Finance

For some road projects which are tolled, a gap exists between the socio-economic benefits and the financial profitability, often called a 'Viability Gap'. This needs to be filled by the public sector in order to attract private investors. This is possible through direct subsidies, fiscal incentives and guarantees.

When direct subsidies are given to the private investors, generally the PPP contract is given to the bidder that claims the least subsidy since this criterion is usually given a high score in the tender evaluation process.

Fiscal incentives can help the PPP project to reach a financial equilibrium, lowering the profit taxes of the concessionaire in the beginning of the contract for instance.

Guarantees are contingent liabilities from the general budget but are only triggered if some future event under the contract does not occur e.g. traffic does not reach a certain minimum level.

Traffic is an important determinant of feasibility, although not the only factor. It is generally considered for normal highway construction standards, that the traffic threshold for a PPP project to be financially viable is 10,000 vehicles per day for a Greenfield project and 6,000 vehicles per day for a Brownfield project.

Some roads are important for socio-economic development in low trafficked areas roads and if governments seek to finance these projects, they will have to give strong public sector support.

Use of private finance

Analyzing and developing the financing scheme should always be performed after the socio-economic analysis, including the evaluation of:

- The overall cost of the project including construction or rehabilitation costs, and operation and maintenance costs. The flow of expenditure depends to a large extent on the project scope of work.
- The economic benefits of the project are evaluated in the economic analysis. Typically, economic benefits are generated by an increased level of service for the users and mainly take the form of savings in vehicle operating costs, reduced travel time, mitigated impact on the environment and reduced casualties as a result of fewer accidents. Two characteristics of these benefits shall be kept in mind to structure the financing of the project:
    - They are only generated over the entire operation period, typically 15 to 20 years
    - A substantial initial investment is often required to increase the level of service.

If the economic analysis and the other components of the feasibility studies (social and environmental impact assessment) have concluded that the project should be implemented, the Government has a choice between the following funding options (this issue is addressed in Revenues):

- **General budget funding:** resources usually coming from tax payment and revenues from government-owned properties are partially used for the implementation of the project. However the tax burden borne by the public cannot be increased indefinitely by national or local Governments without risking social instability. Moreover countries embarking on massive road rehabilitation and construction programs are unlikely to find the required funds from their budget.
- **Funding from user charges:** funds come from tolls or specific taxes (e.g. fuel tax, vehicle licensing fees) paid by the users of the project.
- Limited user charges and government support.

It is the Government's responsibility to set up an appropriate financial scheme if there is a gap between the funds required for the investment and the resources available and/or generated from the project directly. Two options are available:

- Government financing is still by far the most popular way of financing road infrastructure but demands are huge and resources extremely limited with many competing demands e.g. education and health.
- Private financing through either Corporate Finance or Project Finance offers possibilities for Governments to mobilize extra sources of finance and therefore limit the amount of public funds directly mobilized for the project.

The financing scheme will have some influence on the economic soundness of the project.

The impacts of private financing are:

- an increase in the cost of financing due to the higher interest paid by private sponsors than by Governments.
- and in case of toll implementation:
- a reduction in traffic, depending on the elasticity of demand and the benefits from using the facility compared to the toll charged. The toll rate could potentially be such that it reduces future traffic levels such that the project becomes economically unviable (Module 3 -> Sector Planning and Strategy -> Planning Process -> Demand Forecasting -> Influence of tolling on transport demand).
- an increase in the construction costs due to the additional costs to build and operate the toll plazas.

Project Finance

Project finance is a term which defines a specific type of financing whereby the expected future revenue stream (cash flow) of a project is almost the only means of paying interest and repaying the required debt to fund it. Another term for project financing is 'no-recourse' financing. As noted in the term 'almost' above, no-recourse is often difficult and more usual or popular is 'limited recourse' in which the cash flow is expected to

finance most of the investment but includes provision for some external (to the project) sources and/or fall back sources.

