The natural rate of interest through the hall of mirrors
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The natural interest rate debate: an evolution

Post-GFC pre-COVID consensus

- Trend decline in real rate owes to falling natural interest rate (r-star)
- Linked to structural factors e.g. slowing productivity, demographic shifts (more savers & higher life expectancy), higher inequality, global saving glut etc
- With ELB, this poses problems for monetary policy

Post-COVID debate

- Blanchard (2023): It would be surprising if the deep pre-COVID forces are going to revert in the opposite direction so soon.
- Summers (2023): Fed has raised rate substantially and yet the economy has not slowed. Lower sensitivity of demand to interest rates implies a higher r-star.
Puzzle 1: We know less than we think we do about r-star drivers

Sources: Borio, Disyatat, Juselius and Rungcharoenkitkul (2022)
Puzzle 2: Nobody anticipated the supposedly predictable r-star decline
Puzzle 3: Apparent influence of monetary policy on expected r-star ⇒ a violation of MP neutrality
MP surprises explain most of the trend decline in yields

Sources: Replicating Hillenbrand (2022)
Standard theoretical framework

- Structural factors determine $r^*$
- Everyone knows the true process of real rate trend
- Money neutrality holds true
This paper

- $r^*$ process is unknown, and agents must learn the $r^*$ value
  - Beliefs matter, not just fundamentals $\Rightarrow r^*$ is endogenous to learning
- Agents rely on each other to learn about $r^*$
  - Cyclical shocks can persistently affect beliefs via the “hall-of-mirrors” effects
The hall-of-mirrors intuition

1. Negative demand shocks

2. CB sees lower output but cannot observe true shocks
   - Thinks it’s partly due to lower r*
   - Revises down r* beliefs

3. Private sector sees lower rate but not the detailed shocks
   - Thinks it’s partly because CB receives a lower r* signal
   - Revises down r* beliefs
Formal steps

- Introduce a two-sided learning problem into the New Keynesian framework

- Solve the model under two imperfect information settings
  - **Common knowledge**: Each side understands that the other is learning from itself
  - **Hall-of-mirrors**: Both are unaware of double learning

- Quantitative analysis
  - Simulate r-star beliefs, with shocks chosen to match key macro variables
  - Examine the potential relevance of hall-of-mirrors effects in post-GFC period
  - Explore the implications for post-COVID period and beyond
Post-GFC simulation
Explaining excess sensitivity of long rates to monetary policy
Explaining yield curve dynamics
Post-COVID: What’s on the cards?
Model predicts higher for longer
Conclusion

- "Hall-of-mirrors" hypothesis: $r^*$ is endogenous to cyclical shocks and monetary policy through a self-reinforcing two-sided learning process

- A parsimonious explanation of many post-GFC salient features
  - Low for long rates, apparent $r^*$ decline, slow output recovery, low inflation
  - Excess sensitivity of forward rates to MP & apparent violation of money neutrality

- Policy implications
  - Aggressive MP easing designed to avert ELB may in fact make it more likely
  - Recent inflation surge may offer a rare opportunity to exit the low-for-long era
  - Communicating views about $r^*$ ("I need to keep rates low because $r^*$ is low") may be counterproductive