Discussion of Svensson’s
What Rule for the Federal Reserve?
Forecast Targeting

V. V. Chari & Keyvan Eslami

University of Minnesota
&
Federal Reserve Bank of Minneapolis

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What Svensson’s Paper Is About

- Hates Taylor rule
  - Not optimal, too rigid, too mechanical
-Apparently wants to implement optimal policy derived from model
- Likes current regime because it seems to be moving in the right direction
Svensson’s Proposal

- Consider many policy paths
- For each path, compute equilibrium in model, assuming commitment
Svensson’s Proposal

Consider many policy paths

For each path, compute equilibrium in model, assuming commitment

Hidden question: How to select equilibrium if model has multiplicity?
Svensson’s Proposal

- Consider many policy paths
- For each path, compute equilibrium in model, assuming commitment
  - Hidden question: How to select equilibrium if model has multiplicity?
- Setting aside hidden question, pick “best” policy path
What Is Missing in Proposal

- What will policymaker do if outcome $= \text{forecasts}$?
  - Presumably implement announced policy

- What will policy maker do if outcomes $\neq \text{forecasts}$?

- What will policy maker do if circumstances change, shocks affect economy?
What Is Needed to Complete Proposal

- Implement announced path if outcomes = forecasts
- Commit to what policy will do if no shocks and outcomes $\neq$ forecasts
  - Needed to solve indeterminacy problem
- Commit to what policy will do if shocks affect economy
What Will We End Up with?

- Let policy be $r_t$
- Let history of outcomes be

$$h_t^0 = (Y_0, Y_1, \ldots, Y_{t-1}; \pi_0, \ldots, \pi_{t-1}; \text{other endogenous variables})$$

$Y_t$: output in $t$
$\pi_t$: inflation in $t$

- Let history of shocks be $s^t$
- History of policymakers $h_t = (h_t^0, s^t)$
- Let $r_t = r_t(h_t)$

But this is exactly what all economic theory says you should do!

- Policymaker should go away until there is a compelling reason to change model
Lay out optimal policy in New-Keynesian model

Show how optimal policy looks like forecast targeting

Discuss how to solve indeterminacy problem

Suggest practical ways of attaining commitment
Optimal Policy in a New-Keynesian Model
Ingredients of New-Keynesian Model

- Monopolistic competition as in Dixit-Stiglitz-Spence-Ethier
- Calvo price setting
- Shocks to technology: implicit in efficient output $y_t^*$
- Shocks to intertemporal Euler equation: $\varepsilon_t$
- Shocks to markups: $u_t$
Log-linearize around zero inflation, efficient steady state

\[ \tilde{y}_t = \mathbb{E}_t (\tilde{y}_{t+1}) - \frac{1}{\sigma} [\tilde{r}_t - \mathbb{E}_t (\pi_{t+1})] + \varepsilon_t \]

\[ \tilde{\pi}_t = \beta \mathbb{E}_t (\tilde{\pi}_{t+1}) + \kappa \tilde{y}_t + u_t \]

\[ \tilde{y}_t = y_t - y_t^* \]

\[ \tilde{\pi}_t = \pi_t - 0 \]

\[ \tilde{r}_t = r_t - r_t^* \]

\( y_t^* \): efficient output level

\( r_t^* \): real interest rate in efficient allocation (nominal rate since \( \pi_t^* = 0 \))
Optimal Policy

- Solves

\[
\min \sum_{t=0}^{\infty} \beta^t \left[ (\tilde{y}_t)^2 + \lambda (\tilde{\pi}_t)^2 \right]
\]

subject to equilibrium conditions

- Optimal policy tries to keep \( \tilde{y}_t \) and \( \tilde{\pi}_t \) close to zero
Suppose $y_t^*$ iid

Can keep $\pi_t = 0$, $\tilde{y}_t = 0 = y_t - y_t^*$ by lowering $r_t$
Suppose $y_t^*$ iid

Can keep $\pi_t = 0, \tilde{y}_t = 0 = y_t - y_t^*$ by lowering $r_t$

\[
\tilde{y}_t = \mathbb{E}_t (\tilde{y}_{t+1}) - \frac{1}{\sigma} [\tilde{r}_t - \mathbb{E}_t (\pi_{t+1})] + \varepsilon_t
\]

\[
\tilde{\pi}_t = \beta \mathbb{E}_t (\tilde{\pi}_{t+1}) + \kappa \tilde{y}_t + u_t
\]

\[
\tilde{y}_t = y_t - y_t^*
\]
Optimal Policy and Technology Shocks

- Suppose $y_t^*$ iid

- Can keep $\pi_t = 0, \tilde{y}_t = 0 = y_t - y_t^*$ by lowering $r_t$

- Suppose $y_t^*$ random walk $\Rightarrow r_t^*$ constant

- Can keep $\pi_t = 0, \tilde{y}_t = 0 = y_t - y_t^*$ by leaving $r_t$ unaffected
- Say markup shock positive

