IV. Microeconomic Foundations of Sticky Prices. (Revised.)
Wickens Chapter 13 (1st Edition) : Problems 13.4 (omit part d, ii) and 13.5, parts a and c only (for part c assume that μ > 1).

Additional Problem 1: Consider the following simple New-Keynesian model:

$$x_t = -\left(R_t - E_t\pi_{t+1} - r\right) \qquad (1)$$
$$\pi_t = \beta E_t\pi_{t+1} + x_t + e_t, \qquad 0 < \beta < 1 \qquad (2)$$
$$R_t = r + \gamma\pi_t, \qquad \gamma > 1 \qquad (3)$$

where π_t denotes inflation, x_t denotes the GDP gap, R_t denotes the nominal federal funds rate, and r is the steady-state equilibrium real interest rate. Assume that e_t is $i.i.d.\left(0,\sigma^2\right)$. Also, note that $0 < \beta < 1 < \gamma$.

A.) Give a brief **ECONOMIC** explanation of each equation. What is the Taylor principle and does it hold in this model? What is the implied target inflation rate?
B.) Derive the rational expectations equilibrium values of $\pi_t, x_t,$ *and* R_t, each as a function of e_t.
C.) Derive the policy that minimizes the Variance of π_t. Also, derive the policy that minimizes the Variance of x_t. (Note that $\gamma > 1$). Comment on the difference between these two policies and what it means for central-bank policy.

Additional Problem 2: Consider the following New-Keynesian model:

NKPC: $$\pi_t = \beta E_t\pi_{t+1} + \gamma x_t + \varepsilon_{\pi t}, \qquad 0 < \beta < 1 \qquad (1)$$

NKIS: $$x_t = E_t x_{t+1} - \theta\left(i_t - E_t\pi_{t+1}\right) + \varepsilon_{xt} \qquad (2)$$

Cagan Money Demand: $$\left(m_t - p_t\right)^d = \mu + x_t - \alpha i_t \qquad (3)$$

Real Money Supply Rule: $$\left(m_t - p_t\right)^s = \mu + \varepsilon_{mt} \qquad (4)$$

Here π_t denotes inflation, x_t denotes the GDP gap, i_t denotes the nominal federal funds rate, m_t is the log of nominal money, and p_t is the log of the price level. Note that (4) is a monetary policy rule in which the central bank sets the supply of ***real*** money balances. Assume that each of the shocks, $\varepsilon_{\pi t}, \varepsilon_{xt}, \varepsilon_{mt}$, is white noise.

Derive a second-order difference equation in equilibrium π_t. (You do not need to evaluate the roots of this difference equation or solve it. Just derive it.)