Relational Contract and Endogenous Contractual Incompleteness. Experimental Evidence.

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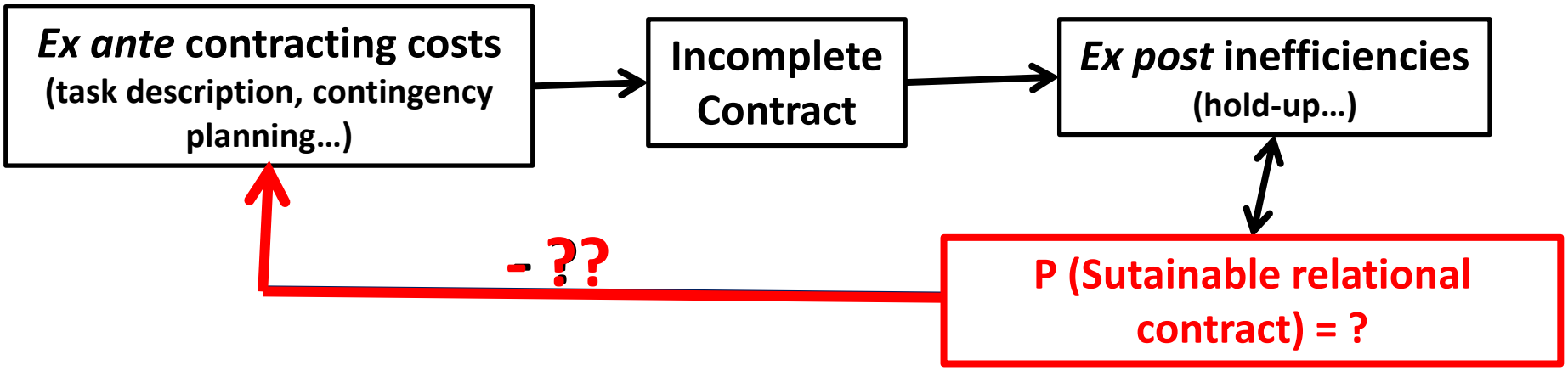
International Conference - "Contracts, Procurement and Public-Private Agreements"

Paris, May 31th 2011

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.



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
  - Indefinetely 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.

Literature

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 an other.
- At most 3 relationships per round and per players.
- Each **new** relationship is costly for each partner (- 6 ECUS): specific investment made once per relationship

The experiment

Cooperation of Sellers

- With probability **1/2** → each party gets the same amount of money
  - (20 ECUS for each partner)

Complete Contract

- Or, with probability **1/2** → 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]**

Incomplete Contract

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)

