

Economics 100B: Macroeconomics

Monetary Policy III: Economic Fluctuations and Policy Response

October 14, 2020

Reading:

- R.J. Hawkins (2020) – *A Monetary Policy Model*. On bCourses as **MonetaryPolicyModelNotes-v7.pdf**.
- Mishkin – Chapter 12 for discussion of shocks *not the model*.

Today's Agenda:

- 1 The monetary policy model in gap form.
- 2 An inflation shock.
- 3 A temporary positive demand shock.
- 4 Repeated shocks.
- 5 Shocks: an empirical review.

Optimal Monetary Policy

Optimal policy as three gap equations:

The optimal path:

$$(y_t - y^P) = -\gamma\beta (\pi_t - \pi^T) \implies \tilde{y}_t = -\beta\gamma\tilde{\pi}_t$$

The rate gap:

$$(r_t - r^*) = \frac{1}{\zeta_Y \left(\gamma + \frac{1}{\gamma\beta} \right)} (\pi_t - \pi^T) \implies \tilde{r}_t = \frac{1}{\zeta_Y \left(\gamma + \frac{1}{\gamma\beta} \right)} \tilde{\pi}_t$$

The IS curve:

$$(y_{t+1} - y^P) = -\zeta_Y (r_t - r^*) \implies \tilde{y}_{t+1} = -\zeta_Y \tilde{r}_t$$

Optimal Monetary Policy

Optimal policy as three gap equations:

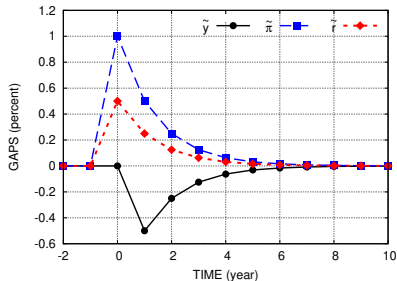
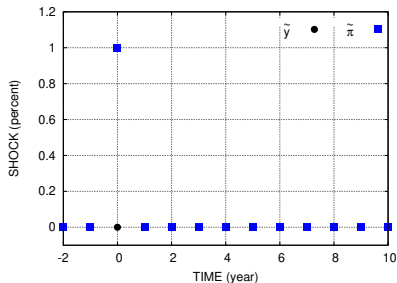
Operationally, a shock at $t = 0$ evolves as follows:

- $\tilde{y}_0$ and $\tilde{\pi}_0$ set $\tilde{r}_0$.
- $\tilde{y}_1$ follows from $\tilde{r}_0$ via the IS curve.
- $\tilde{\pi}_1$ follows from $\tilde{y}_1$ via the optimal path.
- $\tilde{\pi}_1$ sets $\tilde{r}_1$.
- $\tilde{y}_2$ follows from $\tilde{r}_1$ via the IS curve.
- ...

Optimal Monetary Policy

An inflation shock at $t = 0$.

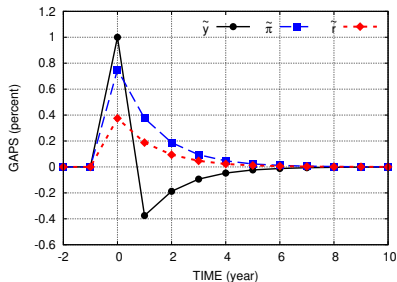
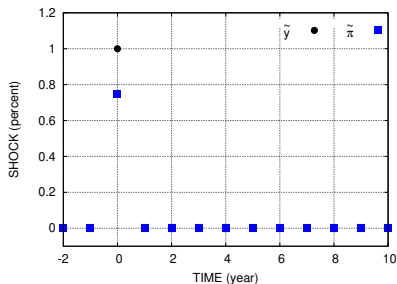
- For $t < 0$: equilibrium.
- At $t = 0$:
 - Positive $\tilde{\pi}_0$ shock.
 - No $\tilde{y}_0$ shock.
 - $\tilde{r}_0$ responds to $\tilde{\pi}_0$.
- At $t = 1$:
 - $\tilde{y}_1$ responded to $\tilde{r}_0$.
 - $\tilde{\pi}_1$ down due to $\tilde{y}_1$.
- For $t > 1$: relaxation to equilibrium.



Optimal Monetary Policy

Temporary demand shock at $t = 0$.

