

**Game Theory
for
Strategic Advantage**

15.025

**Alessandro Bonatti
MIT Sloan**

Today's Learning Goals

1. How to manage long-run relationships
2. What makes a good reputation sustainable?
3. The economics of relational contracts

Toyota & Johnson Controls Inc

- Why isn't Toyota vertically integrating the design and production of its car seats?
- What protects the small suppliers from Toyota's bargaining power, in the absence of a written contract? How can the parties trust each other?
- If demand is strong, and the need for a second assembly line comes up, should Toyota give the business of both assembly lines to JCI?

The Problem

- Car seats are a non-trivial part of the car.
 - Toyota has the internal know-how to design them
 - Toyota can develop expertise in producing them.
 - Why isn't Toyota vertically integrating that part of its business?
-
- ***What are the pros and cons of the way using outside suppliers relative to vertical integration?***

Outsourcing?

Pros

- High-powered incentives
- Suppliers can exploit economies of scope

Cons

- Transaction costs
- Required negotiations
→ lower flexibility
- Hold-up: renegotiation risk after highly specific investments

Managing Suppliers

- Toyota has many subcontractors (no one is key)
- Each subcontractor depends on Toyota's orders
- Standard Toyota practices: double-sourcing, low prices, incentives for cost reduction
- Toyota demands flexibility (!)
- (Very few explicit contracts and formal guarantees)
 - Why does this work?

