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Managing Financial Risk for Uncertainty

Alessandro Palmieri, Lead Dam Specialist, World Bank



Outline

- Project Financing
- Management of Project Risks
- Minimising “Unknown unknowns”

Financing options for large civil work contracts

- Financial Viability
- Risk Assessment
- The concept of Bankability
- Main Financial Instruments for Different Project Structures

Financial Viability

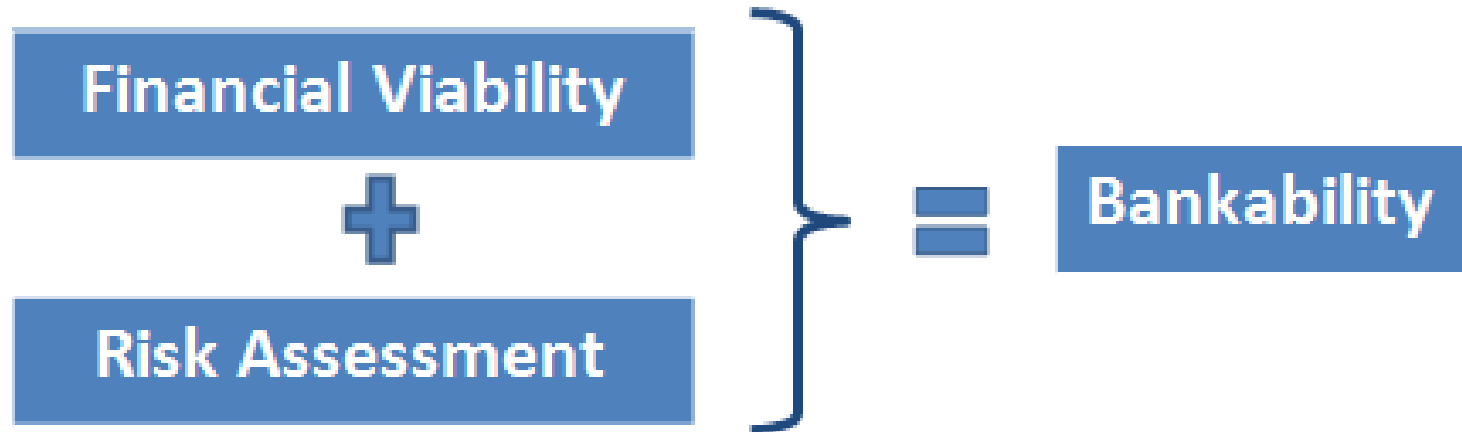
- Measure of the commercial strength of a project, judged typically over a period of 15 to 20 years.
- Determines whether the project is robust enough to repay loans at commercial rates of interest even under a downside scenario,
- and whether it is likely to provide a sufficiently high return on equity to attract private investors.

Risk Assessment

Type of Risk	Mitigation
Political (Country)	Guarantees
Commercial (Market, Defaulting Off-Taker)	Partially insurable
Project (site specific)	Usually not insurable

