

Economics of Information

LECTURE 4

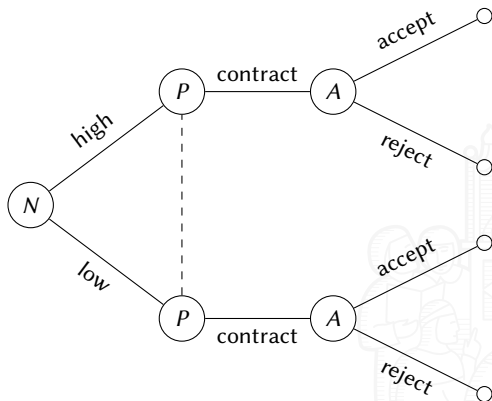
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28th March 2018



Adverse selection



Source: Rasmusen (2007, p. 183, fig. 7.1c)

Adverse selection (cont'd)

- game of **incomplete** information with **(un-)certainty**

- 1 Nature picks the agent type
- 2 the principal offers a contract
- 3 the agent accepts or rejects

- the agent has private information *before* the contract is conceived
- the principal might propose multiple contracts
- emphasis is on *which* contract the agent accepts

Hidden actions vs. hidden knowledge

hidden actions

- agent's *effort* is noncontractible
- principal designs a contract that induces the agent to perform the desired *behaviour*

hidden knowledge

- agent's *ability* is noncontractible
- principal cannot induce a *characteristic*
- principal designs different contracts that are attractive to different types in order to induce *self-selection*, **or not!**

Principal problem and equilibrium

the principal maximises her own utility knowing that

- the agent is free to reject the contract entirely
- the contract should induce the agent to *'do the right thing'*

hidden actions

- (participation)
- (incentive compatibility)

hidden knowledge

- (participation) $\times \#\{a\}$
- (self-selection) $\times \#\{a\}$

equilibrium types

*if all types of agents choose the same strategy in all states, the equilibrium is **pooling**; otherwise it is **separating***

- sometimes it is too costly to induce self-selection

Production Game VI: adverse selection

players

principal: a manager

agent: a worker

order of play

- 0 Nature chooses the agent's ability a , observed by the agent but not by the principal, according to distribution $F(a)$
- 1 the principal offers the agent one or more wage contracts $w_1(q), w_2(q), \dots$
- 2 the agent accepts one contract or rejects them all
- 3 Nature chooses a value for the state of the world, θ , according to distribution $G(\theta)$; output is then $q = q(a, \theta)$

payoffs

- if agent accepts: $\pi_{agent} = U(w, a)$ $\pi_{principal} = V(q - w)$
- if agent rejects: $\pi_{agent} = \bar{U}(a)$ $\pi_{principal} = 0$

The (basic) Lemons model

the principal contracts to buy from the agent a car whose quality is noncontractible, despite the lack of uncertainty

players

principal: a buyer

agent: a seller

order of play

- 0 Nature chooses seller's car quality $\theta \sim F(\theta)$
- 1 the buyer offers a price P
- 2 the seller accepts or rejects

payoffs

- if seller rejects: $\pi_{buyer} = \pi_{seller} = 0$
- if seller accepts: $\pi_{buyer} = V(\theta) - P, \quad \pi_{seller} = P - U(\theta)$



Lemons I: identical tastes, 2-types

- quality $\theta \sim \mathcal{U}\{2000, 6000\}$
- players value quality at one dollar per unit

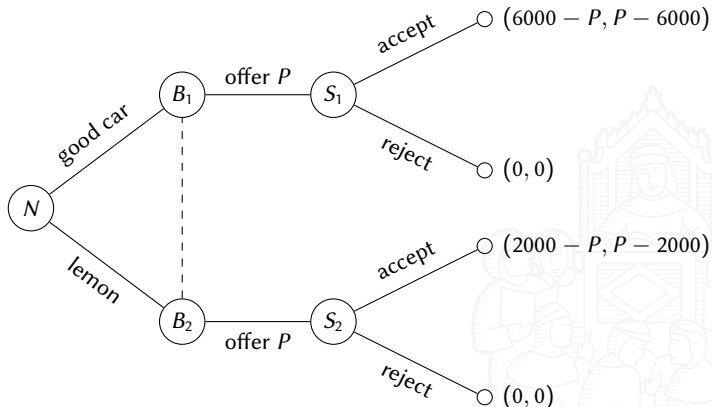
$$\begin{aligned} V(\theta) &= \theta & \pi_{\text{buyer}} &= \theta - P \\ U(\theta) &= \theta & \pi_{\text{seller}} &= P - \theta \end{aligned}$$