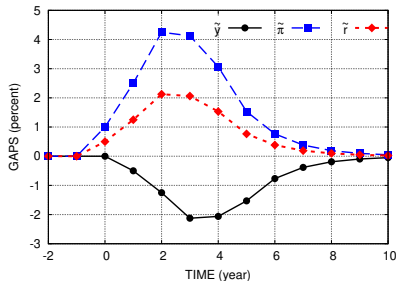
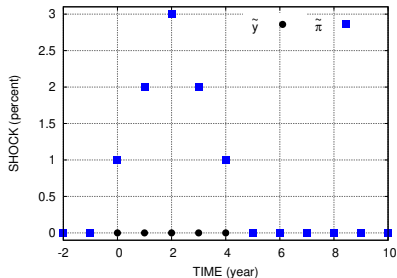
- For $t < 0$: equilibrium.
- At $t = 0$:
 - Positive $\tilde{\pi}_0$ shock.
 - Positive $\tilde{y}_0$ shock.
 - $\tilde{r}_0$ responds to $\tilde{\pi}_0$.
- At $t = 1$:
 - $\tilde{y}_1$ responded to $\tilde{r}_0$.
 - $\tilde{\pi}_1$ down due to $\tilde{y}_1$.
- For $t > 1$: relaxation to equilibrium.



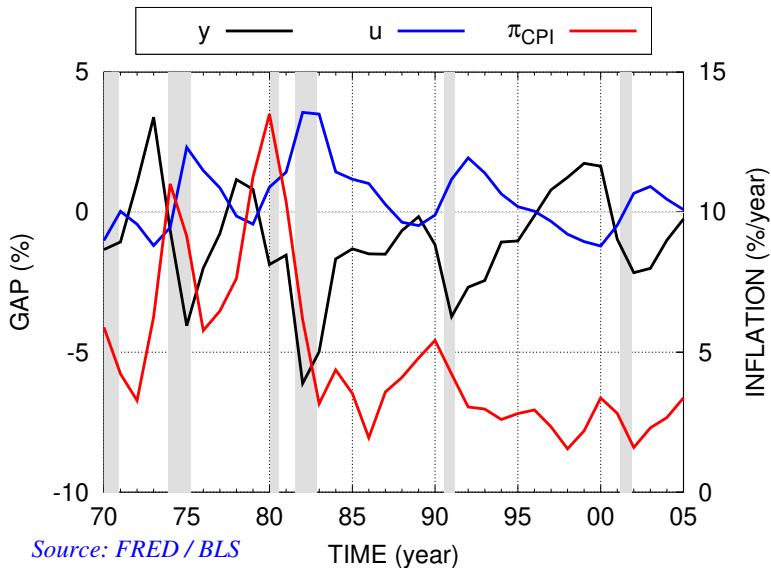
Optimal Monetary Policy

A sequence of inflation shocks.

- For $t < 0$: equilibrium.
- For $0 \leq t \leq 4$ a sequence of shocks.
 - $\tilde{\pi}_t$ shock.
 - $\tilde{r}_t$ responds to $\tilde{\pi}_t$.
 - $\tilde{y}_{t1}$ responds to $\tilde{r}_t$.
- For $t > 4$: relaxation to equilibrium.



Fluctuations (shocks) and Policy Response



Aggregate Demand Shocks

Aggregate demand shocks:

Aggregate demand shocks are events that cause the IS curve to shift.

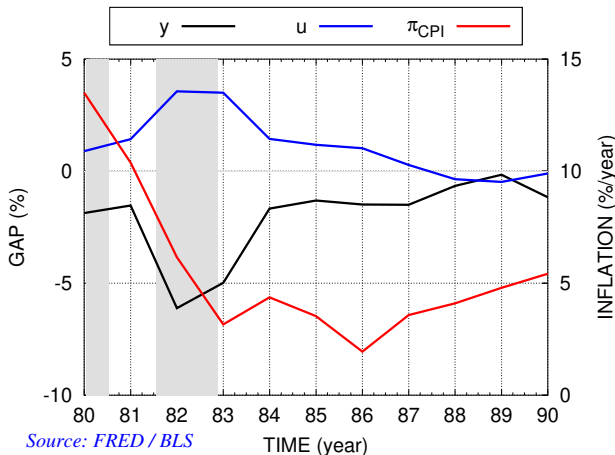
- *Positive, or favorable, demand shocks* initially cause economic output to increase.
- *Negative, or unfavorable, demand shocks* initially cause economic output to decrease.

