ECON 200A
Spring 2008

Assignment #6
Due Monday, May 12^{th}

1. **Efficiency Wages**
   Suppose that effort is a function of the preveiling wage w, the unemployment rate u, and the average wage paid w_a :

$$
\begin{aligned}
e &= \begin{cases} \left(\frac{w-x}{x}\right)^{\beta} & \text{if } w > x \\ 0 & \text{otherwise} \end{cases} \\
x &= (1-bu)w_a
\end{aligned}
$$

   where $0 < \beta < 1$ and $b > 0$.

   (a) Show that the equilibrium wage is $w = \left(\frac{x}{1-\beta}\right) = \left(\frac{1-bu}{1-\beta}\right) w_a$.

   (b) Find the unemployment rate in terms of β and b.

   (c) Explain the intuition for how this model implies there is an equilibrium with unemployment.

2. **Unions and efficiency wages**

   Now, suppose that a fraction α of workers are members of a union. Let w_u denote the union wage and w_n denote the wage paid to non-union workers. The union workers receive a wage higher than the equilibrium wage by some proportion, so $w_u = (1+\mu)w_n$. The average wage $w_a = \alpha w_u + (1-\alpha)w_n$. Firms employing non-union workers pay them the same wage from 1(a):

$$w_n = \frac{(1-bu)}{(1-\beta)} w_a$$

   (a) Express the union wage w_u in terms of α, b, u, β, μ, and w_a.

   (b) Find the unemployment rate in terms of α, b, u, β, and μ.

   (c) Suppose $\beta = 0.06, b = 1, \mu = 0.15$, and 15% of the workers are union members. Compare the unemployment rate from 1(b) to the unemployment rate when some fraction of workers are union members.

   (d) How does the presence of unions affect the unemployment rate? Explain the intuition for your result.

3. **Random Walk**

Discuss how the Hall (1978) implies that consumption follows a random walk. Address the following issues:

(a) What does it mean for a variable to follow a random walk?

(b) Based on the Euler equation from class, why is it that consumption follows a random walk (technically and intuitively). You can use the notation from the article or the notation from class.

(c) How does Hall test the relationship between wealth and consumption? How does he measure wealth and why does he choose this measure? What potential bias does this create in his results?

(d) What is the relationship between new classical implications about policy and the Hall random walk hypothesis?

(e) Obtain data on income and consumption and conduct your own random walk test using the most recently availble data (you don't need to control for stock prices in your analysis, but you can if you are interested to see whether your results differ from Hall's). Briefly describe your test and your findings.

4. **Hall's Test with CRRA Utility**

Suppose utility is of the constant relative risk aversion form and households discount future consumption by $\beta < 1$. If households lived for two periods, the utility function would therefore be:

$$U = \frac{C_1^{1-\theta}}{(1-\theta)} + \beta \frac{C_2^{1-\theta}}{(1-\theta)}$$

Also, savings from period 1 pays gross interest of $(1+r)$ in period 2. Assume that income is random and equal to Y_1 in the first period andY_2 in the second period.

(a) Write down the lifetime budget constraint for the household. You may assume the household has no initial wealth. Be careful; the household earns interest on savings from one period to the next.

(b) Set up the Lagrangian for the household maximization problem.

(c) Find the Euler equation that relates C_1 to C_2. Note, it should look similar to the one you found for the Diamond model and the one from the Hansen model on the last problem set.

(d) Does the permanent income hypothesis (PIH) hold in this model? What does this imply about RBC models? The Diamond model?

(e) Take the log of the Euler equation above. If the interest rate is constant, show that consumption follows a random walk with a drift (δ) :

$$\ln(C_2) = \delta + \ln(C_1) + \varepsilon_2$$

where ε_2 is the "error" in measured consumption for the second period. Based on the model (the terms in your Euler equation), what does δ depend upon?

(f) Using the data from part (e) in the previous question, conduct a random walk test assuming CRRA utility. Compare your results to the specification used above.