Macroeconomics and Household Reality

Gianluca Violante

Princeton University

T2M 2019 – Nuremberg

Based on joint research with Greg Kaplan and Ben Moll

Dualism in Quantitative Macroeconomics

- **Aggregate macro (RA)**: business cycles and stabilization policies

- **Distributional macro (HA)**: inequality and redistributive policies

Dualism in Quantitative Macroeconomics

- **Aggregate macro (RA)**: business cycles and stabilization policies

- **Distributional macro (HA)**: inequality and redistributive policies

- Why the lack of overlap?

  - Computational complexity

  - Approximate aggregation

Dualism in Quantitative Macroeconomics

- **Aggregate macro (RA)**: business cycles and stabilization policies

- **Distributional macro (HA)**: inequality and redistributive policies

- Why the lack of overlap?

    - Computational complexity

    - Approximate aggregation

- **(Mis-)perception**: HA models entail large costs for small gain

- Great Recession: game changer

Yellen: Macroeconomic Research After the Crisis

`http://www.federalreserve.gov/newsevents/speech/yellen20161014a.htm`

- *Prior to the financial crisis, representative-agent models were the dominant paradigm for analyzing many macroeconomic questions*

- *However, a disaggregated approach seems needed to understand some key aspects of the Great Recession*

- *While the economics profession has long been aware that these issues matter, their effects had been incorporated into macro models only to a very limited extent prior to the financial crisis*

- *I am glad to now see a greater emphasis on the possible macroeconomic consequences of heterogeneity*

It's not just Yellen...

- Fraction of speeches at Central Banks and Feds mentioning at least once the words: heterogeneous, heterogeneity, inequality
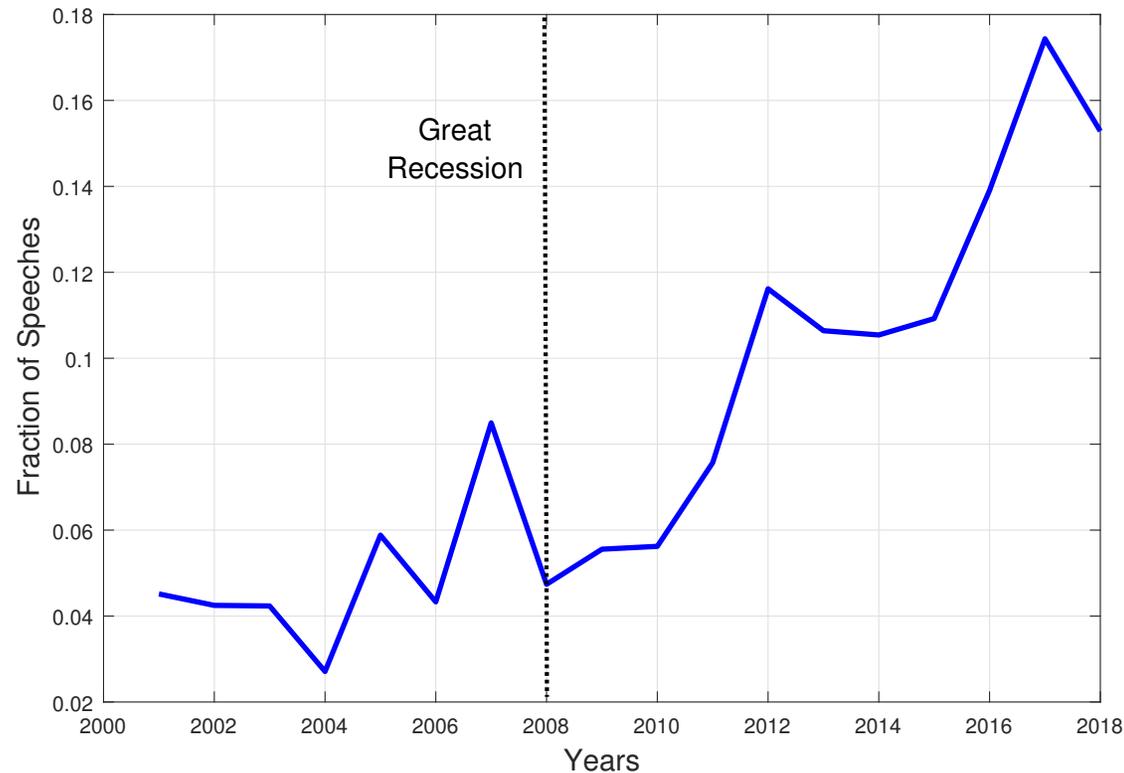
Source: BIS database of central bankers' speeches

An Emerging New Framework

- **HA + NK**: Aiyagari meets Gali-Woodford

- What is attractive about this approach?

An Emerging New Framework

- **HA + NK**: Aiyagari meets Gali-Woodford

- What is attractive about this approach?

  - **Conceptually**, unified framework to study:

    - ▶ Short-run fluctuations and long-run dynamics of distribution

    - ▶ Stabilization and redistributive policies

    - ▶ Aggregate demand channel $\Rightarrow$ MPC salient

  - **Empirically**, unified approach to micro and macro data

  - **Technically**, now easier / faster to solve these models

Desirable Consequences of Adding HA to NK

1. Stronger microfoundation

2. Different IRF to aggregate shocks and propagation mechanism

3. Wider set of macro questions

4. Micro data for model identification and validation

1. STRONGER MICROFOUNDATION

First Failure of RA: Sensitivity of c to r

- **Aggregate EE** $\Rightarrow$ high sensitivity of expected C growth to r

- Two sources of evidence against this view:

  - **Macro data:** C growth decoupled from dynamics of short rate

    ▶ Yogo (2004), Canzoneri et al. (2007), Atkeson-Kehoe (09)

    $\Rightarrow$ **Time-varying wedge** in aggregate EE

First Failure of RA: Sensitivity of c to r

- Aggregate EE $\Rightarrow$ high sensitivity of expected C growth to r

- Two sources of evidence against this view:

  - Macro data: C growth decoupled from dynamics of short rate

    ▶ Yogo (2004), Canzoneri et al. (2007), Atkeson-Kehoe (09)

    $\Rightarrow$ Time-varying wedge in aggregate EE

  - Micro data: consumption of non-participants unresponsive to r

    ▶ Attanasio et al. (2002), Vissing-Jorgensen (2002)

    $\Rightarrow$ Wedge linked to distribution of household portfolios

Second Failure of RA: Sensitivity of c to transitory y

- **RA=PIH:** quarterly MPC out of a transitory income shock $\simeq 2\%$

Second Failure of RA: Sensitivity of c to transitory y

- **RA=PIH:** quarterly MPC out of a transitory income shock $\simeq 2\%$

- Tons of micro evidence on **excess sensitivity**:

  - Hypothetical survey questions: *What would you do with $500?*

  - Quasi-natural experiments (tax rebates / tax refunds)

  - Structural models with covariance restrictions btw Δc and Δy

Second Failure of RA: Sensitivity of c to transitory y

- **RA=PIH:** quarterly MPC out of a transitory income shock $\simeq$ 2%

- Tons of micro evidence on **excess sensitivity**:

  - Hypothetical survey questions: *What would you do with $500?*

  - Quasi-natural experiments (tax rebates / tax refunds)

  - Structural models with covariance restrictions btw Δc and Δy

- Main findings:

  - Avg. **quarterly MPC $\simeq$ 20-25%**, but MPCs very heterogeneous

  - Higher MPC for low liquidity and high leverage households

  - Higher MPC for smaller and for negative income changes

One-asset IM Model: Qualitative Reconciliation

- Poor hand-to-mouth + precautionary saving:

  - Lower sensitivity to r and higher sensitivity to y

One-asset IM Model: Qualitative Reconciliation

● **Poor hand-to-mouth + precautionary saving**:

  ■ Lower sensitivity to r and higher sensitivity to y
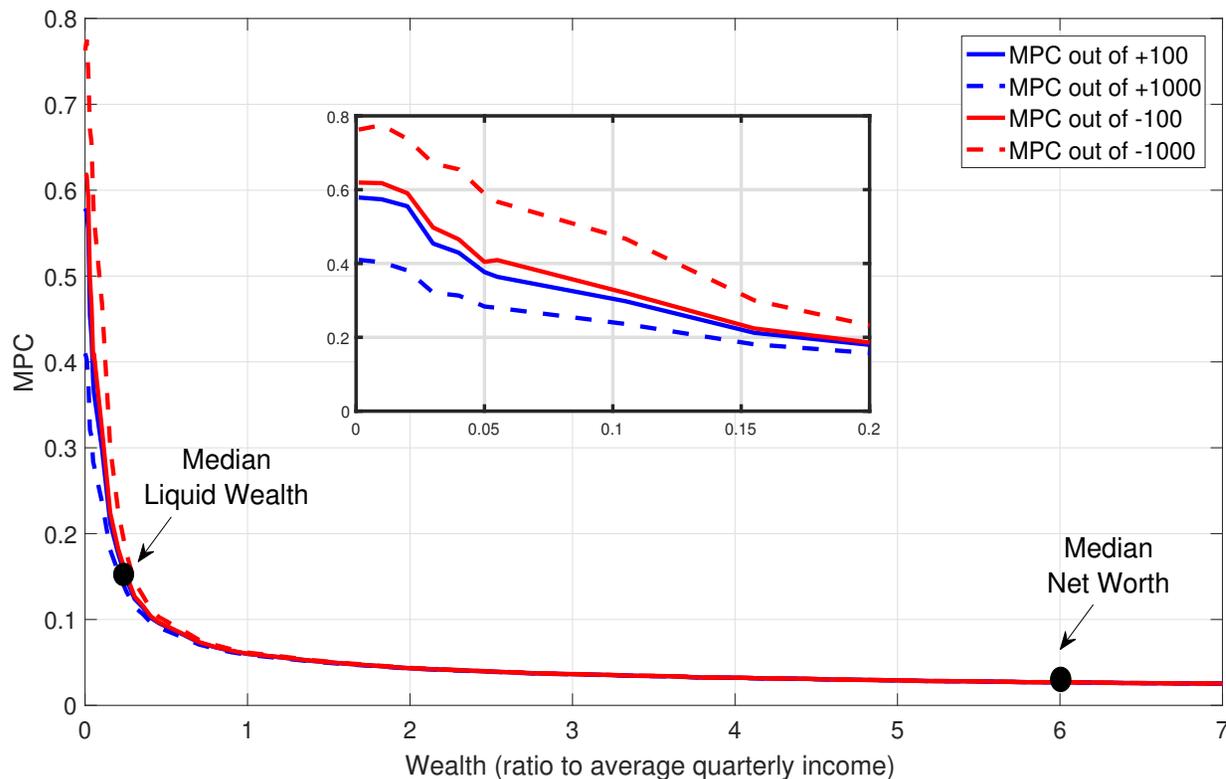
● **Tension** in the one-asset model: large MPC vs large aggr. wealth

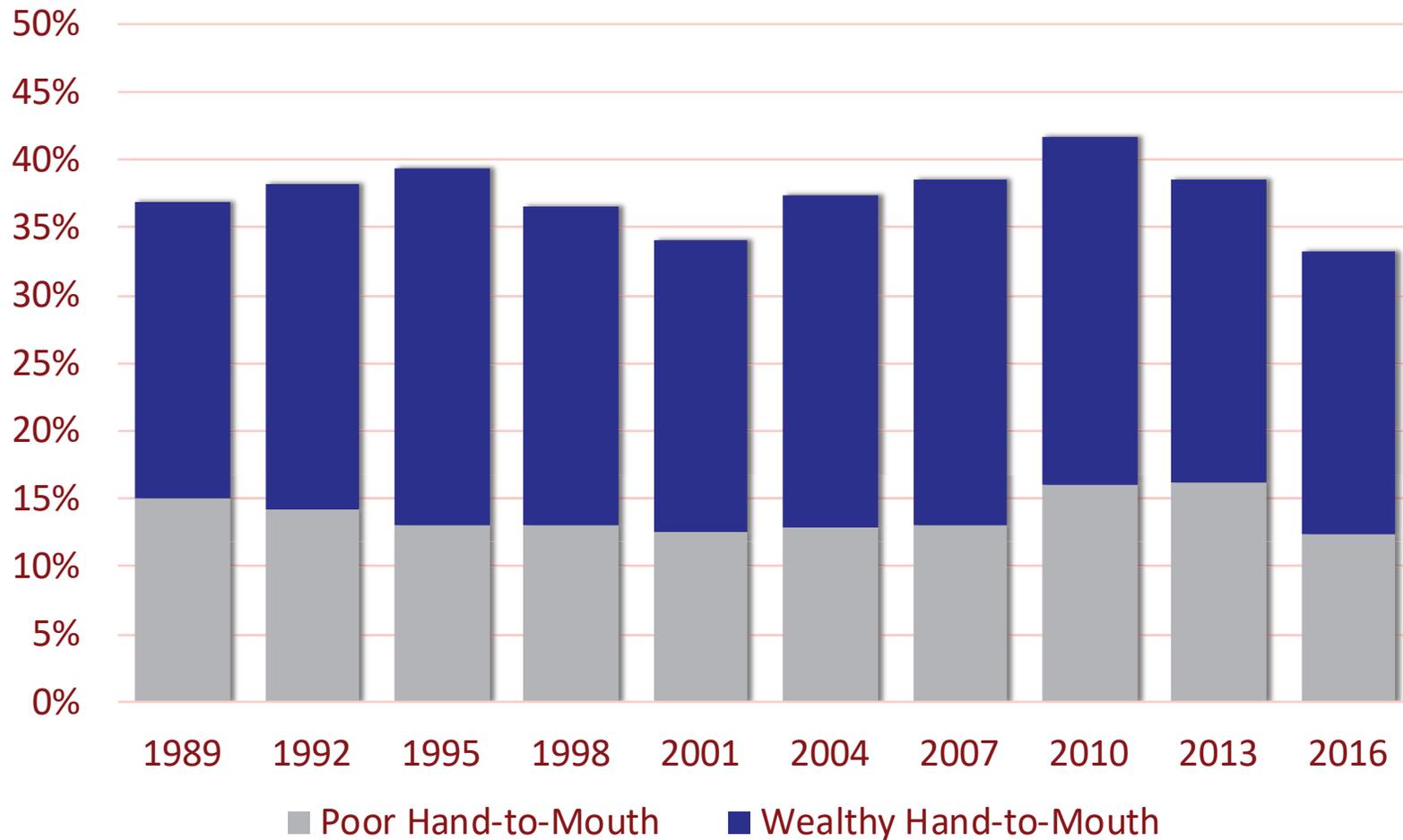# Two-asset IM Model: Quantitative Reconciliation