Complete Contract

- Or, with probability **1/4** → the seller makes the decision
  - He chooses an equal sharing (20 ECUS for each partner) **[cooperation]**
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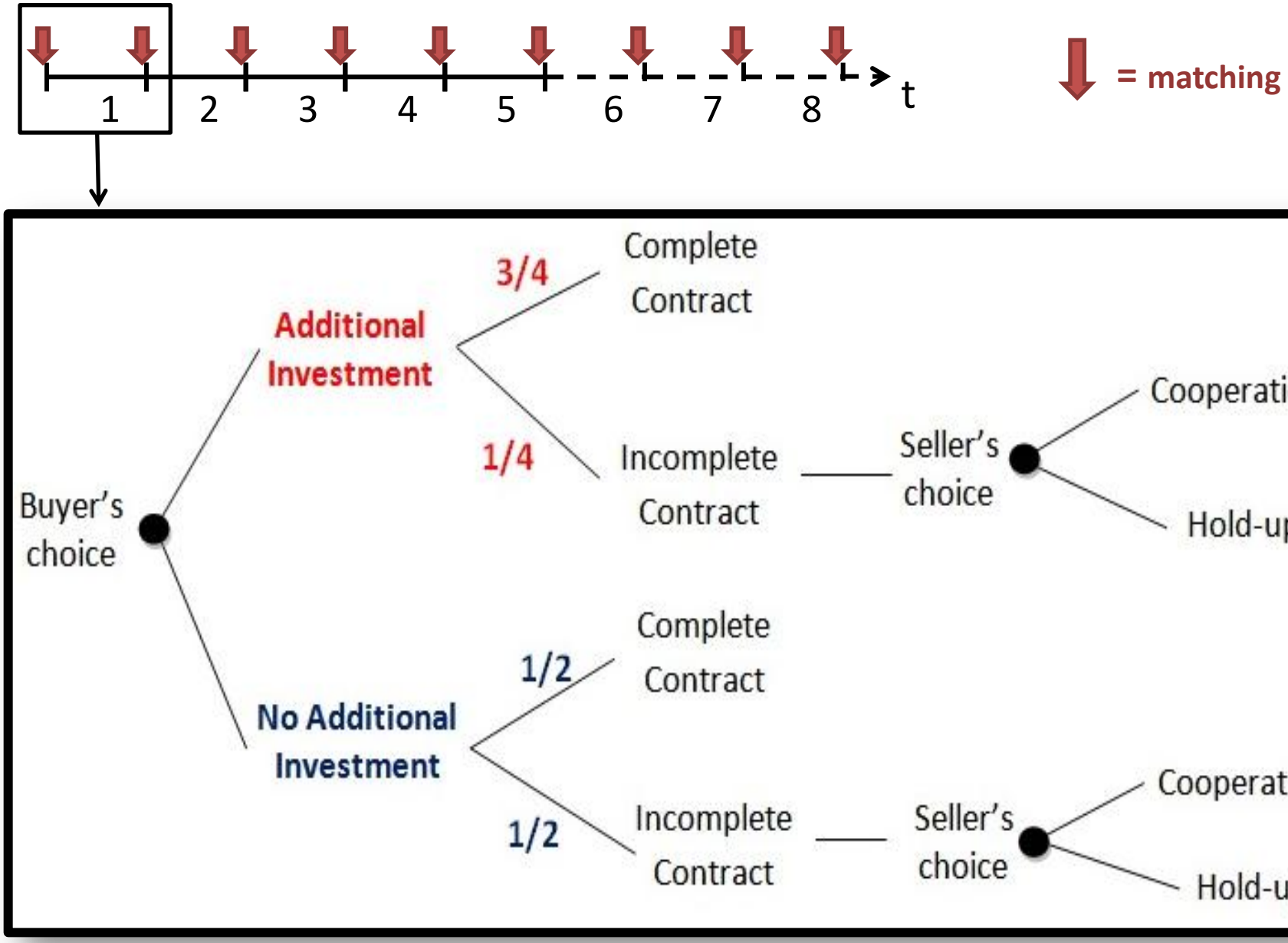
Incomplete Contract

The experiment

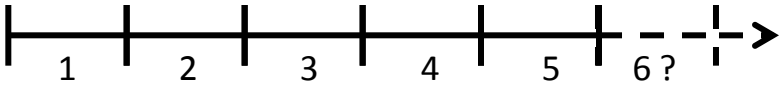


The treatments

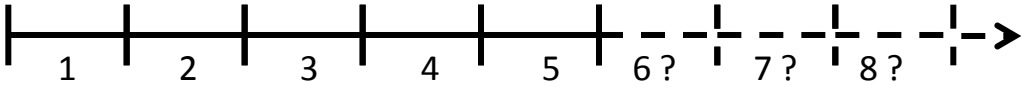
Factors that make relational contract more or less sustainable:

- Duration of the game (Bull 1987, Baker *et al.* 2002)
- Nature of information : private or public (Greif 1993, Dixit 2007)

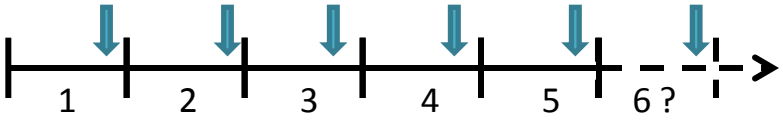
❑ **SR** (**low** probability of continuation (**0,2**) and **private** information)



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



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



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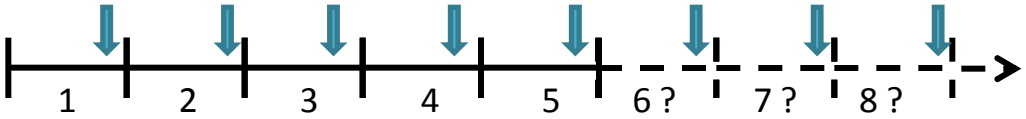


What do we expect?