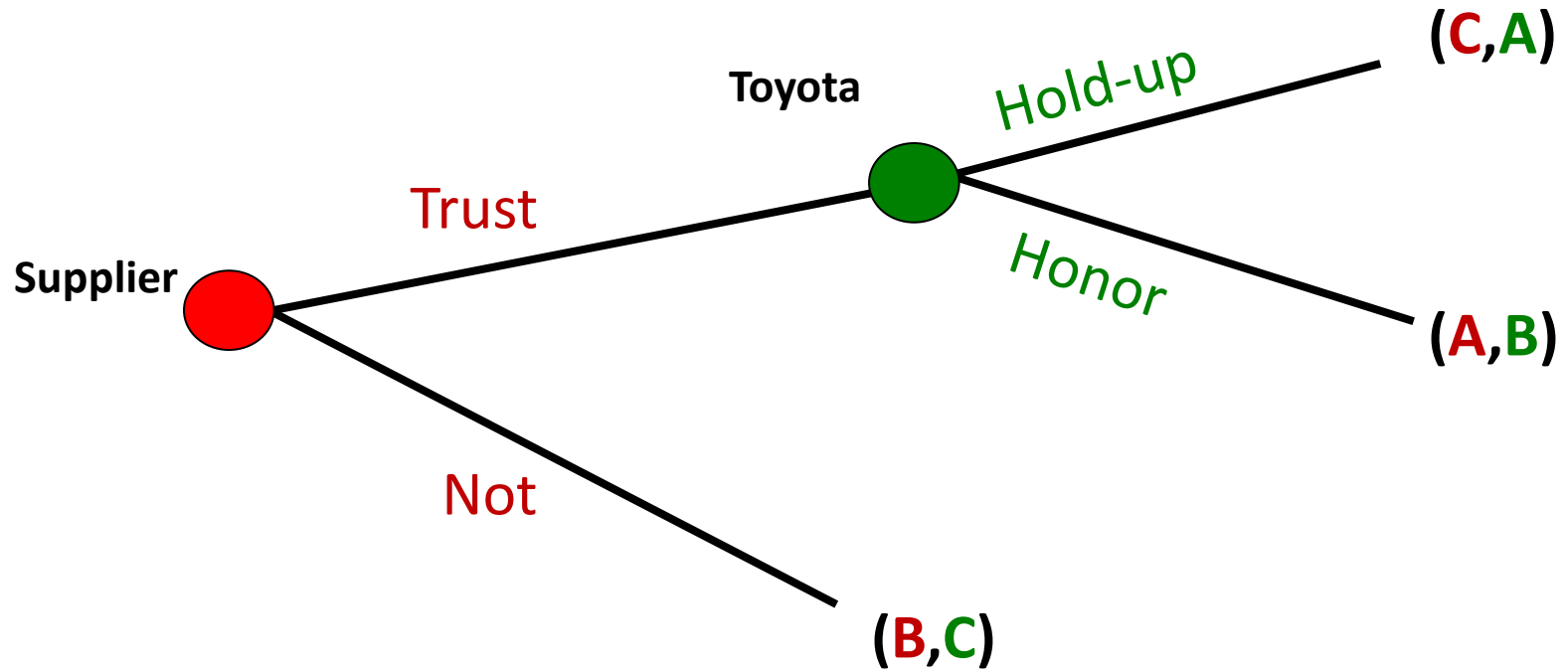
Reputation

- Reputation for treating subcontractors (harshly, but) fairly
- Good knowledge about suppliers' costs
- Anticipate production / design problems
- JC's holdup mitigated by
 - Relative stakes
 - Double-sourcing
- What about Toyota's holdup risk?

Necessary Condition

reward – punishment > temptation

Basic Model: Trust Game



Reputation for Fairness

- Use repeated interaction
