Motivation and Contribution

Recent empirical evidence on effectiveness and transmission of monetary policy:
1. Monetary policy affects consumption largely through indirect (GE) effects.
2. High-MPC households tend to be more exposed to monetary policy.
3. Forward guidance has relatively weak effects on economic activity.
4. Advanced economies remained stable during long ELB periods.

Our contribution: The Behavioral Heterogeneous Agent New Keynesian Model—a new framework that allows for household heterogeneity and bounded rationality in the form of cognitive discounting:
- can account for the empirical facts 1 - 4 jointly
- resolves tension in existing literature
- matters for transmission of supply shocks: 2.5 times as inflationary
- more pronounced trade-off for monetary policy: price stability vs. fiscal and distributional consequences of monetary policy

Model

Households: incomplete markets and cognitive discounting
\[ V_t(B_{i,t}, e_{i,t}) = \max_{C_{i,t}, X_{i,t}, B_{i,t+1}} \left\{ C_{i,t}^{1-\gamma} - (N_{i,t})^{1-\gamma} + \beta(e_{i,t}) E^{\text{BR}} V_{t+1}(B_{i,t+1}, e_{i,t+1}) \right\} \]
subject to
\[ C_{i,t} + \frac{B_{i,t+1}}{R_t} = B_{i,t} + W_i z(e_{i,t}) N_{i,t} + d_i(e_{i,t}) - \tau_i(e_{i,t}) - \bar{\tau}_i, \quad B_{i,t+1} \geq 0, \]
ei determines idiosync. prod. z(ei), dividends di(ei), taxes τi(ei) and β(ei)

Bounded rationality:
\[ E^{\text{BR}}[X_{i,t+1}] \equiv \hat{X}_{\text{anchor}} + m E^{\text{BR}}[X_{i,t}] \text{ expected deviation} \]
- anchor expectations to stationary equilibrium outcome \( \hat{X} \)
- \( m \in [0, 1] \) : cognitive discounting parameter, \( m = 1 \): rational expectations
- underreaction of household expectations in data: \( m \in [0, 0.85] \)

Firms: standard NK setup, monopolistic competition and nominal rigidity
Govt.: fiscal policy issues bonds, raises taxes, MP rule + MP shocks

Analytical Results

Special calibration allows for closed-form solution:
- zero liquidity, only two idiosyncratic states with \( \beta(e_i) \ll \beta(e_g) \)
- share \( \lambda \) of \( H \) and to-mouth households with consumption \( \hat{C}_t^H = \hat{X}_t \)
- Fact 2: \( \chi > 1 \)

Aggregate IS equation:
\[ \hat{y}_t = \psi_f E^{\text{BR}}[\hat{y}_{t+1}] - \psi_s \frac{\tau}{\gamma}, \]
where
\[ \psi_f \equiv m \left[ 1 + (\chi - 1) \frac{1 - \sigma}{1 - \chi \lambda} \right] \quad \text{and} \quad \psi_s \equiv \frac{1 - \lambda}{1 - \chi \lambda}. \]

- monetary policy redistributes to \( H \) households (\( \chi > 1 \)) ⇒ transmission and amplification through indirect effects: \( \psi_f > 1 \) (fact 1 ✔)
- forward guidance shocks become weaker as the announcement horizon increases: \( \psi_f < 1 \) (fact 3 ✔)
- \( \psi_f < 1 \) also keeps the economy stable at the effective (or zero) lower bound (fact 4 ✔)
- simultaneously having \( \psi_f > 1 \) and \( \psi_f < 1 \): not possible in rational TANK/HANK models or without household heterogeneity!
- can derive observationally-equivalent IS equation with sticky wages

Calibration:
- relax special calibration that was imposed for closed-form solution
- set government debt level to match average quarterly MPC of 0.16
- set dividend shares to match empirical finding of Patterson (AER, 2023): regressing income elasticity of households with respect to aggregate changes in output on HHS’ MPC yields regression coefficient of 1.33 (fact 2 ✔)
- \( m = 0.85 \) (upper limit of our empirical estimates)

Results: Effect of contemporaneous MP shocks (\( k = 0 \)) and of FG shocks of different horizons \( k \) on output today:

Amplification of Productivity Shocks

Heterogeneous exposure and behavioral friction increase inflation response and reinforce each other such that inflation increases 2.5 times as much as in RANK (black line):

Can monetary policy impose zero inflation? Yes, but more aggressive rate hikes necessary which implies larger fiscal and distributional consequences compared to rational model:

Details are in the paper—if interested, please scan the QR code at the top to get the latest version of our paper!