Moral Hazard

Recitation 3

MORAL HAZARD

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• Two agents - principal and agent P makes a take-it-or-leave-it offer to A, who has reservation utility U.

If contract is accepted, A takes action $a \in \mathcal{A}$ which (stochastically) affects outcome $x \in [\underline{x}, \overline{x}]$.

Assume x is verifiable so we can write wages/payments w(x)and go to court with it.

P's payoffs

$$V(x - w(x)), V' > 0, V'' \le 0.$$

A's payoffs

$$U(w(x), a) = u(w(x)) - \psi(a), \ u' > 0, \ u'' \le 0.$$

Let F(x, a) be CDF over x for a given effort a. Assume $F_a(x,a) < 0$ at all x. What does this mean?

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Full Information

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Let effort be observable and verifiable.

$$\max_{w(\cdot),a} \int_{\underline{x}}^{\overline{x}} V(x-w(x))f(x,a)dx,$$

subject to

$$\int_{\underline{x}}^{\overline{x}} u(w(x))f(x,a)dx - \psi(a) \ge \underline{U}.$$

The Lagrangian is

$$\mathcal{L} = \int_{\underline{x}}^{\overline{x}} V(x - w(x)) + \lambda u(w(x)) f(x, a) dx$$
$$-\lambda \left(\underline{U} + \psi(a)\right).$$

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FOCs:
[(1)] For every x, foc for
$$w(x)$$
:

$$0 = -V'(x - w(x)) + \lambda u'(w(x)) \iff \lambda = \frac{V'(x - w(x))}{u'(w(x))}.$$
[(2)] FOC for effort:

$$\int_{\underline{x}}^{\overline{x}} V(x - w(x)) + \lambda u(w(x)) f_a(x, a) dx = \lambda \psi'(a).$$

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Full Information

• Intuition for (1)?

• Intuition for (2)?

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Now action is hidden

$$\max_{w(\cdot),a} \int_{\underline{x}}^{\overline{x}} V(x - w(x)) f(x, a) dx,$$

subject to

$$\int_{\underline{x}}^{\overline{x}} u(w(x))f(x,a)dx - \psi(a) \ge \underline{U}.$$
$$a \in \operatorname{argmax} \int_{\underline{x}}^{\overline{x}} u(w(x))f(x,a')dx - \psi(a')$$

Interpret!

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HIDDEN ACTIONS

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