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# Long Run versus Short Run Player

## **Moral Hazard**

choose  $a^i \in A$ 

observe  $y \in Y$ 

 $\rho(y|a)$  probability of outcome given action profile

 $u^i(a^i,y)$  utility

private history:  $h^i = (a_1^i, a_2^i, ...)$ public history:  $h = (y_1, y_2, ...)$ 

strategy  $\sigma^i(h^i,h) \in \Delta(A^i)$ 

"public strategies", perfect public equilibrium

Moral Hazard Example

mechanism design problem

each player is endowed with one unit of income

players independently draw marginal utilities of income  $\eta \in \{\overline{\eta}, \eta\}$ 

player 2 (SR) has observed marginal utility of income player 1 (LR) has unobserved marginal utility of income

player 2 decides whether or not to participate in an insurance scheme

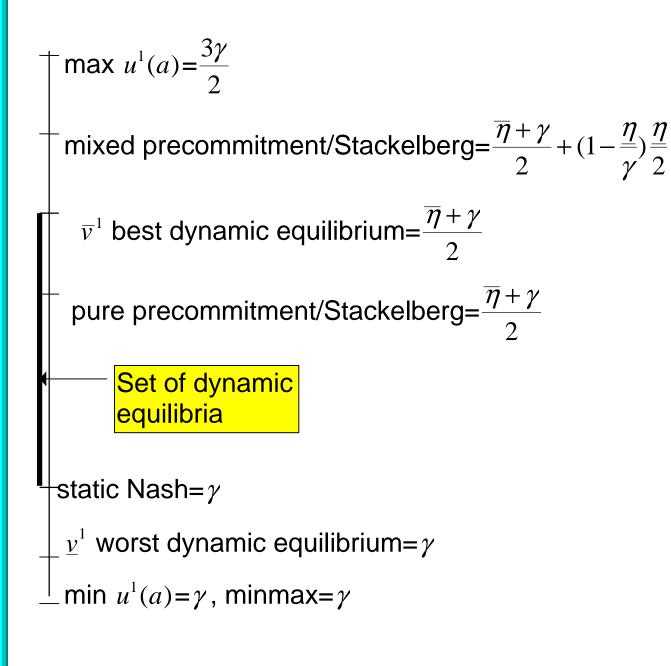
player 1 must either announce his true marginal utility or he may announce  $\overline{\eta}$  independent of his true marginal utility

non-participation: both players get  $\gamma = \frac{\overline{\eta} + \underline{\eta}}{2}$ 

participation: the player with the higher marginal utility of income gets both units of income

#### 

$$p^* = \frac{\eta}{\gamma}$$
 makes player 2 indifferent



### moral hazard case

player 1 plays "truth" with probability p \* or greater player 2 plays "participate"

$$\overline{v} = (1 - \delta) \frac{\overline{\eta} + \gamma}{2} + \delta \left( \frac{1}{2} w(\underline{\eta}) + \frac{1}{2} w(\overline{\eta}) \right)$$
$$\overline{v} \ge (1 - \delta) \frac{3\gamma}{2} + \delta w(\overline{\eta})$$
$$\overline{v} \ge w(\underline{\eta}), w(\overline{\eta})$$

 $w(\overline{\eta})$  must be as large as possible, so inequality must bind;  $w(\eta) = \overline{v}$ 

$$\overline{v} = (1 - \delta)\frac{3\gamma}{2} + \delta w(\overline{\eta})$$

solve two equations

$$\overline{v} = \overline{\eta} - \frac{\gamma}{2}$$
$$w(\overline{\eta}) = \frac{\overline{v} - (1 - \delta)3\gamma/2}{\delta}$$

check that  $w(\overline{\eta}) \ge \gamma$ 

leads to 
$$\delta \ge 2\left(2 - \frac{\overline{\eta}}{\gamma}\right)$$

from  $\delta < 1$  this implies

 $\overline{\eta} > 3\underline{\eta}$ 

### Moral Hazard Mixing Games

 $\rho(y \mid a) > 0$ 

then  $\overline{v}_{MH} < \overline{v}_{PO}$ 

moral hazard worse than perfect observability