- **Two assets**: liquid and illiquid (higher return but transaction cost)

  - **Liquid**: cash, deposits, directly held m.f., unsecured debt

  - **Illiquid**: housing, retirement account (85% of net worth)

Two-asset IM Model: Quantitative Reconciliation

- **Two assets**: liquid and illiquid (higher return but transaction cost)

  - **Liquid**: cash, deposits, directly held m.f., unsecured debt

  - **Illiquid**: housing, retirement account (85% of net worth)

- Return / illiquidity trade-off

  - **Long-run gain**: higher level of consumption

  - **Short-run cost**: worse consumption smoothing

Poor and Wealthy HtM Households in the US

Legend: Poor Hand-to-Mouth, Wealthy Hand-to-Mouth

Kaplan-Violante-Weidner (2014)

Two-asset Model: Quantitative Reconciliation

- **Two assets**: liquid and illiquid (higher return but transaction cost)

    - **Liquid**: cash, deposits, directly held m.f., unsecured debt

    - **Illiquid**: housing, retirement account (85% of net worth)

- Return / illiquidity trade-off

    - **Long-run gain**: higher level of consumption

    - **Short-run cost**: worse consumption smoothing

- Emergence of **wealthy hand-to-mouth households**

    - Amplifies further sensitivity to y and unresponsiveness to r

    - **No more tension** between large MPC and large aggr. wealth!

A HANK ECONOMY

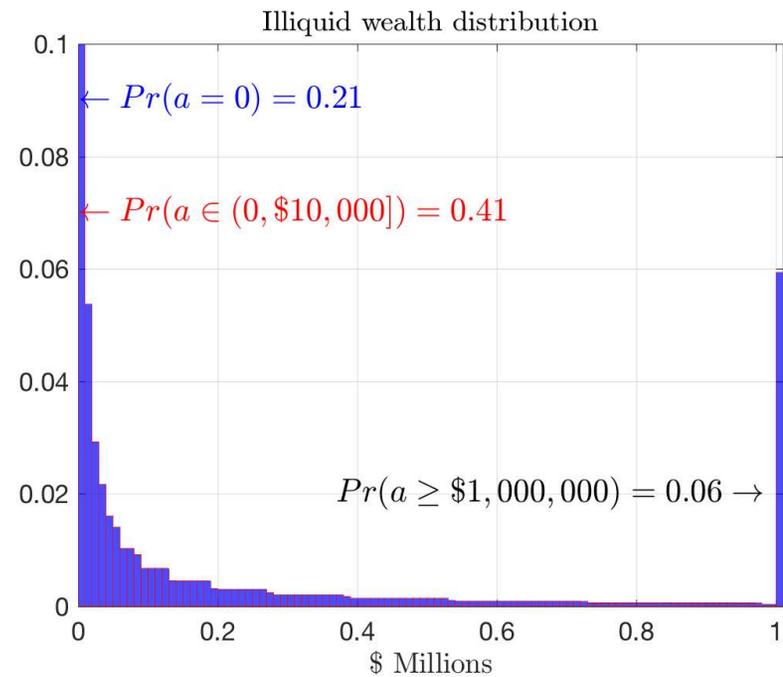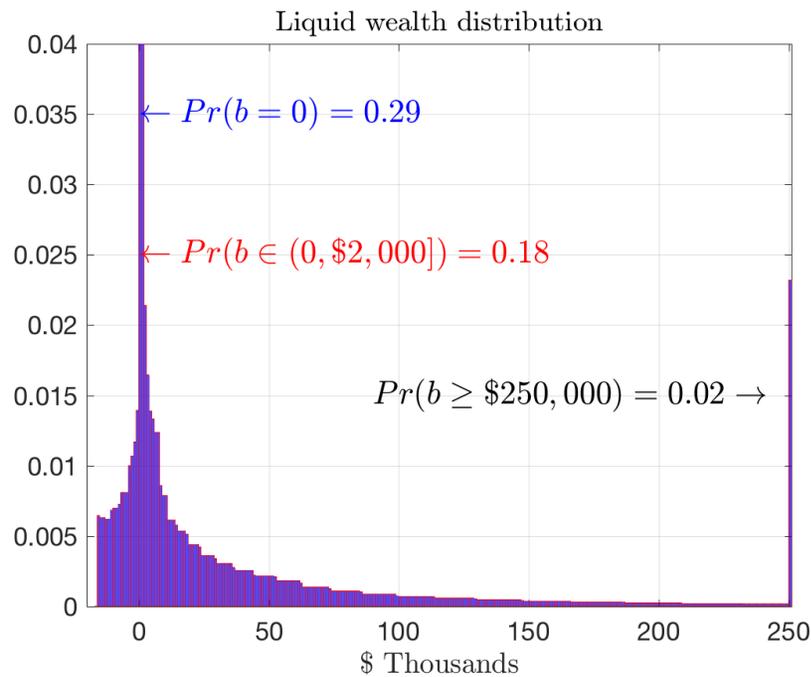# HANK as in Kaplan-Moll-Violante (AER, 2017)

Households

- Continuum of households

- Subject to uninsurable idiosyncratic productivity shocks

- Choose consumption, labor supply, saving

- Two assets: liquid (govt. bonds) and illiquid (K + firms' shares)