The concept of project financing is to structure and raise funding of the stand alone project company on the basis of future project cash flows. The responsibility of the project company (special purpose vehicle or SPV), which enters into the PPP agreement, is to implement and operate the project. For that purpose, it raises the financing and often subcontracts construction and operation activities. Government may also support a project through direct support or more likely through risk mitigation measures/ guarantees.

Contrary to the other types of financing (corporate financing), the lenders have no recourse or only limited recourse on the entities which have initiated the project (sponsors, shareholders, etc) in case of difficulty for the project to reimburse them.

Project finance thus comprises mechanisms both for Funding, and Investment Recovery, which depend on each other as two sides of one coin: the cash flow (after deducting operating costs and tax payments) must be sufficient to service and repay debt and reward equity.

Project finance is a useful tool for companies with insufficient balance sheet strength to take on the whole debt and who wish to avoid the issuance of a corporate repayment guarantee, thus preferring to finance the project "off-balance".

Although project finance can be used for all types and sizes of projects, it is often used for the financing of more expensive projects, such as larger infrastructure projects and toll roads. The costs related to implementing project finance structures prohibit the use of this type of instrument for smaller scale projects.

Principles

Several companies forming a Consortium contribute to the development of the project. In order to make a clear separation between the sponsors and the project itself, a Special Purpose Vehicle (SPV) or project company is created after the client has awarded the project to the consortium. The sponsors then become the shareholders of the SPV and their liability is limited to the amount of share capital they have invested in the new company.

Since the SPV itself is usually not competent to construct and operate the project, it will sub-contract these tasks to other companies (most of the time to some of the shareholders which are both constructor and operator). The only purpose of the project company is to raise the financing necessary for the implementation of the project, collect the cash flow generated by the project and redistribute the responsibilities accordingly: the SPV is largely an empty shell.

The total exposure of the lenders in a project finance scheme could reach 80-90% of the funding requirement (project cost). As the lenders have only limited recourse in the project, their behavior is always driven by a risk approach consisting in mitigating the risk of incapacity for the project to repay the debt: they thus require full access to the project revenue stream.

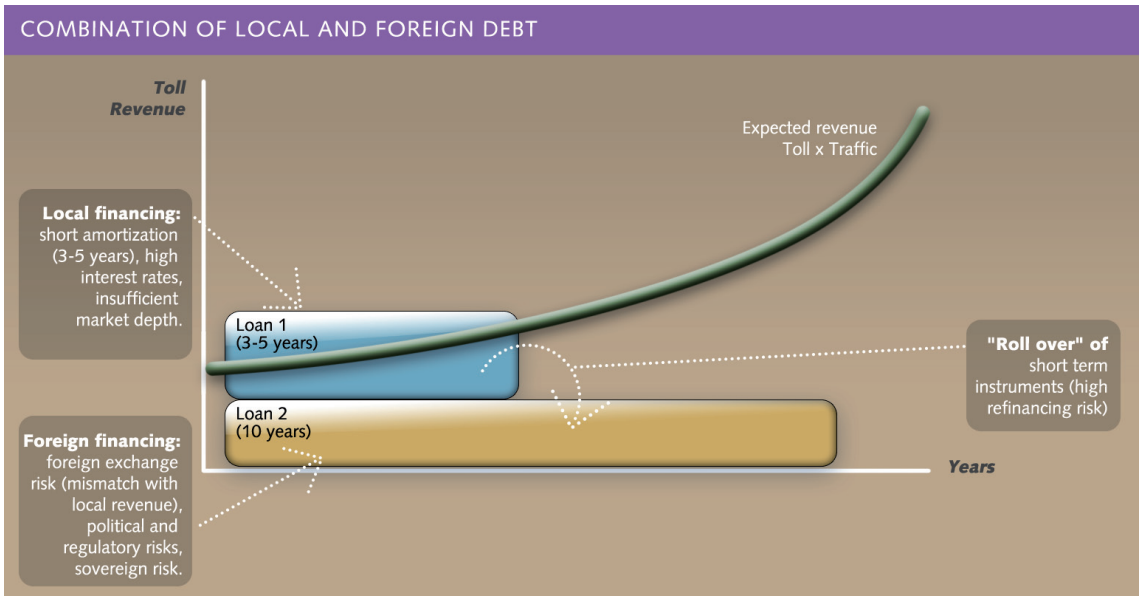
Most project risks should be allocated to others than the borrower or SPV (Risk allocation), and the possibility should exist of intervening in the management of the project company in case of cash flow shortfall leading to incapacity for the project company to repay the debt.