- quality is non-contractible, thus contract cannot be conditional
- the buyer cannot enforce a contract based on her discovery once the purchase is finalised

first guess

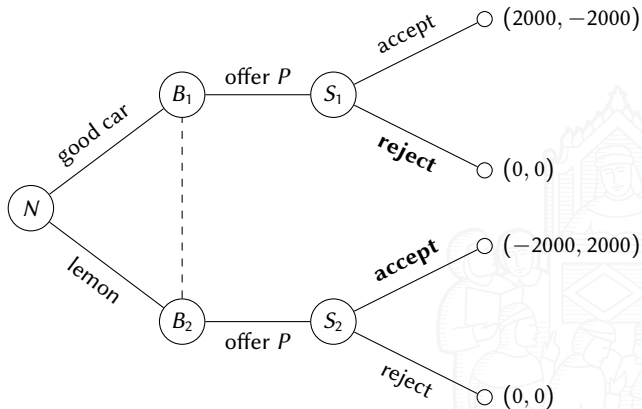
$$P = \text{average quality} = E[\theta] = 4000$$

Lemons I: extensive form



Source: Rasmusen (2007, p. 250, fig. 9.1)

Lemons I: extensive form (cont'd)



Source: Rasmusen (2007, p. 250, fig. 9.1) with $P = 4000$

Lemons I: equilibrium

- if $P = 4000$ only sellers of lemons accept
 - but the buyer is willing to pay up to $P = 2000$ for a lemon
 - if $P = 2000$
 - sellers of lemons are indifferent between accepting or rejecting P
 - buyers are indifferent between owning a car (lemon) or not
- the very fact that the car is for sale demonstrates its low quality
- in equilibrium only half of cars are traded, all of them lemons

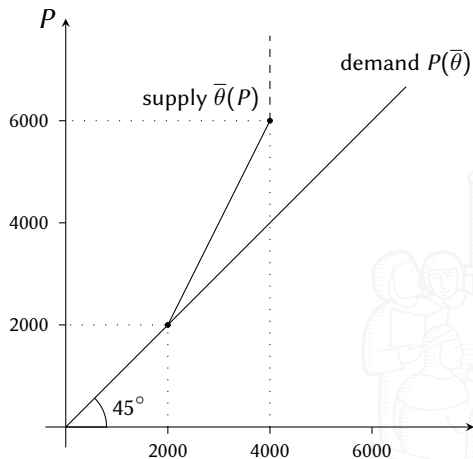
Lemons II: identical tastes, continuum of types

Q: was the outcome of Lemons I an artifact due to the 2-type assumption?

Lemons II

- *continuum* of types of sellers $\theta \sim \mathcal{U}(2000, 6000)$, $E[\theta] = 4000$
- as in Lemons I, if $P = 4000$, the seller is willing to sell only if $\theta \leq 4000$
 - sellers of cars with $\theta \in (4000, 6000]$ pull out of the market
 - average quality of car on sale is $E[\mathcal{U}(2000, 4000)] = 3000$
- P must drop to 3000
 - sellers of cars with $\theta \in (3000, 4000]$ pull out of the market
 - average quality of car on sale is $E[\mathcal{U}(2000, 3000)] = 2500$
- [...]
- P must drop to 2000
 - sellers of cars with $\theta > 2000$ pull out of the market
 - remaining # of cars with $\theta = 2000$ in the market is infinitesimal
- **the market has completely collapsed !**

Lemons II: equilibrium



Source: Rasmusen (2007, p. 251, fig. 9.2)

Thank you for your attention!

see you on
Wednesday, 4th April
h. 17:00 – Aula 6

