

# ADVERSE SELECTION - GENERAL THEORY

## BRIEF SUMMARY

Principal is uninformed - Agent has private information

### 1. Mechanism design

stage 1: Principal announces contract that specifies allocation  $y$  given the message sent by the agent  $m \mapsto y(m)$

stage 2: Agent sends message  $m$

stage 3: Principal implements contract and payoffs are realized.

Sequential game  $\Rightarrow$  solve by backward induction

STAGE 2: agent chooses  $m$  to maximize his utility

$$\max_m u(y(m), \theta) \Rightarrow m^*(\theta)$$

Agent behaves strategically BUT Principal can anticipate it

$$\theta \xrightarrow{\text{message game}} m^*(\theta) \xrightarrow{\text{contract}} y(m^*(\theta))$$

$\Leftrightarrow$

$$\theta \xrightarrow{\hspace{10em}} y^*(\theta)$$

where  $y^*(\theta) = y(m^*(\theta))$

and  $u(y^*(\theta), \theta)$  is max. by construction

It is therefore sufficient to restrict attention to direct mechanism (message is an  $\theta$ ) and construct a mechanism  $y^*(\cdot)$ , that is such that the agent reveals truthfully.

REVELATION PRINCIPLE

## 2. Optimal mechanism

Given the revelation principle, the problem of the Principal is simply to find the optimal incentive compatible allocation  $y^*(\cdot)$ .

The principal also satisfies other constraints when they apply. Generally, the principal satisfies the INDIVIDUAL RATIONALITY constraint (IR) because he cannot force the agent to accept the contract.

Principal does not observe realization of  $\theta$

$$\begin{aligned} \max_{y^*(\theta)} \quad & \mathbb{E}_{\theta} W(y^*(\theta)) \\ \text{s.t.} \quad & \theta \end{aligned}$$

$$\text{s.t.} \quad u(y^*(\theta), \theta) \geq u(y^*(\theta'), \theta) \quad \theta' \neq \theta$$

INCENTIVE COMPATIBILITY

$$u(y^*(\theta), \theta) \geq R \quad \forall \theta$$

INDIVIDUAL RATIONALITY -

outside option  
reservation utility -