Specificity of road projects

The nature of road projects introduces a number of specific constraints for financing as road projects involve a large initial investment in order to create a capacity that will often only be fully utilized after 10 or more years, with the consequence that:

- the initial traffic revenue is unlikely to match the financing requirements during this period
- the depreciation period is likely to be significantly longer than the loan maturity period, which, for indirect reasons, sometimes prevents cash flow after debt service being distributed in full to the shareholders.

The following graph is an example of the use of a combination of local and foreign debt, with different maturity, in a motorway project. The local debt, with short maturity, is used to finance projected cash shortfall at the beginning of the concession.



Source: Irigoyen, 2000

Moreover, an added complication could be the requirement to mitigate exchange risks. In countries with limited capital markets, funding is likely to be raised in foreign currencies, whilst the revenue, from tolling, will most likely be generated in local currency.

Since only very few projects are sufficiently profitable for them to be developed as 100% private solutions both in terms of funding and recovery, the public sector is likely to be obliged to financially support the project by participating in the funding or the recovery of the investment, or in both funding and recovery.

Participation in the funding could either involve providing capital grants, funding parts of the project, providing subordinated loans, taking out shares in the SPV or providing tax advantages.

Participation in the recovery of an investment could include a range of options such as:

- repaying the investment on the basis of a fixed repayment schedule (Pre-Financing) or through Shadow Tolling or Availability Payments,
- making operational subsidies, which could be linked for example to traffic or revenue levels, or
- providing certain tax incentives and tax exemptions specific to the project.

The choice of each of the above options depends on the viability of the project, the preferred risk allocation and sharing mechanisms and the optimization of the SPV's financial and tax structure. In return for providing such forms of financial support, the public sector could require to be reimbursed if support was provided to cover cash shortfalls during the early stages of the project, or to share in the benefits if the project does better than expected.

Clearly, the above options are not exhaustive, but give an indication of possible solutions that could be proposed and developed depending on the project needs and the public sector requirements. The development and use of a Financial Model is an important tool in evaluating the best solution.

Investment recovery

The investment is to be recovered through the revenue stream after deducting the annual operating costs, including tax payments. As indicated, this revenue stream could come 100% from private sources, a combination of private sources and operational subsidies, or 100% from payments made by the public sector.

In the case of a 100% contribution from the public sector, the type of payments will largely depend on the type of risks that the public sector wishes to transfer to the private sector. A fixed type of payment (Pre-Financing) leaves the private sector with a construction and operation cost risk, but the public sector guarantees the whole financing as it would have done by taking out a loan directly.

Performance (Availability Payments) and traffic dependent payments (Annuities or Shadow Tolls) allow governments to consider the funding as alternative sources to direct government borrowing which would affect their credit capacities less than direct borrowing.

The impacts on the public sector's credit rating will be minimal or non-existent in the case of 100% private sources with the option of operational subsidies. These operational subsidies could either be provided as annual fixed amounts, a fixed contribution per road user or as a standby facility in case traffic (or revenue, in order to compensate lower chargeable toll rates) falls below a certain pre-agreed level.

As an alternative solution (recommendable if there is a high degree of uncertainty regarding future traffic) the private sector could collect tolls for the public sector and

be paid by the public sector on the basis of a shadow toll mechanism. In the base case projection, toll revenue could cover all or most shadow toll payments, the public sector would directly benefit if traffic is higher (unless it uses this surplus to reduce tolls) and would provide subsidies if traffic is lower.

Financial structure

The funding of all project finance, i.e. PPP, solutions is achieved through various forms of equity and senior debt ("senior" means, that debt service receives priority payment from the cash flow).

