HA} - C^{RA} = \underbrace{C^{HA}(p^{HA}) - C^{HA}(p^{RA})}_{\text{GE component}} + \underbrace{C^{HA}(p^{RA}) - C^{RA}(p^{RA})}_{\text{PE component}}$$

4. Ricardian neutrality 'holds' also in HANK

HANK vs RANK

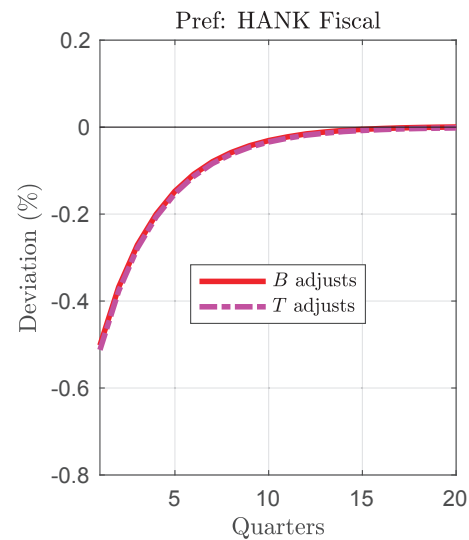
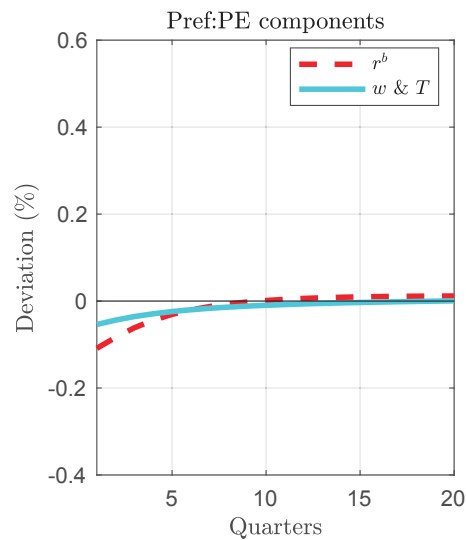
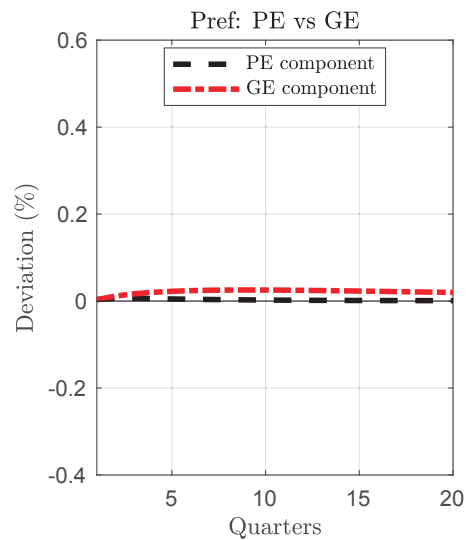
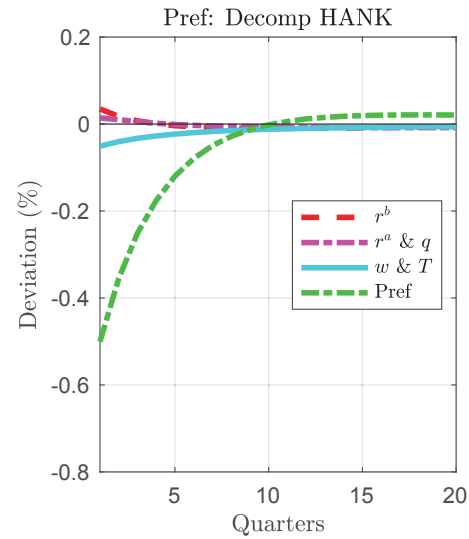
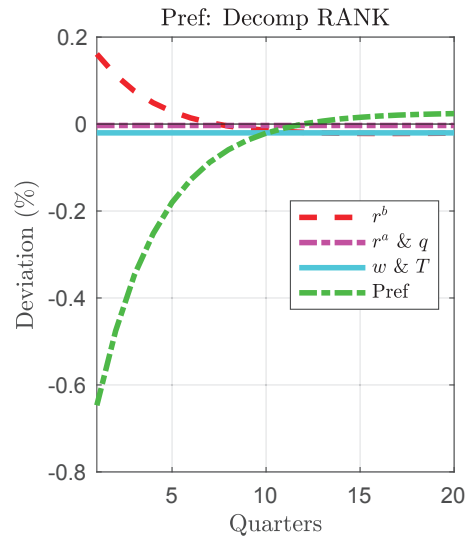
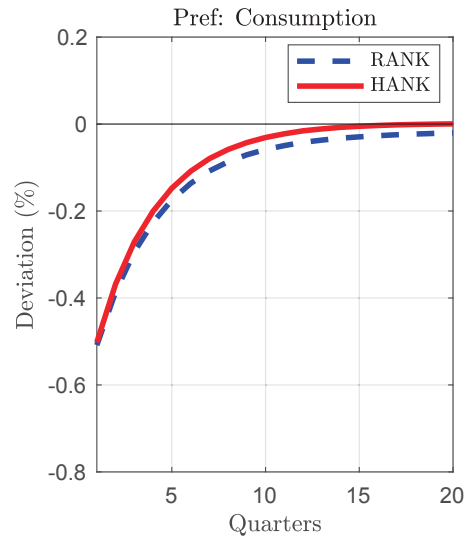