- Supplier's strategy: trust Toyota as long as you have not been held-up in the past
 - NPV of Honor = B today & forever [= $B + B/r$]
 - NPV of Hold-up = A today & C forever [= $A + C/r$]
- If $A - B < (B - C)/r$, then Toyota wants to Honor
- Toyota wants to preserve its reputation for fairness
- Where does reputation come from?

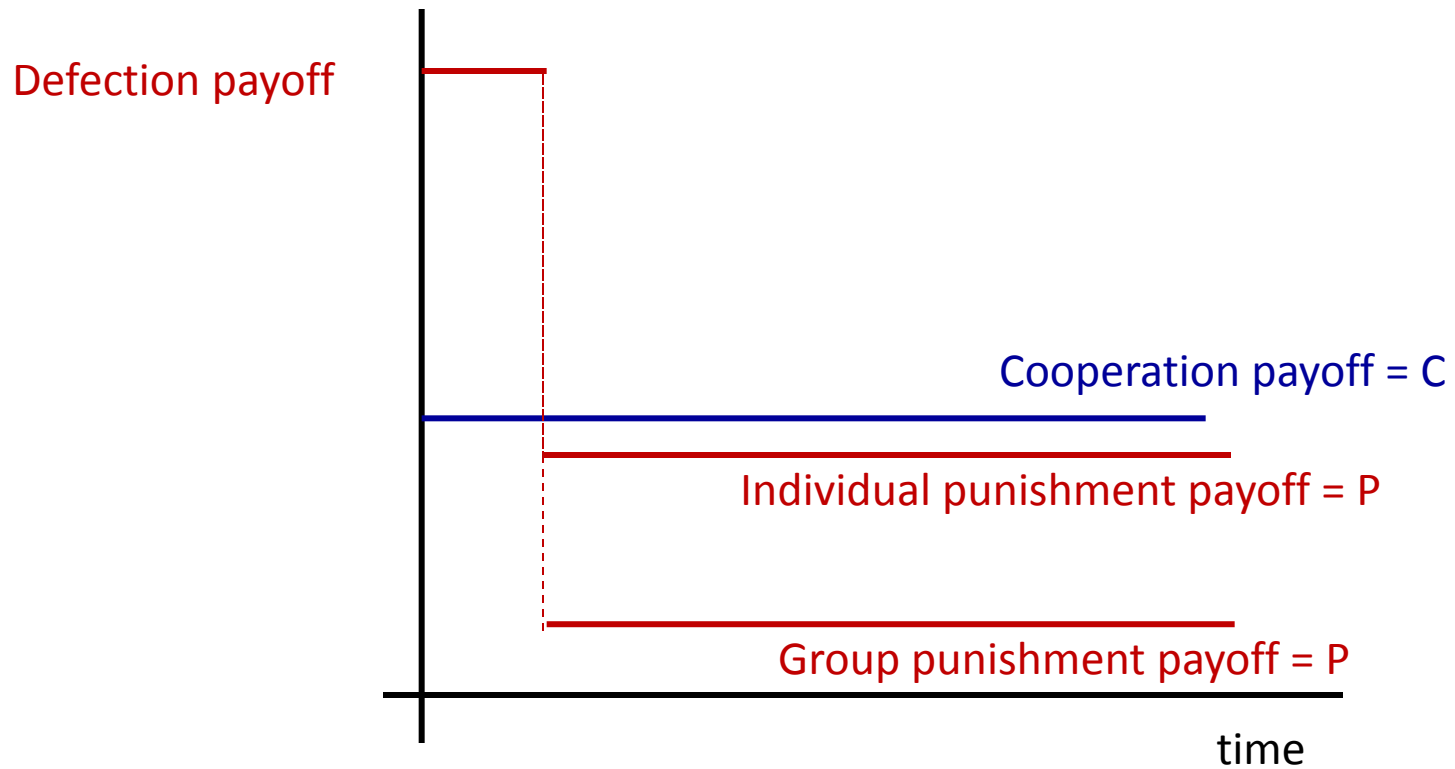
**“We are what we repeatedly do.
Excellence, then, is not an act, but a habit.”**