Every project needs equity, i.e. the project sponsor's own money. The amount of equity depends upon: the maximum amount of debt sustainable by the project, given the income flow and risk profile (debt service has to be ensured by project income even in cases where risks materialize), and the return rate expected by investors.

The balance between equity and debt depends on the project structure, the quality of the revenue stream and risk profile. This is the reason why equity level can be somewhat lower in shadow toll and annuity schemes, since the economic risks are much lower than in toll roads.

For example, inter-urban toll roads typically require a relatively high level of equity (20% - 30% of the total funding requirements) but projects funded on the basis of a shadow toll payment or annuity may be only 15%-20% equity. The normal range across all commercial projects whether PPP or private is 20%-40% equity with a usual figure being 25%-30% equity as commercial bankers and public authorities take comfort from the borrower investing considerable amounts of their own money before borrowing. Additionally, if the project gets into financial difficulties and its (resale) value decreases, the equity portion can provide a buffer of comfort for the debt providers.

Depending on the project characteristics and the requirements of the Sponsors and investors (voting rights against return, tax optimization, etc.), the equity could be provided in the form of share capital, preferential capital, various forms of shareholder loans and a combination thereof.

Potential investors include;

- International financial institutions
- Infrastructure investment funds
- Various organizations that might have an interest in the project once completed (petrol companies, property developers, etc).

Debt could be provided in the form of:

- senior debt from International financial institutions and Commercial lenders, or
- mezzanine debt from various Infrastructure Investment Funds, in the form of bond issues or public and private placements), or in the form of a combination thereof.

The nature of the funding and the sources of funding will depend on a wide range of aspects, such as the project characteristics (including possible public sector financial

support), the country in which the project is being developed, the ability of the sponsors to raise capital, the interest of third party investors, the availability of capital markets, the time available for raising the financing and the general risk structure of the project.

Government financing

Public loans

Government can raise debt from banks (private loans), multinational institutions (Public loans) and investors (bonds). The characteristics (amount, maturity and interest rate), of the government loans and bonds depend substantially on the country profile and on the debt providers.

Although Governments from low- and middle-income countries have access to loans from bilateral aid, international financing institutions (IFIs) or private lenders to finance their infrastructure, numerous countries have already reached the limit of their public debt. The International Monetary Fund (IMF) closely monitors macro-economic indicators and tends to limit access to international aid for such countries.

All low- and middle-income countries are familiar with international aid made available by International Financing Institutions to support Government financing of infrastructure projects.

It should be noted however that loans proposed by IFIs are particularly attractive for infrastructure financing due to:

- **Below market interest rates.** Such rates depend on both the country profile (Gross Domestic Product) and the IFI, but are always below rates offered by private lenders.
- **Long grace period** i.e. before principal repayments start and very long maturity that could go up to 25-30 years and match project life.

A special attention should be paid to the main drawback linked to public debt increase i.e. credit worthiness. A country with large debt relative to its productive capacity may run into problems with respect to the ability to service its debt. Lenders may require higher interest rates from such countries than from countries with smaller debt/production ratios. The higher interest rate can be seen as a market based way to signal problems with respect to spending.

Revenue bonds

A revenue bond is a bond issued to finance a specific public-work project and is paid back by the revenue from that project. Thus, a revenue bond is essentially a special type of bond distinguished by its guarantee of repayment solely through a specific revenue generating entity.

Private Financing

Types of Private Financing

The financing of private investment in public infrastructure, as in corporate financing, can be classified mainly into two categories - equity financing and debt financing. Equity financing is led by investment companies, venture capital funds, construction firms and banks. Debt financing is mainly conducted through a syndicated loan. The issue of long-term bonds is still quite limited.

This section discusses the financial mechanisms involved when a specific company, often called a Special Purpose Vehicle (SPV), is set up to develop and implement the project and when this SPV uses private sources of finance. Most privately financed PPPs are structured in this way.

In such arrangements, a public entity grants a concession to the SPV for a pre-determined period during which the SPV is responsible for:

- Construction, operation and maintenance of the road in BOT-type projects
- Operation and Maintenance only for O&M concessions

Private financing is required to pre-finance the required investment and is mobilized as either equity or debt.