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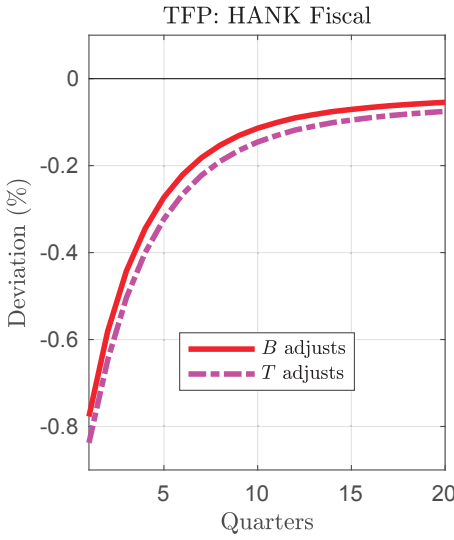
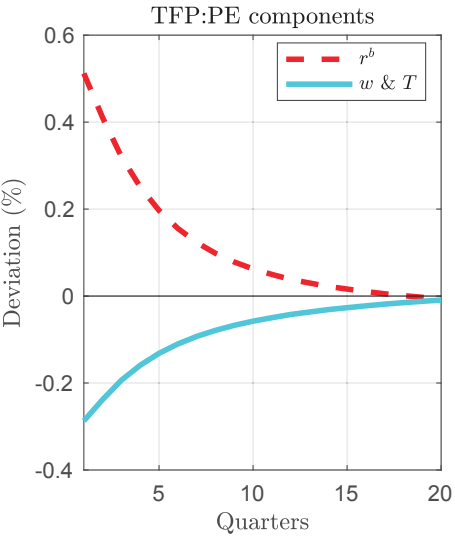
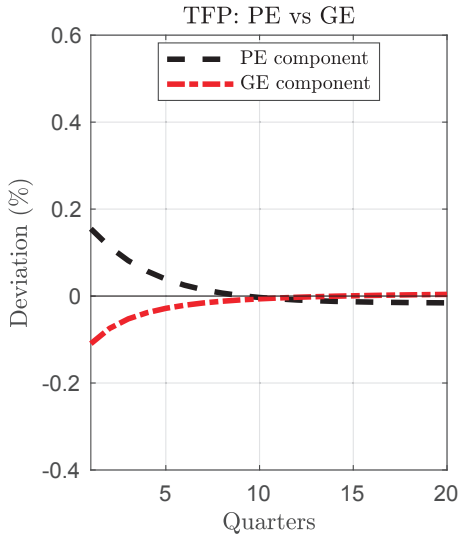
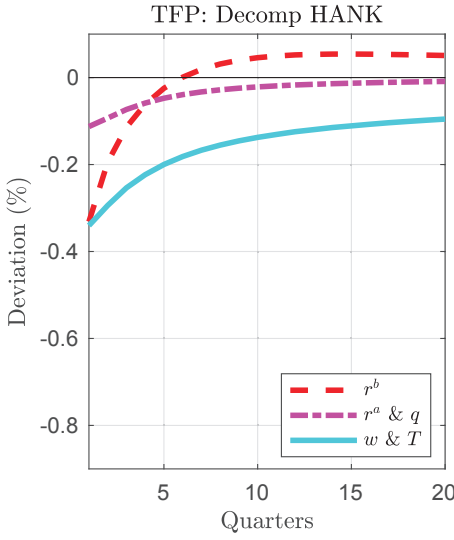
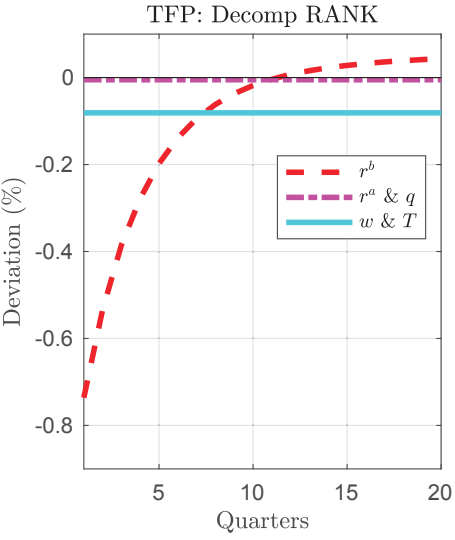
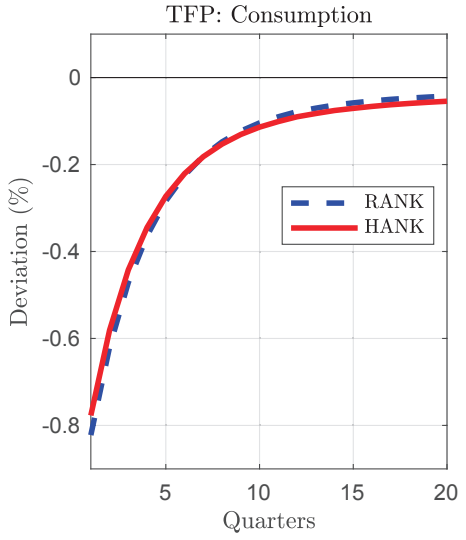
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4. Ricardian neutrality 'holds' also in HANK
- **Weak equivalence:** (1) holds, but not others
 - **Non-equivalence:** (1) does not hold

