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ECONOMICS 7344 – MACROECONOMIC THEORY II, Spring 2016

Homework 2. Wednesday February 3. Due Wednesday February 10.

1. (10% of core exam January 2008) Consider an IS/LM framework. The demand for money is

$$M^d = 0.5Y - 0.5i$$

where Y is output and $i = r + \pi$ where r is the real rate of interest and π is the rate of inflation. Further assume that output demand is

$$Y = C + G + I$$

where $C = 0.8Y$ and $I = 0.1Y - 0.1r$.
a) Derive the IS-curve (you need to find the exact coefficients implied by the information you are given).
b) If $G = 1$, $M = 4$, and $\pi = 0$ find Y.
c) Derive the aggregate demand curve; i.e., a relation between Y and π. (Again, you need to find the exact function implied by the information given.)

2. Romer (4th edition), Problem 6.3.

3. Romer (4th edition), Problem 6.5.

4. (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).