Equity

Private firms take shares in the capital of the SPV: Equity investors (as sponsors of the project and/or financial investors), become owners of the SPV in proportion with their share of capital and expect to be remunerated from their invested capital through the payment of dividends from the SPV. Dividends are usually paid on a yearly basis from the (after tax) profit generated by the SPV which means that equity holders are being paid last, after lenders.

Equity typically accounts for 20 to 40% of the overall project cost. The larger the investment required to build or upgrade the infrastructure, the more difficult it will be to mobilize sufficient capital and for the sponsors to share risk with other investors.

Public players and international institutions can also join the project as equity investors, when private capital is insufficient.

The various types of equity mobilized by the different potential investors are similar for other infrastructure projects such as Ports and are discussed in the Port Reform Toolkit sponsored by the PPIAF and the World Bank.

Financial Implications of port reform, Principles of financial modelling, engineering and analysis (Structuring equity). World Bank Port Reform Toolkit.

Private Debt

This is mainly made available by Commercial Lenders or Capital Markets. Debt will be reimbursed by the SPV during the operation period on the basis of regular installments. Maturity and interest rates of the debt depend on the project specificities.

The loan conditions will depend to a very large extent on the legal and macroeconomic features of the country and in particular:

- political stability,
- foreign exchange reserve for loans in foreign currencies,
- inflation

Governments too often focus on interest rates in the assessment of loans that are made available to them. In fact, maturity often has a greater influence on the future reimbursement installments.

The maturity of loans proposed by private lenders can be lengthened through conducting sound economic reforms that will improve the above-mentioned macro-economic parameters.

Various types of debt instruments and the mechanisms to structure them in an infrastructure project are discussed in the Port Reform Toolkit sponsored by the PPIAF and the World Bank.

Infrastructure funds

PPP infrastructure funds attract money from long-term investors (such as pension funds, banks, foundations). They inject equity or mezzanine finance in PPP projects.

Since highway infrastructure projects often offer stable cash-flow businesses with a moderate risk, infrastructure funds have grown rapidly worldwide. The global market capitalization of listed infrastructure funds is estimated to be around USD 2.1 trillion, nearly 5 percent of the market capitalization of the global equity market (Dr Cho Sung-Won 2008).

Australia is renowned for its listed infrastructure funds. More than 23 infrastructure funds are currently listed and publicly traded on the Australian Stock Market with a market capitalization of (USD 43 billion).

Dr Ryan J. Orr in a paper on Collaboratory Research on Global Projects in 2007 notes a rapidly increasing number of PPP infrastructure funds. He notes that 32 new PPP funds were created in 2006 and 2007 and raised more than USD 50 billion. The funds are generally created to invest in a specific geographical area as shown in Dr Orr's survey of the last 32 infrastructures funds created.

Source: Dr Ryan J. Orr, Collaboratory Research on Global Projects in 2007

Infrastructure funds help sponsors to:

- Structure project financing and make projects "bankable"
- Face equity needs (both through capital increase and mezzanine financing)
- Control costs during the construction and operational periods

If a PPP infrastructure fund expresses interest in a project, it is also a sign for the public sector of the feasibility of the project because:

- PPP funds stress analysis on economic and financial feasibility of projects in the long-term.
- PPP funds are, by nature, long-term investments i.e. they are not interested in short-term revenues.

Corporate Finance

Under corporate finance, lenders ask equity investors to pledge their assets as collateral for the loan made available to the SPV. In other words, the loan is backed by the investors. If the project does not generate sufficient cash to repay the debt, lenders will have the recourse of selling the investors' assets.

The use of corporate finance in highway infrastructure projects is limited. Due to the massive investments required in such projects and the consequent magnitude of the commercial loans, private investors are usually unable or reluctant to give such guarantees.

Financial Evaluation

Cost of financing and the WACC

Most PPP projects are financed through the project company (SPV) by a combination of equity and debt, in much the same way as investments in the corporate sector. This combination of sources of capital, referred to as financial structure, impacts the cost of capital employed for the funding of a PPP investment. The project sponsors expect to receive benefits for the equity invested in the project and lenders expect to receive interests for the money lent to the PPP shareholders.

