HOMEWORK 4. Wednesday February 6, due February 11. (The questions are from the 2010 Midterm 1 with the indicated weights.)

1. (35%) The Fischer model.

a) (20%) Derive the formulas for prices as a function of m_t and lagged expectations of m_t in the Fischer model. (Start from the assumption that the desired price level in log terms is $p_t^* = 0.5m_t + 0.5p_t$.)

b) (15%) Assume that monetary policy is described by the AR(2) process

$$m_t = 10 + 0.5m_{t-1} + 0.3m_{t-2} + e_t \quad .$$

Also assume you observe $m_t = 10$, $m_{t-1} = 20$, and $m_{t-2} = 40$.
What is the predicted level of y_t and p_t in the Fischer model?

2. (35%) Assume that a representative agent has a utility function

$$U(C, L) \; = \; C - \delta \exp(L) \, ,$$

where δ is a positive parameter. Assume that agent i supplies output Q_i produced by the production technology $Q = L$. The agent sets the relative price P_i/P, where P is the aggregate price index (assume there a many agents so a change in P_i doesn't change P) and faces a demand function

$$Q_i = Y \, (\frac{P_i}{P})^{-\eta} \, .$$

The agent supplies labor L_i to the market at the equilibrium wage rate W and hires labor in the amount of Q_i.
a) Find the optimal relative price $\frac{P_i}{P}$ (where the agent takes P as given).
b) Find the agent's labor supply as a function of the real wage.
c) Find the equilibrium level of output in the economy.
d) Does the equilibrium level of output increase or decrease with the parameters δ and η? Explain the intuitive logic underlying your answer.