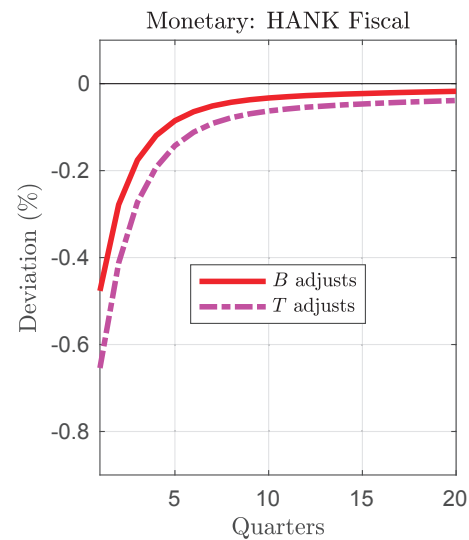
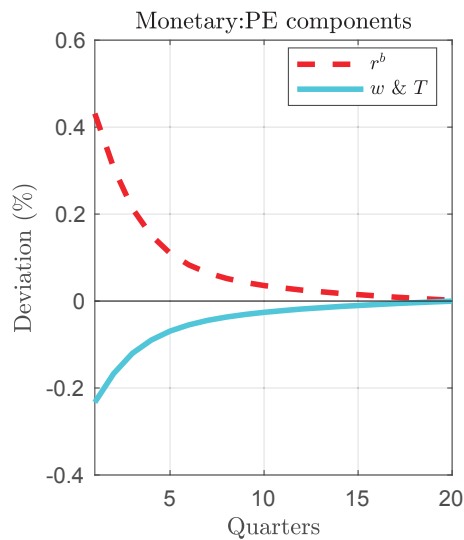
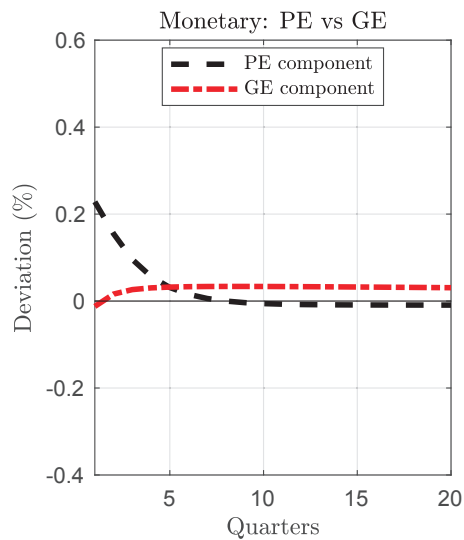
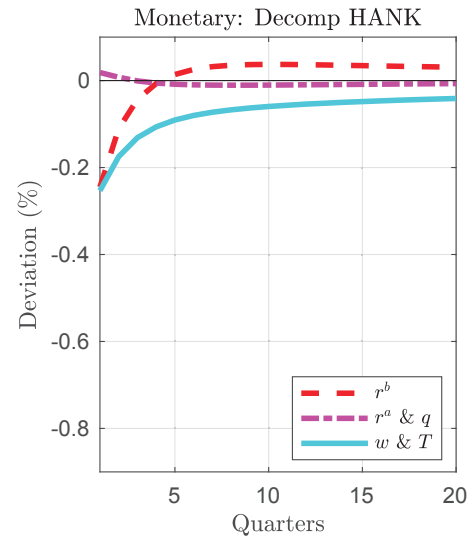
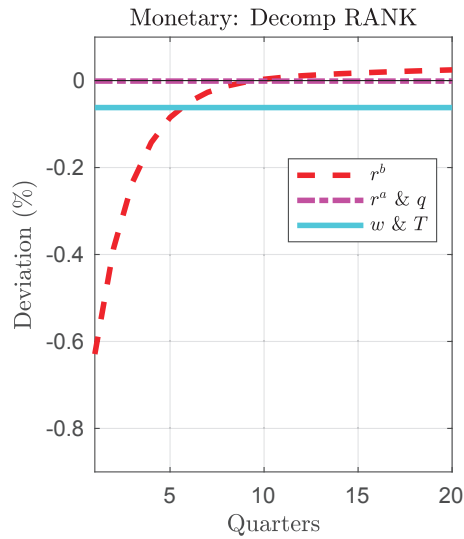
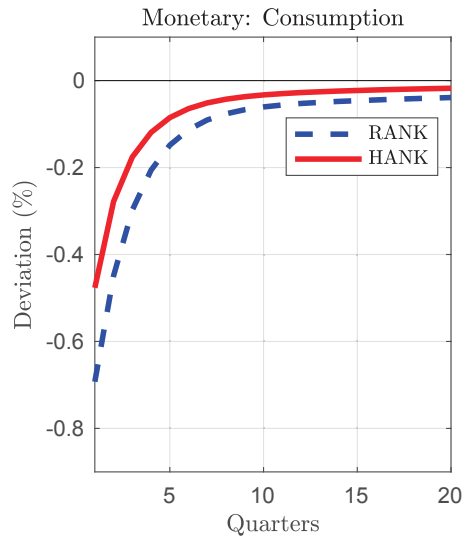
Demand shock: strong equivalence



