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ECONOMICS 7344 – MACROECONOMIC THEORY II, Spring 2011

Homework 2. Monday January 31, due Monday February 7.

1. Romer, problem 6.1, pp. 339–340, parts (a) and (b). (Note: This demonstrates the workings of Jensen's inequality which underlies theories of precautionary saving and, more generally, risk aversion, so you should understand this in detail. Log-linear approximations used to be so common in rational expectations models that macroeconomists sometimes are jokingly referred to as people who believe the "log of the expectation is the expectation of the log." Such approximations are often impossible to avoid without resorting to simulations (simulations are, however, becoming increasingly popular tools).

2. Romer, problem 6.2, p. 340. You can use a summation instead of the integral if you feel more comfortable doing it that way—this is a (minor) approximation because you will still take the consumption of other goods and the aggregate price levels as constant. The advantage of the continuous time formulations is that the consumption of each good is infinitesimally small so there is no impact on other goods from changing consumption of an individual good. (Note: This type of Dixit-Stiglitz utility functions and their implied price indices have become standard in macroeconomics, so don't rush trough this exercise, it will be assumed for exams that you know this material well. Over the last few years, I have several times asked this exact question in finals or core exams [do NOT expect that I don't ask the same question twice].)

3. Derive the formula for "b" (the slope in the Lucas supply curve) in terms of the deep structural parameters, γ, η, Var(z) and Var(m).

4. (This was question 2 in the 2005 final with a weight of 20%) Consider the Lucas imperfect information model.
Assume that shock to individual demand (z_i in the text) have a variance σ_z^2. Now assume that demand follow one of the two following models

$$m_t = 1 + .2m_{t-1} + u_t \ ; \ var(u_t) = 4 \ , \ (A)$$

or

$$m_t = 3 + .6m_{t-1} + u_t \ ; \ var(u_t) = 2 \ . \ (B)$$

(The process for individual demand is the same in both cases.) Assume that agents observe m_{t-1} before making decisions in period t; i.e., at time t m_{t-1} is given. Then assume that the shock u_t takes the value 1. Now would the impact of the shock be larger if monetary policy is described by model A or by model B. (Explain the logic of your answer).