Economics of information

Lecture 7

November 17, 2015

- Situations where some parties have private information that is pay-off relevant.
- There is a difference whether the informed party moves first or second.
- In the previous case a game of signalling ensues.
- In the latter case there are two cases of interest: The informed party has private information about his/her type, or the informed party takes an action that is not observable to the first mover.
- When non-informed party moves first and informed party has private information about his/her type we have adverse selection.
- When non-informed party moves first and informed party takes a non-observable action we have moral hazard.

Adverse selection

- Market may fail under adverse selection.
- Consider a market where used cars are for sale.
- There are cars of different condition and their values range uniformly from 1000 to 10000 to their owners.
- Any car of value x to its owner is of value $\frac{3}{2}x$ to a buyer.
- What might be the equilibrium price of the cars in the market when the value of the car x is private information to the seller.
- As a first approximation assume that competition for cars drives the buyers to zero surplus and the price of the cars is the average value of the cars $p_1 = 8250$.
- But this cannot be since all the owners whose valuation of their cars are above 8250 refrain from selling them.

Adverse selection

- Thus, the values of the cars brought to the market range uniformly from 1000 to 8250.
- As a second approximation the market price of the cars could be the average of 1500 and 12375, $p_2 = 6937.5$.
- But again, only owners whose car's value is at most 6937.5 bring them to the market.
- The market price p has to be such that if the highest value car brought to the market is p then $p = \frac{1}{2}\left(1500 + \frac{3}{2}p\right)$.
- The solution to this is $p = 3000$ which means that markets do not break down completely but plenty of profitable trades remain unconsummated.

Adverse selection in a strategic setting

- Situation where moves are made sequentially and the first mover offers a contract to a second mover(s) who has private information.
- Informed parties get informational rent, and efficiency is compromised.
- Consider the insurance example we had in the first half of the course.
- Assume that the insurance markets are perfectly competitive and the unit price of insurance is the same as the accident probability $p = \pi$.
- Assume that there are two types of agents.
- High-risk agents have higher accident probability than low-risk agents $\pi_h > \pi_l$.

Adverse selection

- Assume that the share of low-risk types is α, or assume that an agent who is offered a contract is low-risk with probability α.
- The agents' wealth is y, the loss in case of accident is L, and these as well as all other parameters are common knowledge.
- Consider first the full information case.
- The insurance company offers full coverage to both types of agents but at different prices: Two contracts (π_h, L) and (π_l, L).
- This guarantees zero profits, and constitutes a competitive equilibrium (see the text book).

- Under asymmetric information different agents cannot be offered full-coverage contracts at different prices.
- Thus, full-insurance contracts can be offered only at uniform price, denote it by p.
- If contract (p, L) is supposed to generate zero profits then $p = (\alpha\pi_l + (1-\alpha)\pi_h)\,L$.
- If all agents bought the insurance this would be the case.
- But it is possible that low-risk agents find the insurance too expensive, and do not buy.
- But then insurance companies make lossess.
- The proper price of insurance is not given by the average probability of accident in the population.
- It is given by the average probability of accident of those who buy the insurance.

- If $u(y-p) \geq \pi_l u(y-L) + (1-\pi_l)u(y)$ low-risk agent buys insurance.
- This is equivalent to $\pi_l \geq \frac{u(y)-u(y-p)}{u(y)-u(y-L)} \equiv h(p)$.
- Price $p^*$is a competitive equilibrium price if

$$p^* = E\left(\pi \mid \pi \geq h\left(p^*\right)\right)L$$

- Such price exists; it could be $\pi_h L$.
- This would be the case where markets fail.

Adverse selection

- One can show that generally in a competitive setting there does not exist a so called pooling equilibrium in which both types buy the same coverage at the same price.
- This configuration can be broken by a separating contract that offers different amounts of insurance at different prices such that each type of agent has his/her favourite price-coverage pair.
- It can also be shown that generally there cannot be a separating contract where both types are offered different contracts.
- Assumption about competitive outcome (zero profit) actually makes the situation difficult.
- One can gain insight to the problem assuming that there is a monopoly insurance company.
- This analysis is conducted in the next lecture.