Managing Expectations

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Motivation

- Management of expectations is central to monetary policy:
  - “If monetary policy is managing expectations, as the current doctrine has it…” Central Banking News, April 2006.
  - “Monetary policy works primarily through expectations”, Phillip Hildebrand, SNB vice chairman, 2006.

- Management of expectations is subtle since the credibility of low and stable inflation is
  - imperfect
  - endogenous
Five key notions

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- **Mimicking**: short-term credibility $> long-term credibility$ since a weak central bank may take the same near-term actions as the strong type
- **Announced inflation plans**: a strong central bank uses plans to manage inflation expectations as well as the evolution of its long-term credibility
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- **Announced inflation plans**: a strong central bank uses plans to manage inflation expectations as well as the evolution of its long-term credibility
- **Imitation**: weak central banks will announce the same plans as strong central banks, so such plans will not always be executed
General idea

Subperiod structure

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<tr>
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- Inflation expectations depend on plan ($p$) and long-term credibility ($\rho$): $e(\rho, p)$
- Optimal management of expectations by strong type
  \[
  W(\rho) = \max_{p} \left\{ w(p, e) + bW(\rho') \right\} \\
  s.t. e = e(\rho, p) \text{ and } \rho' = \kappa(\rho, p)
  \]
Modeling expectations and credibility evolution

- Weak type has stochastic time discount factor $\beta \sim F(\cdot)$ with support $(0, b)$. i.i.d draw each period, private info.
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- Weak type’s choose inflation action $\pi$: given $p$ and $e$

\[
V(\rho, \beta) = \max_{\delta} \{ (1 - \delta) M + \delta D \}
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M = w(p, e) + \beta E_{\beta} V(\rho', \beta)
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D = \max_d [w(d, e) + \beta E_{\beta} V(0, \beta)]
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- Cutoff-strategy $\hat{\beta}$: determined by temptation $w(d, e) - w(p, e)$ and punishment $V(\rho', \beta) - V(0, \beta)$

\[
\delta = 1; \quad \pi = d(e) \quad \text{if } \beta \leq \hat{\beta}(p, e)
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- The probability of weak type mimicking strong type’s action

$$m(p, e) = 1 - F\left(\hat{\beta}(p, e)\right)$$
Effects of inflation plan

- Rational expectation formation leads to the fixed point

\[ e(\rho, p) = \psi(\rho, e, p) p + (1 - \psi(\rho, e, p)) d(e) \]

3 channels for plan (p) managing expectations:
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- Bayesian learning for long-term credibility evolution

\[ \rho' = \kappa(\rho, p) = \rho / \psi(\rho, p) \]

long-term credibility grows fast when short-term credibility is low (hitting plan is then very informative)
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  - low $\rho$: decreasing $p$ may even raise $e \Rightarrow$ substantial welfare loss
Dynamics: Oil price shock under low and high credibility

- Our approach makes it easy to add shocks.
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- A good example, of current interest, is an oil price shock:

  \[ x = \alpha(\pi - e) - \varepsilon x^* \]

  with \( x = \alpha(\pi - e) \) being PC and shocks \( x^* \) occurring with probability \( q \)
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- Small output losses and expectations effects at high levels of credibility \( \rho \) (now)
Conclusion and research overview

- A smooth macro model in which
  - inflation plan affects inflation expectations with influence depending on credibility
  - optimal policy takes this influence into account
- Recursive equilibrium that can be used to study transition dynamics (e.g., disinflation)
- A straightforward extension to management of expectations in presence of shocks:
  - Application to energy price shocks with various levels of credibility
- This presentation has abstracted from signalling game issues. But we show that our optimal inflation plan is the unique equilibrium surviving a particular refinement (Mailath et al.) which imposes strongly coherent out-of-equilibrium beliefs.
Figure 6: Equilibrium policy functions (case 4 parameters). Solid line is deterministic reference model; dashed-dotted line is stochastic model with shock occurring, while dashed line is when no shock occurs.
Figure 4: Transition dynamics from low initial credibility ($\gamma = .2$) with quasilinear utility (case 3 parameters).
Figure 5: Equilibrium reactions to inflation plan $p$ in full dynamic model (case 4 parameters).
Why not mixed strategy?

- The weak type randomizes between two strategies: mimicking and deviating

\[ \pi = \begin{cases} 
  p & \text{with prob } m \\
  d & \text{with prob } 1 - m 
\end{cases} \]

- \( m \) is set such that it implies an expected inflation \( e(m) \) making \( M = D \)

- Suppose exogenous reward for deviation: \( D + \epsilon \)

- To keep the mixed strategy: \( M \) also need to increase.

- But it requires the expected inflation to decrease \( \Rightarrow m \) increases when the rewards of deviation increases!

- This counter-intuitive comparative static is not present using the stochastic discount factor approach.