Lecture 1: Moral Hazard - Social preferences and intrinsic motivation

SP between Principal and Agent

Starting point Akerlof 1982: If labor contracts are not complete, social preferences can be used to partially overcome morale hazard problem.

Gift exchange between firm and its workers
$\Rightarrow$ workers respond to high wages with effort levels above those enforceable to selfish workforce
$\Rightarrow$ high wages - high efforts
$\Rightarrow$ involuntary unemployment

"Gift exchange might allow to enforce effort levels not enforceable by normal contracts with selfish agents."

A very simple game

3 stages:

Principal offers a "contract" consisting of a wage w and a demanded effort $\tilde{e}$

Agent decides whether to accept the offer or not

Upon acceptance, agent chooses actual effort e at costs $c(e)$.

"Completely incomplete contract": $\tilde{e}$ should be irrelevant since wage does not depend on it at all

Payoffs:

$$\pi_P = e - w,$$
$$\pi_A = w - c(e),$$

with $e \in [0, 1]$, $c(e) = \frac{1}{2}e$

Selfish agent and principal: $w^* = e^* = 0$

Experimental results (Fehr, Gaechter, and Kirchsteiger):

$e > 0$, $w > 0$: Many players do not behave selfishly

$\widetilde{e} > 0$: Principals expect non-selfish behavior

positive correlation $e - w$, $\widetilde{e} - w$: "gift exchange"

$\widetilde{e}$ has no impact on e (when controled for w): $\widetilde{e}$ "cheap talk", no framing or effort triggereing effects (Contradicts Hart/More 2008?)

Same results in experiments without $\widetilde{e}$

A very simple model with social (fairness) preferences (Fehr - Schmidt 1999):

The agent is inequality averse:

$$U(\pi_A, \pi_P) = \pi_A - \alpha \left| \pi_A - \pi_P \right|$$

with $1 > \alpha > \frac{1}{3}$.

This implies:

$$\frac{\partial U}{\partial e} = \begin{cases} \frac{3\alpha - 1}{2} > 0, \text{ when } \pi_A - \pi_P \geq 0 \\ -\frac{3\alpha + 1}{2} < 0, \text{ when } \pi_A - \pi_P < 0 \end{cases} .$$

For any $w > 0$, the agent increases the effort until $\pi_A = \pi_P$. Therefore

$$e^* = \frac{4}{3}w.$$

Taking this into account, the profit maximizing principal chooses

$$w^* = \frac{3}{4}$$

The effort is increasing in the wage, wage and effort are above zero, $\widetilde{e}$ irrelevant.

Incomplete contract with fines

contract stipulates also fine $f \in [0, \overline{f}]$

fine to be paid with prob $\frac{1}{2}$ whenever $e < \widetilde{e}$

Expected payoffs:

$$\begin{aligned} \pi_P &= \begin{cases} e - w \text{ if } e \geq \widetilde{e} \\ e - w + \frac{1}{2} f \text{ else} \end{cases}, \\ \pi_A &= \begin{cases} w - \frac{1}{2} e \text{ if } e \geq \widetilde{e} \\ w - \frac{1}{2} e - \frac{1}{2} f \text{ else} \end{cases}. \end{aligned}$$

Egoistic risk-neutral players:

Contract $f^* = \overline{f}$, $\widetilde{e}^* = \overline{f}$, $w = \frac{\overline{f}}{2}$ offered

Agent: Chooses $e = \widetilde{e}$ whenever $\widetilde{e} \leq f$, and $e = 0$ else: w irrelevant for effort choice (risk-neutrality not needed for this result)

Experimental results (for $\overline{f} < \frac{1}{2}$):

$f = \overline{f}$, $w > \frac{\overline{f}}{2}$

If shirking, $e = 0$, otherwise $e = \widetilde{e}$

Positive $e - w$ and $\widetilde{e} - w$ relation

Due to gift exchange or inequality aversion, high wage-high effort contracts can be enforced

Profitable for both sides

SP between Multiple Agents

Empirical findings:

Wage compression

Wage secrecy

Possible explanation:

If agents have social preferences like fairness or envy between each other, their wages should not differ so much - wage compression

Wage secrecy to avoid "bad climate" (envy) between the workers

Simple model with multiple agents with social preferences

based on Bartling and von Siemens 2010

one principal, two agents ("1" and "2"), all players risk neutral, agents envy each other

3 Stages:
Principal offers personalized contracts with wages depending on realized gross profit. Gross profit can be 0 or 1. Likelihood of good outcome depends on efforts chosen by agents. Wages cannot be negative (limited liability) $\Rightarrow$ profit maximizing firm offers contract with zero wage in case of low gross profit.
Agents decide simultaneously whether to accept or not the offers. If both accept, stage 3, otherwise game ends with zero profit for everyone.
Both agents choose simultaneously effort levels $e_i \in \{0, 1\}$ with connected effort costs $0/c_i > 0$. $p(e_1, e_2)$ denotes likelihood of high gross profit.

Expected payoffs:

$$\text{Principal:} \quad \pi_P = p(e_1, e_2)[1 - w_1 - w_2]$$
$$\text{Agents:} \quad \pi_i = p(e_1, e_2)w_i - c_i - \alpha[p(e_1, e_2)w_j - c_j]$$

with $\alpha \geq 0$, $\alpha < 1$ (agents are homogenuous in envy).

Assumptions:

$p(0,0) = 0$, $p(1,1) = 1$, $p(1,0) = p(0,1) = p < \frac{1}{2}$, $c_1 < c_2$ - Agent 1 has lower effort costs

c_i, p, and α small enough so that it pays for the principal to induce both agents to choose high effort

Stage 3: Both agents choose effort simultaneously $\Rightarrow$ multiplicity of Nash equilibrium $\Rightarrow$ implementation in dominating strategies:

IC1: $\pi_i(e_i = 1 \,|\, e_j = 1) > \pi_i(e_i = 0 \,|\, e_j = 1) \iff$
$(w_i - \alpha w_j)\,[1 - p] \geq c_i$
IC2: $\pi_i(e_i = 1 \,|\, e_j = 0) > \pi_i(e_i = 0 \,|\, e_j = 0) \iff (w_i - \alpha w_j)\, p \geq c_i$
Because of assumptions, IC1 implied by IC2

Stage 2: Contract accepeted, if:
PC: $(w_i - \alpha w_j) \geq c_i - \alpha c_j$
PC implied by IC2

Stage 1: Principal sets minimal wages such that IC2 is fulfilled $\Rightarrow$

$$w_i^* = \frac{c_i + \alpha c_j}{p(1-\alpha)}$$

$w_1^* < w_2^*$ since agent 1 has lower effort costs

$$\frac{w_2^*}{w_1^*} = \frac{c_2 + \alpha c_1}{c_1 + \alpha c_2}$$

The higher α the lower this ratio - wages compressed due to social preferences.

If principal could avoid envy by keeping wages secret:

$$w_i^s = \frac{c_i}{p} < w_i^*$$

Experimental test - Carness and Kuhn (2007)

Not exactly this framework

Gift exchange game with "completely incomplete contract" - only lowest possible effort is enforceable with selfish agents

2 agents per principal, one treatment with wage secrecy

Results:

effort depends on own wage, but not on wage of the other agent

wage secrecy makes no difference

Results cast doubt on this explanation of wage compression and secrecy