Economics 302
Intermediate Macroeconomic Theory and Policy
(Spring 2010)

Lecture 27
April 28, 2010
Taylor Rule, Macro Policy curve

\[ r_t = \pi_t + \beta \hat{Y}_t + \delta(\pi_t - \pi_t^*) + R_t^* \]  \hspace{1cm} (16.1)

\[ r_t = (1 + \delta)\pi_t + \beta \hat{Y}_t + R_t^* - \delta \pi_t^* \]  \hspace{1cm} (16.2)

\[ \hat{Y}_t = \frac{-\delta}{(\beta + \sigma)}(\pi_t - \pi_t^*) \]  \hspace{1cm} (16.11)
Federal Funds Rate and Inflation Targets

Calculated federal funds rate is based on Taylor's rule.

Components of Taylor's Rule

Actual and Potential Real GDP

Billions of chain-weighted 2005 dollars

See notes section for further explanation.

PCE Inflation

Percent change from year ago

Updated Fig. 16.2; Source: St. Louis Fed, Monetary Trends
\textbf{IS Curve Revisited}

\[ R_t = s_0 - s_1 Y_t + s_2 G_t \quad (16.3), \text{ IS curve} \]
\[ R_t^* = s_0 - s_1 Y^* + s_2 G_t \quad (16.4), \text{ equilibrium real interest rate. Subtract (16.4) from (16.3) to get} \]
\[ R_t - R_t^* = -s_1 (Y_t - Y^*) \quad (16.5), \text{ divide and multiply by } Y^* \text{ to obtain} \]
\[ R_t - R_t^* = -s_1 Y^* \left( \frac{Y_t - Y^*}{Y^*} \right) \quad (16.6) \]
\[ R_t - R_t^* = -\sigma \hat{Y}_t \quad (16.7) \]

\textbf{Macro Policy Curve}

Subtract inflation and equilibrium real interest rate \( R^* \) from Taylor rule (16.1):
\[ r_t = \pi_t + \beta \hat{Y}_t + \delta (\pi_t - \pi^*_t) + R^* \quad (16.1) \]
\[ r_t - \pi_t - R_t^* = \beta \hat{Y}_t + \delta (\pi_t - \pi^*_t) \quad (16.8), \text{ recall definition of } R \]
\[ R_t - R_t^* = \beta \hat{Y}_t + \delta (\pi_t - \pi^*_t) \quad (16.9), \text{ combine with IS curve (16.7)} \]
\[ -\sigma \hat{Y}_t = \beta \hat{Y}_t + \delta (\pi_t - \pi^*_t) \quad (16.10) \text{ which can also be written:} \]
\[ \hat{Y}_t = \frac{-\delta}{(\beta + \sigma)} (\pi_t - \pi^*_t) \quad (16.11) \]
FIGURE 16.5 The Macroeconomic Policy Curve
Price Adjustment

Notice that this is also sometimes called the “Phillips Curve”

\[ \pi_t = \pi_{t-1} + f\hat{Y}_{t-1} + Z_t \]  \hspace{1cm} (16.12)
FIGURE 16.7 Price Adjustment Line Determining the Inflation Rate
FIGURE 16.8 Simultaneously Determining Inflation and Output
FIGURE 16.9 A Boom

Inflation rate ($\pi$) vs. GDP gap ($\hat{y} = \frac{y - y^*}{y^*}$).

- Long run
- Year 3
- Year 2
- Year 1
- PA line then shifts up
- Boom caused by shift in the macroeconomic policy curve.
FIGURE 16.10 Disinflation

Recession caused by shift in the macroeconomic policy curve.

PA line then shifts down.

GDP GAP $\hat{Y} = \left( \frac{Y - Y^*}{Y^*} \right)$
FIGURE 16.11 A Boom-Bust Cycle

1. Expansionary policy leads to a boom.
2. But inflation then rises.
3. Leading to policy reversal and recession.
4. And a decline in inflation, so the economy returns to normal.

\[ \hat{y} = \frac{Y - Y^*}{Y^*} \]
FIGURE 16.12 An Oil Price Shock

Price shock causes PA line to shift up, then gradually shift down during stagflation.
Updated Figure 16.14
Updated and revised Figure 16.15 (uses PCE deflator)
Federal Funds Rate and Inflation Targets

Calculated federal funds rate is based on Taylor's rule.

Updated Fig. 16.2; Source: St. Louis Fed, *Monetary Trends*