Obligatory problems: Unemployment - problem 2; Investment - problem 1
Deadline: 12 May, 2011, 23:55 :-)

1 Unemployment

Problem 1 - Effect of change in parameters of Shapiro-Stiglitz model.
Describe how each of the following affect equilibrium employment and the wage in the
Shapiro-Stiglitz model:

a) A decrease in workers' discount rate ρ.

b) An increase in the job breakup rate b.

c) A positive multiplicative shock to the production function (i.e. think about production function $AF(L)$ and consider an increase in A).

d) A decrease in the size of the labor force $\bar{L}$.

Problem 2 - Known length of unemployment in Shapiro-Stiglitz model.
Suppose that in the Shapiro-Stiglitz model, unemployed workers are hired according to
how long they have been unemployed, rather than at random, such that the workers
who have been unemployed the longest are hired first.

a) Consider the steady state where there is no shirking. Derive an expression for how
long it takes a worker who becomes unemployed to get a job as a function of firing
rate b, employment level L, number of firms N and labor force $\bar{L}$.

b) Let V_U be the value of being a worker who is newly unemployed. Derived and
expression for V_U as a function of the time it takes to get a job, workers' discount
rate ρ and the value of being employed V_E.

c) Find no-shirking condition for this version of the model.

d) How does the assumption on the priority hiring of the longest-term unemployed affect
unemployment rate in equilibrium? (well reasoned intuitive answer is sufficient).

Problem 3 - Effect of change in parameters of Search and matching model.

Describe how each of the following affect equilibrium employment in the search and matching model:

a) An increase in the job breakup rate, b.

b) An increase in the interest rate r

c) A decrease in the effectiveness of matching K.

2   Investment

Problem 1 - Effect of change in parameters of model of investment with adjustment costs.

Describe the effects of each of the following changes on the $\dot{K} = 0$ and $\dot{q} = 0$ loci, on K and q at the time of the change and on their behavior over time. In each case, assume that K and q are initially at their long-run equilibrium values.

a) A war destroys half of the capital stock.

b) The government taxes returns from owning firms at rate τ.

c) The government taxes investment. Specifically, firms pay the government γ for each unit of capital they acquire, and receive a subsidy of γ for each unit of disinvestment.

Problem 2 - Uncertainty in investment.

Consider a firm that is contemplating undertaking an investment with a cost of I. There are two periods. The investment will pay off π_1 in period 1 and π_2 in period 2. π_1 is certain, but π_2 is uncertain. The firm maximized expected profits and, for simplicity, the interest rate is zero.

a) Suppose the firm's only choices are to undertake the investment in period 1 or not to undertake it at all. Under what condition will the firm undertake the investment?

b) Suppose the firm also has the possibility of undertaking the investment in period 2, after the value of π_2 is known; in this case the investment pays off only π_2. Is it possible for the firm's expected profits to be higher if it does not invest in period 1 than if it does even if the condition in (a) is satisfied?

c) Define the cost of waiting as π_1, and define the benefit of waiting as $Prob(\pi_2 < I)E(I - \pi_2 | \pi_2 < I)$. Explain why these represent the cost and the benefit of waiting. Show that the difference in the firm's expected profits between not investing in period 1 and investing in period 1 equals the benefit of waiting minus the cost.