Aristotle, Nichomachean Ethics

Toyota & Suppliers

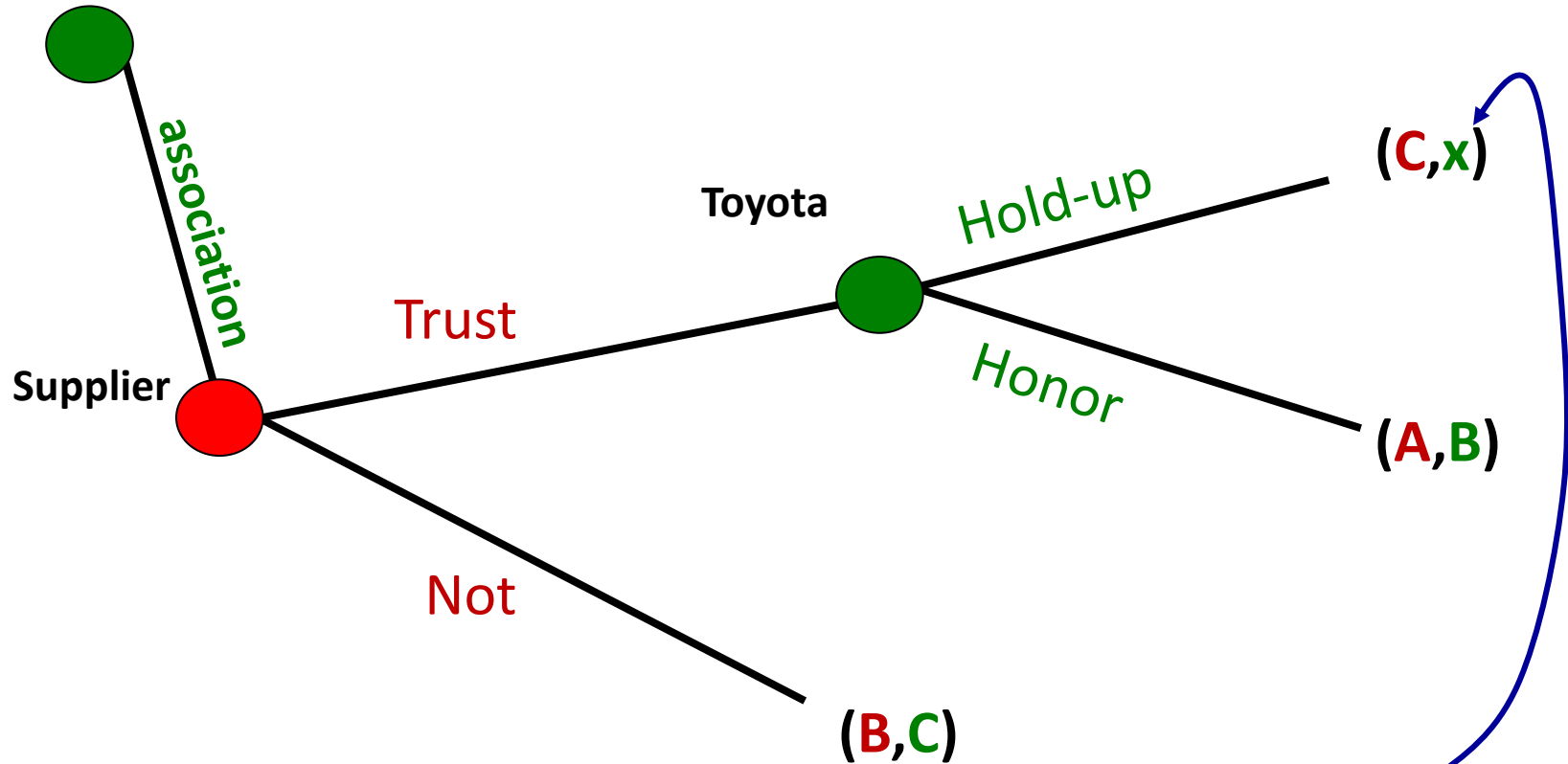
- Established a reputation for fairness – How?
- Annual price reviews to adjust for input cost changes
- Toyota may hold all the bargaining power, but...
- Toyota organized the Blue-Grass Automotive Manufacturers' Association, with 20 select suppliers as members, to provide training and consulting
- Toyota promotes open communication between its subcontractors

