Counter-Incentives in Incomplete Contracts

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Motivation

- Recent trend in PPPs: Availability contracts are increasingly more popular:
  - France, India, Canada, Brazil, USA, Mexico, South Africa, etc. have promulgated guidelines so as to bring in the availability contract after 2003;
  - "Mature" countries: UK, Australia and Japan.

- Availability contracts versus concession contracts: the demand risk
  - Availability contracts: it is the public sector that pays the private sector party for the service that it provides to users according to performance criteria → «PFI Model»;
  - Concession contracts: the private provider is paid according to the demand for the service (either through user charges or through payments from the public authority).

→ *Demand risk allocation issue: either on the public authority or on the private provider*

The Paper

→ Risk allocation in a contractual relationship:

- Usual approach to this issue, principal-agent theory: an agent who bears more risk makes more effort:
  - Iossa and Martimort (2008): when risk aversion and demand risk are high, availability contracts should be adopted.

- In this paper: incomplete contract framework:
  - Two contracting parties,
  - One of the contracting parties makes a quality innovation effort (demand-enhancing effort),
  - The agent who bears the risk (demand risk) can go bankrupt,
  - If he goes bankrupt, he is replaced without costs.

→ An agent who bears more risk makes less effort!

The General Model (1/2)

- Incomplete contract theory model
- Two agents (*i= J or A)*
- *J:* non verifiable quality (demand-enhancing) innovation effort *j;* → Payoff implication: *B(j)*, *B* increasing and concave
- Agent *J* renegotiates with *A* to implement the quality innovation
- Demand risk → β_i: probability of bankruptcy of agent *i* when the innovation is not implemented
- In case of bankruptcy, the agent (*i = J or A*) who bears demand risk can be replaced and the innovation is implemented.

The General Model (2/2)

- Timing of the model:
  - Stage 0: demand risk either on *A* or on *J;*
  - Stage 1: *J* chooses investment *j*;
  - Stage 2: symmetric Nash-bargaining renegotiation;
  - Stage 3: Realization of payoffs.
- Default payoffs:
  - If *J* bears demand risk:
    - *J* gets zero
    - *A* gets $\beta_J B(j)$
  - If *A* bears demand risk:
    - *A* gets zero
    - *J* gets $\beta_A B(j)$
- Renegotiation gain is then:
    - $B(j) - \beta_i B(j)$ when $i = J, A$
- Optimal efforts:
  - If J bears demand risk: $j^R | \frac{1-\beta_J}{2} B'(j^R) = 1$
  - If A bears demand risk: $j^{NR} | \frac{1+\beta_A}{2} B'(j^{NR}) = 1$

Since $B'' < 0$, we have $j^R < j^{NR}$

→ The agent making the effort should not bear demand risk.

Application to PPPs

- PPP as an incomplete contract in which both parties can hold up each other:
  - The public authority invests in non-verifiable effort ***j*** to adapt the public service provision over time to respond to consumers changing demand (Ellman 2006, Athias 2009);
  - The private provider invests in non-verifiable cost-reducing efforts ***e***, fully relationship specific (HSV 1997, Hart 2003, Bennett and Iossa 2006);
  - The public authority cannot go bankrupt ($\beta_J = 0$);
  - The private provider can go bankrupt when he bears demand risk:
    - Guasch (2004): 6% of toll road concessions granted in 1990-2001 worldwide were abandoned.

- When the private provider, *PM,* bears demand risk:
  - Probability of bankruptcy depends on *PM*'s cost-reducing efforts and *PA*'s adaptation efforts:
    → *Positive effect on* e^{CC}.
  - But the fact that *PM* can go bankrupt:
    - lowers the probability for *PM* to get full return of his cost-reducing efforts → *negative effect on* e^{CC};
    - decreases hold up by *PM* of benefits from adaptation efforts of *PA* → *positive effect on* j^{CC}.
- When *PA* bears demand risk:
  - Neither of *PM* and *PA* can go bankrupt;
  - *PM* can get full return of his cost-reducing investments → *positive effect on* e^{AC}
  - *PA* cannot replace *PM* in case of no adaptation implementation, which increases hold up by *PM* of the benefits from *PA*'s efforts → *negative effect on* j^{AC}.

Results

- **Result 1:** The public authority's investment in adaptation is lower when she bears demand risk.