- Transaction cost to move funds into/out of illiquid account

- Both returns determined in equilibrium

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

Households

- Continuum of households

- Subject to uninsurable idiosyncratic productivity shocks

- Choose consumption, labor supply, saving

- Two assets: liquid (govt. bonds) and illiquid (K + firms' shares)

- Transaction cost to move funds into/out of illiquid account

- Both returns determined in equilibrium

Remaining model ingredients

- Standard NK production and monetary blocks

Model Liquid and Illiquid Wealth Distributions

Liquid wealth distribution

$\leftarrow Pr(b=0) = 0.29$

$\leftarrow Pr(b \in (0, \$2,000]) = 0.18$

$Pr(b \geq \$250,000) = 0.02 \rightarrow$

$ Thousands

Illiquid wealth distribution

$\leftarrow Pr(a=0) = 0.21$

$\leftarrow Pr(a \in (0, \$10,000]) = 0.41$

$Pr(a \geq \$1,000,000) = 0.06 \rightarrow$

$ Millions

- **Top**: very skewed wealth distribution (Gini $\approx$ 0.8)

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

MPC Heterogeneity across the Distribution

Quarterly MPC $500

(Axes: Illiquid Wealth ($000), Liquid Wealth ($000))
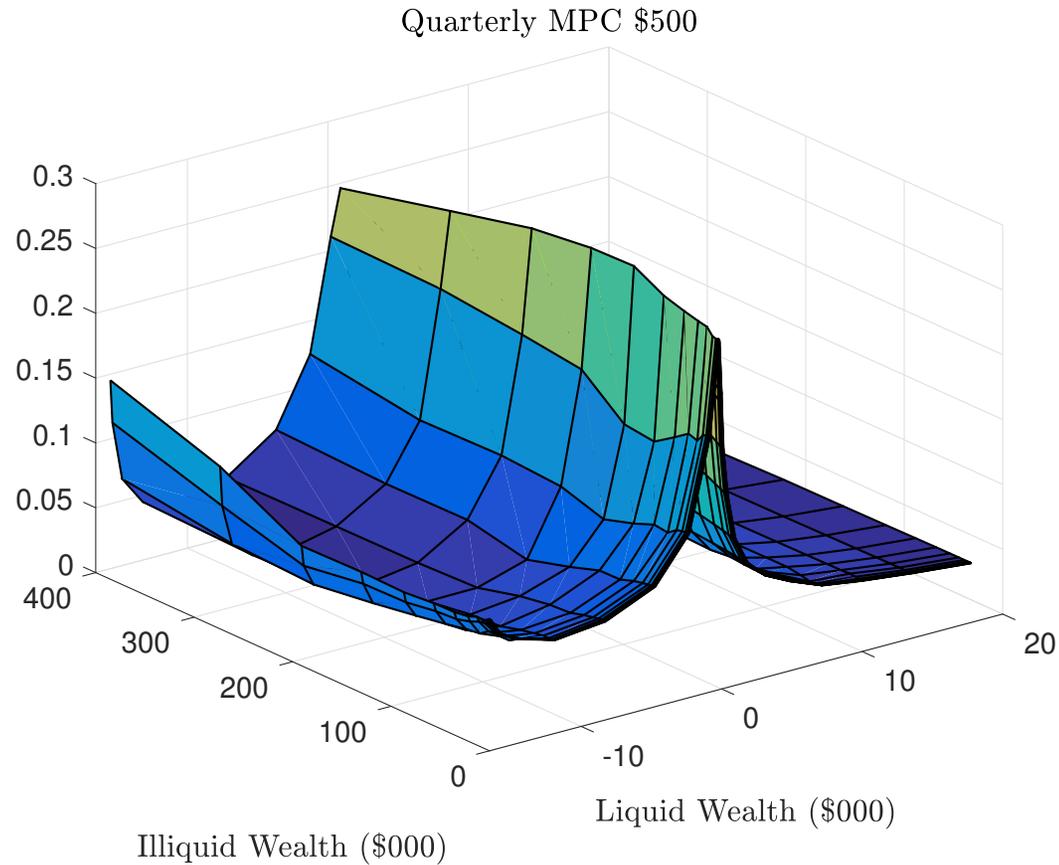
- **MPC**: 15% quarterly

- MPC = slope ⇒ highly nonlinear decision rules

2. HANK VS RANK:

IRF AND TRANSMISSION MECHANISMS

Equivalence between HA and RA Models

- **IRF** of C_t^m in model $m \in \{RA, HA\}$ to a common shock

- **Direct (PE)** effect of the shock on consumption

- **Indirect (GE)** effect of the shock through:

  - Equilibrium prices

  - Fiscal policy variables

- Transmission mechanism = **IRF decomposition into direct/indirect**

Equivalence between HA and RA Models

1. **Strong equivalence ('Same As'):** same IRF + same transmission

2. **Weak equivalence ('As If'):** same IRF, but different transmission

$$dC_t^{HA} = dC_t^{RA} \qquad \forall\, t \geq 0$$
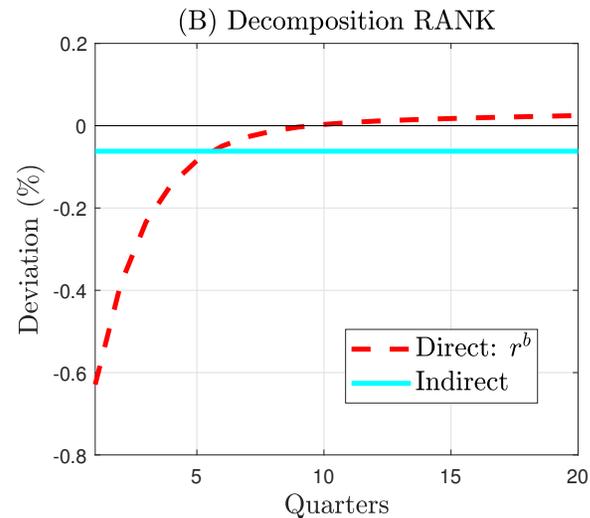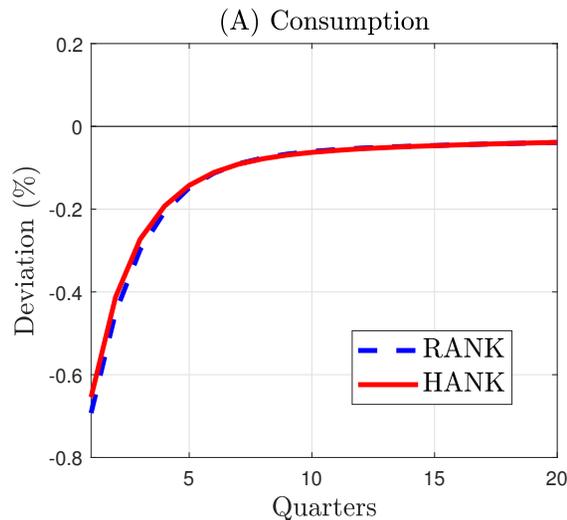
3. **Non-equivalence ('Not As'):** different IRF