In corporate finance, Weighted average cost of capital, WACC is used by companies to determine the feasibility of expansionary opportunities and mergers. Project companies (SPV) financing PPP projects can employ these same methods of financial analysis, with the added precision that the financial structure of the SPV should be considered for the calculation of WACC, rather than that of the investor, insofar as the SPV is non-recourse financing, and thus off-balance sheet.

The WACC calculates a firm's cost of capital in which each category of capital is proportionately weighted. All capital sources - common stock, preferred stock, bonds and any other long-term debt - are included in a WACC calculation. WACC is calculated by multiplying the cost of each capital component by its proportional weight and then summing. WACC is thus the average of the costs of these sources of financing, each of which is weighted by its respective use under the financial structure of the SPV. By taking a weighted average, the WACC represents the annual amount the company needs to pay for every dollar it receives in financing.

The weighted average cost of capital is calculated as per the following formula.

$$WACC = \frac{E}{V} * Re + \frac{D}{V} * Rd * (1 - Tc)$$

Where:

Re = cost of equity

Rd = cost of debt

E = market value of the firm's equity

D = market value of the firm's debt

V = E + D

E/V = percentage of financing that is equity

D/V = percentage of financing that is debt

Tc = corporate tax rate

Whilst the cost of debt may be readily established from local or foreign debt markets or providers, the cost of equity requires a much more detailed assessment, since risk is largely supported by the equity of investors.

Cost of equity

The Capital Asset Pricing Model (CAPM) is used to determine the expected return on equity which would be required by investors on capital markets, in accordance with the specific risk profile of the investment. In that it represents the expected return to the investor, it thus represents the cost of equity to the receiver (project company).

The formula for the CAPM is as follows:

$$C_e = R_f + (\beta \times MRP)$$

Where;

Ce= the required return on an Asset/Equity

Rf=Risk free return

β=Market risk (the higher the risk the higher β)

MRP=Market Risk Premium

The model takes into account;

- the asset's sensitivity to systemic risk or market risk, often represented by the quantity beta (β) in the financial industry
- expected return of a theoretical risk-free asset
- the expected return of the market

The **beta coefficient** describes how the expected return of a stock or portfolio is correlated to the return of the financial market as a whole.

An asset with a beta of 0 means that its price is not at all correlated with the market; that asset is independent. A positive beta means that the asset generally follows the market, and a beta of 1 means that the asset is fully correlated to the market. A negative beta shows that the asset inversely follows the market; i.e. the asset generally decreases in value if the market goes up. Correlations are evident between companies within the same industry and beta values are generally determined for industry sub-sectors which are considered to have similar operational characteristics and following similar market trends.

The CAPM is widely applied in countries with well-developed equities markets, with significant economic activity, mature financial markets and for which significant market data is available. However, developing countries may lack equity markets, which considerably reduce the liquidity of equity and for which relevant market data would be sparse or unavailable.

In such cases, and since capital (and debt) would largely be originating outside of the country, the cost of equity would generally be calculated using CAPM with equity data from developed countries. In such cases, it is generally accepted that a country risk premium is then added to the CAPM formula, representing in effect a premium on the risk free rate. The premium of a country's central bank debt over comparable US rates serves as a proxy for country risk in developed countries.