TFP shock: weak equivalence



Monetary shock: non equivalence



Fiscal stimulus

Fiscal stimulus differs greatly between HANK and RANK

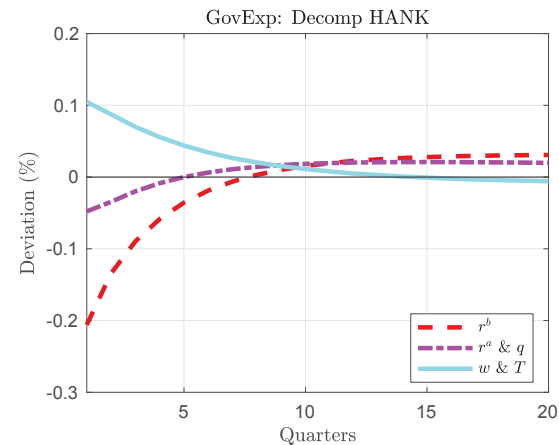
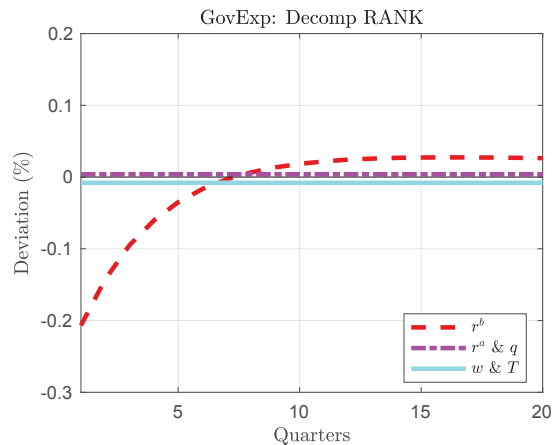
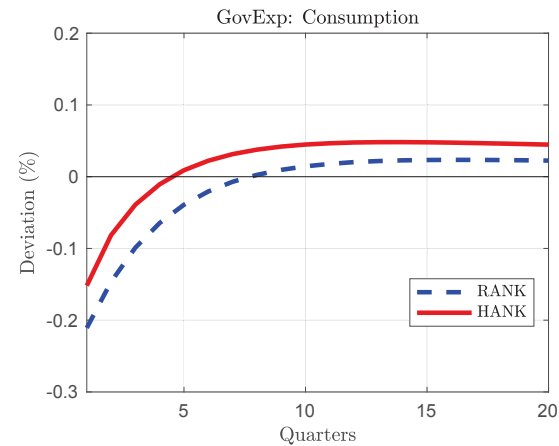
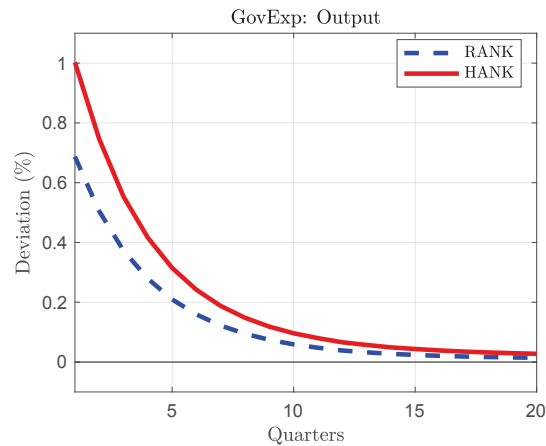
1. Expansion of G expenditures

