Econ 301: Microeconomic Analysis

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Asymmetric Information

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  - Labor markets: some people more productive that others, but had to tell before hiring
  - Used car markets: seller (owner) knows quality, but buyer may not
- Todays lecture: what happens when one side of the transaction knows more than the other about the quality of the good

Adverse Selection and Moral Hazard

Example: The Market for Lemons

- Suppose there are 100 cars being sold: 50 “plums” and 50 “lemons”
- There are 100 buyers
- Seller’s lowest price willing to sell at:
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  - $1000 for lemons
- Buyer’s highest price willing to buy at:
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- What happens if quality of cars is observable to buyers and sellers?
  - All cars are sold
  - Plums are sold for anywhere between $2000 and $2400
  - Lemons are sold for anywhere between $1000 and $1200

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  - Forced revelation of quality
  - Warranties

Hidden Quality: Umbrellas

- Let's see another example where quality is unknown to buyers
- Consider competitive market for umbrellas
- Can be either low or high quality
- Consumers:
  - High quality worth \$14, low quality worth \$8
  - Cannot tell difference between high and low quality at time of purchase
- Sellers:
  - High quality sellers have fraction q of market
  - Both high and low quality cost \$11.50 per umbrella to make
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  - Since market is competitive, price is \$11.50
- What happens if $q \in [0, 1]$?
  - Consumers will buy at price \$11.50 only if $\$14q + \$8(1 - q) \geq \$11.50$
  - So if $q \geq \frac{7}{12}$ we have an equilibrium where all firms sell at \$11.50
    - Note that profit is always 0, but consumer surplus increases as q increases
  - So if $q < \frac{7}{12}$, no transactions are made

Adverse Selection

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- The classic example of adverse selection is the insurance market:
  - Insurance companies cannot tell risk of individual people, so insurance rates are based on average risk of individuals
  - For low-risk people, buying insurance at this price is not sensible
  - So only high-risk people buy insurance, but this drives up insurance rate
  - Again, market failure/inefficiency: insurance company willing to insure low-risk people if could tell who they were, but instead they get an *adverse selection* of customers

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  - This is done for car insurance and health insurance
- Another option: insurance pools
  - Instead of government mandating, firms can require employees to buy health insurance through group plan
  - Reduces rates because no longer have adverse selection of only high-risk consumers

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    - Examples? Lower car insurance rates if you drive safely; lower health insurance rates if you don't smoke
  - But effort is usually only partially observable
    - Another tactic: align consumer's incentives with a *deductible*, where consumer pays first part of cost of coverage
    - That way, consumer bears the marginal risk of their action
    - This is called *incomplete insurance*

Principal-Agent Problems

Moral Hazard Example: Setup

- Suppose landowner wants to hire someone to work the land for them
- If worker puts in effort x, land will produce output $y = f(x)$
- Landowner will pay them according to function $s(y)$
- Worker can choose instead to take *outside option*, worth $\bar{u}$ to them
- Effort costs $c(x)$ to worker
- Good y has price 1
- Utility functions:
  - Landowner: $y - s(y)$
  - Worker: $s((f(x)) - c(x)$
- In general, landowner is called *principal* and worker is called *agent*

The Principal's Problem

- Note that the principal must ensure that the agent actually wants to work for the principal and not take the outside option
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- Solution?
  - Note we can rearrange the constraint and plug in to the maximand:

$$\max_x f(x) - c(x) - \bar{u}$$

  - The FOC of this problem is then $f'(x^*) = c'(x^*)$, ie MP=MC

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- The principal want to ensure that the agent will choose effort level x^*
- Need this to be utility maximizing for the agent, ie need x^* to solve

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- Alternatively, can write this as

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- Note that there may be many possible $s(\cdot)$ functions (ie *contracts*) that principal can choose to use
- For contracts to work (ie achieve x^*), must satisfy both PC and IC

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- Note that PC is what determines contract (ie size of rent R)

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- Note that in this case, PC determines lump sum K but IC determines wage rate w

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- From principal's point of view, agent will provide less than optimal level of effort, ie $\hat{x} < x^*$. Why?
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- So why would principal ever consider using sharecropping as contract?

Return of Asymmetric Information

- We're assuming that principal can directly observe effort because it is perfectly correlated with output, ie $y = f(x)$
- But in reality there is noise (good and back luck) that can determine output in addition to effort, ie $y = f(x) + \epsilon$
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  - Wage: not feasible since need to observe effort x
    - Workaround in reality: pay for hours worked as proxy for effort
  - Sharecropping: both worker and landlord bear risk of bad luck, so their incentives are aligned

A Note on Evaluations

- Evaluations are now live
- These are incredibly important to me:
  - I want to make the course continually better for future students
  - Evaluations are also used to determine whether I get tenure
- Please fill them out as completely as possible