Aggregate Demand Shocks

1980 – 1986 Negative Demand Shock

$$Y = \bar{Y} - \zeta_Y r$$

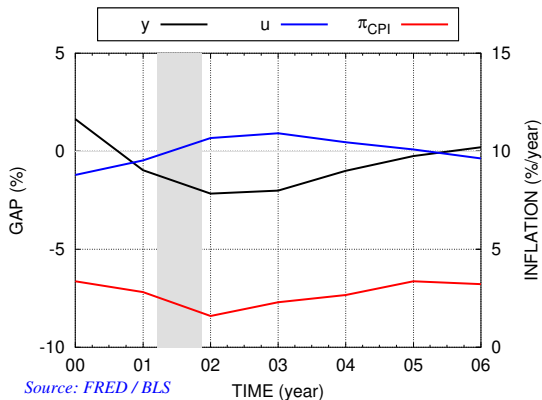
In the early 1980s the Federal Reserve significantly tightened monetary policy resulting in a *negative aggregate demand shock*.



Aggregate Demand Shocks

2000 – 2002 Negative Demand Shock

$$Y = \bar{Y} - \zeta_Y r$$

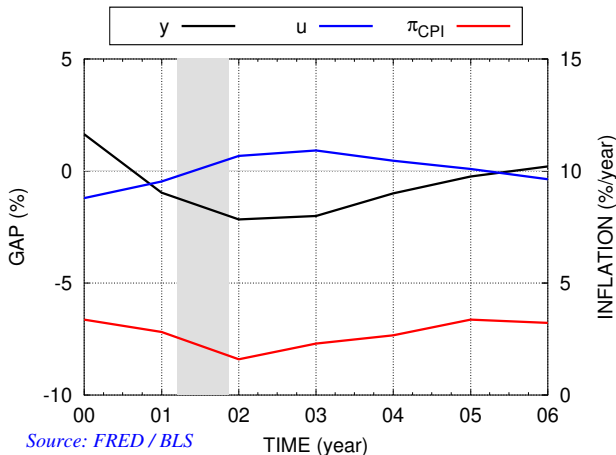


- the dot-com bubble burst
- business confidence declined
- consumer confidence declined
- interest rates on corporate bonds increased

Aggregate Demand Shocks

2003 – 2006 Positive Demand Shock

$$Y = \bar{Y} - \zeta_Y r$$



- taxes were reduced
- banks loosened credit standards, creating a lending boom

Aggregate Supply Shocks

Aggregate supply shocks:

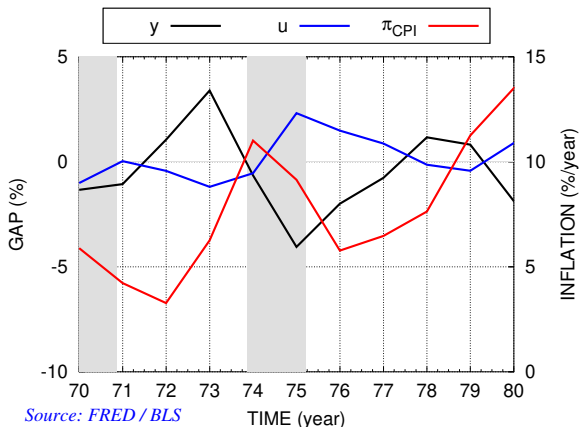
Aggregate supply shocks are events that cause the short-run or long-run curves to shift.

- *Positive, or favorable, supply shocks* initially cause inflation to decrease.
- *Negative, or unfavorable, supply shocks* initially cause inflation to increase.

Temporary Aggregate Supply Shocks

1973 – 1975 and 1978 – 1980 Negative Supply Shocks

$$\pi_t = \pi_{t-1} + \gamma (y_t - y^P) + \rho_t$$



- oil prices rose dramatically (OPEC, '73; Fall of Shah, '79)
- crop failures caused food prices to soar ('73 and '78)
- wage and price controls were lifted ('73 and '74)

Aggregate Demand and Supply Shocks

The origin of business cycles:

Business cycle fluctuations are caused by the combination of

- positive and negative aggregate demand and
- positive and negative aggregate supply shocks
- leading to changes in economic output and inflation

hitting the economy both simultaneously and sequentially.