

Lucas Supply Curve and Macroeconomic Policy Ineffectiveness Proposition

The representative firm supply curve:

$$Y_i = h(P_i - P) + Y_i^* \quad (15.1)$$

Where $h > 0$. Since firms don't know what the price level is, they must guess:

$$Y_i = h(P_i - P^e) + Y_i^* \quad (15.2)$$

How do the firms guess what the price level is, conditional upon their guess of the price level made at the beginning of the period, and the observation of the firm's price of output.

$$P^e = \hat{P} + b(P_i - \hat{P}) \quad (15.3)$$

Where b is a regression coefficient:

$$b = \frac{(P^e - \hat{P})}{(P_i - \hat{P})}$$

Substitute (15.3) into (15.2):

$$Y_i = h(P_i - [\hat{P} + b(P_i - \hat{P})]) + Y_i^* \quad (15.4)$$

Rearranging:

$$Y_i = h(1-b)(P_i - \hat{P}) + Y_i^* \quad (15.5)$$

Aggregating over all the firms in the economy, where there are n firms, yields the aggregate supply curve:

$$Y = nh(1-b)(P - \hat{P}) + Y^* \quad (15.6)$$

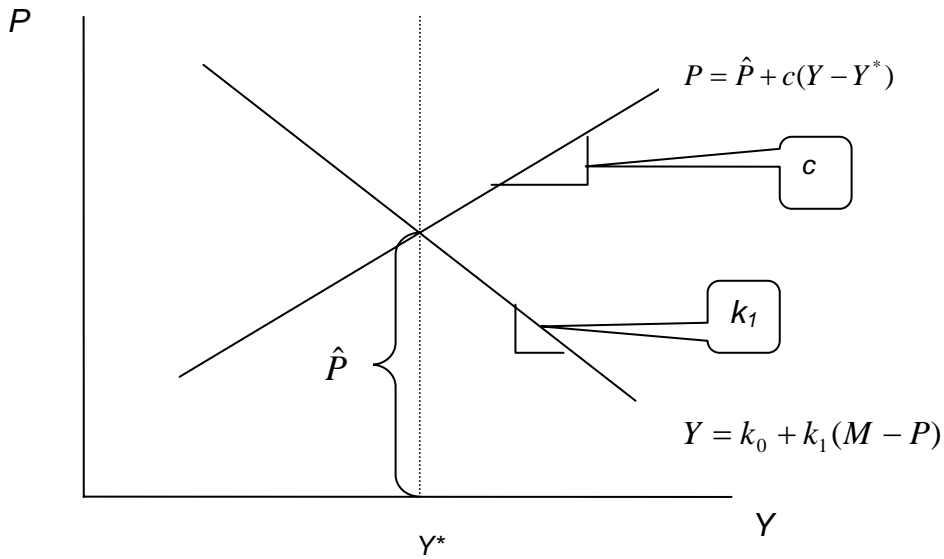
Solving for P yields:

$$P = \hat{P} + c(Y - Y^*), \quad c = \frac{1}{nh(1-b)} \quad (15.7)$$

Let's complete the system by writing out the demand equation. In this simplified world, only monetary policy matters:

$$Y = k_0 + k_1(M - P) \tag{15.8}$$

This system can be graphically depicted:



What happens if the money supply is increased? It depends on whether the monetary policy is anticipated or not.