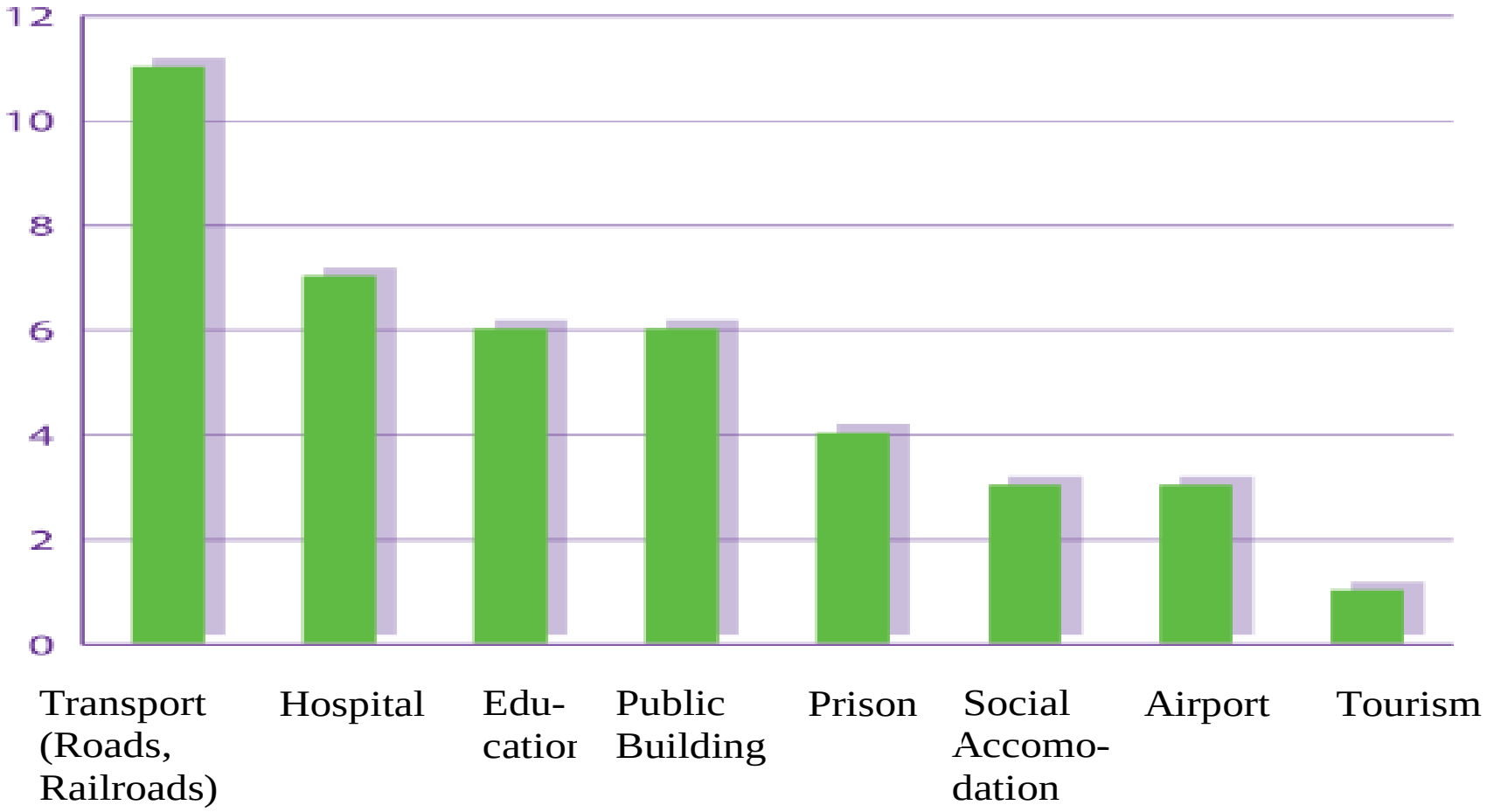
- **Result 2:** The private provider's cost reducing effort is lower when he bears demand risk.

Policy implications

- Choice of the contractual design:
  - When the benefits from adaptation are important, it is socially preferable to design a contract in which demand risk is on the private provider;
  - When the benefits from cost-reducing efforts are important, it is socially preferable to put demand risk on the public authority.

→*No contractual design is optimal and always dominant.*

Distribution of availability contracts by sector in a sample of 12 countries (by number of countries concerned for each sector)



Source: Ernst & Young 2006

Thank you for your attention

Canceled or distressed infrastructure projects with private participation in developing countries, 1990–2008

Canceled or distressed infrastructure projects with private participation and associated investment, by region, 1990–2008

Region	Projects		Investment	
	Number	As % of total	In 2008 US$ billions	As % of total
East Asia and Pacific	80	6.0	44.8	12.2
Europe and Central Asia	21	3.1	4.5	1.6
Latin America and the Caribbean	118	9.1	68.8	10.6
Middle East and North Africa	6	4.9	1.3	1.7
South Asia	8	1.8	5.3	2.9
Sub-Saharan Africa	34	9.2	2.7	2.9
Total	267	6.3	127.4	7.8

Source: World Bank and PPIAF, PPI Project Database.