

## Information

*Industrial Organization*

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## Outline

- Asymmetric Information
  - Adverse Selection
    - Solving the Adverse Selection Problem
    - Signaling in other Scenarios
  - Moral Hazard
    - The Principal Agent Problem

## Asymmetric Information

- Asymmetric Information:
  - Adverse Selection
    - One party to a transaction knows a material fact that the other party does not
    - Can lead to market failure
  - Moral Hazard
    - An individual knows more about his or her own actions than other people do
    - Leads to a distortion of incentives

## The Market for “Lemons”

- Consumers value “lemons” at \$100 and “peaches” at \$200
- Consumers are risk neutral
- A randomly selected car has a valuation of \$150
- No good cars are sold
- Only bad cars are sold and buyers will only pay \$100.
- \*There is no market for good quality used cars

## Solving the Problem

- Outside Verification
  - Liability laws
  - Experts
  - Standards and Certification
- Random Pooling
- Screening
- Signaling
  - Guarantees or Warranties
  - Reputation
  - Other types of signalling

## Random Pooling

- Employer-based health insurance
- Mandatory Health Insurance – (The Individual Mandate)
  - Arguments for and against
  - Massachusetts experience
- Problem can still exist if given choice of health plans

### Screening

- Using observable information to make inferences about private information
  - Auto Insurance
  - Health Insurance

### Signaling through Education (Spence)

- Just a thought, but suppose you don't learn anything at university, is it still worthwhile to go?
- Suppose for a minute that university is difficult even though you don't learn anything. However, the more intelligent you are, the less difficult it is.
- This difficulty translates into costliness of going to university – the more intelligent you are, the less costly it is to go.

### Signaling through Education

- Going to university is a way to sort intelligent workers from non-intelligent workers.
- Employers can then pay higher wages to more intelligent workers
- Intelligent workers can signal that they are intelligent by spending more years at university.

### The Entry problem and signaling cost

- Going back to Milgrom and Roberts signaling on price...
  - Low cost incumbent firms can signal that they have a low cost by charging a low price.
  - But, the Milgrom and Roberts example is more complicated, so lets do this example in the context of education....

### Pooling equilibrium

- Suppose that an employer, a priori (that is, before knowing anything about a particular student) decides that there is a 90% chance that a worker is intelligent and a 10% chance that he is not. So, if he can't distinguish between two students, he will assume they are intelligent. Assume that the monetary and opportunity cost of a BA is zero (just so you know that this is a fictional example..), but there is an intellectual cost to unintelligent students. Now, students who are intelligent get BA degrees because they enjoy the course. Students who are not intelligent do not enjoy the course, but get a BA anyway so that the employer cannot distinguish them from intelligent workers.

### Separating Equilibrium

- Suppose now, that an employer believes that there is a 10% chance that a student is intelligent but a 90% chance that he is not. In this case, the intelligent students want to distinguish themselves from the unintelligent ones. But, since the unintelligent ones would get a BA if that was all that was required, the intelligent students have to do something to distinguish themselves that would not be in the realm of possibility (ie profitable) for the unintelligent students. In this case, the intelligent students get an MBA. Since the unintelligent students know that they will never be able to distinguish themselves from the intelligent ones, they just stick with their high school diploma.

## Moral Hazard

- Sometimes known as “hidden action”
  - New York City in 1970
  - Careless Drivers
- Solution
  - Deductible

## Work and Moral Hazard

- One party, a *principal*, hires another party, an *agent*, to perform some task.
- Agent has a reservation level of utility
- Agent doesn't like hard work
- Agents overall utility is given by

$$U(w, e) = \sqrt{w} - e$$

- Suppose, arbitrarily, an agent won't work unless he has a utility level of at least 9

- If the agent expends high effort, this costs him 5. If the agent expends low effort, this costs him 0.
- However, for the principal, if the agent works hard, this is worth \$270, but if he doesn't, the “product” is only worth \$70.
- To get the agent to work at a low level of effort  $w \geq \$81$ . (Because  $e=0$  and  $\sqrt{w}=9$ , which exactly equals his reservation utility). Not worth it.

- However, to get the agent to expend high effort, the principal must offer wages such
- $$\sqrt{w} - 5 \geq 9$$
- This works out to  $w \geq \$196$
  - Is this worthwhile? Yes!
  - So, how can the principal get the agent not to shirk??

## Possible Solutions?

- Write a contract that offers the agent \$197 and trust that he will work hard
- Write a contract such that his pay depends upon how much effort he puts in
- Principal could monitor agent
- Let the agent share in both the risk of the project and the reward of the project

## Example: Franchises

- Franchise owners try harder
  - 85% of McDonald's outlets are franchises
  - It costs about \$1 million dollars in investment to open a franchise
  - Why do people take risk? Franchise owners earn a lot more than simple managers
  - McDonalds likes it to guarantee effort – it gets around the moral hazard problem

### Question:

- Why do most employment contracts involve a fixed wage rather than some sort of profit-sharing scheme?

### Conclusion

- Difference Between Adverse Selection and Moral Hazard
- Solutions to these Problems