

2006

Micro Question 1 (30 Minutes)

REMEMBER: Answer only 2 of 4 micro questions.

Consider a firm that pays a highly-skilled, experienced worker \$20 per hour. She is allowed to work as many hours as she chooses and she chooses precisely 30 hours each week. There has been a recent increase in demand for the firm's output, so the firm would like to induce this worker to work 40 hours each week. She has many job opportunities and would be very difficult to replace, so the firm has to be very careful not to provoke her into quitting. This means that they must devise an offer that will get her to work 40 hours each week and will leave her at least as well off as she is currently.

The firm is considering three alternative types of offers:

1. Increasing the wage rate for each hour worked.
2. Paying a higher overtime wage rate for all hours worked in excess of 30 per week.
3. Paying her a specified weekly salary on the understanding that a workweek consists of 40 hours. She would not earn more income by working more than 40 hours and would be fired if she worked fewer than 40 hours.

The firm is certain that it is feasible to induce her to work 40 hours per week using any of these alternatives.

- a. Use indifference curve/budget line diagrams to show how each of these schemes will lead the worker to choose exactly 40 hours per week.
- b. If the firm is interested in minimizing the cost of achieving this goal, which alternative should it choose? Provide a brief explanation.
- c. Suppose instead that the firm is willing to expend a specified amount of money on one of the three alternatives to induce this worker to work *at least* 40 hours per week, but would like to choose the alternative that makes her as well off as possible. The total amount of money that the firm pays her is to be the same regardless of which alternative is used and the amount is sufficient that she will work 40 or more hours under all three options. Which alternative will make her best off? Provide a brief explanation.

2004

Micro Question 1

A competitive industry is in a long run equilibrium. All firms have the same U-shaped cost curves. The government then imposes a \$2 per unit tax. Note: in the following questions, assume that the market demand is downward sloping. All firms have the same cost curves in both the short run and the long run.

1. What will happen to the market price in the short-run (when there is no firm entry or exit)? Why? (Compare the change in market price to the tax level—i.e., is the change in price less than, equal to, or greater than the tax?)
2. What will happen to the market price in the long-run (when firm entry and exit is possible)? Why? (Compare the change in market price to the tax level—i.e., is the change in price less than, equal to, or greater than the tax?)
3. What happens to the number of firms in the industry in the transition to the long-run?

2004

Micro Question 4 (New Blue Book)

Consider the following game:

First period: Jim offers John some amount of money, denoted X , between zero and ten dollars.

Second period: John decides whether or not to accept the offer.

Final period. John gets paid the offer of X dollars and Jim receives $(10 - X)$ dollars.

1. What are the Nash Equilibria of this game?
2. What are the Subgame perfect equilibria of this game? Explain the difference between the two concepts.

Now restrict your attention to subgame perfect equilibria, and assume that John is a vengeful person who hates getting maltreated. As a result, John receives total utility from accepting an offer of X if the offer is above some cutoff level K , and $X - Z$ if the offer is below that cutoff level.

3. If the level of K and Z is known to Jim, and if $Z > 10 > K$, what is the subgame perfect equilibrium of the game? What happens to John's total welfare if he is an angry type—i.e., as K increases?
4. Now assume that $10 > Z > K$, what will the subgame perfect equilibrium of the game be? What about if $10 > K > Z$, what will the subgame perfect equilibrium be? Can it be bad to be vengeful under these assumptions?

2006

Macro Question 4 (New Blue Book)

(30 Minutes)

REMEMBER: Answer only 2 of 4 macro questions.

Consider a closed economy as described by the IS-LM model:

$$Y = C(Y - T) + I(r) + G \quad IS$$
$$\frac{M}{P} = L(r, Y) \quad LM$$

where Y is current income, consumption (C) is a function of current disposable income, T is taxes, investment (I) is a function of the interest rate (r), G is government spending, M is money supply, P is the price level that is constant in the short run, and the demand for real money balances (L) is a function of income and the interest rate.

a. Suppose the government decides to reduce taxes in the current period, without changing its level of spending. Describe the short run effects of this tax cut on the following variables (you must explain and graph the IS-LM diagram to get credit):

- (i) income
- (ii) consumption
- (iii) interest rate
- (iv) investment

b. Now suppose that consumers are forward-looking, thus consumption is a function not only of current income but also of future income and the interest rate. In this case, what would be the short-run effects of a tax cut on the above variables? (Assume the government reduces taxes in the current period, without changing its present and future level of spending).

c. Would your answer in (b) be different if many consumers in the economy were credit constrained? Explain.

2008

Question 6 (Macroeconomics, 30 minutes). Consider an economy described by the following assumptions. The aggregate production function is $Y = K^\alpha(EL)^{1-\alpha}$, the saving rate is s , the depreciation rate is δ , the rate of growth of E is 0 , and the rate of growth of L is n .

a. **(10 minutes)** Express steady state income per worker as a function of the exogenous parameters.

b. **(3 minutes)** What is consumption per worker in this steady state?

c. **(3 minutes)** Suppose that the economy has been in steady state for a while. Now suppose that suddenly there is a one-time, large increase in the efficiency level E . On the day of the change in E , what happens to the level of output per worker?

d. **(7 minutes)** In the years following the change in E , as the economy moves to its new steady state, what happens to income per worker? Illustrate your answer with a graph that has time on the horizontal axis.

e. **(7 minutes)** Suppose now that on the same day that E increases, a large fraction of the capital stock is destroyed. How does this change your answers to part (c) and (d)?

2007

Question 8 (Macroeconomics, 30 minutes)

Consider a pay-as-you-go social security system. The generation born at time t faces the following maximization problem:

$$\begin{aligned} & \underset{c_t, c_{t+1}, s}{Max} \ln(c_t) + \beta \ln(c_{t+1}) \\ s.t. \quad & c_t + s = (1 - \tau)y_t \\ & c_{t+1} = (1 + r)s + b_{t+1} \end{aligned}$$

where τ is the payroll tax rate at time t and b_{t+1} is the social security benefit at time $t+1$ when the generation born at time t is retired.

a. If the population growth rate is n , i.e. $N_{t+1} = (1 + n)N_t$, N_t is the number of people in generation t , and the economic growth rate is g , i.e. $y_{t+1} = (1 + g)y_t$, write down the formula for b_{t+1} as a function of y_t , n and g .

b. Solve for c_t , c_{t+1} and s by substituting b_{t+1} in 1 into the maximization problem of generation t .

c. What's the effect of a more generous social security system on national savings? More specifically, if the government raises payroll tax to increase the social security benefit, will s increase or decrease?

d. Under what condition(s), are people strictly better off if there is no such a social security system? Your result should be solely based upon this model and not any factors that may complicate the discussion, such as risk, uncertainty, etc. (Hint: you should compare the life-time utility people can achieve with/without a social security system and show under what condition(s) people can achieve higher utility when $\tau = 0$ and $b_{t+1} = 0$).