An Integrated Macro Model

Taylor Rule

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

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

Federal Funds Rate and Inflation Targets


IS Curve Revisited

\[ R_t = s_0 - s_1 Y_t + s_2 G_t \]  \hspace{1cm} (16.3), IS curve

\[ R_t^* = s_0 - s_1 Y^* + s_2 G_t \]  \hspace{1cm} (16.4); equilibrium real interest rate. Subtract (16.4) from (16.3) to get

\[ R_t - R_t^* = -s_1 (Y_t - Y^*) \]  \hspace{1cm} (16.5); divide and multiply by \( Y^* \) to obtain

\[ R_t - R_t^* = -s_1 Y^* \left( \frac{Y_t - Y^*}{Y^*} \right) \]  \hspace{1cm} (16.6)

\[ R_t - R_t^* = -\sigma \hat{Y}_t \]  \hspace{1cm} (16.7)
Macro Policy Curve

Subtract inflation and equilibrium real interest rate $R^*$ from Taylor rule (16.1):

$$r_t = \pi_t + \beta \dot{Y_t} + \delta (\pi_t - \pi_t^*) + R^* \quad (16.1)$$

$$r_t - \pi_t - R_t^* = \beta \dot{Y_t} + \delta (\pi_t - \pi_t^*) \quad (16.8); \text{ recall definition of } R$$

$$R_t - R_t^* = \beta \dot{Y_t} + \delta (\pi_t - \pi_t^*) \quad (16.9); \text{ combine with IS curve (16.7)}$$

$$-\sigma \dot{Y_t} = \beta \dot{Y_t} + \delta (\pi_t - \pi_t^*) \quad (16.10) \text{ which can also be written:}$$

$$\dot{Y_t} = -\frac{\delta}{(\beta + \sigma)} (\pi_t - \pi_t^*) \quad (16.11)$$

Notice when $\delta$ increases (i.e., the weight on inflation increases), the slope of the Macro Policy curve becomes flatter (when drawn in a graph with inflation on the vertical axis and the output gap on the horizontal).

Price Adjustment Revisited

$$\pi_t = \pi_{t-1} + f \dot{Y}_{t-1} + Z_t \quad (16.12)$$