Economic Analysis – In Class Exam Component

6:30-9:30 pm Wednesday 4-28-2021

Instructions

- ✧ Answer all 4 questions.
- ✧ Make sure your answers are neat and easy to follow.
- ✧ Provide complete, neat, and clearly labeled figures where appropriate.
- ✧ Explain your work and intuition.
- ✧ You may use any resources ***except*** talking to anyone else.

1) Optimal Production and Pricing and Valuation

Inverse demand is p=10-0.1q with probability 0.75 and otherwise is p=10-0.2q. Cost is $2 per unit. Unsold output is disposed of at a cost of $1 per unit. The profit function is:

$$\pi = 0.25(10 - 0.2q_L)q_L + 0.75(10 - 0.1q_H)q_H - 2q_H - 0.25(q_H - q_L),$$

with the constraint that $q_H \geq q_L$. Profit is maximized by producing 35 units, selling them all at a price of $6.50 if demand is high, and selling 27.5 units at a price of $4.50 if demand is low.

a) Show that if the firm could instead store unsold output at a cost of $1 per unit, to sell in the next period, they would produce 38.33 units, sell them all at a price of $6.17 if demand were high, and sell 22.5 at a price of $5.50 if demand were low. If you set up and explain the new profit function correctly and explain the intuition for the solution well, but mess up the math, you will get significant credit.
b) What is the value, per period, of obtaining the ability to store output, ignoring discounting? Explain how valuation problems like this are approached generally.

2) Risk Aversion and Insurance

Consider an individual with preferences over uncertain monetary outcomes (m) represented by $u(m)=m^{0.5}$. Initial wealth is $81,000 but they face a 0.1 probability of a $45,000 loss.

a) Show that the most the individual would pay for full insurance is $5,310.
b) If the administrative cost of insurance averages $100 per policy, the insurance market is highly competitive, and there are many insured facing independent risks, the approximate market price of full insurance is $4,600. Why?
c) What is the approximate value added by the insurance industry, per individual insured, in (b)? Explain, intuitively, how the insurance industry adds value while creating no tangible output. How would a lack of independence change value added, and why?

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3. Game Theory

An incumbent and a potential entrant engage in one shot competition. Each can compete aggressively or passively. The entrant can also stay out. The incumbent moves first. Payoffs are shown in the table to the right.

Decisions		Payoffs	
		Incumbent	Entrant
Incumbent aggressive			
Entrant	Aggressive	-2	-3
	Passive	4	-4
	Out	8	0
Incumbent passive			
Entrant	Aggressive	3	2
	Passive	6	4
	Out	12	0

a) Represent the game in normal form and find all pure strategy Nash equilibria.
b) Represent the game in extensive form and find the subgame perfect Nash equilibrium. Explain why the non-subgame perfect pure strategy Nash equilibrium is nonsensical.
c) Why is cooperation in repeated games harder to sustain when interest rates are higher or when there are more players?

4) Supply and Demand Models for Highly Competitive Markets

Consider a highly competitive increasing cost industry beginning in long run equilibrium at an initial price of $10 with no taxes, upon which a 10% sales tax is levied.

a) Describe the way the industry adjusts to the tax over time.
b) Provide an explanation of the impact of the tax on the price paid by consumer including the tax, the price received by suppliers net of the tax, and social surplus.
c) Illustrate with an appropriate diagram.

You need to answer all three parts, but you do not necessarily need to separate your answers, as they are all interrelated. In particular, your description and explanation should likely reference your diagram.