- Larger output multiplier (weaker crowding out) in HANK

2. Expansion of lump-sum transfers

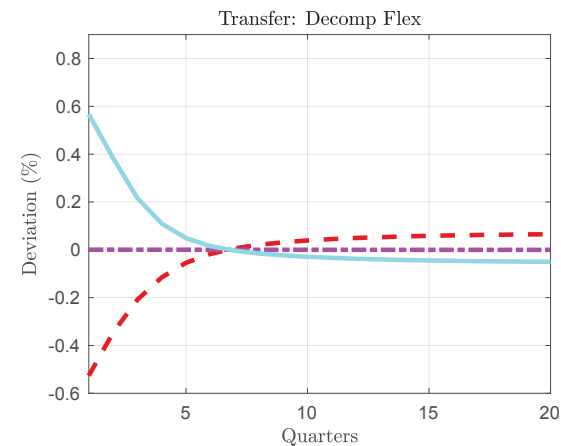
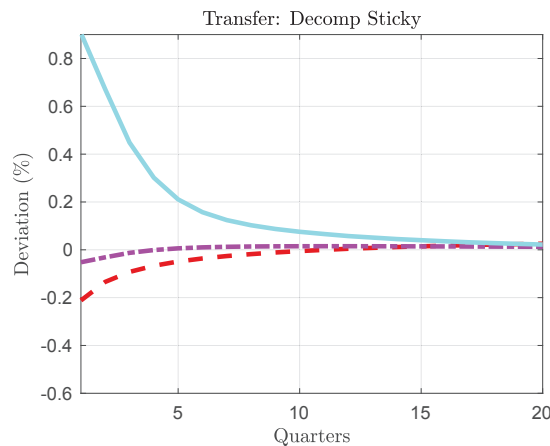
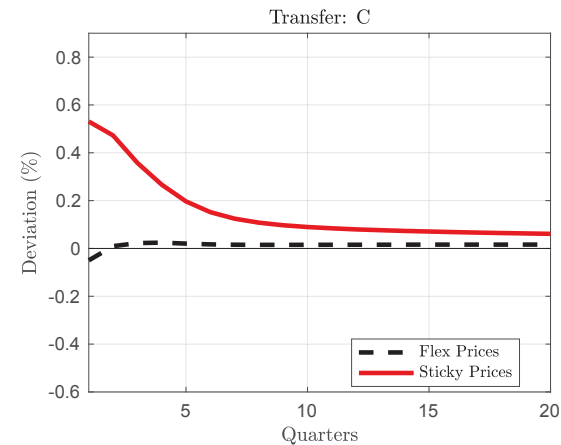
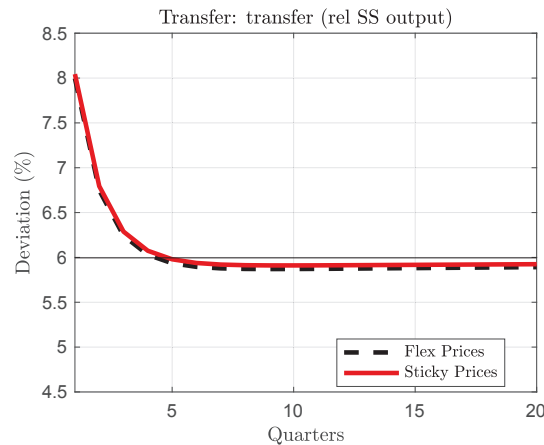
- Positive effects in HANK (zero in RANK due to Ricardian Neutrality)
- Nonlinearities and sign-asymmetries

