

# **“Multitask Principal-Agent Analyses”**

A discussion of Milgrom and Holmstrom JLEO ‘91

# Introduction



The Teacher Example

# **Diverse Levels of Measurability Shape Incentive Design**

# Incomplete Contracts and Multi-Task



Incomplete Contracts

Focus on *Ownership*  
(Opportunistic Bargaining)

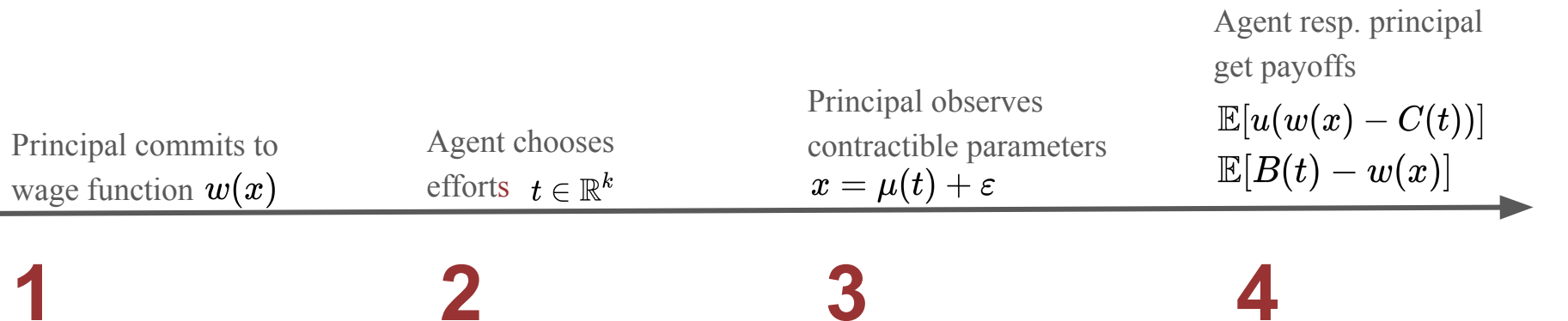


Multitask Principal-Agent

Incentive design  
*given there is a principal*

**Model**

# Timeline



Functional Forms

$$u(w) = -e^{-rw}$$

$$\varepsilon \sim N(0, \Sigma)$$

# Tractability

- **Theorem** (Holmstrom-Milgrom '87):

- If all past performance indicators are available to the agent, and
- time horizon is fixed

then **wages** only depend on the final stage and **are linear** in the aggregate contractible characteristics.

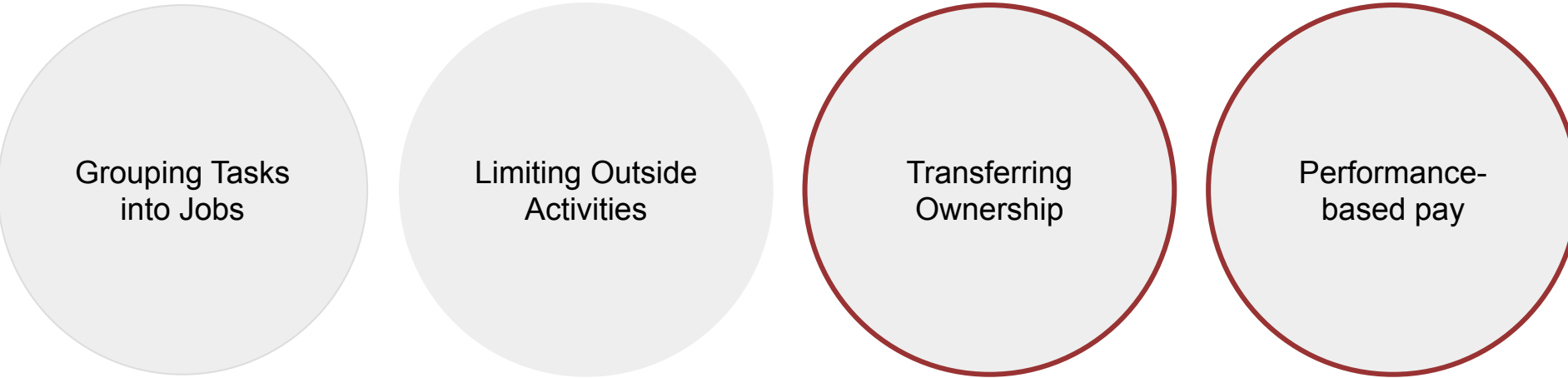
$$w(x) = \alpha x + \beta,$$

$\alpha$  commission rate,  $\beta$  wage

- (+Normality) Maximise certainty equivalent.
- Derive First-Order Conditions for the problem.



# Incentive Measures Considered



Grouping Tasks  
into Jobs

Limiting Outside  
Activities

Transferring  
Ownership

Performance-  
based pay

# Two Predictions

# Fixed wage can be optimal

- If agents have to subdivide **attention**  $C(t_{\text{test}}, t_{\text{curiosity}}) = C(t_{\text{test}} + t_{\text{curiosity}})$
- and student's curiosity is hard to measure:  $x = \mu(t_{\text{test}}, t_{\text{curiosity}}) + \varepsilon = t_{\text{test}} + \varepsilon$
- then any performance-based pay will induce teacher to substitute away from  $t_{\text{curiosity}}$
- This lowers principal's payoff  $\mathbb{E}[B(t_{\text{test}}, t_{\text{curiosity}}) - w(x)]$   
(If the agent likes to work a bit even without commission.)

# Make or Buy (Contractor or Employee)

- There is an asset (e.g. goodwill) whose value is unmeasurable. (attention-division still assumed.)
- Employment: agent gets returns of asset
- Contracting: principal gets returns of asset

## Employment:

- Agent get a fixed wage
- No performance-based incentives  
not to shift attention *away* from  
asset-building

## Contracting:

- Agent gets a positive commission
- Performance-based incentives to  
shift attention *towards* work for  
firm

Thank you!



# Extension/ Variation

(Holmström-Milgrom AER '94)  
Multiple Measurable Efforts

- If agent splits attention,  
**levels** of incentives for different tasks matter
- Incentive instruments are **complements**  
under variation of measurement precision.
- E.g.: under exogenous improvement of  
output, the optimal
  - commission rate
  - measure of ownership of the agent
  - permission level of outside activities
- **jointly** increase.