"Central Bank's Two-Way Communication with the Public and Inflation Dynamics" by Kosuke Aoki and Takeshi Kimura

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A simple New Keynesian model

Let $x_t \equiv y_t - y_t^n$ and $r_t^n \equiv E_t y_{t+1}^n - y_t^n$.

$$x_t = r_t^n - (r_t - E_t \pi_{t+1}) + E_t x_{t+1}$$

$$\pi_t = \kappa x_t + \beta E_t \pi_{t+1}$$

- Private agents' expectations about future policy are determinants of x_t and π_t.

- Policy that responds to stochastic variation in y_t^n by setting $r_t = r_t^n$ is consistent with $\pi_t = 0$ and $x_t = 0$ at all times.

This paper asks: what if...

1. ...private agents are uncertain about the stochastic process followed by the policy instrument r_t;

2. policymakers are uncertain about the natural interest rate r_t^n; and

3. private agents and policymakers can communicate?

The model in this paper

- Islands indexed by i with trees also indexed by i. A tree i sells at the price $q_t(i)$ and it yields a stochastic endowment $y_t^n(i)$.

- A central bank sets the interest rate r_t as a function of its view of the state of the economy.

- Private agents and policymakers know $q_t(i)$ for each i. In equilibrium $q_t(i) = q_t(j)$ for each pair i, j.

- Private agents observe noisy measures of y_t^n and p_t. Policymakers observe different noisy measures of y_t^n and p_t.

The case of transparent policy

$$r_t = \bar{\pi}_t + \phi E_t^c \left(\pi_t - \bar{\pi}_t \right) + E_t^c r_t^n, \qquad \phi > 1$$

$$\bar{\pi}_t = \bar{\pi} + e_t, \qquad e_t \text{ is white noise}$$

In the case of transparent policy, private agents know $\bar{\pi}$ and e_t.

In equilibrium:

- $\pi_t - \bar{\pi}$ follows a white noise process

$$\pi_t = \bar{\pi} + \left(1 - \phi^{-1} \right) e_t.$$

  Knowing $\bar{\pi}$ and e_t, policymakers and private agents infer π_t exactly.

- Having observed q_t and knowing π_t, policymakers infer y_t^n exactly.

The case of uncertainty about $\bar{\pi}$ and e_t: fully revealing equilibrium

- Having observed q_t and having inferred π_t exactly, policymakers infer y_t^n exactly. Therefore, $E_t^c \pi_t = \pi_t$ and $E_t^c y_t^n = y_t^n$.

- Policymakers announce $E_t^c \pi_t$ and $E_t^c y_t^n$.

- Having observed q_t and having been told what π_t is and what y_t^n is, private agents figure out e_t from

$$\Delta q_t - \Delta y_t^n - \bar{\pi}_t = -\phi^{-1} e_t$$

and they figure out $\bar{\pi}$ from

$$\bar{\pi} = \bar{\pi}_t - e_t.$$

The case of uncertainty about $\bar{\pi}$ and e_t: equilibrium with imperfect communication

- Private agents begin with a prior belief about $\bar{\pi}$. They use observations of $\bar{\pi}_t$ to update their belief about $\bar{\pi}$. Their belief about $\bar{\pi}$ converges to the true $\bar{\pi}$.

- Policymakers use observations of q_t to update their beliefs about the perceived inflation target and about y_t^n. Their beliefs converge to the truth.

- Inflation converges to

$$\pi_t = \bar{\pi} + \left(1 - \phi^{-1}\right) e_t.$$

Along the convergence path π_t is serially correlated and more volatile.

Conclusions from the model

- The degree of uncertainty facing policymakers depends on how well policymakers communicate with private agents.

- Bad communication can make inflation persistent and volatile.

- The paper uses the model as a story for why inflation persistence and inflation volatility have declined.

Main comments

The paper recommends transparency in monetary policy. In the model, transparency in monetary policy means a transparent inflation objective. It means "announcing $\bar{\pi}$ and e_t".

1. "Transparent inflation objective" in the model is a stand-in for something more complicated in the real world. Once one thinks about what this "something" is, one realizes that an important aspect of central bank communication has not been modeled here.

2. People process information imperfectly. Therefore, another important aspect of central bank communication is what to announce and how. This aspect has not been modeled here either.

1. "Transparent inflation objective" is a stand-in for the central bank continuously explaining its current actions, its intended future actions, and why its current actions deviate from their past forecast.

   – The authors write: "(...) some central banks publish their forecasts of the future path of inflation and/or policy rates. In our stylized current setting, it is straightforward to show that, if those forecasts are credible, announcing the predictions and making the inflation target credible are equivalent."

   – What does it mean that forecasts are "credible"? That they are always accurate *ex post*?

   – What if forecasts turn out to be inaccurate *ex post* and private agents must infer whether this is because of "bad policy" or "bad luck"?

2. Private agents perceive the state of the economy with error, even if one announces it to them perfectly. Therefore, a central bank needs to figure out what to announce and how.

   – If the central bank's communication strategy is volatile, it will be perceived with a large amount of error.

   – If statements are short and cryptic, error is more likely to be correlated across private agents.

   – If statements are long and detailed, error is more likely to be idiosyncratic.

   – If policymakers fail to provide a simple and accurate summary of the state of the economy, private agents will have to construct one by themselves.

Another comment: surprising informational assumption

- In the model, private agents may or may not be aware of $\bar{\pi}$, but they are perfectly aware of $E_t^c \pi_t$ and $E_t^c y_t^n$.

- Isn't the communication problem of most modern central banks more like the opposite?

  - Private agents are well aware of the long-run objective of the central bank, but they are not well aware of the central bank's assessment of the state of the economy, today and in the future.

- More generally, there is arbitrariness with respect to which variables agents are perfectly aware of and which variables agents are imperfectly aware of, e.g. q_t versus π_t.