

The Distributional Consequences of Monetary Policy

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Based on joint work with:
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ECB Conference on Monetary Policy: Bridging Science and Practice

Message

- The **distribution of income and wealth** is central in economics

Labor	Public	Macro	Finance
Evolution of skill and task premia in response to technical change	Optimal design of income/wealth taxes and transfers	Determinants of wealth inequality in the cross section and over time	Heterogeneous preferences and uninsurable income risk

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- Until recently, however, it played **no role in monetary economics**
- **Science** of monetary policy dominated by **representative agent** paradigm
- **Practice** of monetary policy greatly influenced by this perspective
- **Distribution matters for how monetary policy transmits to real economy**

Monetary policy in RANK

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- Continuous time
- Preferences: CRRA with $IES = \frac{1}{\gamma}$ and discount rate ρ
- Technology: $Y_t = N_t$
- Prices are perfectly rigid: $p_t = 1 \quad \forall t$
- Monetary authority sets time path: $r_t = \rho + e^{-\eta t}(r_0 - \rho), \quad \eta > 0$
- Equilibrium: $C_t(\{r_s, Y_s\}_{s \geq t}) = Y_t, \quad \text{and} \quad \lim_{t \rightarrow \infty} C_t = \bar{C}$

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- Equilibrium: $C_t(\{r_s, Y_s\}_{s \geq t}) = Y_t$, and $\lim_{t \rightarrow \infty} C_t = \bar{C}$
- Impact effect at $t = 0$ of a monetary policy shock:

$$\frac{d \log C_0}{dr_0} = -\frac{1}{\gamma \eta}$$

Transmission mechanism to C

- IRF of $\{C_t\}$ to the monetary policy shock can be decomposed into:
 - Direct (PE) effect of $\{r_t\}$ on consumption
 - Indirect (GE) effect of $\{r_t\}$ through disposable income:
 - Equilibrium prices (wage, asset returns)
 - Fiscal variables (taxes, transfers,...)
- Transmission mechanism = Decomposition of IRF into direct/indirect

Monetary transmission in RANK

- In our special case:

$$\frac{d \log C_0}{dr_0} = -\frac{1}{\gamma\eta} \left[\underbrace{\frac{\eta}{\rho + \eta}}_{\text{direct response to } r} + \underbrace{\frac{\rho}{\rho + \eta}}_{\text{indirect effects due to } Y} \right]$$

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- Plausible quarterly parameterization:

- $\rho = 0.005$ (2% per year)

- $\eta = 0.5$ (half-life $\simeq 2$ quarters) \rightarrow $\text{direct} \equiv \frac{\eta}{\rho + \eta} = 0.99$

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- In RANK it's all about intertemporal substitution!
- True also in **medium-scale monetary DSGE** (e.g., Smets-Wouters)
- Not very Keynesian! Rather: “**sticky-price intertemporal-subst. model**”

What's wrong with intertemporal substitution logic?

Empirical evidence

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- Many 'hand-to-mouth' with high MPC and low sensitivity to interest rate
- Nontrivial distribution of MPCs across the population

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Two implications:

1) **Wealth distribution and portfolio composition** determine aggregate MPC

Aggregate MPC key for size of **indirect/GE effects** of monetary policy

2) With heterogeneous MPCs, **income redistribution** has real effects

By redistributing toward high-MPC hh, effects of monetary policy are **amplified**

A New Macro Framework is Emerging

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- **HA + NK**: Aiyagari-Krusell-Smith meets Gali-Gertler-Woodford
- What else is attractive about this approach?
 - **Empirically**, unified approach to **micro and macro** data
 - **Conceptually**, unified framework to study:
 - Short-run fluctuations and long-run dynamics of distribution
 - Stabilization and redistributive policies
 - **Technically**, it is now easier and faster to solve these models

HANK as in Kaplan-Moll-Violante (AER, 2017)