$$dC_t^{HA} \neq dC_t^{RA} \qquad \forall\, t \geq 0$$

Patience Shock: Strong Equivalence
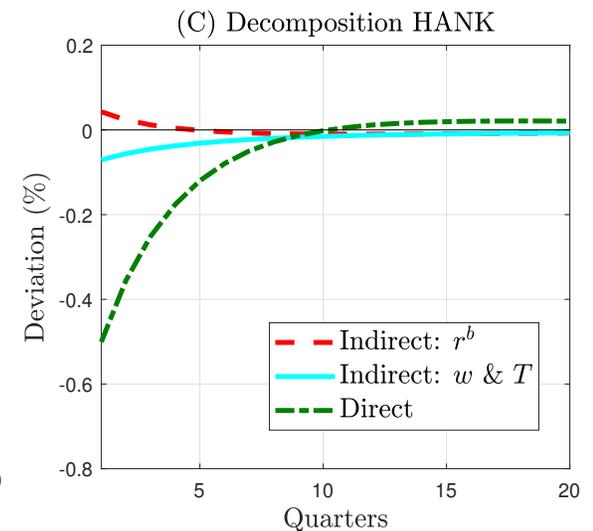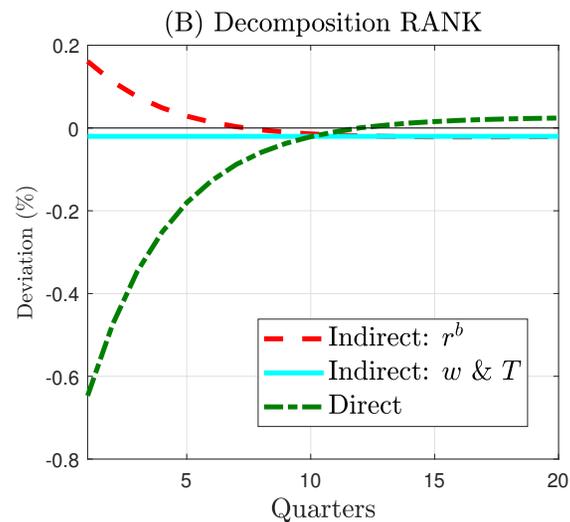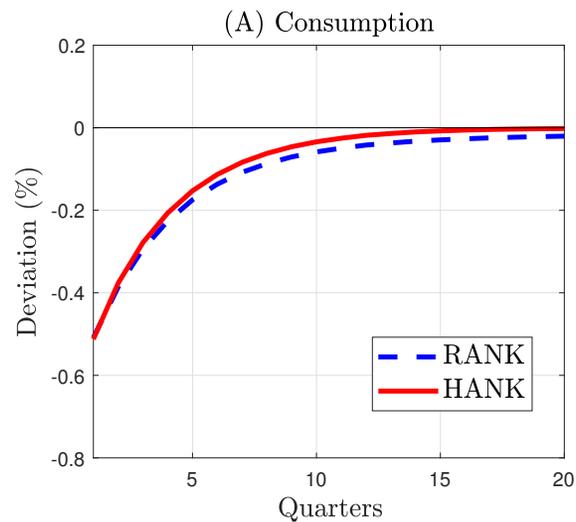
- Same IRF

- Same transmission mechanism: all due to the shock (direct)

Monetary Shock: Weak Equivalence

(A) Consumption (B) Decomposition RANK (C) Decomposition HANK
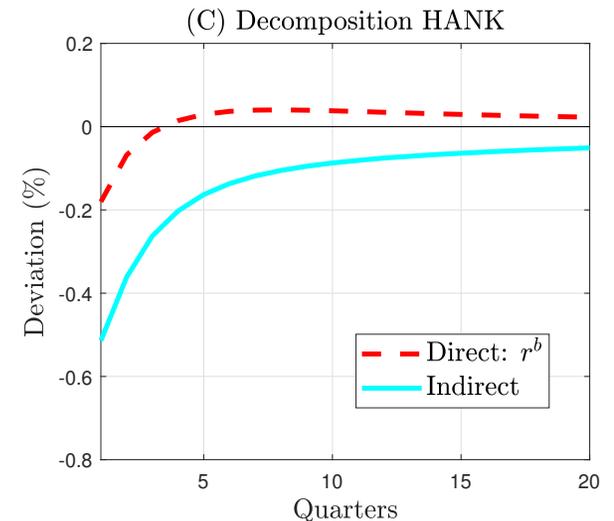
- **Same IRF**

