

MICROECONOMICS III
CLASS 10

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INCENTIVE CONTRACTING

A worker is hired by a principal to do a task.

- Only the worker knows the effort she exerts (asymmetric information).
- The effort exerted affects the principal's payoff.

The principal's problem: Design an incentive-scheme contract that induces the worker to exert the amount of effort that maximizes the principal's payoff

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INCENTIVE CONTRACTING

e is the agent's effort.

Principal's reward is $y = f(e)$.

An incentive contract is a function $s(y)$ specifying the worker's payment when the principal's reward is y . The principal's profit is thus

$$\Pi_p = y - s(y) = f(e) - s(f(e)).$$

INCENTIVE CONTRACTING

Let \tilde{u} be the worker's utility of not working

- Measured in money (a reservation utility level).

To get the worker's participation, the contract must offer the worker a utility (money)

at least equal to the reservation level

The worker's utility cost of exerting effort at the level of e is $c(e)$.

INCENTIVE CONTRACTING

So the principal's problem is choose e to

$$\mathbf{\max} \Pi_p = f(e) - s(f(e))$$

Subject to $s(f(e)) - c(e) \geq \tilde{u}$.

Because principal wants to maximize the profit, the constraint will be:

$$s(f(e)) - c(e) = \tilde{u}.$$

INCENTIVE CONTRACTING

This leads to the following maximization problem:

$$\mathbf{\max} \Pi_p = f(e) - c(e) - \tilde{u}.$$

With first-order condition

$$f'(e) = c'(e) \Rightarrow e = e^*.$$

How can the principal induce the worker to choose $e = e^*$?

INCENTIVE CONTRACTING

$e = e^*$ must be most preferred by the worker.

So the contract $s(y)$ must satisfy the incentive compatibility constraint:

$$s(f(e^*)) - c(e^*) \geq s(f(e)) - c(e), \text{ for all } e \geq 0.$$

RENTAL CONTRACTS

The principal keeps a lump-sum R for himself and the worker gets all profit above R ; i.e.,

$$s(f(e)) = f(e) - R.$$

the worker's payoff is

$$s(f(e)) - c(e) = f(e) - R - c(e)$$

and to maximize this, the worker should choose the effort level for which

$$f'(e) = c'(e); \text{ that is, } e = e^* .$$

RENTAL CONTRACTS

How large should be the principal's rental fee R ?

- The principal aims at extracting as much rent as possible, without causing the worker not to participate.

So R should satisfy

$$s(f(e^*)) - c(e^*) - R = \tilde{u};$$

WAGE CONTRACTS

In a wage contract, the payment to the worker is

$$s(e) = we + K$$

If we choose w and K such that:

$$w = f'(e^*)$$

$$s(f(e^*)) - d(e^*) - K = \tilde{u},$$

The contract will be incentive compatible

SHARECROPPING

This is an example of non-incentive compatible contract

- Employee gets a share of the profits

$$s(f(e)) = af(e) + b$$

- Still applied in practice – belief that splitting the profit leads to the optimal effort