14.01 Problem Set 8

Due at 5pm on December 8st, 2023
Late problem sets are **not** accepted.

1 True, False or Uncertain? (20 Points)

True, false or Uncertain? Justify your answer

1. *(5 Points)* In a market with asymmetric information, the party with private information will always end up better off than in a market with perfect information.

2. *(5 Points)* The market for health insurance will fail due to adverse selection.

3. *(5 Points)* An increase in labor taxes induce people to work more.

4. *(5 Points)* Consider an economy with two people, Pedro and Andrew, and a single good: money. Both Pedro and Andrew have the utility funtion $u = \log w$, where w is the amount of money they possess. Now consider a government intervention where Pedro transfers some dollars to Andrew. A government who maximizes a utilitarian social welfare function will want to implement this transaction only if Pedro is richer than Andrew.

2 Health Insurance and Incomplete Information (40 Points)

Students of MIT are automatically enrolled in the MIT Student Health Insurance Plan (MIT SHIP), which provides comprehensive coverage. MIT SHIP is offered by Blue Cross Blue Shield of Massachusetts (BCBS). There are two types of students: healthy students and unhealthy students. Healthy students fall sick with a probability p_H, and unhealthy students fall sick with a probability $p_U > p_H$. If a student becomes sick, then they have costs of 1000 dollars.

1. *(5 Points)* Assume everyone enrolls in MIT SHIP. Suppose BCBS cannot distinguish between healthy and unhealthy students and does not make any (expected) profits on MIT SHIP. How much should it charge? Let c denote the cost of coverage.

2. *(5 Points)* Let w denote the willingness to pay for insurance. How does w depend on risk aversion? Provide an economic intuition.

3. *(5 Points)* How does w depend on whether the student is healthy or unhealthy? Provide an economic intuition.

4. *(5 Points)* Suppose at price c only unhealthy students purchase the health insurance. What happens to the insurance market for MIT students? Provide an economic intuition.

5. *(5 Points)* What can BCBS do to avoid the market collapse?

6. *(5 Points)* What can the government/MIT administration do to avoid the market collapse?

Now suppose each student at MIT can decide whether to engage in healthy or unhealthy behavior, so their health status is not exogenous anymore. Students can exert some effort to be healthy, but this effort is costly for them.

7. *(5 Points)* Suppose MIT SHIP offers full coverage in the case the student falls sick. Consider a student who has insurance, would they choose to be healthy or unhealthy? Explain.

8. *(5 Points)* How much should BCBS charge for insurance in this case? Explain the difference from 1.

3   Taxes and Redistribution (40 Points)

Consider an economy with two types of individuals: high skilled and low skilled. The only difference between the two is that the skilled have a higher wage $w_s = 2$ than the unskilled $w_u = 1$. Suppose that a fraction θ of the population is skilled. Suppose also that each individual has the same preferences over consumption and labor

$$U(c, l) = c - \frac{1}{2}(24 - l)^2$$

where $0 \leq l \leq 24$ is leisure.

1. *(5 Points)* Write down the high skilled and low skilled worker's budget constraints in a graph with leisure (l) on the x axis and consumption on the y axis.

2. *(5 Points)* Solve for each type's optimal choice of consumption and labor.

Now suppose the government decides to levy an labor income tax. This tax collects a fraction τ of each individual's earnings. The tax proceedings are rebated lump-sum equally between workers. Let T denote the lump-sum transfer.

3. *(5 Points)* Write down the new budget constraints. Solve for each type's optimal choice of consumption and labor in terms the tax rate τ and the lump-sum transfer T.

4. *(5 Points)* How does labor supply depend on the tax rate τ and the lump sum transfer T?

5. *(5 Points)* Compute the tax collected from each type separately. What is the equilibrium value of the lump-sum transfer T as a function of τ? Is this policy redistributing from high skilled to low skilled? Explain.

6. *(5 Points)* Solve for each type's utility in equilibrium, in terms of the tax rate τ. Let $V_H(\tau)$ and $V_L(\tau)$ denote the utilites of high-skilled and low-skilled workers in equilibrium. How does an increase in τ affect each worker's welfare? Explain.

7. *(10 Points)* Suppose the government wants to maximize a utilitarian social welfare function. That is, the government chooses the tax rate τ such to maximize

$$\mathcal{W} = \theta V_H(\tau) + (1 - \theta) V_L(\tau)$$

What are the trade-offs faced by this government? How would the optimal tax rate compare if the government had Rawlsian preferences? Explain. You don't need to solve for the optimal value of τ, providing the correct economic intuition is sufficient for full credit.

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