Central Bank Forward Guidance and the Signal Value of Market Prices

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dual role of market prices for monetary policy

Two way flow:

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- But market prices inform the central bank on *where* to steer the economy.
Samuelson (1994) at Boston Fed:

*When Dr Greenspan says he must do this or that to be in accord with the bond market, I am reminded of a monkey who for the first time has seen a mirror. He sees an image of himself in the mirror and thinks that by looking at the reactions of that monkey – including its surprises – he is getting new information. Well, what Greenspan is getting from the market is what the market heard Greenspan say before.*
central bank communication and commitment

- Communication:

  - Reflection problem arises when CB communication is about future policy actions (forward guidance).
  - More weight on forward guidance as policy rates have hit the effective lower bound.

- Commitment:

  - Time consistency of actions (i) will central bank follow through on high interest rates after lowering inflationary expectations? (ii) will central bank follow through on continued easy policy after recovery?
  - Time consistency in choice of information set: use of market signal reduces the informativeness of market signal. CB gains from committing to reduced weight on market signals, focusing on non-market information.
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- the central bank chooses an action $r$
- private sector agents choose actions $a_i$ in anticipation of central bank action and the central bank can condition on them as well as $z$
central bank wants to set action appropriate for fundamentals: it minimizes

\[(r - \theta)^2\]
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• market participants want (mostly) to guess central bank action
  but also (a bit) to match fundamentals: agent i minimizes

\[w (a_i - r)^2 + (1 - w) (a_i - \theta)^2 ;\]

where \(w \approx 1\)... we will consider limit as \(w \rightarrow 1\) (limit \(w = 1\) case will be degenerate)
market participant actions depend on CB reaction function

- central bank reaction function

\[ r = \lambda \bar{a} + (1 - \lambda) z \]

where \( \bar{a} \) is market signal (average action) and \( \lambda \) is "weight on market"
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\[ \xi = \tilde{\xi}(\lambda) = \frac{\beta (1 - w \lambda)}{\alpha + \beta (1 - w \lambda)} \]
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- "reflection effect":
  - high \( \lambda \) and high \( w \) reduce \( \xi \)… etc.
  - in \( w \to 1 \) limit, as \( \lambda \to 1 \), we have \( \xi \to 0 \), rendering market signal uninformative
- $w = 1$, $\alpha = 1$, $\beta = 2$, $\gamma = 1$
solution with commitment: Odyssean or Stackelberg

- CB chooses $\lambda$ to minimise

$$\lambda^2 (1 - \xi)^2 \frac{1}{\alpha} + (1 - \lambda)^2 \frac{1}{\gamma}$$

subject to $\xi = \xi(\lambda)$.
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- Stackelberg equilibrium $\lambda^* = 0.63$ and $\xi^* = 0.42$
CB chooses $\lambda$ as a best reply to $\xi$

$$\lambda = \frac{\alpha}{\alpha + \gamma (1 - \xi)^2}$$
solution without commitment: Delphic or Cournot

- CB chooses $\lambda$ as a best reply to $\xi$

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- Nash Equilibrium $\lambda^{**} = 0.71 > \lambda^*$ and $\xi^{**} = 0.36 < \xi^*$
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with no semi-public signal \((\alpha = 0)\) and proper prior, can get arbitrarily close to first best with small weight on \(z\) and weight \(\geq 1\) on \(\bar{a}\).... indeterminacy in the limit (c.f., Bernanke-Woodford 97)....
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precision of semi public signal has non-monotonic effect of CB’s objective (c.f., Morris-Shin 02)

\[ \lambda^2 \frac{\alpha}{(\alpha + \beta (1 - w \lambda))^2} + (1 - \lambda)^2 \frac{1}{\gamma} \]
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with no semi-public signal ($\alpha = 0$) and proper prior, can get arbitrarily close to first best with small weight on $z$ and weight > 1 on $\bar{a}$. indeterminacy in the limit (c.f., Bernanke-Woodford 97).

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$$\frac{\lambda^2}{(\alpha + \beta (1 - w \lambda))^2} + (1 - \lambda)^2 \frac{1}{\gamma}$$

same conclusion about forward guidance if CB puts weight on $(\bar{a} - \theta)^2$ as well as $(r - \theta)^2$