Group Punishment



Game with Suppliers' Association

Toyota



$x < B ?$

A vs. this supplier
C vs. everyone else

Johnson Controls, Inc. – Automotive Systems Group

The Georgetown, Kentucky Plants

- 1991: Toyota prepares to produce new Camry
- Due to start in March 1992
- New rear seats for wagon version (77 varieties!)
- JCI asked to make prototype seats
- **Feb. 1992: no purchase order, no formal assurance
JCI will get the actual contract**
- Major production-line reorganization required
- Go ahead?

Johnson Controls, Inc. – Automotive Systems Group

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- New rear seats for wagon version (77 varieties!)
- JCI asked to make prototype seats
- Feb. 1992: no purchase order, no formal assurance
JCI will get the actual contract
- Major production-line reorganization required
- This is an opportunity for Toyota to confirm itself!

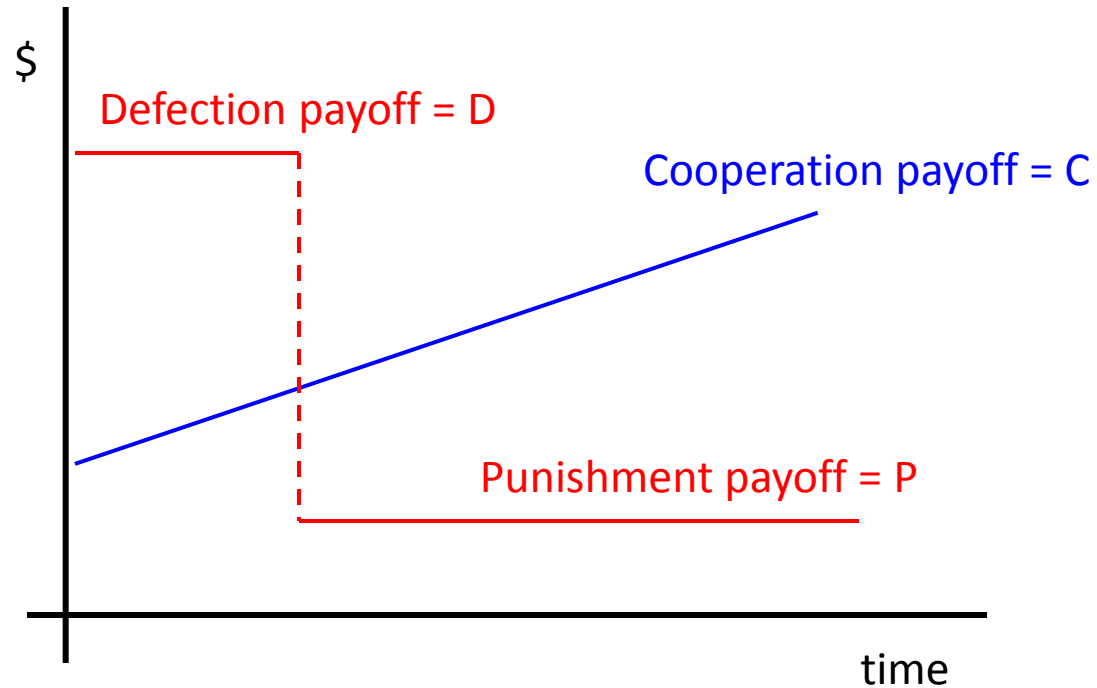
Aftermath

- Soon after the case ends, a significant decision was looming for Toyota.
- TMM decided to add a second production line to the Georgetown plant.
- (This was to produce Avalons, not the station wagons.)
- Toyota's policy: double-sourcing all major sub-assembly categories.
- If Toyota adhered to that policy, JC would NOT get the contract for this second line.

Key Decision

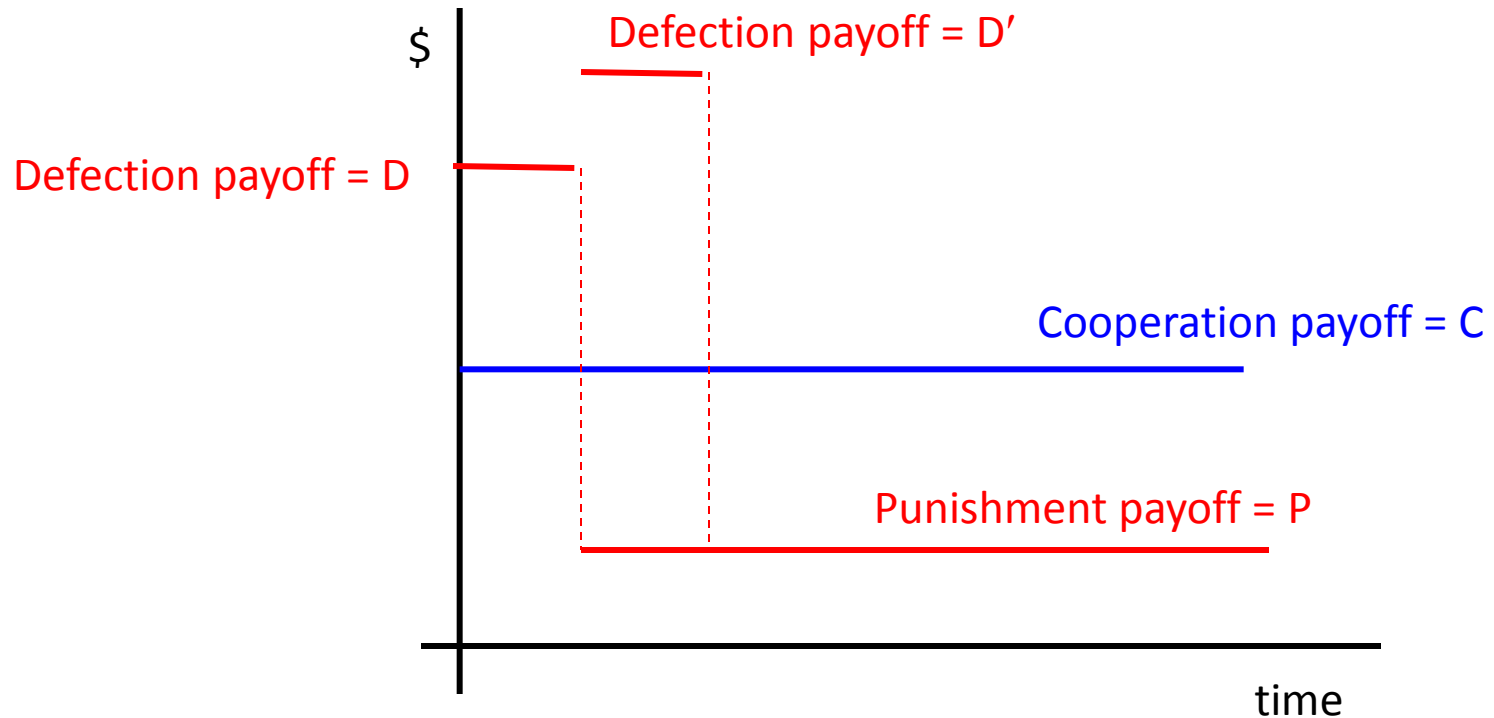
- But JC wanted the business!
 - JC is a model Toyota subcontractor.
 - Toyota should make an exception for them.
 - Moreover, Toyota would find no one in the US who could do the job nearly as well.
- ***Should Toyota give the business of the second assembly line to JC?***

