

Extra Assignment: Macro Model Simulation. (total 10 extra points)

Consider the following five simple macro model equations.

- (1) AD: Good and Services

$$Y_t = \bar{Y}_t - \alpha (r_t - \rho) + \varepsilon_t$$

- (2) Fisher Equation

$$r_t = i_t - E_t \pi_{t+1}$$

- (3) Phillips Curve:

$$\pi_t = E_{t-1} \pi_t + \phi (Y_t - \bar{Y}_t) + v_t$$

- (4) Adaptive Expectation

$$E_t \pi_{t+1} = \pi_t$$

- (5) Taylor Rule

$$i_t = \pi_t + \rho + \theta_\pi (\pi_t - \pi_t^*) + \theta_y (Y_t - \bar{Y}_t)$$

Q1 (2 points) Derive the dynamic AD and dynamic AS.

Q2 (2 points) Assume

$$\bar{Y}_t = 100, \quad \pi_t^* = 2, \quad \alpha = 1, \quad \rho = 2, \quad \phi = 0.25, \quad \theta_\pi = 0.75, \quad \theta_y = 0.25$$

Plot the impulse response function of Y_t , r_t , i_t , π_t to a supply shock of v_t . Note that we are considering only $v_1 = 1$, $v_t = 0$ for $t > 1$ and $\varepsilon_t = 0$ for $t > 0$.

Q3 (2 points) Assume

$$\bar{Y}_t = 100, \quad \pi_t^* = 2, \quad \alpha = 1, \quad \rho = 2, \quad \phi = 0.25, \quad \theta_\pi = 0.75, \quad \theta_y = 0.25$$

Plot the impulse response function of Y_t , r_t , i_t , π_t to a demand shock of ε_t . Note that we are considering only $\varepsilon_1 = 1$, $\varepsilon_t = 0$ for $t > 1$ and $v_t = 0$ for $t > 0$.

Q4 (4 points) Assume

$$\bar{Y}_t = 100, \quad \pi_t^* = 2, \quad \alpha = 1, \quad \rho = 2, \quad \phi = 0.25, \quad \theta_\pi = 0.5, \quad \theta_y = 0.5$$

Plot the impulse response function of Y_t , r_t , i_t , π_t to a demand shock of ε_t . Note that we are considering only $\varepsilon_1 = 1$, $\varepsilon_t = 0$ for $t > 1$ and $v_t = 0$ for $t > 0$. Compare your result with that in Q3. Explain your result.