Fiscal stimulus: G



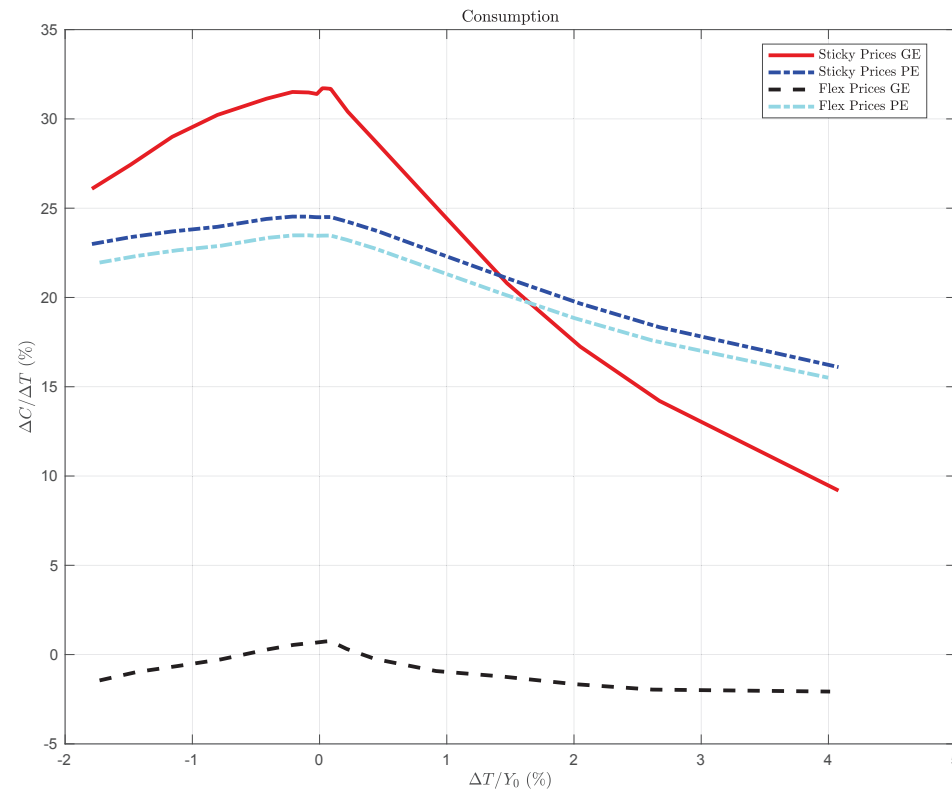
- Weaker crowding out in HANK due to strong GE effects from higher labor demand

Fiscal stimulus: Transfer



- Stronger stimulus with **sticky prices**: r^b has to rise less to induce households to buy govt. bonds, as rise in labor income is stronger

Transfers: nonlinearities and asymmetries



- Response falls with size of T and is stronger for negative transfers
- GE amplifies T stimulus, until inflationary effects ($\uparrow r^b$) dominate