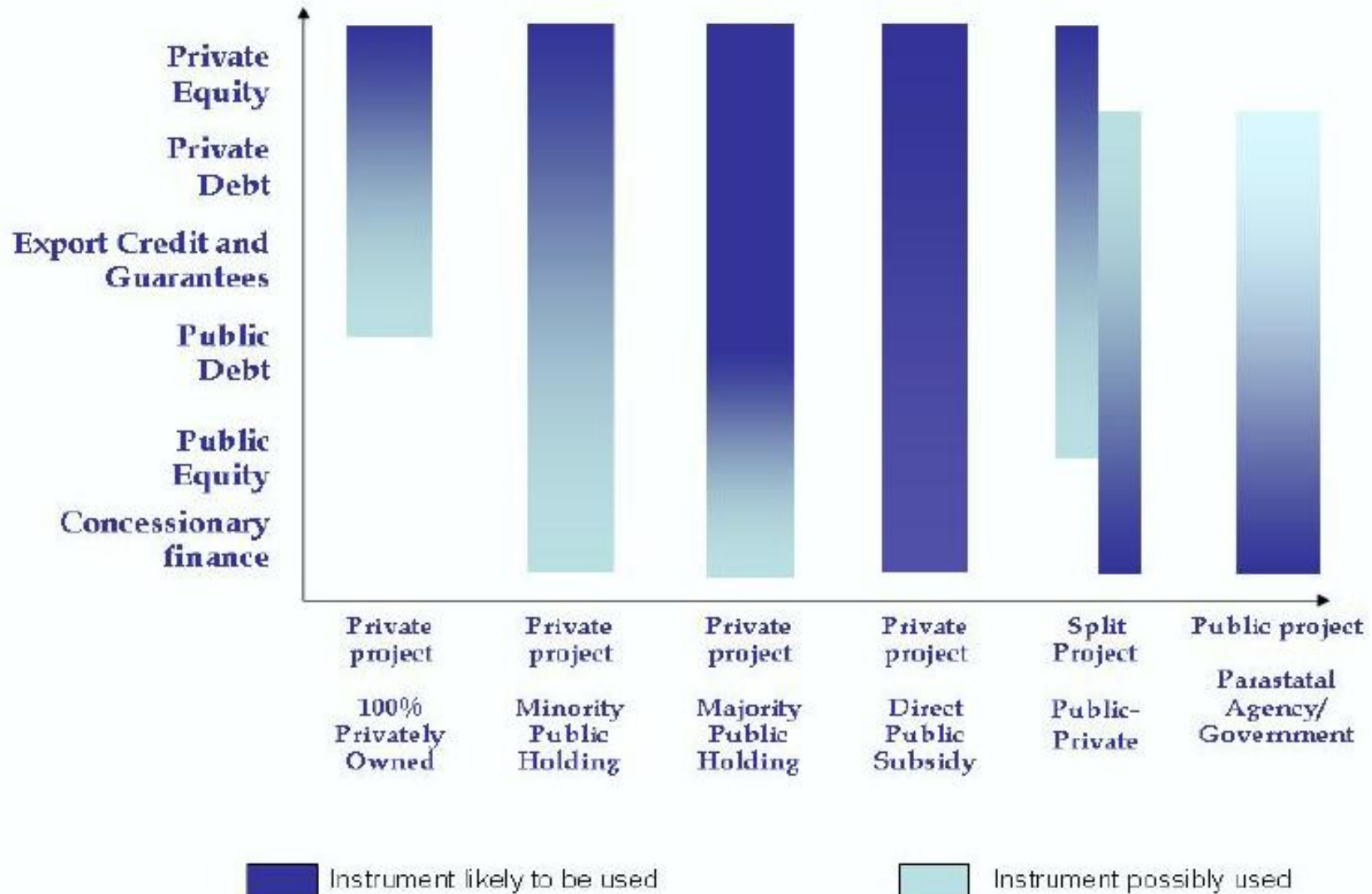
- Risk has a Cost
- Risk Cost depends on how risk is allocated

The Concept of Bankability



- Credit ratings that can extend from AAA (triple A) downwards
- BBB+ generally regarded as the threshold for an Investment Grade project
- Bankability determines also the interest rate and the tenor of the loan

Main financing instruments for different project structures



Project Risk Management

Geotechnical Risk

Key management tools:

❖ Geotechnical Baseline Report (GBR),
and

❖ Project Risk Register (PRR)

Geotechnical Baseline Report

- Contractual understanding of the site conditions, referred to as the geotechnical / geological baseline.
- Contractor bears risk at or below baseline; Owner accepts risk above baseline.
- Baseline setting determines risk allocation and has a great influence on risk acceptance, bid prices, quantity of change orders and the final cost of the project

Re: "ASCE 2007, Geotechnical Baseline Report for Construction – *Suggested Guidelines*"

Project Risk Register (PRR)

- For each risk scenario the following elements are assessed:

Frequency or probability of occurrence

Preventive measures

Potential consequences, before remedial measures

Remedial measures

Resources and costs associated with remedial measures

Time influence after remedial measures

Cost consequences after remedial measures

Project Risk Management

Jointly, GBR and PRR allow to:

- inform decision making on the most appropriate project technology and procurement strategy;
- inform contract documents preparation, and allocation of contingency funds;
- prepare an Health & Safety Management Plan to be implemented during construction;
- manage design variations and associated claims during construction.

Minimizing the "unknown unknowns"

- In a paper on hydro plant rehabilitation, Gummer and Obermoser [1], introduce the concept of “unknown unknowns” (k-ks)
- The “k-ks” concept is equally suitable in tunneling projects

[1] J.H. Gummer, and H. Obermoser (2008) “A new approach to defining risk in rehabilitation works” *Int. Journal on Hydropower & Dams, Issue Five, 2008*

“K-Ks” in a Tunneling Context

K-Ks	Tunneling context	What to do
“Known knows”	General geology, overburden, expected rock types, groundwater:	The problems lie in the detail, i.e. adequate site investigations at planning stage.
“Known unknowns”	Actual distribution of rock masses along tunnel alignment, extent of fault areas, sudden water inflows, etc.	Availability of adequate resources, and designed contractual flexibility.
“Unknown unknowns”	Un-anticipated extensive fault area, large karst cavity with water and debris filling, mud-like soil within hard rock	The importance of investigations during construction (probe drilling, gas detection, etc.)

How to do it

- “*Known knowns*” should not be dealt with by a good design
- “*Known unknowns*” should be mitigated by appropriate contractual architecture
- “*Unknown unknowns*” can be minimised if investigations is embedded in the construction phase.
- Residual uncertainties should be incorporated in the Operation & Maintenance Plan

We absolutely must leave room for doubt or there is no progress and no learning.

Richard Feynman (1964)

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