- **Different transmission mechanism: in HANK, mostly indirect**

- **AD channel is salient in HANK because of HtM/high MPC**

Consequences of a Non-Ricardian Economy

- HANK: power of monetary policy depends on fiscal adjustment

Consumption
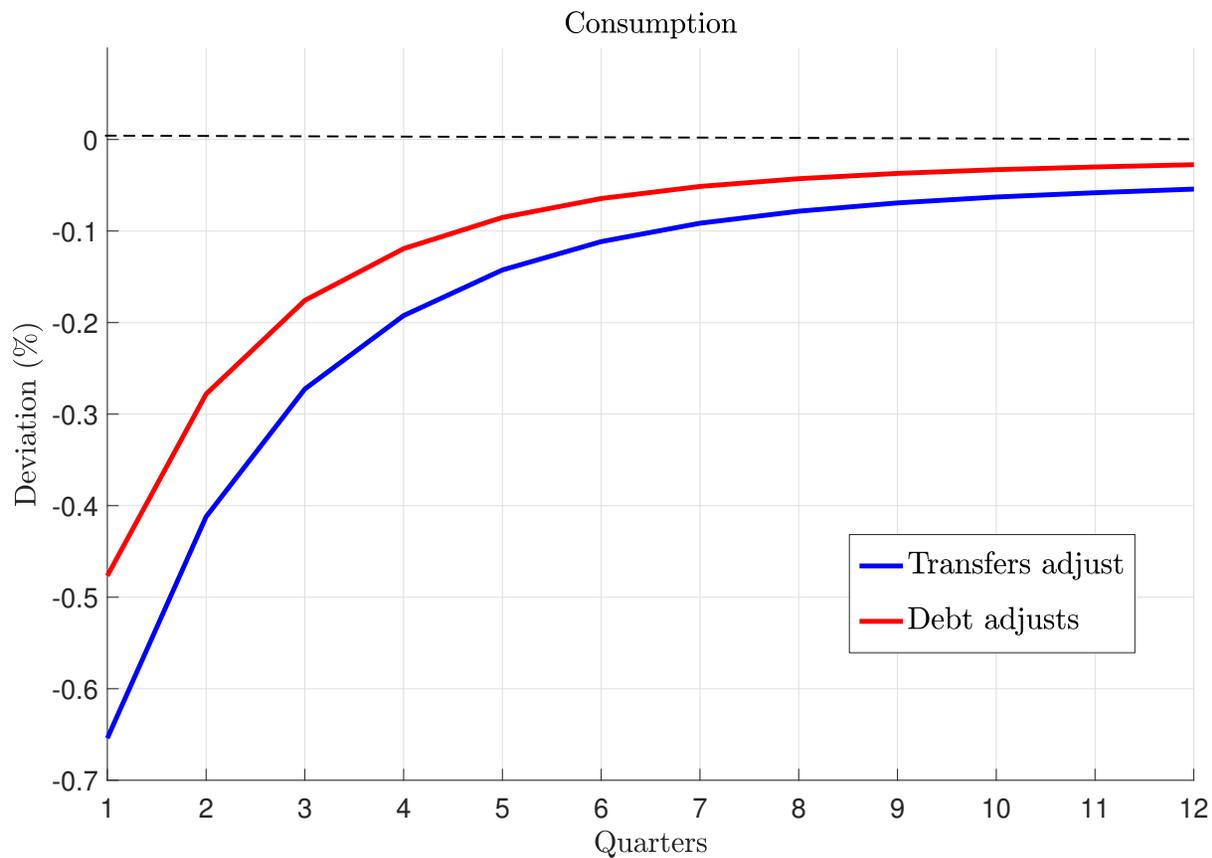
Fiscal Transfer Stimulus: Non-Equivalence

Consumption Response to Change in Transfers
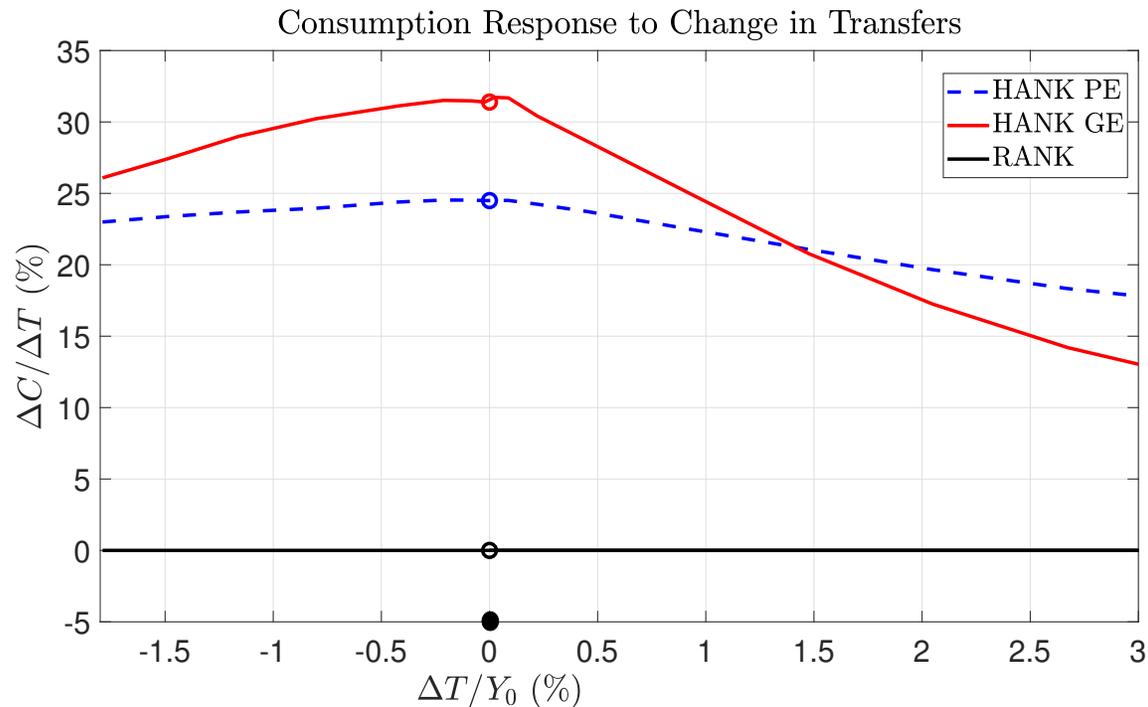
- **Nonlinearity:** C response falls with $|\Delta T|$

- **Sign asymmetry:** C response larger for negative ΔT

What determines amplification relative to RANK?

$$cov(mpc_i, dy_i)$$

- Sensitivity of y_i to aggregate shock varies across distribution

What determines amplification relative to RANK?