- **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

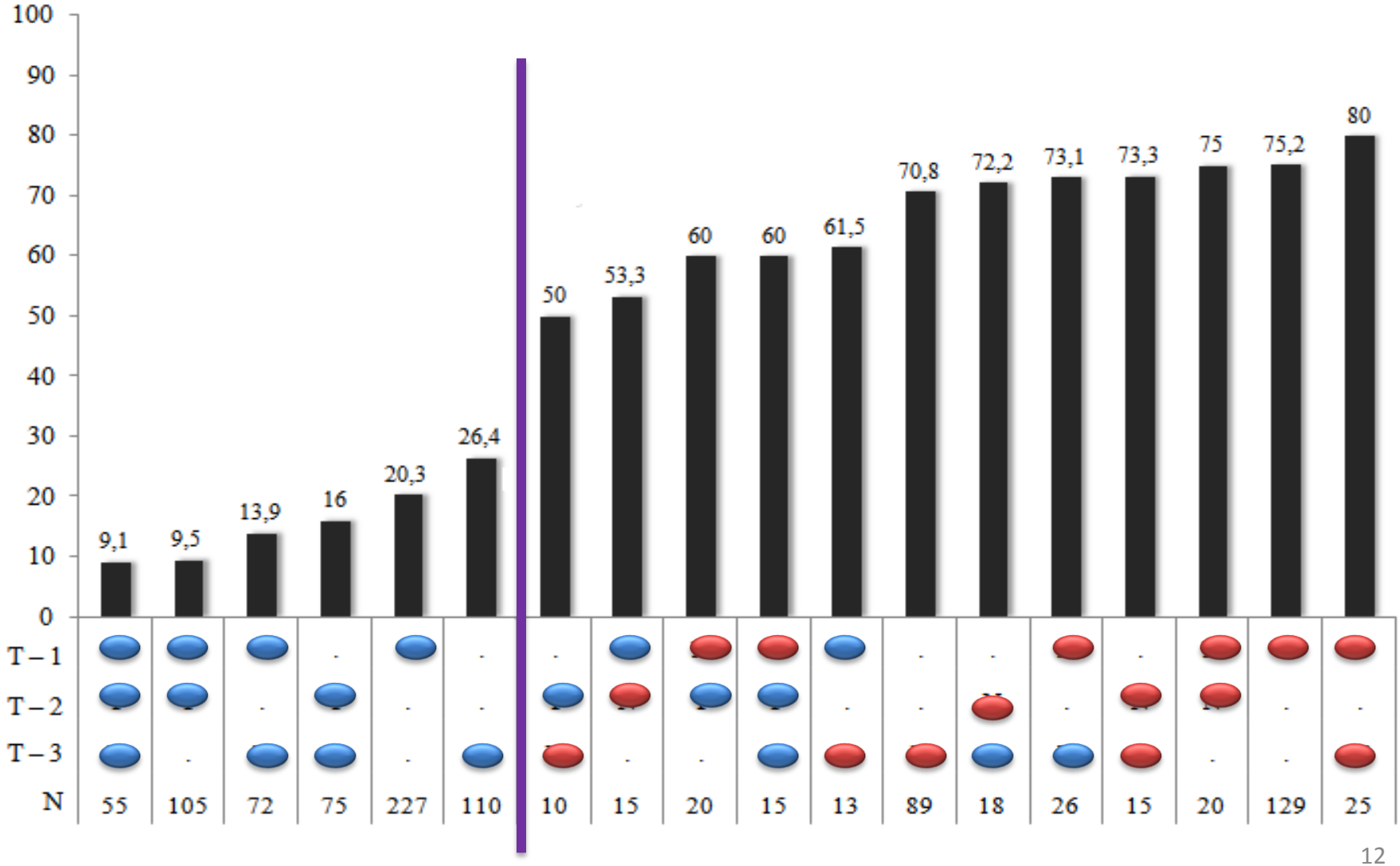
☑ **Proposition 1**

☑ **Proposition 2**

☒ **Proposition 3**

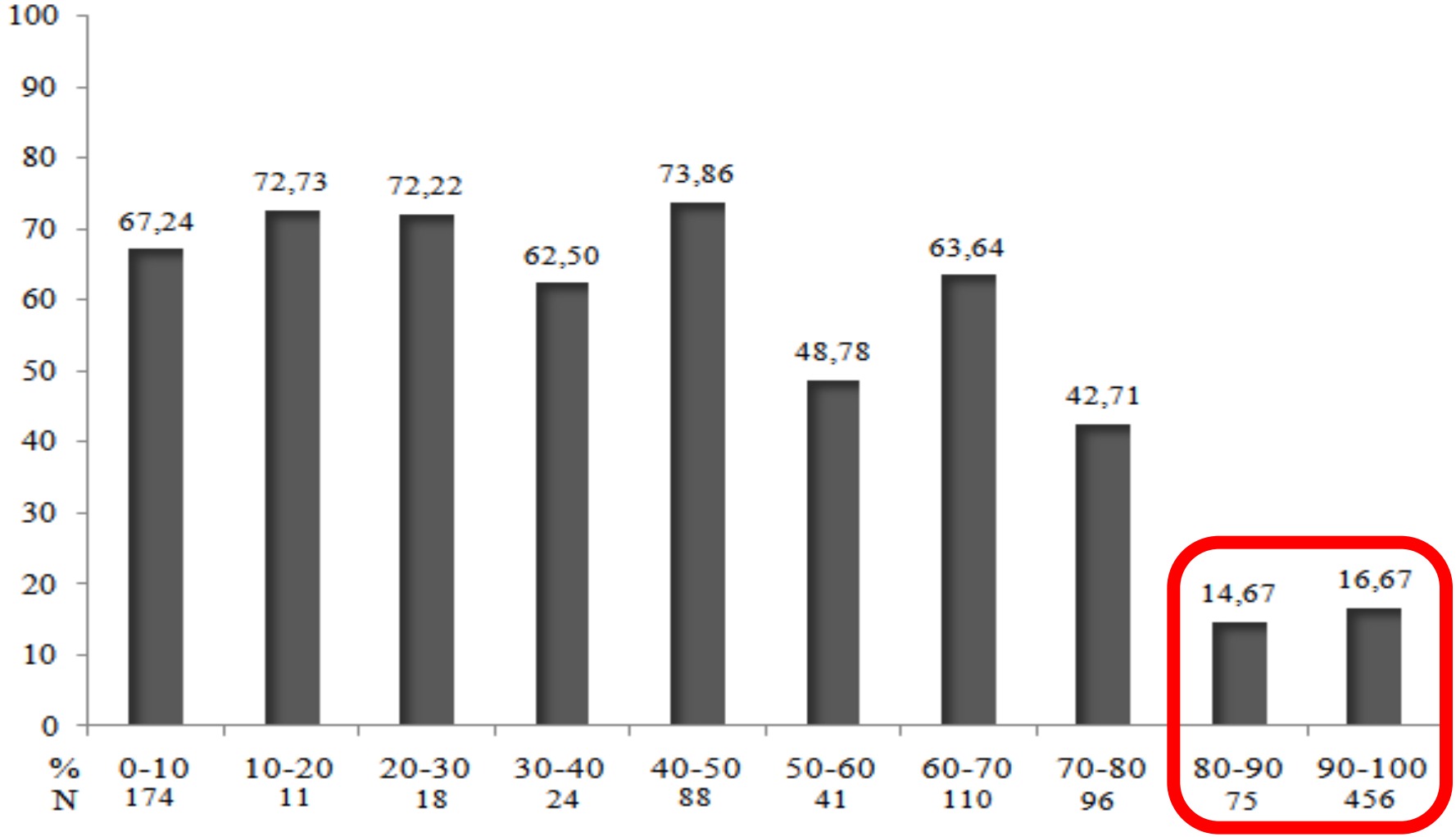
Results

Additional Investment of Buyers according to previous behaviors of Sellers



Results

Additional Investment of Buyers according to Sellers' reputation



Results

Probit estimations

	Cooperation	Additional Investment	Additional Investment (New relationships)
