Managing Conflicts in Relational Contracts

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Structure

• Motivation and intuition
• Model setup
• Equilibrium characterization
• Conclusion and limitations
The motivation

• Conflict within the boundaries of the firm about the size of bonus payments
• Conflicts during which workers punish managers for broken promises
• Disagreement over the availability and efficient use of funds
• Asymmetric information: managers better informed about opportunity cost of paying workers
Example 1: Lincoln Electric Company

- US business going well. Foreign business making losses
- US workers expect bonus due to successful US business
- Tradeoff: benefit of adapting to current circumstances vs. cost of lower effort provision of workers in the future
- CEO borrowed money to pay the bonus
- CEO: “If we didn’t pay the bonus the whole company might unravel”
Example 2: Credit Suisse First Boston

- Upheaval after consecutive years of low bonus payment
- Management claimed that there was need to increase capital
- Traders, after a further disappointment, reduced their effort levels
- At the heart of the conflict was uncertainty about the opportunity cost of bonus payments
Key intuition: Part 1

- Opportunity cost of paying workers evolves stochastically and is privately observed by the manager.
- The worker cannot observe the motives of the manager in case of no bonus payment.
- Is the manager making efficient use of funds due to high opportunity costs? Or is the manager extracting rents?
- To keep the manager honest, the worker must punish the manager through lower effort provision.
- CEO: benefit of adaptation vs. the cost of conflict.
Key intuition: Part 2

- No possibility to commit to a long-term contract
- It is optimal to promise the worker a bonus, so that worker exerts high effort
- If opportunity cost of paying the worker is low, then pay the bonus
- If opportunity cost of paying the worker is high, then pay no bonus
- Worker effort provision is contingent on the bonus payment
Key intuition: Part 3

- Optimal contract: make payments contingent on the opportunity costs even if conflicts are inevitable.
- Periodic conflicts during which effort and expected profits decline gradually, but recover instantaneously.
- Liquidity constraints limit the manager’s ability to manage conflicts.
- Liquidity constraints may induce the worker to respond to a conflict by providing more effort.
Model setup

• A firm is comprised of an owner-manager and a worker
  ▶ Both are risk-neutral
• The manager and the worker engage in an infinitely repeated relationship in discrete time
• In each period, one of two states of the world is realized: either the firm is hit by a shock, or it is not
  \[ \Theta_t \in \{ s, n \} \quad P(s) = \theta \]
• The state of the world is privately observed by the manager and influences his opportunity costs of paying the worker
• The manager is not liquidity constrained
At the beginning of any period $t$, the manager makes the worker an offer:

- Contractible wage: $w_t \geq 0$
- Non-contractible promise to pay contingent bonuses: $b_{s,t}, b_{n,t}$

The worker accepts or rejects the offer:

- If he rejects, both agents turn to their outside options: $\pi, u$
- If he accepts, he then decides on an effort level $e_t$ at cost $c(e_t)$
Model setup (3)

- The manager realizes output $y(e_t)$
- The state of the world is observed by the manager
- The manager must pay the worker the agreed wage, and chooses whether or not to pay a bonus which may be different from his promise
- Manager and worker observe the realization of a public randomization device
Definition of equilibrium

A “relational contract” is defined as a pure-strategy Perfect Public Equilibrium (PPE):

- The agents play public strategies, i.e., strategies in which the players condition their actions only on publicly available information
- Following every history, the strategies are a Nash equilibrium

The “optimal relational contract” is a PPE which is not Pareto-dominated by any other PPE
Conditions for equilibrium

• Feasibility constraints

• No deviation constraints:
  ▶ The manager is better off paying the agreed bonus than deviating
  ▶ The worker is better off accepting the manager’s offer and providing effort
  ▶ The manager is truthful about the state of the world

• Promise keeping constraints
PPE payoff set

• Define the PPE payoff frontier

\[ u(\pi) \equiv \sup\{u' : (\pi, u') \in \mathcal{E}\} \]

• Properties of the PPE payoff set:
  ▶ It is a compact set
  ▶ Payoff pair \((\pi, u)\) belongs to \(\mathcal{E}\) iif

\[ \pi \in [\underline{\pi}, \bar{\pi}] \text{ and } u \in [\underline{u}, u(\pi)] \]

▶ Extremal point \(u(\bar{\pi})\) satisfies \(u(\bar{\pi}) = \underline{u}\)
Optimal relational contract

• Intuition for optimal contract:
  ▶ Need to incentivize worker to exert effort and to incentivize manager to tell the truth
  ▶ Efficient to pay higher bonus in no-shock state—no bonus in shock state
  ▶ Manager punished through gradual effort reduction and being forced to pay wages
Figure 2. The PPE Frontier
Optimal relational contract

PROPOSITION 1: For any level of expected profits $\pi$, there exists a unique optimal relational contract that gives the worker $u(\pi)$. Under the optimal relational contract:

(i) The no-shock bonus $b_n^*(\pi)$ is given by

$$b_n^*(\pi) = \frac{\delta}{1 - \delta} (\bar{\pi} - \pi_s^*(\pi)) > 0 \text{ for all } \pi \in [\underline{\pi}, \bar{\pi}]$$

(ii) If the firm is hit by a shock, the continuation profit $\pi_s^*(\pi)$ satisfies

$$\pi_s^*(\pi) = \bar{\pi} \text{ and } \pi_s^*(\pi) < \pi \text{ for all } \pi \in (\underline{\pi}, \bar{\pi}]$$

(iii) If the firm is not hit by a shock, the continuation profit is given by

$$\pi_n^*(\pi) = \bar{\pi} \text{ for all } \pi \in [\underline{\pi}, \bar{\pi}]$$

(iv) Effort $e^*(\pi)$ is given by the unique effort level $e$ that solves

$$\frac{c'(e)}{y'(e)} = -u'(\pi) \text{ for all } \pi \in [\underline{\pi}, \bar{\pi}]$$

(v) The wage is given by

$$w^*(\pi) = \max \left[ \frac{\hat{\pi} - \pi}{(1 - \delta)(1 + \alpha \theta)}, 0 \right] \text{ for all } \pi \in [\underline{\pi}, \bar{\pi}]$$
Conflict!

Figure 4. Evolution of Effort, Bonuses, and Wages
Conflict!

Figure 3. Evolution of Expected Profits
Liquidity constrained manager

- Relationship termination possible (and eventually happens with certainty)
- Recoveries no longer immediate
- Effort may sometimes increase as the conflict worsens
Conclusions

An exploration of a real case conflict situation about the interplay of bonuses, private information about the opportunity cost (the need to “build” capital) of bonus payments.

• It is optimal for the manager to make payments contingent on his opportunity costs, even though this makes conflicts inevitable

• Conflicts evolve gradually

• As expected profits cycle indefinitely, the relationship between the manager and the worker never terminates, nor does it reach a steady state
Conclusions

• Predictions:
  ▶ Evolution of trust depends on whether shocks are private or public
  ▶ The long-term prospects of a relationship depend on whether the responder is liquidity-constrained

• Model can be applied in other settings
Afterthoughts

- Bargaining (negotiation) is far more complex in real life and of great importance during a conflict.
- The prediction of the model of the surplus for the worker across the conflict cycle seems a bit strange, in particular that the agent gets zero surplus in the good state.
- It is claimed that the worker punishes the manager by lowering his effort in conflicts. It seems that we need to model or at least justify this choice, why would a single worker suddenly decrease his effort as punishment when his marginal effect is very small?