$$cov(mpc_i, dy_i)$$

- Sensitivity of y_i to aggregate shock varies across distribution

$$cov(dmpc_i, y_i)$$

- Aggregate shock affects distribution of households' mpc_i

  - Loosening/tightening of liquidity constraints

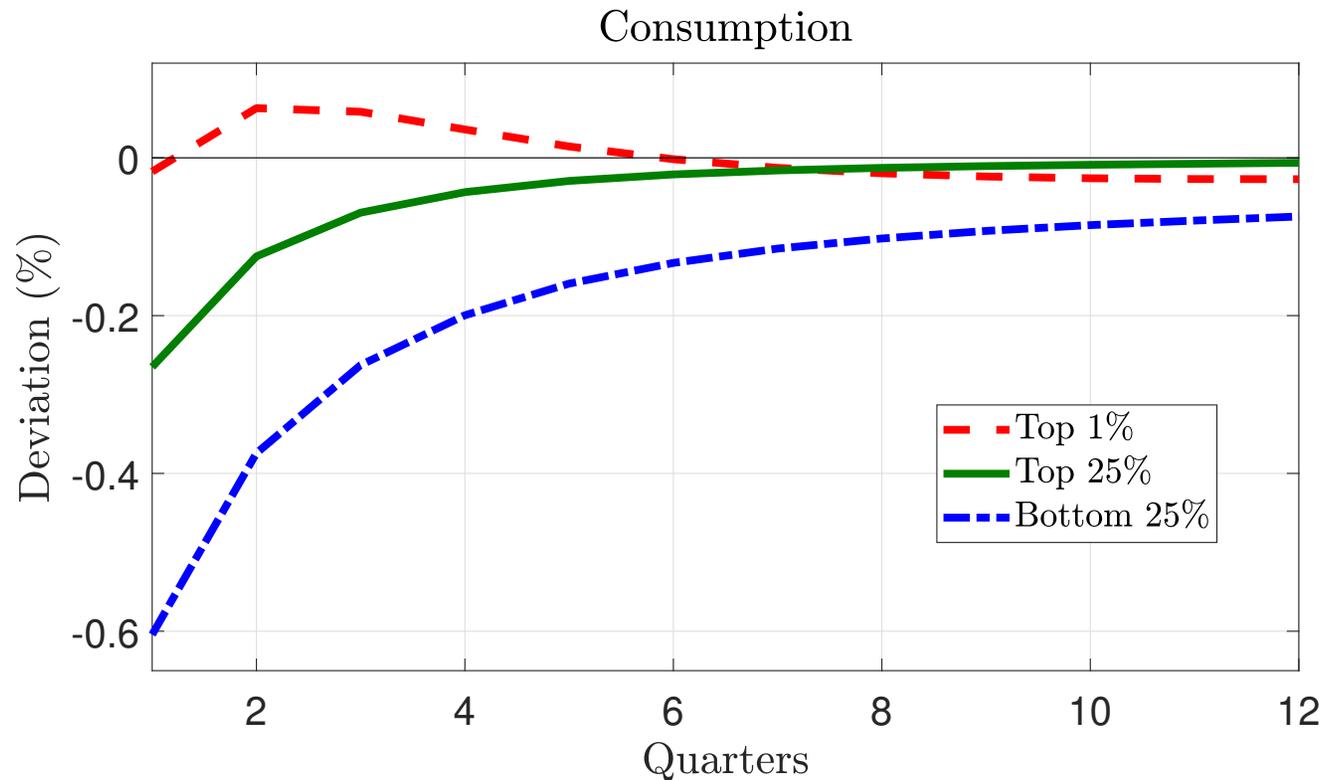 - Change in households' precautionary saving motive

3. NEW QUESTIONS REQUIRING HA

Can We Microfound the Preference Shock?

- **Want**: contemporaneous drops in C and in i

- Tighter credit limits and rise in individual y risk: ↑ prec. saving
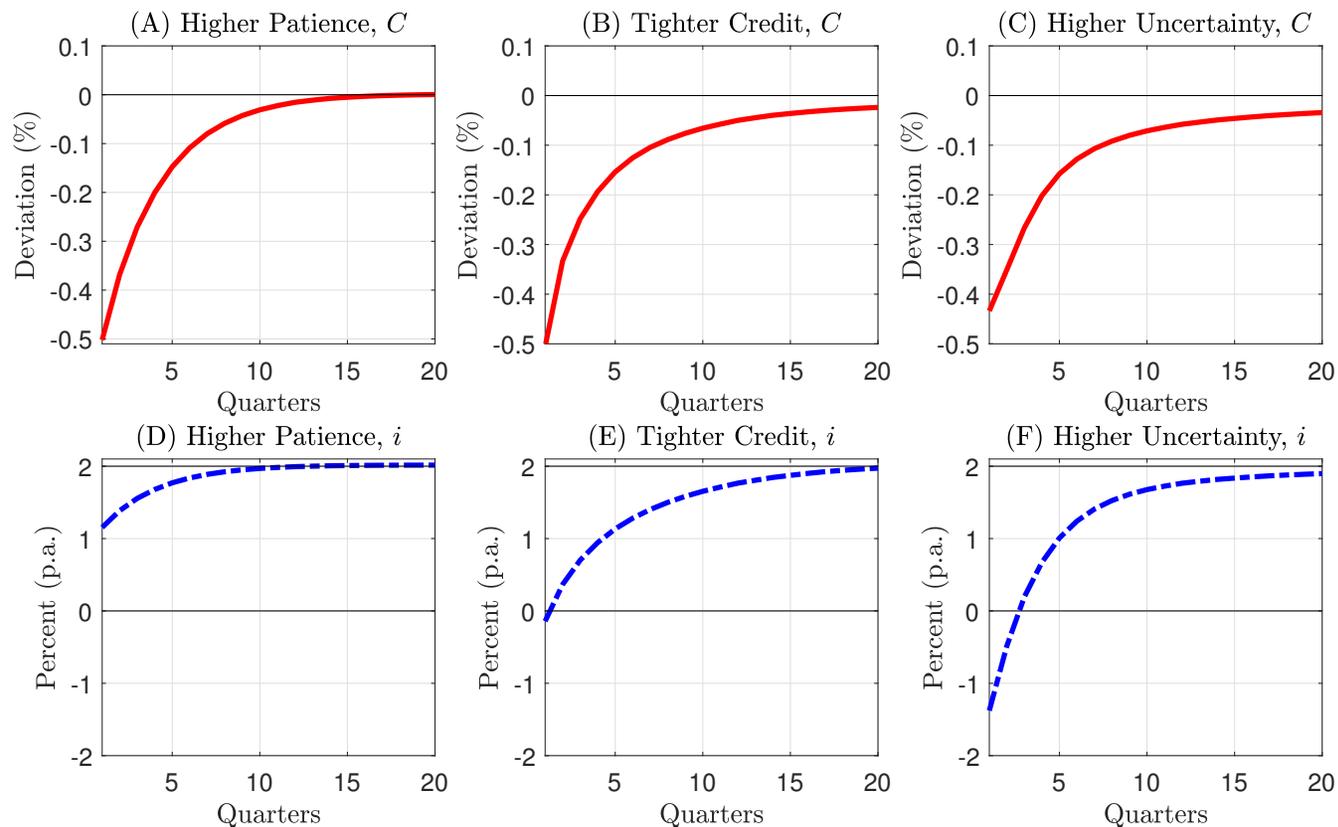
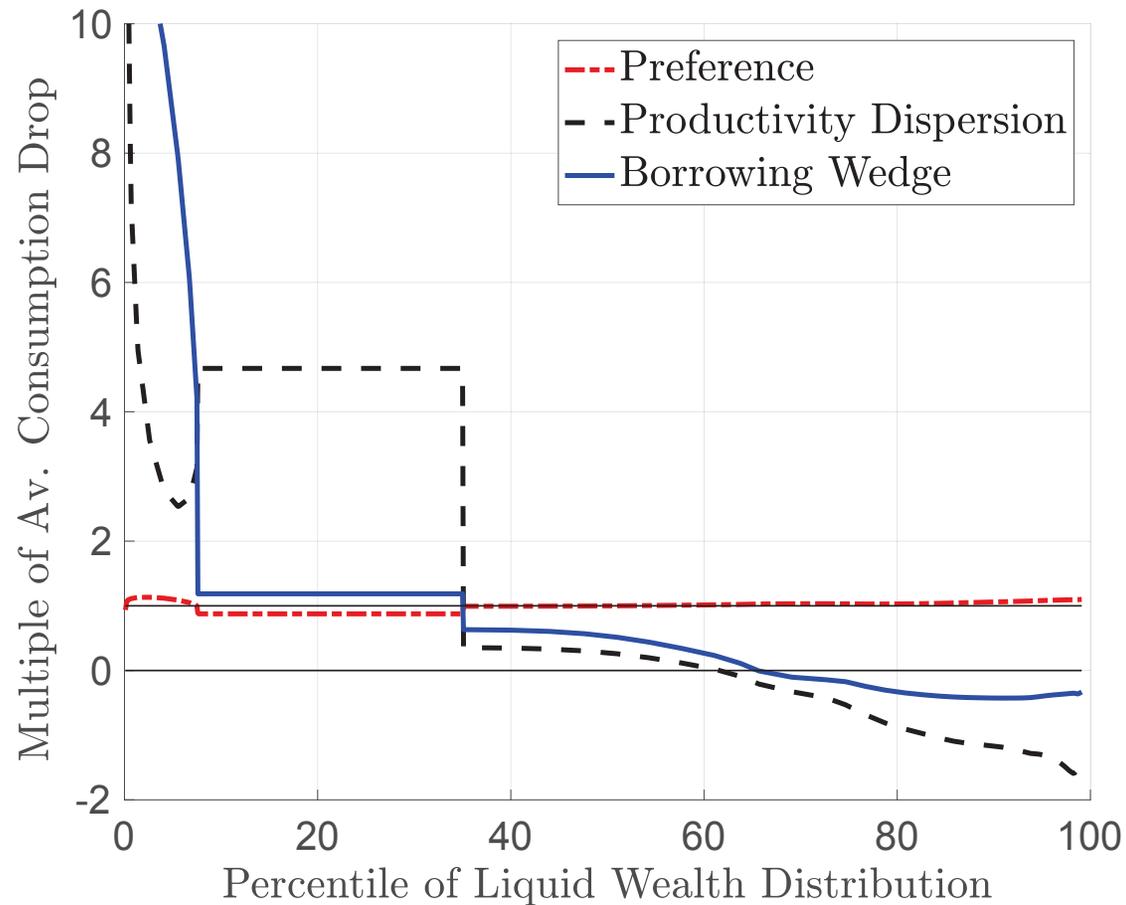# Distributional Impact of a Monetary Tightening

