Contracting for Resilient Infrastructures

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Very Preliminary. Please do not cite

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Presentation Outline

I. Infrastructures: A Typology

II. Contracting for Infrastructure

III. France as a Natural Experiment
I. Infrastructures: A Typology

- **Standalone physical infrastructures**
  - Construction and manufacturing firms
  - Dams and reservoirs
  - Mining firms
  - Public administration and utilities
  - Trade and services firms

- **Transportation infrastructures**
  - Railways, roads, skyways and waterways
  - Airports, ports and railway stations
  - E-lines and pipelines

- **Digital infrastructures**
  - Data collection, processing, transfer and storing
  - Digital networks

- **Social infrastructures**
  - Human capital and unions
  - Social networks
II. Contracting for Infrastructures

• Bundling infrastructure design, construction and operation
• Delegating public services to providers
  • Payments according to performance → No demand risk for provider (France since 2004)
  • Payment depends on actual use → Demand risk on provider (traditional approach)
• Incomplete contract theory (Hermalin, Katz & Craswell 2006; Athias & Soubeyran 2012)
  • Contracts cannot take into account all the relevant variables
    → Infrastructure contracts are complex long-term projects
    → Provider performance and drivers of demand are both hard to assess
  • Rule of thumb
    → High benefits of adaptation: No demand risk on provider
    → High benefits of cost reductions: Demand risk on provider
• Renegotiation clauses and pre-contractual commitment (Laffont & Tirole 1988; Engel & Galetovic 2009)
Taking into Account Resistance Factors

• The concept of resistance
  • Ability to withstand high-magnitude/low probability disruptions
  • Preventive measures are harder to adopt or implement

• Identifying disruptions
  • Disruptive events
  • Infrastructure fatigue or neglect

• Reporting disruptions
  • Managerial and owner disincentives
  • High magnitude events are hard to conceal
  • Role of media and social networks
DISRUPTIVE EVENTS: PROBABILITY & DISCLOSURE
Preliminary & Incomplete Identification by Layla Khoja (London Listed Firms)

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IMPACT OF DISRUPTIVE EVENTS
(Based on 1414 events identified by Layla Khoja)

- 88% No impact
- 10% Delay
- 2% Business Interruption

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Integrating Resilience Considerations

• The concept of resilience
  • Capability to **recover, adapt and learn**
  • When disruptive events occur

• Dealing *ex ante* with resilience issues
  • Contract governance: Unilateral actions vs cooperation
  • Risk allocation: Risk aversion and getting the investment surplus
  • Doctrinal approach: Frustration exception and force majeure clauses

• Contractual flexibility as an adaptation and learning option
  • Introducing re-negotiation clauses
  • Providing for *ex post* third party intervention
III. France as a Natural Experiment

• Regulatory and privatization events in early 2000
  • Pay for performance (adaptation) as an alternative to pay for actual use (cost reduction) (2004)
  • Introducing PPP

• Parties to infrastructure contracts
  • State & State pre-2000
  • PPP post-2000
    • When business becomes profitable
    • A handful of counterparties

• Prototypical infrastructures
  • Highways, bridges and tunnels
  • Airports
  • Pipelines
  • River use and dams
Highways: Basic Framework

• The State’s counterparties
  • Specialized state entities pre-2000
  • Powerful private corporations post-2000
    • Significant grid: Vinci (ASF, Cofiroute, Escota, Arcour), Abertis (Sanef), Eiffage (SAPRR)
    • Marginal involvement: Powerful engineering and insurance groups (Axa, Bouygues, Egis)

• Scope of the contract
  • Highway construction, maintenance and exploitation (1973/1975)
    Adding highway design (2005/2008) and extension to related tunnels (2016)

• Financing
  • State provides 30% to 50% (1973/1975), e.g. via real estate transfer (1975)
  • State guarantees long term debt (1975)
  • User must pay fees set by specialized entity/private counterparty (1973/1975/2005)

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Highways : Performance → Adaptation

• **Construction**
  - State of the art approach and good quality material, with counterparty bearing costs (1973/1975)
    Counterparty bears design and construction risk (2005/2008)
  - Within 53,5 (2005), respectively 26 (2008) months of contract in force

• **Maintenance and exploitation**
  - Counterparty must maintain and exploit, bearing the related costs (1973/1975)
  - Traffic safety and continuity to be guaranteed at all times, regardless of circumstances (1975/2005/2008)
  - Insurance requirement for torts, unless sufficient reserves (2016)

• **Real estate**
  - Transferred by the State (1973/1975)
  - Remains a State asset if transferred + transferred by the counterparty to the State at termination (2005/2008)
Highways : Contract Resilience

• **Risk allocation**
  - Design and construction risk allocated to counterparty (2005/2008)
  - Highway opening can be delayed if due to circumstances out of the control of the counterparty (2005/2008)

• **Economic equilibrium**
  - Impacted by new State requirement or regulatory changes or unforeseen circumstances (2005/2008)
  - Adoption of required measures, including new user fees (2005/2008)

• **Force majeure**
  - Immediate information of authorities (2005/2016)
  - May limits or prevent liability vis-à-vis the State or users (1973/1975)

• **Contract termination**
  - After 22 (1973), 20 years (1975), 55 (2008) and 65 years (2005)
  - As a sanction for non-performance (1973/1975)
  - As a contractual mechanism (2005/2008)
Highways : (Very) Preliminary Conclusion

• Innovation in terms of
  • Risk and revenue allocation
  • Contract adaptation
• Focus on performance and adaptation
• Resistance: Traditional force majeure approach
• Emerging discrete resilience clauses