Relational Contract and Endogenous Contractual Incompleteness. Experimental Evidence.

Jean Beuve
Claudine Desrieux

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Introduction

Contracts are incomplete...

- Contracting costs: costs/benefits analysis.
- What if the partners have a perspective of future interactions?
  - Possible relational contract...
    - ... that allow to avoid ex post difficulties...
    - ... and lead to more and more incomplete contract??
- BUT it is impossible to know whether the relational contract will be sustainable or not.

Ex ante contracting costs
(task description, contingency planning...)

Incomplete Contract

Ex post inefficiencies
(hold-up...)

P (Sustainable relational contract) = ?
Introduction

Our objective

- To explore contractual choice when parties have perspective of future businesses.
  - Is it sufficient to lead to incomplete contract?

Our methodology

- Experiment
  - Indefinitely repeated games between identifiable players...
  - ... where the probability of continuation and the level of shared information vary...
  - ... and where contractual incompleteness is endogenously determined.

Our results

- The perspective of future interactions is not sufficient *per se* to lead to incomplete contract.
We observe...

- **More and more** complete agreements
  - Air force engine (Crocker and Reynolds, 1993) [public – private]
  - IT services (Argyres et al., 2007) [private– private]

- **Less and less** complete agreements
  - Construction of submarines (McNaugher, 1989) [public – private]
  - Off shore drilling (Corts and Singh, 2004) [private– private]

- **But** all those studies focus on past interactions to measure repeated interactions.

- **In this paper**, we rather focus on the perspective of future interactions (real foundations of relational contract).
The experiment

Matching

- 2 groups of 6 players (6 buyers and 6 sellers, identifiable).

- Buyers propose relationships to sellers that accept or refuse.

- At the end of each round, buyers may renew each seller or choose another.

- At most 3 relationships per round and per player.

- Each new relationship is costly for each partner (- 6 ECUS): specific investment made once per relationship.
The experiment

Cooperation of Sellers

- With probability $\frac{1}{2} \rightarrow$ each party gets the same amount of money
  - (20 ECUS for each partner)

- Or, with probability $\frac{1}{2} \rightarrow$ the seller makes the decision
  - He chooses an equal sharing (20 ECUS for each partner) [cooperation]
  - He chooses 30 ECUS for him and 10 ECUS for the buyer [deviation]
The experiment

Additional investment of buyers

→ A possible additional investment (- 2 ECUS) by the buyer before each round (not observed by the seller):

- With probability 3/4 → each party gets the same amount of money
  - (20 ECUS for each partner)

- Or, with probability 1/4 → the seller makes the decision
  - He chooses an equal sharing (20 ECUS for each partner) [cooperation]
  - He chooses 30 ECUS for him and 10 ECUS for the buyer [deviation]
The experiment

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[Diagram showing decision points and outcomes involving choices for buyer and seller, with probabilities and matching events.]
The treatments

Factors that make relational contract more or less sustainable:
- Duration of the game (Bull 1987, Baker et al. 2002)
- Nature of information: private or public (Greif 1993, Dixit 2007)

- **SR** (low probability of continuation (0,2) and **private** information)

- **LR** (high probability of continuation (0,8) and **private** information)

- **SRP** (low probability of continuation (0,2) and **public** information)

- **LRP** (high probability of continuation (0,8) and **public** information)
What do we expect?

- **Proposition 1.** Informal cooperation is more sustainable when the duration of the game is longer.

- **Proposition 2.** Informal cooperation is more sustainable with public information than with private information.

- **Proposition 3.** When informal cooperation is sustainable, contracts are incomplete.
Results

Cooperation of Sellers

Additional Investment of Buyers

Proposition 1

Proposition 2

Proposition 3
Results

Additional Investment of Buyers according to previous behaviors of Sellers
Results

Additional Investment of Buyers according to Sellers’ reputation
## Results

### Probit estimations

<table>
<thead>
<tr>
<th></th>
<th>Cooperation</th>
<th>Additional Investment</th>
<th>Additional Investment (New relationships)</th>
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<tbody>
<tr>
<td>Probability of continuation</td>
<td>1.310*** (0.365)</td>
<td>0.442*** (0.189)</td>
<td>0.892 (0.865)</td>
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Conclusions

- Public information and longer duration determine cooperation...
  ... **BUT** not directly contractual incompleteness.

- Empirical proof of the potential existence of a Bayesian or learning process to see whether cooperation is sustainable...
  ...and then contractual incompleteness decreases over time.

- **Further developments:**
  - Change in the size of hold-up.
  - Change in the size of specific investments.
  - Change in the market structure.
  - Investment in completeness also by the seller.
Thank you for your attention
Relevant rounds to observe

We distinguish six settings of observations corresponding to different segments of experiments length:

- All rounds compiled.
- Rounds 1
  - The first round of each session.
- Rounds 1 to 5.
  - It corresponds to the first five rounds of each session where the probability of continuation is equal to 1.
- Rounds 6 to 19.
  - It corresponds to rounds where the probability of continuation becomes lower than 1 (19 = highest number of rounds reached during a session (LR treatment)).
- Rounds 6 and Rounds 7
  - It corresponds to the two first rounds of each session where buyers and sellers interact in an uncertain context. (Rounds 6 were played in all sessions. Rounds 7 were played in almost all sessions (13/16)).
Relevant rounds to observe (Sellers’ cooperation)
Relevant rounds to observe (Buyers’ additional investment)
More Additional Investment in LR treatment ??

Answer has to be found in:

1. Market structure (not enough competitive pressure)
2. Nature of information (private)
3. Strategic behaviors of sellers

In fact ➔ LR treatment = less time-consistency of sellers behaviors

➔ Possible explanation: sellers anticipate that the risk of not being renewed is quite low (cf. 1.) and that they will have more time to maximize their gains. As a consequence, they imagine strategies (cf. 3.) that consist to:

- Cooperate most of the time and deviate occasionnally
- Cooperate at the beginning and hold-up more and more frequently
- Opt for deviation once per round but each time with a different seller

And they can implement such strategies while minimizing the risk of being broadly punished because information is private (cf 2.)

As a consequence: buyers are encouraged to incur additional investment.

Convincing?