

ECONOMICS 7344 – MACROECONOMIC THEORY II, Spring 2010

Homework 3. Monday February 8. Due Monday February 15.

1. Compare the formulas (6.50) and (6.51) in the text. Calculate the profits π_{FIXED} and π_{ADJ} for a 10 percent increase in real demand (M/P)(just start from $M/P = 1$) for $\eta = 3$ and $\nu = 0.1$. Sketch the labor supply curve for this value of ν . Redo the calculations for $\eta = 2$. Interpret why the result change. Then assume that $\nu = 6$ and calculate the profits for this value (keep $\eta = 3$) and interpret. Sketch the labor supply curve for this value and interpret why it is different from the previous one.

2. (30% of midterm 1, 2008) Consider an economy with a large number of agents where the utility of agent i is determined by a utility function

$$U(C_i, L_i) = E \log C_i - \alpha L_i ,$$

where L_i is labor supplied, C_i is agent i 's consumption (a basket of goods in fixed proportions) and α is a positive parameter (E is the expectations operator). Assume that agent i supplies output Q_i produced by the production technology $Q = L$. The agent is a price taker and the price of the single good agent i produces is denoted P_i . The aggregate price index (price of consumption) is $P = 1$ so $C_i = P_i * Q_i$. Assume there are many goods so a change in P_i doesn't change P . Agent i faces a demand function

$$Q_i = Y P_i^{-1} Z_i,$$

where Y is aggregate output and Z_i is log-normally distributed with mean $e^{\sigma_z^2/2}$, where $\sigma_z^2 = 2$ is the variance of $\log(Z_i)$. Assume that the Z_i random variables are independent of each other and independent of Y . Assume that the agent has to decide on his labor supply *before* he or she knows Z_i (otherwise there will no uncertainty at all).

a) (15%) Find the equilibrium level of output in the economy. (You need to solve the model. Hint: If you consider the relation between normal and log-normal random variables, you can figure out what is the distribution of Z_i^{-1} .)

b) (5%) Explain intuitively why output goes up/goes down/stays the same, when α increases. You can get full points if you explain what must happen even if you couldn't solve part a).

Now assume instead that

$$U(C_i, L_i) = E\{C_i - \kappa \frac{1}{2} C_i^2\} - \alpha L_i .$$

c) (10%) Find the level of output using this utility function (assume that the magnitudes of κ and α are such that a positive solution exists).