Discussion: Monetary Policy and Heterogeneity: An Analytical Framework by Florin Bilbiie

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Models of Consumption

Literature:

Enrich the Consumption block of the New Keynesian model

- Standard: Complete Markets (RANK models)

$$u'(c_t) = \beta(1 + r_{t+1})u'(c_{t+1})$$

- TANK models: Add Hand-to-mouth consumer

$$c_t = y_t.$$

- Heterogeneous Agent Incomplete markets

$$u'(c_t) = \beta(1 + r_{t+1})E_t u'(c_{t+1}).$$

BILBIIE: ANALYTICAL HANK

- Analytical HANK is a Stochastic TANK:
  - Unconstrained agents (S): Full access to credit markets.
  - Constrained agents (H) : Hand-to-mouth.
  - But with transition probabilities:
    - $S \to H$ with prob. $1 - s$.
    - $H \to S$ with prob. $1 - h$.
- Consumption:

$$\text{S type:} \quad u'(c_t^S) = \beta(1 + r_{t+1})E_t u'(c_{t+1})$$
$$= \beta(1 + r_{t+1})[s u'(c_{t+1}^S) + (1 - s)u'(c_{t+1}^H)]$$
$$\text{H type:} \quad c_t^H = y_t^H$$

BILBIIE: ANALYTICAL HANK

- Linearizing Analytical HANK:

$$\begin{aligned} c_t &= \delta E_t c_{t+1} - \sigma \frac{1-\lambda}{1-\lambda\chi}(i_t - E_t\pi_{t+1} - \rho_t), \\ \text{where} \quad \delta &\equiv 1 + (\chi - 1)\frac{1-s}{1-\lambda\chi}, \\ y_t^H &= \chi Y_t, \\ \lambda &= \frac{1-s}{2-s-h} \quad \text{(ss-mass of H-types).} \end{aligned}$$

- For $\chi = 1$: Standard Euler Equation.

$$\begin{aligned} c_t &= 1 E_t c_{t+1} - \sigma \frac{1-\lambda}{1-\lambda}(i_t - E_t\pi_{t+1} - \rho_t), \\ &= E_t c_{t+1} - \sigma(i_t - E_t\pi_{t+1} - \rho_t) \\ \text{where} \quad \delta &\equiv 1 + (\chi - 1)\frac{1-s}{1-\lambda\chi} = 1 \end{aligned}$$

INVESTMENT

- Resource constraint logic: $Y = C + S = C + I$.

  $C \uparrow \quad \Rightarrow \quad S \downarrow \quad \Rightarrow \quad I \downarrow$

  $\hookrightarrow$ Effect on Aggregate Demand $C + I$???

- It matters for multipliers in
  Christiano, Eichenbaum & Rebelo (JPE, 2005).

- It matters for monetary policy transmission mechanism in
  Rupert & Sustek (On the Mechanics of NK Models).

$\hookrightarrow$ Value added:

Understand Inv. and interaction with MPC-hetero.

FUNDAMENTAL AND POLICY χ

- χ is considered a fundamental parameter.
- Seems right if Y is driven by fundamental shocks (technology, preferences, ...)

$$\hookrightarrow \chi^{Fundamental}$$

- BUT: χ seems not to be policy-invariant.
- Two fiscal policies with same Y effect might have a very different distributional impact

$$\hookrightarrow \chi^{Policy}$$

QUANTITATIVE IMPORTANCE OF χ

- $\chi = 1$: Complete Markets
- χ^{Policy} very different from 1
  (Hagedorn, Manovskii & Mitman: The Fiscal Multiplier).
  - Deficit financed govt' spending: $\chi^{Policy} : 1.3 - 1.5$.
  - Tax financed govt' spending: $\chi^{Policy} : 0.6 - 0.7$.
- $\chi^{Fundamental}$ close to 1 (e.g. Luetticke's JMP,...)
- Moving $\chi^{Fundamental}$ requires hard work:
  - Find high MPC studies (Fagerang, Holm, Natvik for Norway), assume is all non-durable consumption ....
  - Large tailor-made redistribution
  - ...
- $\Rightarrow$ RANK $\approx$ a-HANK $\approx$ HANK

WHAT MATTERS

Add nominal bonds to a-HANK or HANK. No further assumptions needed.

- Reinterpretation of Friedman (63, 68, 79):

  inflation is always and everywhere a monetary phenomenon . . .

- Fiscal determination of long-run inflation rate, equal to the growth rate of nominal fiscal variables.
- Price level determinate for all specifications of monetary policy (no Taylor principle). Determined by monetary and fiscal policy.
- Liquidity trap Puzzles disappear
  - Divergence of fiscal multiplier at frictionless limit? NO
  - Contractionary TFP shocks expansionary? NO
  - Forward guidance infinitely powerful? NO (Hagedorn, Luo, Manovskii, Mitman)
- Estimation: See Kurt's talk tomorrow.

CONCLUSION: A-HANK

Difference:

Nominal a-HANK $\leftrightarrow$ RANK

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Difference:

Real HANK $\leftrightarrow$ Real a-HANK $\leftrightarrow$ RANK