Probability of continuation	1.310*** (0.365)	0.442*** (0.189)	0.892 (0.865)
Public Information	0.919** (0.322)	0.146 (0.182)	–
L.Reputation	–	-0.008* (0.003)	-0.063*** (0.016)
L.Cumul.Coop	–	-0.646*** (0.073)	–
Past Experiences	0.056 (0.042)	0.137*** (0.032)	–
Ongoing relationships	0.660 (0.341)	0.007 (0.289)	0.437 (0.559)
Control variables	yes	yes	yes
Cluster	yes	yes	yes
R^2	0.23	0.28	0.26

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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 developements:**
  - 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.

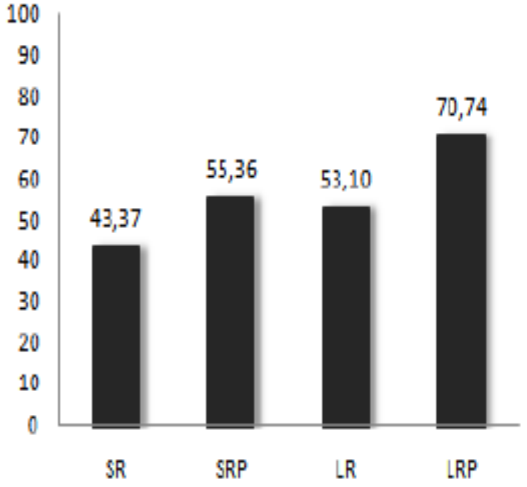
Thank you for your attention

Relevant rounds to observe

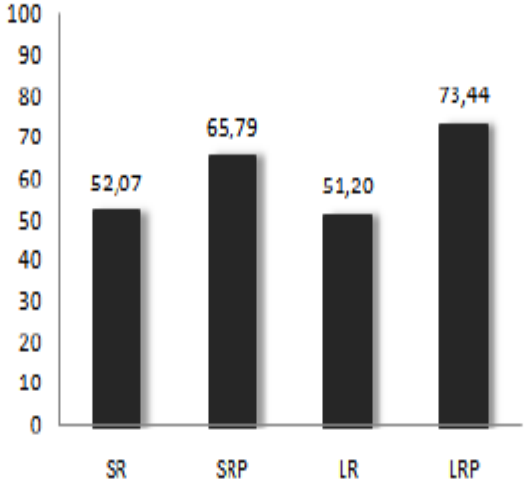
We distinguish six settings of observations corresponding to different segments of experiments length :

- 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)).

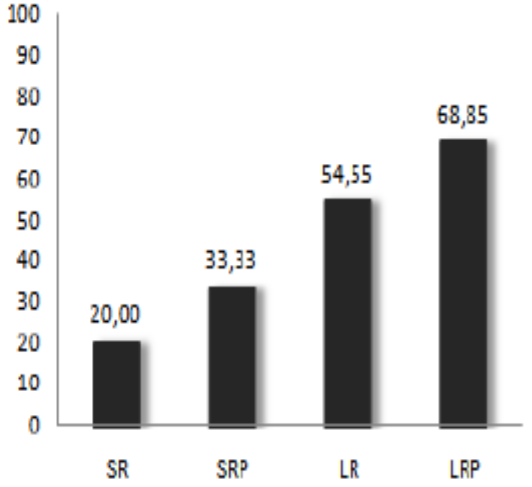
Relevant rounds to observe (Sellers' cooperation)