- Rich households: positive direct income effect (higher interests)

- Poor households: negative indirect effect (lower labor income)

- Consistent with Coibion et al. (2015): ↑ Gini, but small effect
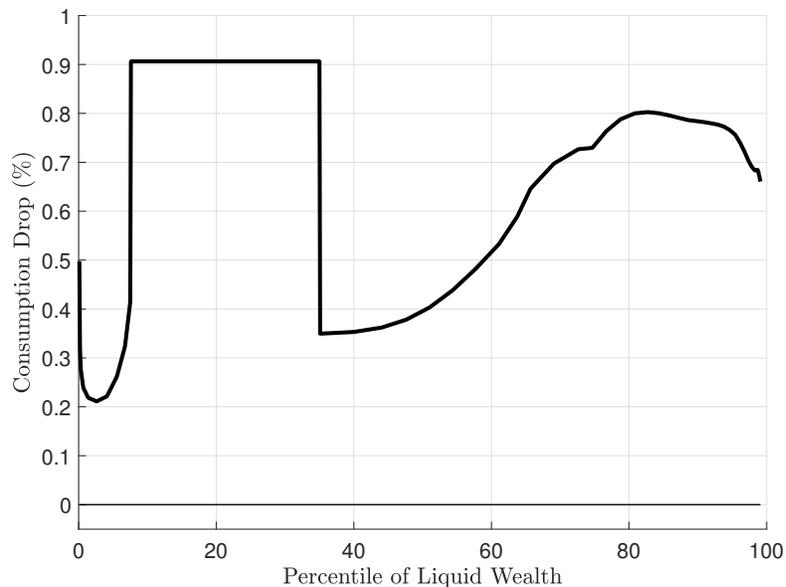
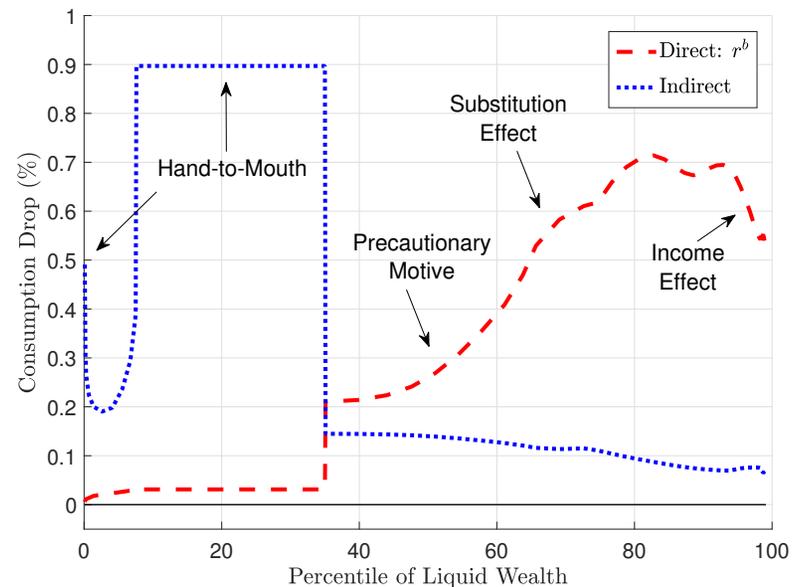# 4. USE OF MICRO DATA

Use Micro Data to Identify Macro Shocks

- Model tells how to identify aggregate shock through cross-section

Use Micro Data to Validate the Mechanism

● Effect of monetary shock across the distribution of liquid wealth

Total Effect   Decomposition

● In line with evidence (e.g., Cloyne-Ferreira-Surico)

Taking Stock

Tobin's description of macroeconomics in the 1970s:

a subject that attains workable approximations by ignoring the effects on aggregates of distributions of income and wealth

Deaton's Nobel Lecture (AER 2016):

Aggregation needs to be seen, not as a nuisance, but as a hallmark of seriousness

Taking Stock

Tobin's description of macroeconomics in the 1970s:

a subject that attains workable approximations by ignoring the effects on aggregates of distributions of income and wealth

Deaton's Nobel Lecture (AER 2016):

Aggregation needs to be seen, not as a nuisance, but as a hallmark of seriousness

● Incorporating hh heterogeneity in the study of business cycles:

1. Anchors model more tightly to observed consumption behavior

2. Changes how we think about macro shocks and propagation

3. Broadens set of questions we can ask

4. Offers new way to identify shocks & transmission mechanism