Questions that require heterogeneity

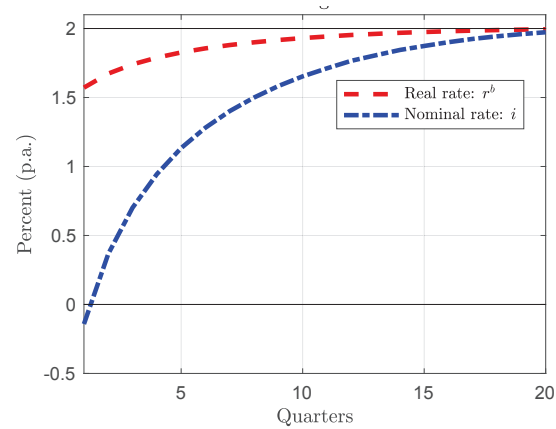
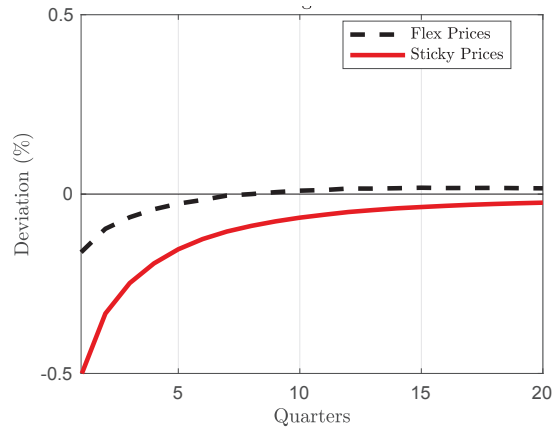
1. **Microfoundation for demand/preference shock in RANK**
 - Shock to credit limits (e.g., Guerrieri-Lorenzoni)
 - Rise in uninsurable risk (e.g., Den Haan-Rendahl-Riegler)
2. **Transmission mechanism of shock across distribution**
 - Useful to compare model with micro data
3. **Distributional implications of aggregate shocks**
 - Welfare consequences across households

Microfoundation for negative demand shock in RANK

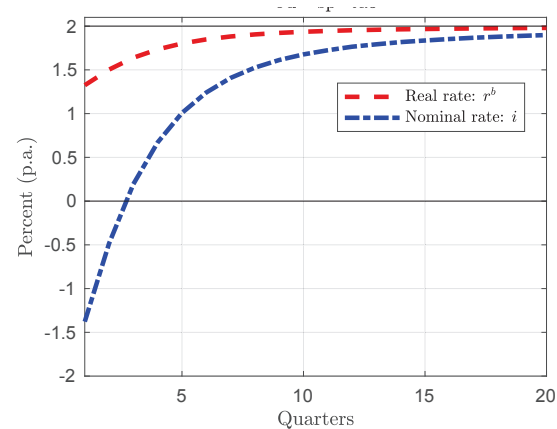
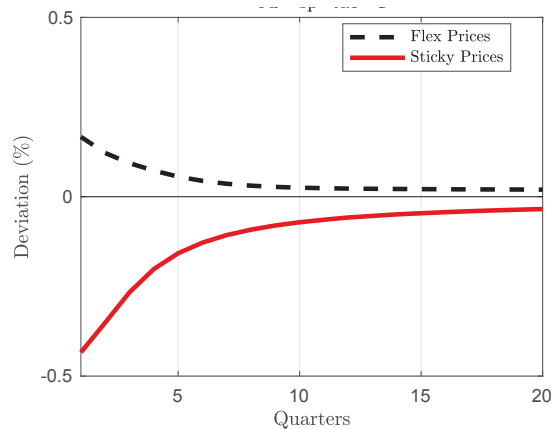
Consumption