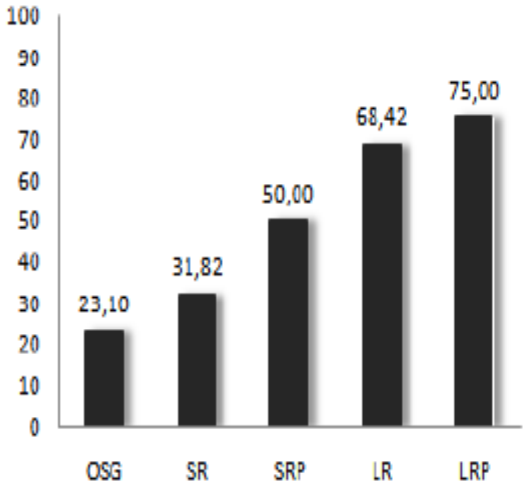
all rounds



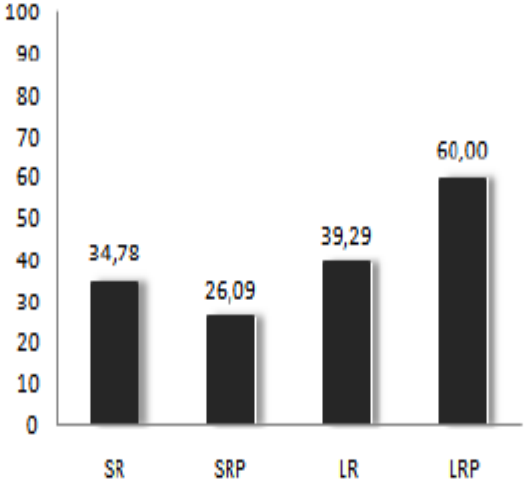
rounds 1 to 5



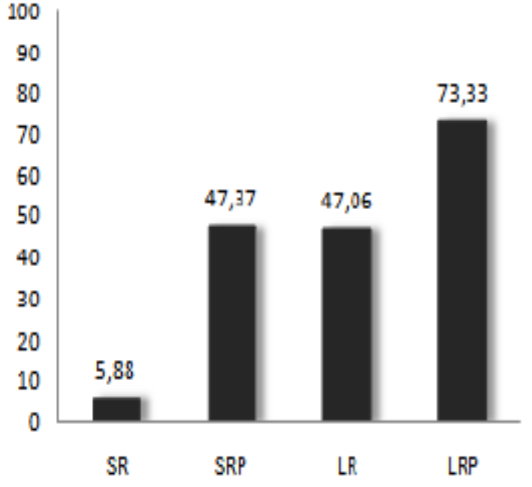
rounds 6 to 19



rounds 1

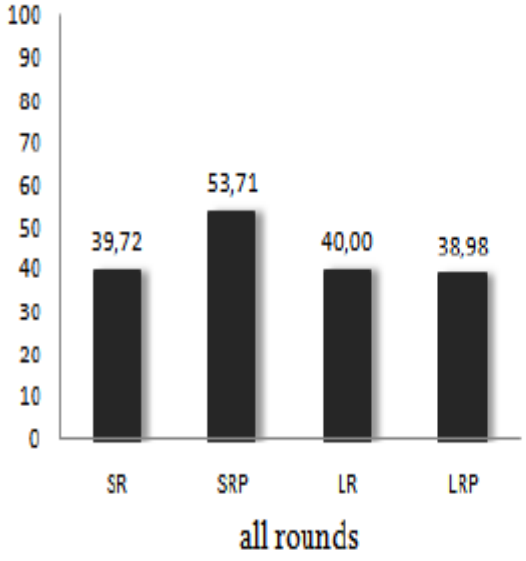


rounds 6

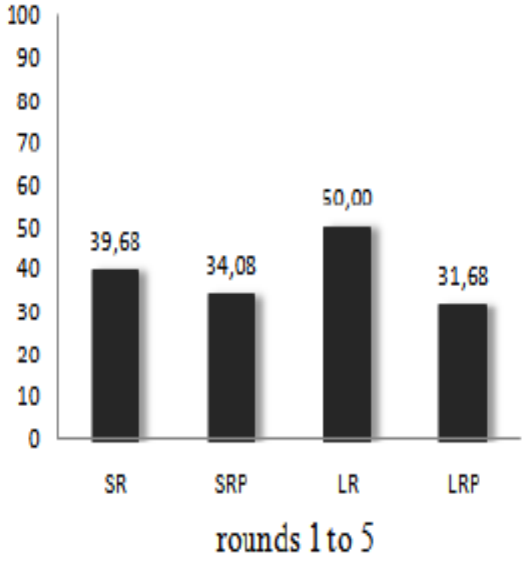


rounds 7

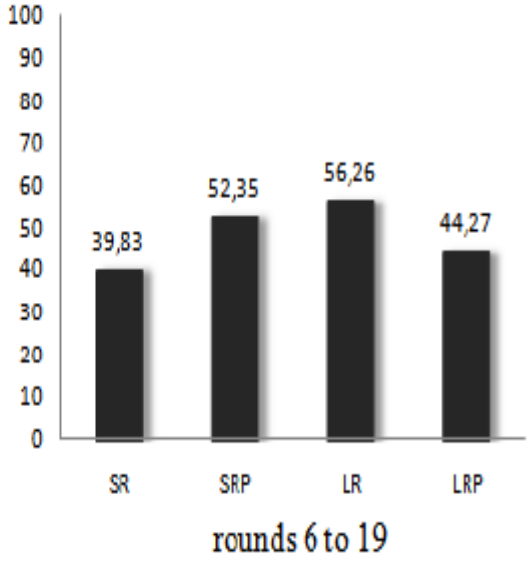