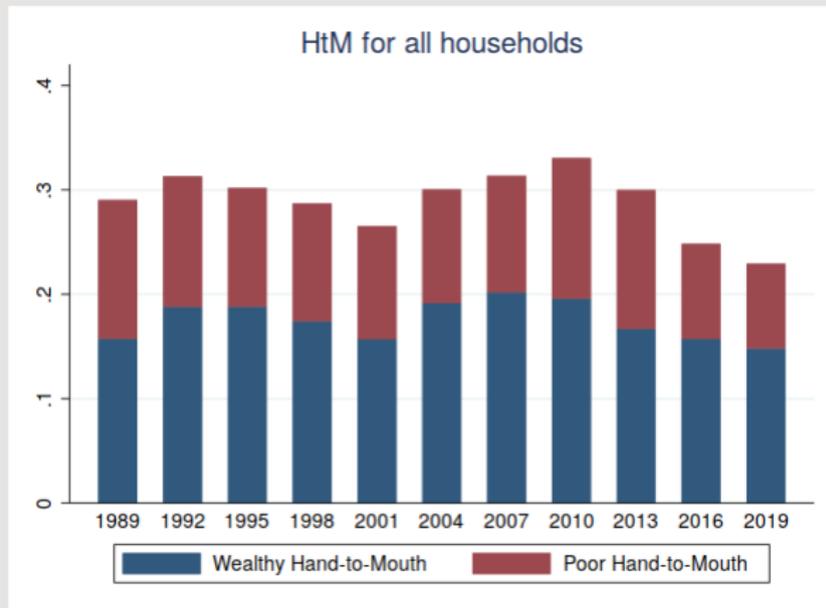
Households

- Continuum of households
- Face uninsurable idiosyncratic productivity shocks
- Choose consumption, saving and labor supply
- **Two assets**: liquid (government bonds) and illiquid (capital)
- Transaction cost to move funds into/out of illiquid account
- Both real returns determined in equilibrium: $r^{ill} > r^{liq}$

Remaining model ingredients

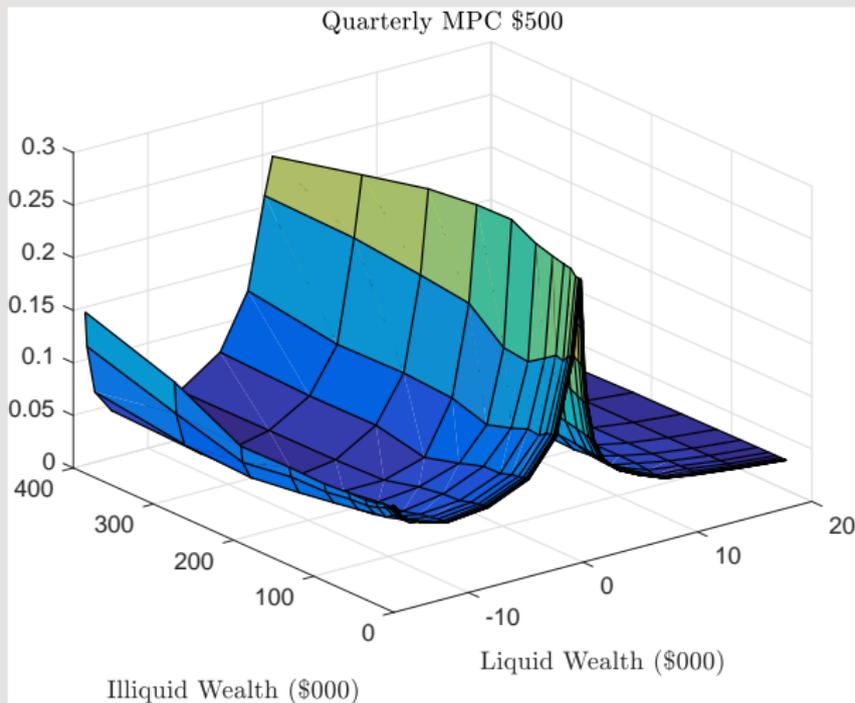
- Phillips curve + Taylor rule

Poor and Wealthy HtM Households in US Data



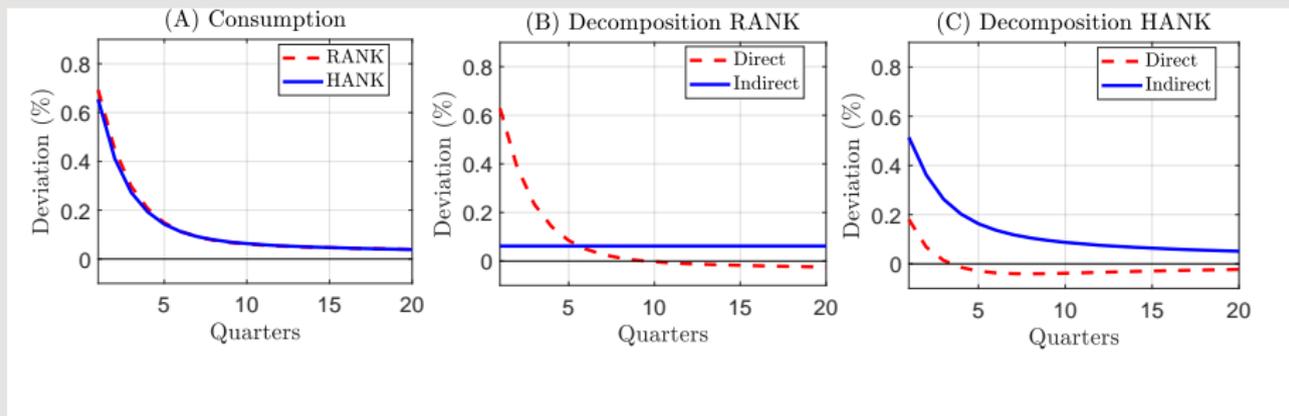
- **Poor HtM**: low net worth
- **Wealthy HtM**: low liquid wealth, but sizable illiquid assets