Growing Relationships?



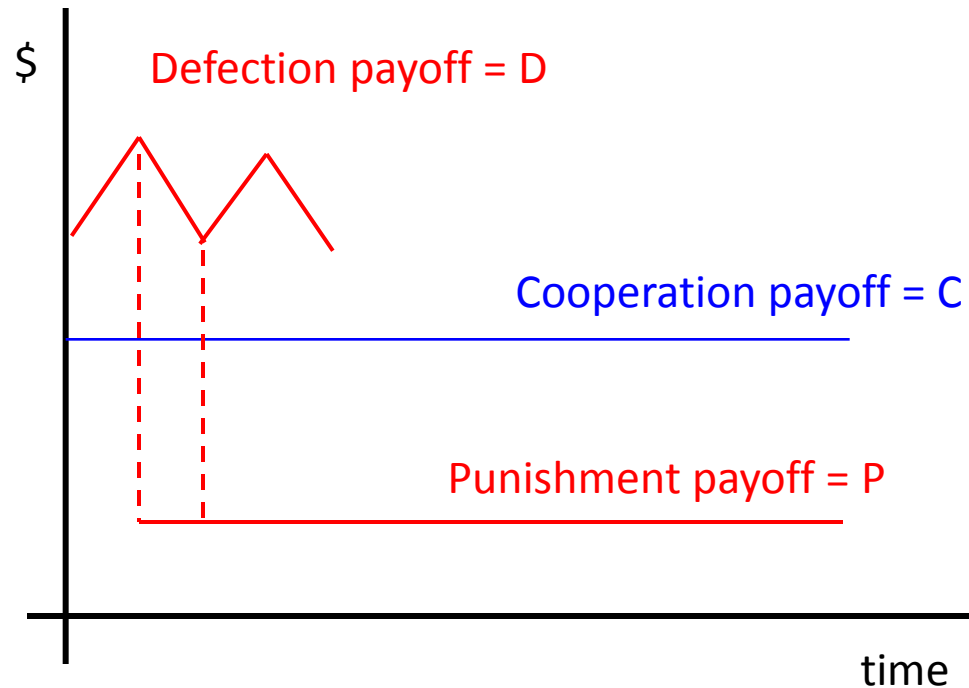
Cooperation easier in growing relationships

Permanent Shocks



Know when to quit (but also when to start)

Transitory Fluctuations



Greatest threat at extreme temptation
→ Lower $E[NPV]$ of cooperation

Summarizing Toyota-JCI

- Relational contract allows **Toyota to maintain both flexibility and high-powered incentives.**
- Hidden costs of relational contracting:
 1. **Toyota must remain knowledgeable** about suppliers' margins.
 2. **Constraints on flexibility:** clarity needed to preserve its *reputation for toughness* → hard for Toyota to make exceptions.

Takeaways

Relational contracts require:

1. Common understanding of what's fair
2. Violations must be detectable
3. Punishments need to be strong and credible

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