Foundations of Incomplete Contracts

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Why do we use incomplete contracts?

- Early literature: incomplete contracts generated by non-describability
- Maskin & Tirole (MT): Irrelevance theorems - optimal contract is same under describability (D) and non-describability (ND)
- Hart & Moore (HM): the conditions for MT theorems are restrictive, when relaxed D or ND matters
  This paper illustrates when MT results apply and where they break down
A model of incomplete contracts

- $N$ widgets can be traded, one is “special” - want to trade it
  - value $v$ to buyer (B)
  - cost to seller (S) $c = c_1$ with probability $\pi(\sigma)$, $c = c_2$ otherwise ($v > c_2 > c_1$)
- At date 1/2, S chooses investment $\sigma$, $\pi'(\sigma) > 0$, $\pi''(\sigma) < 0$
- $N - 1$ generic widgets, costs $g_n = c_1 + \frac{n}{N} (c_2 - c_1)$, $n = 1, \ldots N - 1$

**Figure 1**

- date 0
- B and S contract
- date 1/2
- S invests
- date 1
- B and S trade
Possible contracts

- First best: $\max \pi (\sigma) (c_2 - c_1) - \sigma$
- Cannot contract on investment $\sigma$

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Commitment

Theorem

Suppose case ND holds. If the parties can commit not to renegotiate, then the first best can be achieved.

- Implementation of the first best: give $S$ the right to make a take-it-or-leave-it offer to $B$ at date 1.
  - $S$ gets the whole surplus at date 1 $\Rightarrow$ chooses efficient $\sigma$
- Describability not needed
No Commitment

Theorem

Suppose case D holds. If there is no commitment, then irrespective of the contract, as the number of widgets $N$ tends to infinity, $S$’s investment $\sigma$ approaches 0. That is, in the limit contracts cannot make any difference to expected total surplus and the parties may as well use the null contract.

- Example for finite $N$, assuming $B$ has all the bargaining power in renegotiations:
  - date 0 contract specifies that $S$ must provide a widget at date 1, which he may choose
  - hence, $S$ wants to provide cheapest widget
  - if $c = c_1$ special widget provided
  - if $c = c_2$ $S$ wants to provide cheapest generic widget (which costs $c_1 + \frac{1}{N} (c_2 - c_1)$); $B$ offers $\frac{N-1}{N} (c_2 - c_1)$ to trade special widget
  - $S$’s gain from state 1 is $\frac{1}{N} (c_2 - c_1)$ (incentive to invest tends to 0 as $N \rightarrow \infty$)
Does describability matter?

- MT prove the Irrelevance theorem for:
  - commitment case
  - no commitment + “maximality” + “renegotiation welfare neutrality”

- HM argue that these assumptions might be too restrictive and provide plausible examples $D \neq ND$
Can we assume renegotiation welfare neutrality?

- In many cases, no. What happens then to our theorem?
- Counter-example to irrelevance:
- Suppose that the special widget is known at date 0 and the costs of generic widgets known
  - Case D - optimal contract is agree to trade special widget at fixed price irrespective of $c$. $S$ has first best incentives
  - Case ND - isomorphic to no commitment, full uncertainty problem
- Nondescribability is generally an important constraint in the absence of commitment to not renegotiate
Commitment

Can we implement commitment?
- Use an irrevocability clause
- Use a third party: B and S must pay huge fine if renegotiate

Can we improve outcomes under no commitment?
- Use a third party to penalise B without rewarding S which improves incentives
- Can also achieve this through a lottery instead of a fine if B is risk averse
- A reallocation of property rights can help when contracts are incomplete