Model: MPC Heterogeneity across the Distribution



Quarterly **Aggregate MPC**: 15%

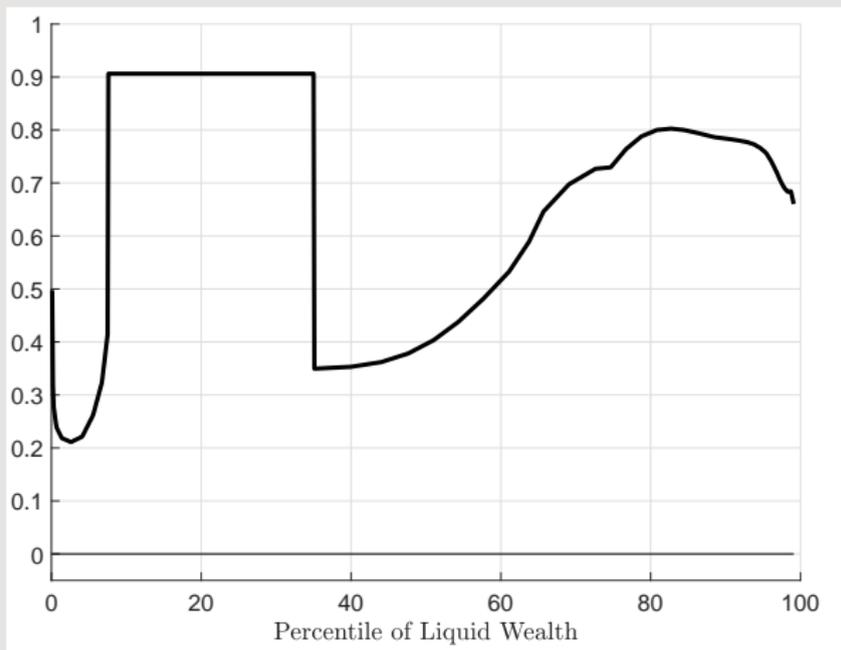
IRF to a Monetary Shock in RANK and HANK



- IRF for aggregate consumption are very similar across models
- Transmission mechanism is different: in HANK, mostly **indirect channel**
- **AD channel is salient** in HANK because of high aggregate MPC

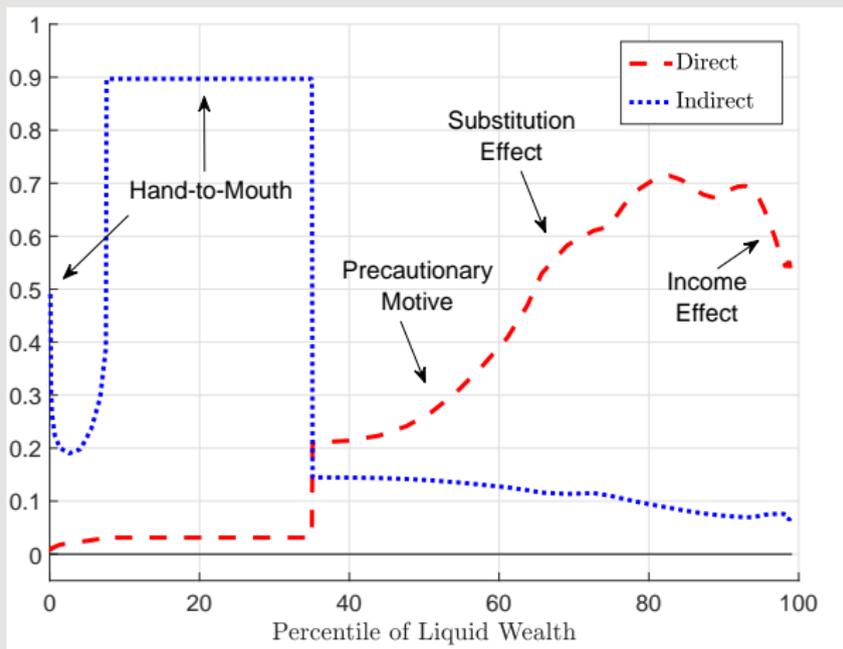
Transmission mechanism across wealth distribution