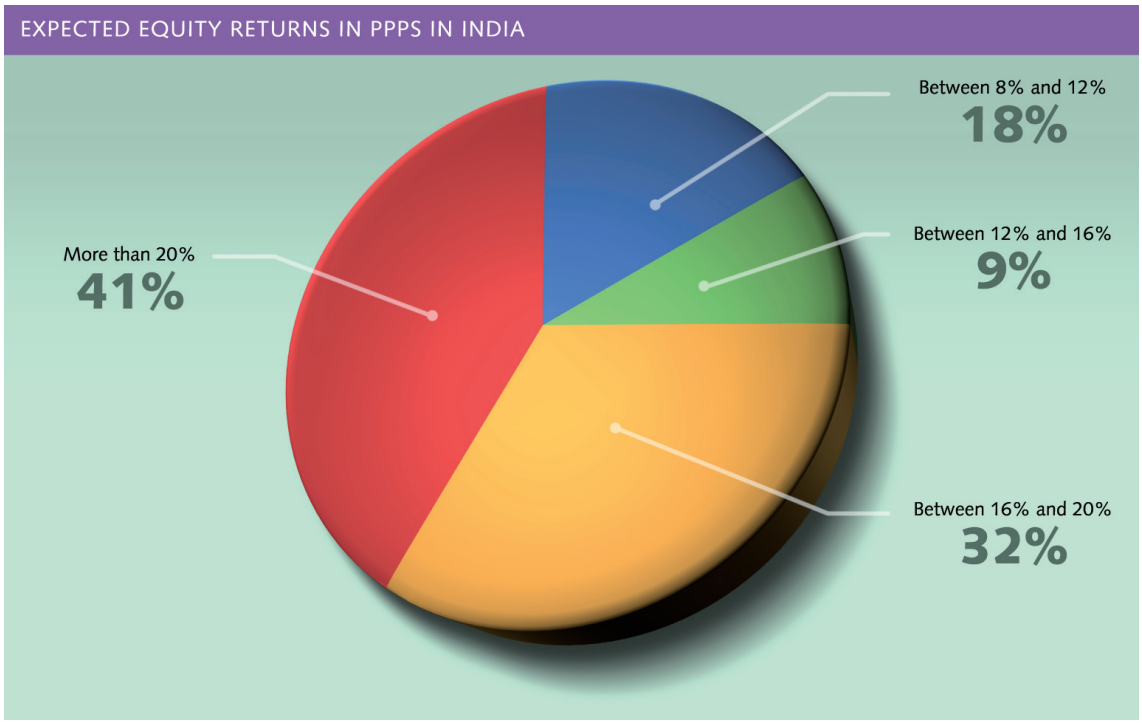
The following table presents estimates for Beta, which are global estimates as measured in developed markets and adapted to the country of Indonesia.

ESTIMATION OF BETA IN VARIOUS CONCESSION COMPANIES					
Company	**Country**	**Industry**	**Role**	**Equity Beta**	**D/E E**
Macquarie Infrastructure Group	AU	Transportation	Investor	0.78	0.41
Macquarie Infrastructure Corp	US	Infrastructure Services	Operator	0.62	1.12
Cintra	ES	Transportation	Operator	0.96	7.90
Abertis	ES	Transportation, Telecomm	Operator	0.12	3.59
Vinci	FR	Concessions, construction (energy, transportation)	Multi-div	0.33	2.41
APRR	FR	Concessions, construction (Paris-Rhine-Rhone)	Operator	0.02	14.95
Citra MargaNusaphala Persada	ID	Concessions, construction	Operator	0.99	0.41
Average		Concessions, construction	Operator	0.80	0.50
Average	MX	Concession	Operator	0.84	0.80
CIA DE CONCESSOES RODOVIÁRIAS	BR	Concession	Operator	0.713	0.86
OBRASCON HUARTE LAIN BRASIL	BR	Concession	Operator	0.878	0.45

Source: Hauswald, Robert / World Bank Institute

Expected equity returns

In India, the average expected equity returns for road investments was around 20%, which has increased from 15-17% in 2002-3 to 24% in 2005-6.



Source: Presentation entitled 'Financing PPPs in India, Clive Harris, South Asia Sustainable Development / Trends and policy implications'SAR-FEU co-sponsored Workshop "How Domestic and Regional Investors and Local Financial Markets Have Changed the Way Infrastructure PPPs are Financed –Global Trends and a Focus on India, SDN Week 2008

Other Comparisons

Estache and Pinglo (WB) estimates of the cost of equity for different countries/sectors:

- Low Income Countries (LICs): 19.2%
- Middle Income Countries (MICs): 14.5%
- Ports: 14-22%
- Energy: 15-19.5%

This is only a broad indication because these estimates use assumptions such as on gearing i.e. debt/equity levels and each set of assumptions will have different implied risks.

