Monetary Policy Interactions: The Policy Rate, Asset Purchases, and Optimal Policy with an Interest Rate Peg

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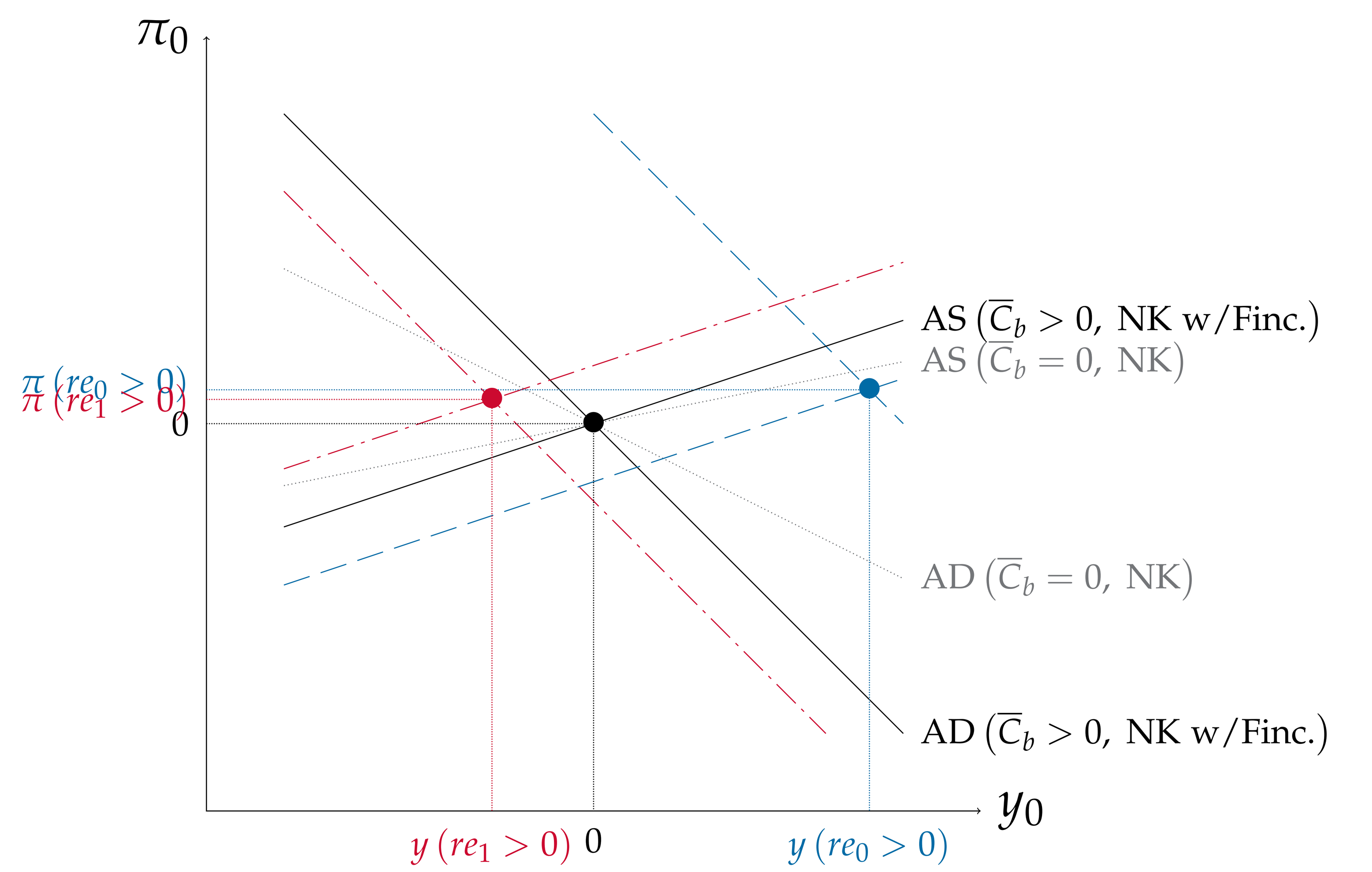
Motivation and Research Questions

- **Balance sheet policy is now standard**
  - Examples: QE1/2/3 and the Covid-19 monetary policy response
  - Federal Reserve balance sheet expanded by $400 billion in 2019 with *policy rate above zero* before any Covid news
- **Research questions:**
  1. What does optimal dual instrument monetary policy look like?
     - The "divine coincidence" holds with dual instrument policy
     - Acts as a simultaneous inflation, output gap, and term premium target
  2. Can balance sheet policy sustain a policy rate peg?
     - YES! However, the welfare costs are high.
     - Four times more costly, in fact, compared to fixing the balance sheet and enacting optimal interest rate policy
  3. How should the policy rate respond to balance sheet expansion?
- **Matters for:** Monetary policy design and transmission; emphasis on the policy rate lower bound and "lift-off"

The Paper in a Nutshell

1. Uses theoretical model to address the above questions
   - New Keynesian model with three structural equations
   - Nominal short-term rate and balance sheet size are policy instruments
2. Model is simple by design for theoretical analysis
   - simplifies to an AS/AD summary of the transmission of balance sheet policy