Percentage change in consumption expenditures



Transmission mechanism across the distribution

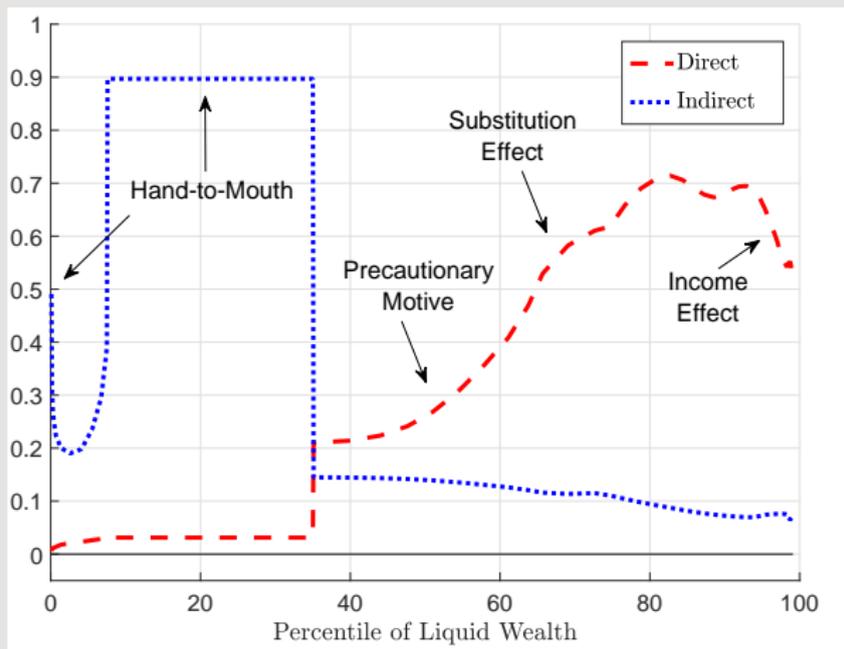
Percentage change in consumption expenditures



- Different forces play out at different points in the wealth distribution

Transmission mechanism across the distribution

Percentage change in consumption expenditures



- Different forces play out at different points in the wealth distribution
- Empirical support from micro data (Denmark, Norway, EU, UK, US)

Amplification of Monetary Policy

$$dc_i = mpc_i \cdot dy_i = \underbrace{mpc_i \left(\frac{y_i}{Y} \right)}_{\widehat{mpc}_i} \cdot \varepsilon_{y_i, Y} \cdot dY$$

$$\frac{dC}{dY} = \mathbb{E} [\widehat{mpc}_i \cdot \varepsilon_{y_i, Y}]$$

- Amplification if monetary shock **redistributes to high-MPC** households

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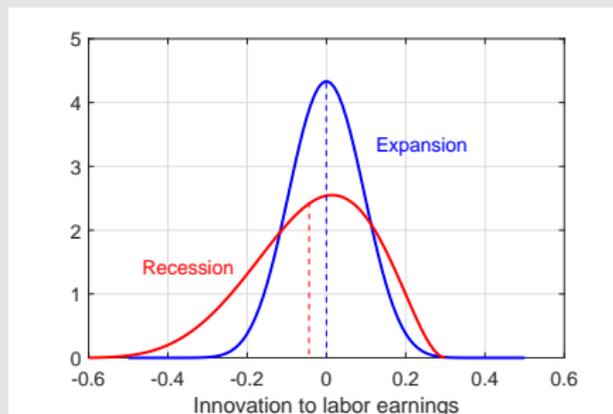
- Amplification if monetary shock **redistributes to high-MPC** households
- Income **composition** varies across distribution

	Quantile of income distribution		
	Bottom 20%	Middle 20%	Top 1%
Labor	1/3	2/3	1/2
Capital/Business	0	0	1/2
Govt. Transfers	2/3	1/3	0

- Different income components respond differently to a monetary shock
- Fiscal response matters: **Ricardian equivalence breaks down**

Amplification of Monetary Policy

$$\frac{dC}{dY} = \mathbb{E} [\widehat{mpc}_i \cdot \varepsilon_{y_i, Y}]$$



- **Countercyclical idiosyncratic risk** is a source of amplification of shocks
 - In a recession, uninsurable income (unemployment) risk rises
 - Precautionary motives become stronger and MPC falls
 - Further reduction in consumption expenditures

Taking Stock

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- Empirically-grounded heterogeneity **alters transmission mechanism**

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- Empirically-grounded heterogeneity **alters transmission mechanism**
- **Wealth distribution and portfolio composition** determine:
 1. Distribution of MPCs
 2. Strength of direct and indirect/GE channels of monetary policy
- **Income distribution and income composition** determine:
 1. Redistributive consequences of monetary policy
 2. Amplification/dampening of monetary policy (relative to baseline RA)

Thank You and Stay Safe!