r^b and i

TIGHTER CREDIT LIMITS

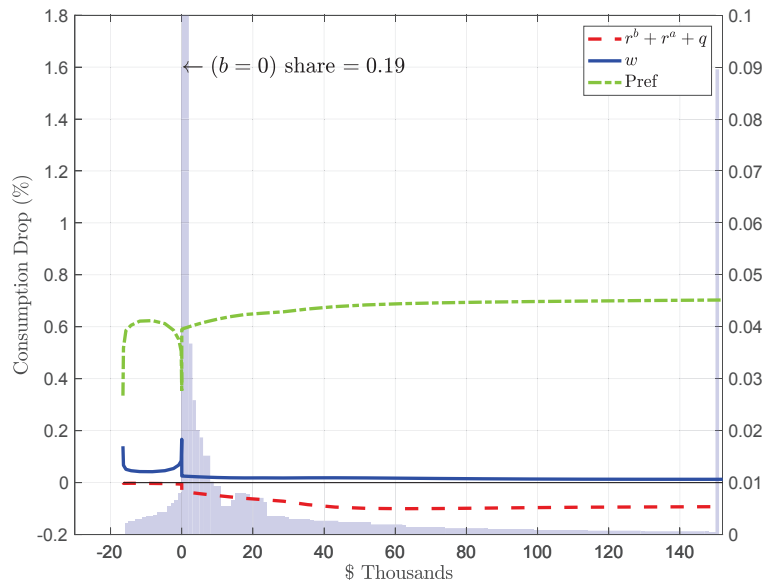


HIGHER UNINSURABLE RISK

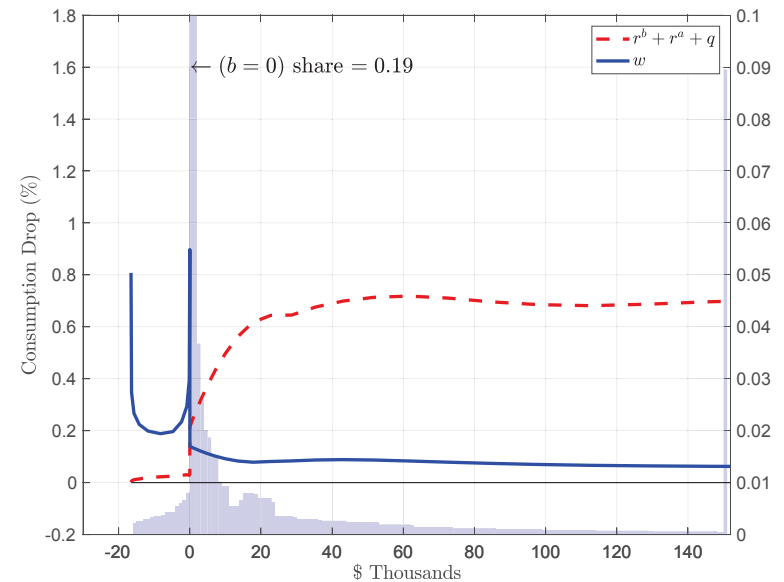


Transmission mechanism across the distribution

Demand shock

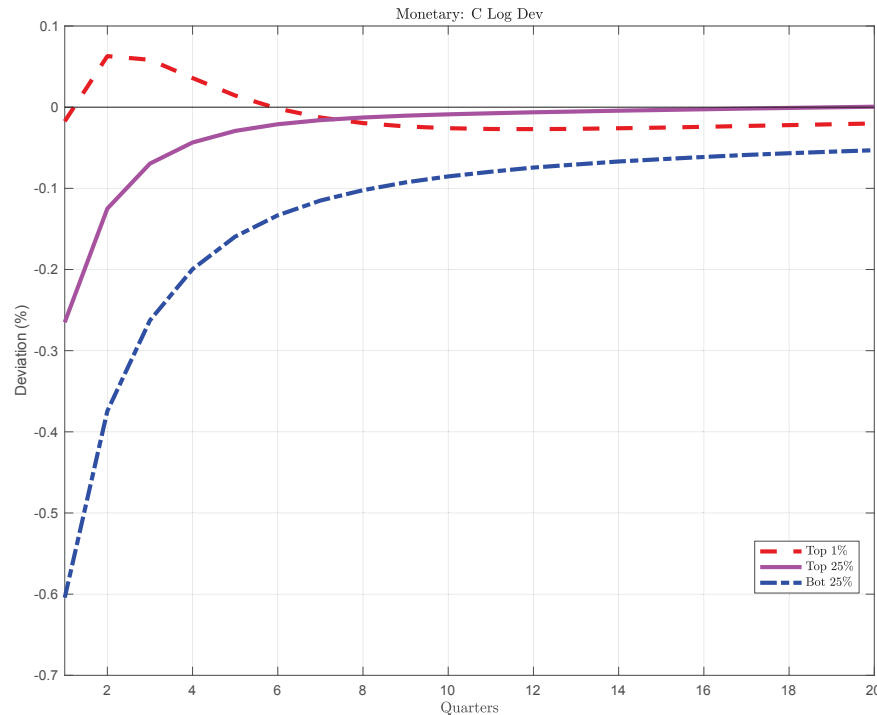


Monetary shock



- Demand shock: uniform across distribution (all direct effect)
- Monetary shock: indirect effects for HtM, direct for others

Distributional implications of negative monetary shock



- Rich households: positive direct income effect (higher r^b)
- Poor households: negative indirect effect (lower w)
- Consistent with Coibion et al. (2015): $\uparrow r^b \Rightarrow \uparrow$ Gini, but tiny effect

Looking ahead

Some directions where HANK models should be extended:

1. **Gross and nominal asset positions:** Fischer effect
2. **Labor market frictions:** endogenize cost-push shocks with OJS
3. **Alternative sources of AD effects:** search in product markets
4. **Time-varying risk premia:** asset price dynamics
5. **Financial sector:** link between bank balance sheets and credit
6. **Optimal stabilization policy:** redistribution implications