A Behavioral New Keynesian Model: Dynare Implementation

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Overview

Gabaix' Behavioral Approach

- New version of the paper posted on December 26th
  - Minor changes to the main model, mostly involving parameter specification
- Attempts to tackle some of the **puzzling "aggregate outcomes"** of the traditional New Keynesian model
- Addition of a new **parameter "M"** representing myopia of economic agents. Large consequences for monetary and fiscal policy!
  - Myopia = "Short-sightedness" - agents can't see very far into the future

Five Major Implications

1. **Forward Guidance Puzzle**: In traditional model FG is unrealistically powerful.
2. **Fiscal Policy**: Traditionally Ricardian Equivalence holds, so lump-sum tax cuts have **no effect** on consumption.
3. **Zero Lower Bound**: Recessions can be **"unboundedly large"** in the traditional model
4. **Equilibrium Selection**: The NK Model offers a continuum of possible equilibria to be selected from.
5. **Neo-Fisherian Paradox**: In the traditional NK model a rise in interest rates leads to a smooth rise in **short-run** inflation.

Five Major Implications

- In his new version, Gabaix describes two additional implications of his model:
  - Explains why economies at the ZLB can be stable
  - Qualitative changes in optimal policy when firms are behavioral
- For today, we will focus on the implications of the model for **Forward Guidance** and the **Costliness of the Zero Lower Bound**

Behavioral NK Model Synthesis

- The Behavioral IS-Curve:

$$x_t = M E_t[x_{t+1}] - \sigma(i_t - E_t \pi_{t+1} - r_t^n)$$

- The Behavioral Phillips Curve:

$$\pi_t = \beta M^f E_t[\pi_{t+1}] + \kappa x_t$$

Breakdown of 'M'

- There are three main behavioral parameters:

$$M = \frac{\bar{m}}{\frac{1}{\beta} - m_y(\frac{1}{\beta} - 1)}$$

$$\sigma = \frac{m_r}{(\gamma \frac{1}{\beta}(\frac{1}{\beta} - (\frac{1}{\beta} - 1)m_y))}$$

$$M^f = \bar{m}(\theta + m_\pi^f(1 - \theta))$$

- Kappa also has a behavioral component:

$$\kappa = (\frac{1}{\theta} - 1)(1 - \beta\theta)(\gamma + \phi)m_x^f$$

- What about the other parameters $\bar{m}$, m_y, m_r, m_π^f, and m_x^f?

Parameterization

Parameter	Traditional Model	Behavioral Model
$\bar{m}$	1	0.85
m_y	1	1
m_r	1	0.2
m_π^f	1	1
m_x^f	1	0.2
β	0.99	0.99
ϕ	1	1
θ	0.7	0.7
γ	1	1
ρ	0.5	0.5

Table: Left: Rational households; Right: Myopic households

Dynare Implementation

- Focus on the Forward Guidance Puzzle and the Costliness of the ZLB
- For each analysis, we looked at the effects of shocks across three cases:

  1. Traditional Model ($M = 1$)
  2. Household Myopia ($M < 1$ for individual households)
  3. Household & Firm Myopia ($M < 1$ for household and $M^f < 1$ firms)

Forward Guidance in Dynare

- Gabaix uses a more general approach to Forward Guidance that is independent of the ZLB
- He follows the approach used by McKay, Nakamura, and Steinsson in their 2016 research on the Euler Equation and Forward Guidance Puzzle:
  - The central bank follows a "naive" interest rate rule WRITE MCKAY EQ
  - A one-time, 1% rate cut is announced to take place several years in the future

Forward Guidance in Dynare

- figures

ZLB in Dynare

- We implemented the ZLB using a large, negative technology shock in conjunction with the `max` operator in MATLAB
- The same central bank policy rule from McKay, Nakamura, and Steinsson (2016) applies here as well

ZLB in Dynare

- figures

Final Thoughts

- We were able to successfully reproduce Gabaix' results using Dynare
- However, his approach to modeling central bank policy-making seems overly simplified and serves mainly to explain his underlying concept

References

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