

Econ 202b Mock Exam

(Do three out of four)

- 1. Efficiency Wages.** Suppose that there are a fixed large number N of identical competitive firms each of which seeks to maximize its profits:

$$\pi = Y - wL$$

Suppose further that each firm's output depends multiplicatively on the number of workers it hires and on the average effort of workers:

$$Y = F(eL), F' > 0, F'' < 0$$

And that the effort of workers is a function only of their real wage:

$$e = e(w), e' > 0$$

- A. What can you say in general about the firm's labor demand? Is there any reason to expect this economy to be at full employment?
- B. Suppose that $e(w) = w^2$ for $0 < w < 1$, that $e(w) = 4w - w^2 - 2$ for $1 < w < 2$, and that $e(w) = 2$ for $2 < w$. What will the prevailing real wage be in this economy?
- C. Does increasing the number of firms in such an economy *ever* have an impact on the real wage? Why or why not?

- 2. Union Bargaining.** Suppose that workers are represented by a union with the objective function:

$$[U(w) - D]L + U(w_u)(N-L)$$

Where U is some increasing function of the income of the relevant group of workers, w is the wage received by those hired by the representative firm, w_u is the unemployment benefit paid to those not hired by the representative firm, D is the disutility of work, L is the level of employment, and N is the level of the labor force.

Suppose that the representative firm's profits are:

$$AL / \theta - wL, A > 0, 0 < \theta < 1$$

Where A is stochastic, and θ is known and fixed. The union sets the wage w after A is known, and the firm then chooses L to maximize its profits given w and A .

- a. What is the firm's optimal choice of L as a function of w and A ?
- b. What is the union's optimal choice of w given A and given the firm reaction function of part (a) above?
- c. Suppose that the union gets to choose *both* w and L —subject to the constraint that firm profits be at least some level π_0 . How, qualitatively, do the level of employment and wages with this more powerful union differ from the results in parts (a) and (b) above?

3. Consumption. Suppose that an infinitely-lived representative consumer with a discount rate of β and facing an interest rate of r sets consumption equal to his or her permanent income.

- A. Is this enough to allow you to conclude that consumption follows a random walk? If not, what other assumptions would you need?
- B. Suppose that changes in income follow the stochastic process:

$$Y_t - Y_{t-1} = \mu(Y_{t-1} - Y_{t-2}) + \epsilon_t$$

Where ϵ_t is a white-noise forecast error, and where the absolute value of μ is less than one. Suppose that income is unexpectedly high this period. Under what conditions does the surprise jump upward in consumption exceed the surprise jump upward in this period's income? Under what conditions does this period's surprise upward jump in income exceed this period's surprise upward jump in consumption?

4. Investment. Consider the q -theory model of investment with adjustment costs, and suppose that q and K are initially at their long-run equilibrium values. Describe—in words and diagrams—the reaction of q and K over time to the following shocks:

- A. The government suddenly and unexpectedly imposes a *permanent* investment tax credit of amount τ .
- B. The government suddenly and unexpectedly imposes a *temporary* corporate income tax at rate τ .
- C. The interest rate r suddenly and unexpectedly falls to a very low level, remains low for ten years, and then suddenly and unexpectedly jumps back to its initial level.