Financial Analysis of Public-Private Partnership (PPP) Projects in Highways

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Presentation Outline

• PPIAF - WB Toolkit for PPP in Highways
• Toolkit modules
• Main financial indicators of a PPP project
• Demonstration of the PPP financial simulation model
• Case studies
• Discussions
Toolkit for PPP in Highways

Objective

To provide policy makers from developing economies with some guidance in the design and implementation of a PPP project in the highway sector
Toolkit for
PUBLIC-PRIVATE PARTNERSHIP in
Highways

Funded by the Public-Private Infrastructure Advisory Facility (PPIAF), a multi-donor technical assistance facility.
Toolkit for PPP in Highways

The toolkit is structured under five headings and includes a library and interactive financial simulation model.

Available at the World Bank’s web site: www.worldbank.org/highways
Availability of the Toolkit

- Free of charge
- A multimedia product available on a CD ROM
- Also available at the World Bank’s transport website: www.worldbank.org/transport
The Highway Toolkit Includes

- over 5000 pages of reference publications and web links
- a 500 word glossary
- case studies and financial simulation software
Toolkit Modules

1. Overview and Diagnosis
2. Project Characteristics
3. Public Sector Functions
4. Laws, Rules and Contracts
5. Implementation
1. Overview and Diagnosis: rationale for private participation in the highway sector, alternative contractual forms, guide to conduct a diagnostic of the sector

2. Project Characteristics

3. Public Sector Functions

4. Laws, Rules and Contracts

5. Implementation
Toolkit Modules

1. Overview and Diagnosis

2. Project Characteristics: key considerations in the design of a public-private partnership, discussions of well-known PPPs

3. Public Sector Functions

4. Laws, Rules and Contracts

5. Implementation
Toolkit Modules

1. Overview and Diagnosis
2. Project Characteristics
3. Public Sector Functions: analyzes the roles of the public sector and presents the tools at Government's disposal for performing such roles
4. Laws, Rules and Contracts
5. Implementation
Toolkit Modules

1. Overview and Diagnosis
2. Project Characteristics
3. Public Sector Functions
4. Laws, Rules and Contracts: guidance on the design of legal and contractual frameworks for private participation in highways, with boilerplate provisions
5. Implementation
Toolkit Modules

1. Overview and Diagnosis
2. Project Characteristics
3. Public Sector Functions
4. Laws, Rules and Contracts
5. Implementation: outlines the key steps in introducing PSP, bringing elements from previous modules and distinguishing by type of private sector contract
1. Overview and Diagnosis

Why Embark on PPP?

- Context and Key Issues
- Expected Benefits from PPP
- Why (and where) is the Private Sector more efficient than the Public Sector?
- Overview of PPP experience
- PPI project data base

Choosing the right option

- Forms of PPP
- Making the diagnosis
- PPP policy and strategy
2. Project Characteristics

• Tailoring appropriate PPP: A continuum of alternatives
• Examples of well-known PPPs
3. Public Sector Functions

- Protect community welfare
- Planning and policy making
- Provide adequate framework
- Facilitator
- Contract award
- Regulation
4. Laws, Rules and Contracts

- Legislation
  - Legislative framework
  - Adjust legal framework
  - Regulatory framework
  - Standards

- Contracts
  - Maintenance contracts
  - Operation and maintenance concessions
  - BOT type projects
5. Implementation

• Actors
• Main Steps
• Managing the Reform
• Selection of Concessionaires and Contract Award
Public Private Partnerships

Works & Services Contracts → Management & Maintenance Contracts → Operation & Maintenance Concessions → Build Operate Transfer Concessions → Full Privatization

Low → Extent of private sector participation → High
In addition to the five modules, the Toolkit also includes:

- Financial simulation tool
- Graphic simulation tool
- Case study
- CD Map
- Documentation
- Glossary
Toolkit for Public-Private Partnership in Highways

Main Financial Indicators
Debt Service Cover Ratio (DSCR)

\[ DSCR \quad n = \frac{(CAFDS)}{\sum_{i=1}^{3} (\text{Debt Service})_{i,n}} \]

where
i = number of tranches, 1\(\leq\) i \(\leq\) 3
n = current year
(Debt Service) \(i,n\) = (Principal) \(i,n\) + (Interest) \(i,n\)
CAFDS = Cash Available for Debt Service
Loan Life Cover Ratio (LLCR)

\[
LLCR_n = \frac{\text{Net Present Value}}{\text{Outstanding Debt}_{n \text{ end of period}}}
\]

maximum maturity of the three tranches \( \sum_{j=n}^{n+2} (CAFDS)_n \)

\( n = \text{current year} \)
\( CAFDS = \text{Cash Available for Debt Service} \)
\( \text{Outstanding debt}_{n \text{ end of period}} \)

The Net Present Value of the Cash Available for Debt Service from year \( n+1 \) to the end of the maturity is discounted at the debt interest rate.