The Varying Equilibrium Effects of Balance Sheet Policy Timing

New Keynesian Model with Finance

Term premium augmented IS and Phillips Curves:

$$x_t = \mathbb{E}_t x_{t+1} - \left(r_t - \mathbb{E}_t \pi_{t+1} - \overline{C}_b \frac{\beta}{1-\beta\kappa} \mathbb{E}_t \Delta tp_{t+1} - r_t^* \right)$$

$$\pi_t = \gamma x_t + \beta \mathbb{E}_t \pi_{t+1} + \gamma \frac{\overline{C}_b}{1+\eta} \frac{\beta}{1-\beta\kappa} tp_t$$

Term premium definition, linear function of:

$$tp_t = f\left(x_t, r_t^*, \pi_t, \{r_{t+j}\}_{j=0}^{\infty}, \theta_t, \theta_{t-1}, re_t, re_{t-1}, tp_{t-1} \right)$$

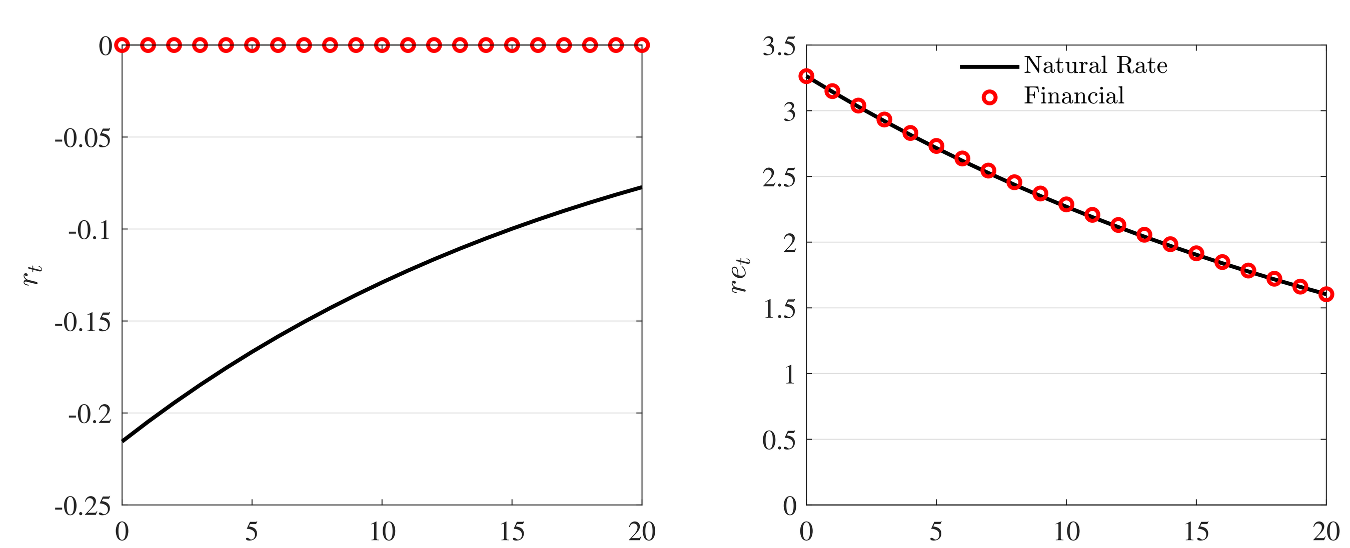
- Expectations hypothesis bond price, or forward looking path of the policy rate
- θ_t, financial capacity shock ($\theta_t \uparrow \Rightarrow tp_t \downarrow$)
- re_t, central bank balance sheet size ($re_t \uparrow \Rightarrow tp_t \downarrow$)

Dual Instrument Policy

Proposition 1: *Absent endogenous balance sheet policy, the divine coincidence fails due to term premium variability.*

Proposition 2: *There exists endogenous balance sheet policy that stabilizes the output gap, inflation, and the term premium, the equivalent of divine coincidence in this economy.*

Corollary: *The policy rate equals the natural rate when balance sheet policy supports term premium stabilization.*



The Effects of Shocks with Optimal Dual Instrument Policy

Endogenous Balance Sheet Policy

Consider the model with short-term debt, $\kappa = 0$, and balance sheet policy given by:

$$re_t = \frac{1}{\overline{b}^{cb}} \left(v_x x_t + v_{tp} tp_t \right)$$

Proposition 3: *The necessary and sufficient condition for a rational expectations equilibrium to be unique under a policy rate peg when debt is short-term and balance sheet policy responds to output gap and term premium fluctuations is that:*

$$\frac{1+v_{tp}}{\overline{C}_b} < v_x < \frac{(1+v_{tp})(1+\eta)}{\overline{C}_b} - \eta$$

Welfare Comparisons across Monetary Policies

Measure	Monetary Policy Specification (I)	(II)	(III)	(IV)
$\lambda_i - \lambda_{\text{Fixed Wedges}}$	0.00%	0.17%	0.76%	0.26%
Fixed Balance Sheet		•		
Interest Rate Peg			•	

where λ_i is the argument satisfying:

$$W_i^s = W(\lambda_i) = \frac{1}{1-\beta} \left[\ln\{(1-\lambda_0)C\} + \psi_b \ln C_b - \psi \frac{N^{1+\eta}}{1+\eta} \right]$$

"Fixed wedges" refers to dual instrument policy following:

$$tp_t = \pi_t = 0$$

The final column considers inflation targeting interest rate policy with balance sheet policy following Sims et al. (2021):

$$re_t = -\frac{1-\overline{b}^{cb}}{\overline{b}^{cb}} \theta_t$$

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