Reducing the cost of major infrastructure procurement in publicly and privately financed projects

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• Authors/Co-Authors of discussion papers
  – “Risk pricing in infrastructure delivery – What can be done to make major infrastructure projects less costly”
  – “Risk allocation in Danish mega-projects”
  – “Efficiency and innovation in infrastructure projects – Four types of collaborative procurement strategies in Sweden and the Netherlands”
Disclaimer

• This presentation is merely a summary and not the full story
What was the objective?

• Identify how cost of major infrastructure projects can be reduced
  – Understand the impact of uncertainty on risk pricing for infrastructure projects
  – Highlight the impact of risk allocation on project delivery
  – Explore the impact of collaboration on project efficiency and innovation
What we did

• We investigated:
  – Risk and uncertainty
  – Risk allocation
  – Collaboration, efficiency and innovation

• We considered different delivery models
  – Dominant (e.g. DBB, DB, EPC) and collaborative (e.g. ECI, Alliancing)

• We studied the scientific literature as well as 16 project cases
  – UK (2), Denmark (3), Sweden (7), Netherlands (3) and Germany (1)
What we found (1)

• Risk pricing in infrastructure is difficult: projects are unique, industry is opaque, data is not collected or is not shared
  – Not enough information available for benchmarking

• Uncertainty in risk pricing is affected by four elements
Uncertainty in infrastructure delivery

Contractor risk pricing challenges:
- Delivery models
- Financing requirements
- Information provision
- Timing constraints
- Methodological issues
What we found (2)

• Interrelationship between design and construction is a key concept; especially how design clarity and flexibility relates to the underlying delivery model.

• Infrastructure delivery has not kept pace with changing nature of projects. Existing “set” solutions not necessarily efficient and customisation may be necessary.
Impact of delivery model on cost estimation

As estimate should be

- Political-economic
- Psychological &
- Technical influences

Typical estimate pathway

Start of construction

Cost over-run
Cost savings

DBB
DB
EPC
ECI*
Alliance

Conceptual Initial design Final design Construction

Time

Source: Adapted by authors from Samset (2008); Samset & Volden (2016)
Delivery model interrelations

**Financing method**
- Publicly financed ("Traditional")
- Privately financed ("PPP")

**Delivery models**
- Design Build (DB)
- Design Bid Build (DBB)
- Alliancing
- Lump sum/fixed time ("Turnkey")
- Engineering, Procurement & Construction (EPC)

**Contract power**
- Non-price competition
- Cost-share (e.g., costs plus a fee)
- Maximum guaranteed price
- Maximum guaranteed price

- Contractor required to price a narrow scope
- .. a wide scope
- Contractor engaged on a low-powered contract
- ...a high powered contract
What we found (3)

• Risks must first be well understood in order to be efficiently allocated

• Risk allocation affected by fundamental choices made during procurement
What we found (4)

• Collaboration can be described by four dimensions:
  – Scope
  – Depth
  – Duration
  – Intensity

• Each dimension can have a different impact on project efficiency and innovation depending on the underlying delivery model and contract design used
What we propose (1)

• Matching **design clarity and flexibility** to the delivery model used and the characteristics of the project. Pricing efficiency, flexibility and innovation need not be mutually exclusive.

• Early and continuous focus on **risk management**. Identifying and understanding risk is a prerequisite for efficient allocation and mitigation.
What we propose (2)

• Facilitation of information provision through data collection and sharing. Communication is key.

• Careful selection of delivery models. Adopting and managing more advanced or more collaborative models requires knowledge and skills which should not be underestimated.

• Well-prepared procurement processes in terms of scope, clarity and duration. They will affect bid pricing but also bid quality.
Thank you!

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