

14.41 Problem Set #3
Due Friday, Oct. 29th, at 1PM

- 1) Consider a society of identical workers, each of whom earns a wage W when she works. Each worker faces a probability of losing her job of α ; if she loses her job, she has no earnings ($W=0$). In any case, however, she always has some outside income of 10. Workers have utility of the form: $U = \log(C)$, where $C = \text{consumption} = \text{total income in the period}$ (she does no savings).

a) What is the expected utility of each worker?

Now, suppose that the government introduces an unemployment insurance system. Under this system, individuals pay some amount when they are employed, and get benefits while they are unemployed. The system must break even at a point in time; that is, the benefits paid to unemployed workers must be equal to the taxes collected from employed workers in each period.

b) What is the optimal unemployment insurance system? (That is, what is the system that, subject to the constraint of breaking even, maximizes worker utility?) Present both the tax rate and the benefit level for this system.

c) Are there welfare gains or losses from introducing the UI system (you don't actually have to measure the gains/losses, just sign them)? Why?

Now, suppose that when workers lose their jobs they get help from their friends. Each job loser gets an amount kW in total from all her friends if she is unemployed, where k is some constant and $k < (1-\alpha)$.

d) What is the expected utility now if there is no government unemployment insurance?

e) Now, reintroduce government unemployment insurance, which once again must break even. What is the optimal unemployment insurance system now (both tax rate and benefit level)? How does this compare to your answer to (b)? Why?

f) Are there welfare gains or losses now from introducing the system (once again, no measurement is necessary)? Intuitively (no need for math), are these gains or losses greater than in (c)?

- 2) In January, you are hired to help the presidential administration set its agenda for the 2005-2009 term. You are asked to review the Unemployment Insurance (UI) program, which currently replaces approximately 45% of a worker's wages for 26 weeks after she loses her job. Answer each part of the question in 1-2 paragraphs.

President X's labor secretary shows you a table comparing the unemployment durations of individuals who receive UI and do not receive UI. This table reveals that those who receive UI stay unemployed longer than those that do not receive UI. He claims that this proves that UI causes longer unemployment durations.

a) Is he correct? Why or why not? What other evidence could you bring to bear on this question that might be more useful in gleaning the correct relationship between UI generosity and unemployment durations?

b) If UI causes longer unemployment durations, does this prove that the generosity of the program should be reduced? Why or why not?

c) Consider two alternative reforms of the current UI system. The first is to perfectly experience rate firms, so that the taxes that firms pay are set exactly equal to the benefits their workers receive (benefits remain at 45% of wages). The second is a system of individual perfect experience rating - the government would loan individuals 45% of their wages while unemployed, but they would have to pay them back when they get a new job.

(i) Contrast the effects of these alternative policies on unemployment durations and the likelihood of worker layoffs.

(ii) Contrast the extent of insurance for workers provided by each of these alternatives with the current system.

- 3) Having done such a great job analyzing UI, you are now asked to help reform the Disability Insurance (DI) system, which provides benefits for the rest of your life for off-the-job injuries which leave you unable to work. In particular, it is considering two alternative reforms:
1. Paying different DI benefits for different types of disabilities (e.g. you get 30% of your previous wage if you have disability type X and 50% if you have disability type Y).
 2. Increasing the length of time people must have gone without working before they are allowed to apply from 5 months to 12 months.
- a) Explain the rationale behind each proposal.
 - b) Explain the downside of each proposal.
 - c) If you recommend reform #1, how would you decide which type of injuries should get higher compensation and which type should get lower compensation?

- 4) In Hatchetville, workers earn a wage of 9. They have a 5% chance of injury on the job, but the injuries differ in severity—the pain P while working that results from the injury is an element of $(1, 2, \dots, 10)$, with a equal 10% probability of each. Workers have utility:

$$U = \frac{2}{3}C^{3/2} - \frac{1}{2}P^2$$

where C , consumption, equals the wage if they work and 0 if they do not, and P equals the pain when they work (if uninjured, $P=0$) and 0 if they do not. (Assume that if people are indifferent between working and not working that they do not work).

- a) In a world without insurance, at what level of pain will people choose not to work? What, on average, will be the labor force participation rate?
- b) What is the socially optimal level of pain at which to not work?

The mayor of Hatchetville creates a worker's compensation program, in which people receive compensation of 3 if they are injured and do not work.

- c) At what level of pain will people choose not to work now? What is the new labor force participation rate? Does this increase in the "adverse event" (not working due to injury) increase or decrease social welfare? Why?

A new mayor takes office who thinks that the compensation is too low—after all, workers only receive 1/3 of their former wage! He proposes instead a payment of 5.

- d) At what level of pain will people choose not to work now? What is the new labor force participation rate? Is this increase in the "adverse event" increase or decrease social welfare? Explain and compare to (c)?