Relevant rounds to observe (Buyers' additional investment)



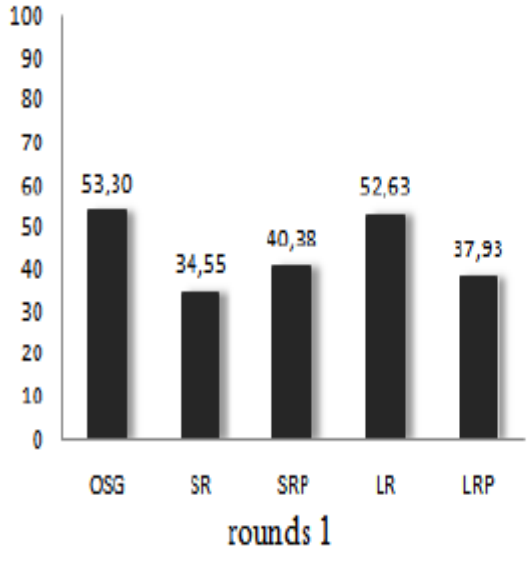
all rounds



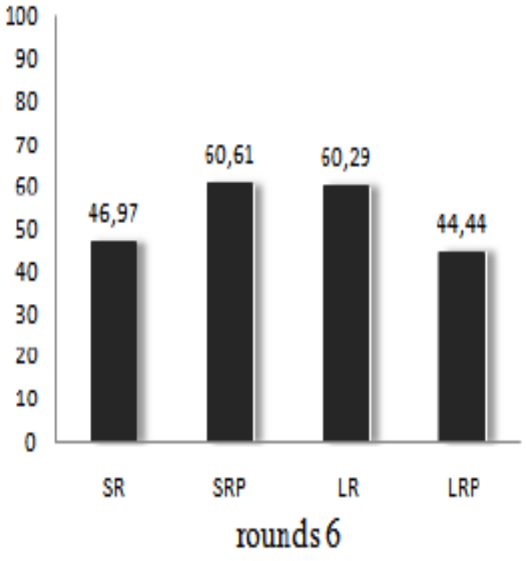
rounds 1 to 5



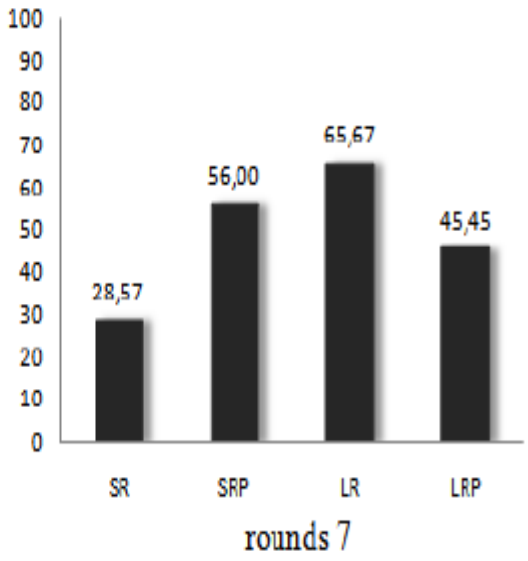
rounds 6 to 19



rounds 1



rounds 6



rounds 7

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?