- Cannot keep $\pi_t = 0$ and $y_0 = y_0^*$

- Compromise is to let $\pi_0$ go up, $y_0$ fall

- Compromise also by letting $\pi_{t+1} \neq 0$ and $\tilde{y}_{t+1} \neq 0$ for $t \geq 0$
Say markup shock positive

Cannot keep $\pi_t = 0$ and $y_0 = y_0^*$

Compromise is to let $\pi_0$ go up, $y_0$ fall

Compromise also by letting $\pi_{t+1} \neq 0$ and $\tilde{y}_{t+1} \neq 0$ for $t \geq 0$

\[
\tilde{y}_t = E_t (\tilde{y}_{t+1}) - \frac{1}{\sigma} [\tilde{r}_t - E_t (\pi_{t+1})] + \varepsilon_t
\]

\[
\tilde{\pi}_t = \beta E_t (\tilde{\pi}_{t+1}) + \kappa \tilde{y}_t + u_t
\]

\[
\tilde{y}_t = y_t - y_t^*
\]
Optimal Policy and Markup Shocks

- Say markup shock positive
- Cannot keep $\pi_t = 0$ and $y_0 = y_0^*$
- Compromise is to let $\pi_0$ go up, $y_0$ fall
- Compromise also by letting $\pi_{t+1} \neq 0$ and $\tilde{y}_{t+1} \neq 0$ for $t \geq 0$
- Such a policy is optimal even if markup shocks are iid
- Next, impulse-response of optimal policy if $u_t$ persistent
Optimal Response to Markup Shocks

\[ \pi_t \]

\[ y_t \]

\[ y^* \]

\[ t = 0 \]

\[ t \]
Optimal Policy with Markup Shocks

- Substantial history dependence
- Very different from outcomes without commitment
  - Without commitment, do not need to react to *history* of markup shocks
Optimal Discretionary Response to Markup Shocks

\[ \pi_t \]

\[ y_t \]

\[ y^* \]

\[ t = 0 \]

\[ t \]

Discretion

Commitment
Central banker can show pictures like previous ones

Argue commitment outcomes are best

Can also try to explain how markup shocks affect economy

In this sense, forecast targeting conveys information about underlying shocks
Risks of Forecast Targeting
Risks of Incompletely Spelled out Svensson’s Proposal

- Suppose market believes policy path will be rigidly followed

- Even if outcomes $\neq$ forecasts

- Economy has continuum of equilibria (indeterminacy)

- Point of Taylor principle was to avoid indeterminacy

- Not addressing this point makes paper seem irrelevant
Idea behind Indeterminacy

- Start at some equilibrium

- Now suppose each price setter expects other price setters to set a higher price

- If monetary policy is sufficiently accommodative, wages and price setter’s costs will rise

- Optimal for price setter to go along and set a higher price
Cure for Indeterminacy

- Atkeson-Chari-Kehoe (ACK)

- Taylor principle makes $r_t$ very responsive to $\pi_t$

- ACK show Taylor principle neither necessary nor sufficient to cure indeterminacy

- ACK show that a hybrid rule can implement equilibrium uniquely

- Hybrid rule uses Taylor principle supplemented with a switch to money regime if inflation sufficiently high
Optimal Policy with Markup Shocks along Equilibrium Path

- Timing: markup shocks, prices set, interest rates set, output realized

- Along equilibrium path

  \[ r_t = r_t (u^t) \]

  \( u^t \): history of markup shocks

- Along equilibrium path \( r_t \) may respond less than inflation

- Along equilibrium path, Taylor principle violated
Optimal Policy with Markup Shocks Off Equilibrium Path

On and off equilibrium path

\[ r_t = r_t \left( u^t \right) + \phi \left[ \pi_t - \pi_t \left( u^t \right) \right], \quad \phi > 1 \]

\( \pi_t \left( u^t \right) \): equilibrium inflation under optimal policy
\( \pi_t - \pi_t \left( u^t \right) \): deviation from desired equilibrium

Avoids indeterminacy when coupled with hybrid rule
Svensson’s Proposal Modified

- Describe policy paths for several scenarios
- Each scenario represents some sequence of changes in circumstances and shocks
- Explain and justify deviations from announced path in term of what new shocks have affected economy
- Lay out policy if shocks small but outcomes very different from forecasts
Main Challenge of Monetary Policy

- Monetary policy is a signal extraction problem
- What shocks have occurred?
- Are they persistent or transitory?
- New-Keynesian model useful in solving signal extraction problem
Signal Extraction and New-Keynesian Models

\[ \tilde{y}_t = \mathbb{E}_t (\tilde{y}_{t+1}) - \frac{1}{\sigma} [\tilde{r}_t - \mathbb{E}_t (\pi_{t+1})] + \varepsilon_t \]

\[ \tilde{\pi}_t = \beta \mathbb{E}_t (\tilde{\pi}_{t+1}) + \kappa \tilde{y}_t + u_t \]

\[ \tilde{y}_t = y_t - y_t^* \]

- Technology shocks rise output and leave inflation roughly unaffected
- Markup shocks drive output and inflation in opposite directions
- Can exploit differential responses to estimate shocks