The financial tool provides the user with the minimum LLCR.

\( ADSCR_j = \frac{(CAFDS)_n}{\sum_{n} \text{DebtService}_n} \)
Return on Equity (ROE)

\[
\sum_{i=1}^{\text{end of the concession}} \frac{(\text{Equity injected}_i - \text{dividends}_i)}{(1 + \text{ROE}_i)} = 0
\]

where:
Equity injected\(_i\) is the equity provided by the sponsors in year \(i\)
Dividends\(_i\) are the dividends distributed to shareholders in year \(i\)
ROE is calculated in real terms through deflated flow (equity - dividends)
Project Financial Internal Rate of Return (IRR)

\[
\sum_{i=\text{first year of construction}}^{\text{end of the concession}} \frac{(\text{OCFBF})_i}{(1 + IRR)_i} = 0
\]

- \( i \) = year
- OCFBF = Operating Cash Flow Before Financing
Project Net Present Value:  

*Present Value of Taxes minus Subsidies (NPV)*

\[
\text{ProjectNPV} = \sum_{i=\text{first year of construction}}^{\text{end of concession}} \frac{(OCFBF)_i}{(1+t)^{i-\text{year of study}}}
\]

where:

- **OCFBF** = Operating Cash Flow Before Financing
- **t** = weighted average of the three rates on the tranches of debt

The NPV is calculated for the first year of the construction period
NPV on Subsidies

\[ \text{NPV on Subsidies} = \sum_{i=\text{first year of operation}}^{\text{end of concession}} \frac{(\text{Subsidy})_i}{(1+r+\text{infl})^{i-\text{year of study}}} \]

*infl* is the inflation rate for the year of study

*r* is the rate used to discount subsidies provided for the Project
NPV on VAT

\[
NPV_{\text{on VAT}} = \sum_{i=\text{first year of operation}}^{\text{end of the concession}} \frac{(VAT)_i}{(1+r+\text{infl})^{i-\text{year of study}}}
\]

where

\( \text{infl} = \) inflation rate for the year of study
\( r = \) rate used to discount subsidies provided for the Project
Financial Simulation Case Study

The Government of Farland is considering to build a road between the cities of Farport and Farcapital (located 50 km apart) through a Public Private Partnership (PPP) scheme.
Financial Simulation Case Study

Basic data include:

- Construction cost: US$150 million
- Source of funds: Subsidies, equity and credit
- Real interest rate: 5%
- Concession duration: 25 years
- Initial traffic: 8,000 vpd
- Toll rate: US$7.00 (indexed on inflation)
- Inflation rate: 6% per year
Financial Simulation Case Study

Using the above information and other default data in the Graphic Financial Simulation tool of the Toolkit for Public-Private Partnership in Highways, please answer the questions below:
Financial Simulation Case Study

Question 1: In the absence of Government subsidies, *ceteris paribus*, what would be the return on equity (ROE)? What would be the change in the internal rate of return (IRR) of the project?
Financial Simulation Case Study

Question 2. While subsidies may be paid by the Government during the construction period, it recovers some of this payment through taxes during the operation period. What would be the Government contribution to this project that would lead to a financial balance for the government throughout the concession period?
Financial Simulation Case Study

Question 3. In the absence of Government subsidies, *ceteris paribus*, what would be the required initial toll rate to yield a return on equity (ROE) of 16%?
Financial Simulation of an Availability BOT Concession

Using the Toolkit default values, please estimate the minimum annual availability fee that the Government would have to pay to attract potential private sector concessionaires. Please consider as minimum requirement a ROE of 15%.
Basic Assumptions to Estimate the Minimum Toll Rate to Attract Private Investors for a PPP Project

- Concession term: 20 yrs
- Construction Cost: $1M/km to $5M/km
- Operation cost: $500,000/km/yr
- Equity: 14%
- Subsidies: 0
- Interest rate: 5%/yr
- Grace period: 4 yrs
- Repayment period: 14 years
- Discount rate: 10%

- Initial traffic: 5,000 vpd to 20,000 vpd
- Traffic growth: 3%
- Inflation: 6%
- Tax: 18%
- IRR ≥ 12%
- ROE ≥ 16%
- LLCR ≥ 1.0
- DSCR ≥ 1.0
Estimated Minimum Toll Rate to Attract Private Investment for a PPP Project

$/km

Construction cost, $ million/km

- 5,000 vpd
- 10,000 vpd
- 15,000 vpd
- 20,000 vpd

[Graph showing the relationship between construction cost and toll rate for different vehicle counts per day (vpd)].
I'm sure glad the hole isn't in our end...
Thank you!
Some Basic References


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