MICROECONOMICS III
CLASS 8

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ASYMMETRIC INFORMATION

In purely competitive markets, all agents are fully informed about traded commodities and other aspects of the market.

- What about markets involving medical services, insurance or used goods?
  - A doctor knows more about medical services than a patient (buyer) does.
  - An insurance buyer knows more about his riskiness than a seller does.
  - A used car's owner knows more about it than a potential buyer does.
  - An employee knows more about his skills and abilities than an employer does

ASYMMETRIC INFORMATION

Imperfectly informed markets with one side better informed than the other are markets with <u>asymmetric information</u>.

Asymmetric information leads to an erroneous market allocation:

- The equilibrium may be not Pareto-optimal.
- The equilibrium may not exist.

ASYMMETRIC INFORMATION

Four effects of asymmetric information will be discussed:

- adverse selection,
- signaling,
- moral hazard,
- incentivising.

ADVERSE SELECTION

Example: A second-hand car market.

Two types of cars: (low-quality) "lemons" and (high-quality) "peaches".

Preferences of buyers and sellers are such that:
- Each lemon seller will accept $1,000.
- Each lemon buyer is willing to pay at most $1,200.
- Each peach seller will accept $2,000.
- Each peach buyer is willing to pay at most $2,400

What will happen if each buyer can perfectly differentiate between lemons and peaches?

ADVERSE SELECTION

Suppose no buyer can tell a peach from a lemon before buying

- What is the most a buyer is willing to pay for any car?

Let q be the fraction of peaches.

Expected value (EV) to a buyer of any car is at most

$$EV = \$1200(1-q) + \$2400q$$

EV is the maximum price a (risk-neutral) buyer would be willing to pay for a car.

ADVERSE SELECTION

Suppose $EV > \$2000$.

Every seller can negotiate a price between $2000 and $EV (no matter if the car is a lemon or a peach).

All sellers gain from being in the market.

ADVERSE SELECTION

Suppose $EV < \$2000$.

A peach seller cannot negotiate a price above $2000 and will exit the market.

So all buyers know that the remaining sellers offer lemons only.
- Then, the buyers will be willing to pay at most $1200 and only lemons are sold.
- Hence, "too many" lemons crowd out the peaches from the market.
- Gains-to-trade are reduced since no peaches are traded.

The presence of the lemons inflicts an external cost on buyers and peach owners

ADVERSE SELECTION

How many lemons can be in the market without crowding out the peaches?

Buyers will pay $2000 for a car only if

$$EV = \$1200(1-q) + \$2400q \geq \$2000$$

$$\Rightarrow q \geq \frac{2}{3}$$

- q – the fraction of peaches

So if over one-third of all cars are lemons, then only lemons are traded

ADVERSE SELECTION

A pooling equilibrium – A market equilibrium in which both types of cars are traded and <u>cannot be distinguished</u> by the buyers.

A separating equilibrium – A market equilibrium in which only one of the two types of cars is traded, or both are traded but can be distinguished by the buyers.

ADVERSE SELECTION

Low-quality products crowd high-quality products out of the market.

- The market fails to supply mutually beneficial transactions.

Adverse selection may lead to a situation when only low-quality cars are sold in the market.

ADVERSE SELECTION

In reality, differences in the cars' quality may be not that large.

- Sellers may also lack complete information.

The car quality verification is possible to be conducted by a buyer but is costly.

Even with a low price, the supply of high-quality cars will not fall to zero.

- However, compared with the complete information case, many high-quality cars will not be sold.

ADVERSE SELECTION

So far, we assumed a given supply of goods of each quality

Now consider a case when every seller can choose the quality (or value) of her product.

- Two umbrella types: high-quality and low-quality.
- Which type will be manufactured and sold?

ADVERSE SELECTION

Buyers value a high-quality umbrella at $14 and a low-quality umbrella at $8.

- Before buying, no buyer can tell quality.

Marginal production cost of a high-quality umbrella is $11.

Marginal production cost of a low-quality umbrella is $10.

ADVERSE SELECTION

Suppose every seller makes only high-quality umbrellas.

Every buyer pays $14 and sellers' profit per umbrella is $14 - $11 = $3.

- But then a seller can make low-quality umbrellas for which buyers still pay $14, so increasing profit to $14 - $10 = $4.

There is no market equilibrium in which only high-quality umbrellas are traded.

Is there a market equilibrium in which only low-quality umbrellas are traded?

- Buyers pay at most $8 for an umbrella, while the marginal production cost is $10.
- There is no market equilibrium in which only low-quality umbrellas are traded.

ADVERSE SELECTION

Is there an equilibrium in which both types of umbrella are manufactured (a pooling equilibrium)?

▪ A fraction q of sellers make high-quality umbrellas; $0 < q < 1$.

▪ Buyers' expected value of an umbrella is
$$EV = 14q + 8(1 - q) = 8 + 6q.$$

▪ High-quality manufacturers must recover the manufacturing cost, so
$$EV = 8 + 6q > 11 \text{ so } q > 1/2.$$

ADVERSE SELECTION

So at least half of the sellers must make high-quality umbrellas for there to be a pooling market equilibrium.

- But then a high-quality seller can switch to making low-quality and increase their profit by $1 on each umbrella sold.

Since all sellers reason this way, the fraction of high-quality sellers will shrink towards zero.

- Then, buyers will pay only $8.

So there is no equilibrium in which both umbrella types are traded.

- Adverse selection has destroyed the entire market!

EXAMPLES

Health and Life Insurance

- More likely to buy health and life insurance:
  - Those whose health condition is bad,
  - Those with unhealthy lifestyle,
  - Family members of those who suffer various health problems,
  - ... .
- Verifying such suspicions (of adverse selection) is costly for the insurer.
- Costs of the insurance increase, and individuals with fewer health issues may give up on being covered by the insurance.
- Similar issues for motor vehicle insurance

EXAMPLES

Loans:

- A significant component of loan costs to a lender is the risk of default or delay in a borrower paying back the loan.

- This risk depends on individual characteristics.

  - Unreliable, dishonest persons, having difficulties in sustaining employment, etc., may be more willing to take loans.

- Again, loan costs rise, and more reliable clients drop out.

SOLUTIONS?

Restrict voluntariness

- Mandatory insurance (role of the state; e.g., social security)
- Selling group insurance to firms

Mitigate asymmetry of information

- Segregation into various risk groups (e.g., depending on a driver's age, accident history, colour of the car)
- Credit history
- Additional screening (e.g., providing additional medical documentation for health insurance)

SOLUTIONS?

Reputation
- Brands, rankings, information from others, etc.

Standards
- e.g., McDonald's, Holiday Inn ("No Surprises")

Warranties, accepting complaints

Signalling quality – certificates, diplomas, etc.