Money Talks: Information and Monetary Policy

Marie Hoerova

ECB

Cyril Monnet

FRB Philadelphia

Ted Temzelides

Rice U.

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"would also function as a *signal* that could subdue house price trends and household indebtedness"

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- Deeds need to complement words!

Research questions

- How can a central bank effectively communicate its info about fundamentals to the private sector?

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- What is the role of monetary policy as
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  - a coordination device?
- Why do central banks typically follow policies that lead to positive average inflation levels?

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- Economic environment:
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  - externalities on the aggregate level
- The CB has info about fundamentals $\longrightarrow$ how to reveal it?

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  - $\longrightarrow$ monetary policy as an optimal balance of this tradeoff
- Changes in the interest rate need not be large to be effective

The environment

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- Time t discrete
- Infinitely lived agents, discount factor β
- Benevolent CB serves for one period and can:
  - print money
  - make loans to the private sector
  - make announcements

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- Each period: three stages 0, 1, and 2
- Three goods:
  - stage 0: an investment good k, uncertain return θ^2 per unit
  - stage 1: good q
  - stage 2: good z

Preferences and technology

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- Stage-1 good:
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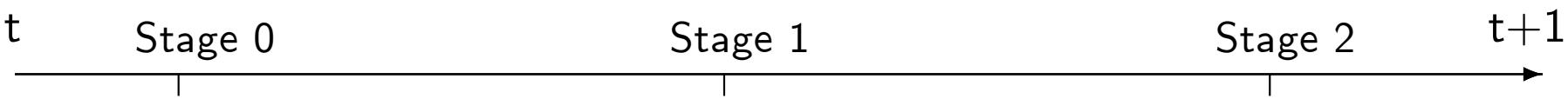
- Stage-2 good:
  - linear utility of consumption (cost of production)
  - $\longrightarrow$ agents use Stage 2 to equalize money holdings

Timeline



Nature chooses θ, signals are sent. The CB makes an announcement or changes the interest rate r. Investor i produces k_i units of the investment good.

Market for good q opens. Good q is traded in exchange for money. Agents can borrow at the lending facility of the CB at the interest rate $r \geq 0$.

Investment matures. Agents produce or consume good z, repay their loans (if any), and even their money holdings.

Benchmark: Fundamentals observable

- Planner max period-t social welfare:

$$W(k_i, \theta) = \frac{1}{2}\left[u(q) - q + \int \theta^2 k_i di - \int \frac{k_i^2}{2} di\right]$$

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- Decentralization using cash:
  - agents can borrow from the CB at $r \geq 0$ at stage 1
  - Friedman rule is optimal: $r = 0$ for all states

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- CB's tools: announcements and changes of r

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  - but: lower α_a increases mean investment
- No equilibrium where the CB announces its precision truthfully and the investors use the announcement $\longrightarrow$ Talk is cheap!

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- Pooling: agents use $\overline{\alpha} = \pi\alpha_L + (1-\pi)\alpha_H$ and the CB sets $r(\overline{\alpha}) = 0$
- If agents' expectations are far away from the truth, costly signaling is preferred to costless pooling

Credible interest rate changes

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- For $CRRA = 1$, credible info transmission achieved with $r = 27$ b.p.
- For $CRRA = 4$, credibility achieved with $r = 54$ b.p.

Concluding remarks

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- Extensions:
  - Signaling both y and α
  - Correlated signals
  - Other instruments

Thank you!

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- Discounted lifetime utility entering Stage 2:

$$\begin{aligned} W(k, m, I; \theta) &= \max_{z, m_{+1}} \{-z + \beta EV(m_{+1}; \theta)\} \\ s.t. \quad \phi m_{+1} &= z + \theta^2 k + \phi m - \phi (1 + r) I + \phi \tau + \phi T \end{aligned}$$

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- Expected discounted lifetime utility entering Stage 0:

$$\begin{aligned} V(m) &= \frac{1}{2} \max_{k_i} \left\{ -\frac{k_i^2}{2} + E \left[\max_q -q + W(k_i, m + pq, 0, \theta) \right] \right\} \\ &\quad + \frac{1}{2} E \left[\max_{q, I \text{ s.t. } pq \leq m + I} u(q) + W(0, m + I - pq, I, \theta) \right] \end{aligned}$$

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- Stage 2: General market
  - return θ^2 per unit of k realized, consumed
  - good z traded
  - frictionless Walrasian market