In India road PPP expected returns are consistent with gearing (more highly geared projects give higher returns).

Some studies have tried to estimate the implied risk in financing roads and bridges. Alexander et al, WBI estimated the asset betas (β) for roads as between 0.31-0.48 (see table above for comparison). This could reflect riskier road projects and is consistent with aggressive bidding for road projects in 2006/7 e.g. negative grant bids for some projects, huge developer interest in road PPPs

Calculation of WACC

The following table presents the calculation of WACC for a highway project in Indonesia.

DETERMINATION OF COST OF EQUITY AND WACC FOR TRANSPORT PSP PROJECTS					
	Cost of Equity i.e. how much return an investor will require				
	Cost of Equity (Ce)=Rf+B(GMRP+CRP)				
Rf	Adjusted risk-free rate	12.75%			
	(6-12 month Central Bank obligations)				
GMRP	Global market risk premium	5.5%			
CRP	Country risk premium	7.5%			
	(Based on Central Bank rating)				
	GMRP+CRP	13.0%			
	Global industry equity beta (B)	0.99			
	GMRP+CRP)*B	12.87%			
	GMRP+CRP)*B+Rf	25.62%			
	Cost of Equity	25.6%			
	Cost of Debt				
	Domestic average 6-12 month rate	17.5%			
	Weighted Average Cost of Capital (WACC)				
	(% equity x Ce) + (% debt x Cd x (1 – tax rate))		Equity	Debt	Weighted
WACC	70/30 Debt/Equity ratio	15.3%	7.7%	8.6%	16.3%
WACC	60/40 Debt/Equity ratio	16.4%	10.2%	7.4%	17.6%

Source: Consultants

The WACC calculation recognizes the benefit obtained from the tax-deductibility of interest payments. WACC is higher for the 60/40 debt/equity ratio because that capital structure uses a higher percentage of expensive equity. However, the additional cost can be somewhat offset by the lower financial risk (volatility) of the 60/40 capital structure.

However, WACC and thus transport PPP project discount rates are more likely to be driven mostly by project-specific risks, until a number of successful PPP projects have been in operation for some time. Transport PPP studies generally use a discount rate in the range of 20% to 25% to assess the viability of proposed projects.

Financial model

The financial model is a tool that simulates the financial performance of the project company. This instrument is used for analyzing projects in order to plan and set up a financial structure (SPV) to meet the requirements of both public and private sectors (a

"bankable project"), evaluate proposals made by the private sector and ensure that the best solution is developed during the negotiation process.

The financial structure of a project has to be consistent with the risk profile and the testing of financial structures is made on the basis of risk occurring scenarios. By varying input assumptions and adopting different financial structures, the financial model is used to assess the impacts on the project company's cash flow throughout the whole project life.

This section describes what can be analyzed with a financial model and how to interpret the results. The purpose, however, is not to provide detailed instructions on how to create a model for use as a tool during the negotiations with the private sector, as the preparation of such complex models should be left to the specialists.

Three aspects of financial modeling need to be addressed:

- **Financial model structure:** description of the basic structure of a financial model;
- **Financial analysis indicators:** description of the main criteria for project analysis;
- **Financial impacts:** simulation of impacts on the financing structure if certain assumptions and parameters are changed.

Two financial models are available in Module 6 -> Financial Models. These models are intended as educational products to allow the user to better understand the process of financial modeling. However, they should not be confused with the much more sophisticated financial models that are developed on a case-to-case basis for detailed modeling of the detailed financial structure of a project.

These products are:

- **A numerical financial model** that is structured in a similar way to a financial model and is particularly useful to understand the links between the various sections of the model (traffic, toll rates, costs, debt service and impacts on cash flow, profit and loss, balance sheet etc.).
- **A graphic financial model** that represents in a graphic form, the sensitivity or the project financial structure to key assumptions and parameters.

Financial model structure

The financial models are built using a standard spreadsheet program in Excel whereby the following work sheets are incorporated:

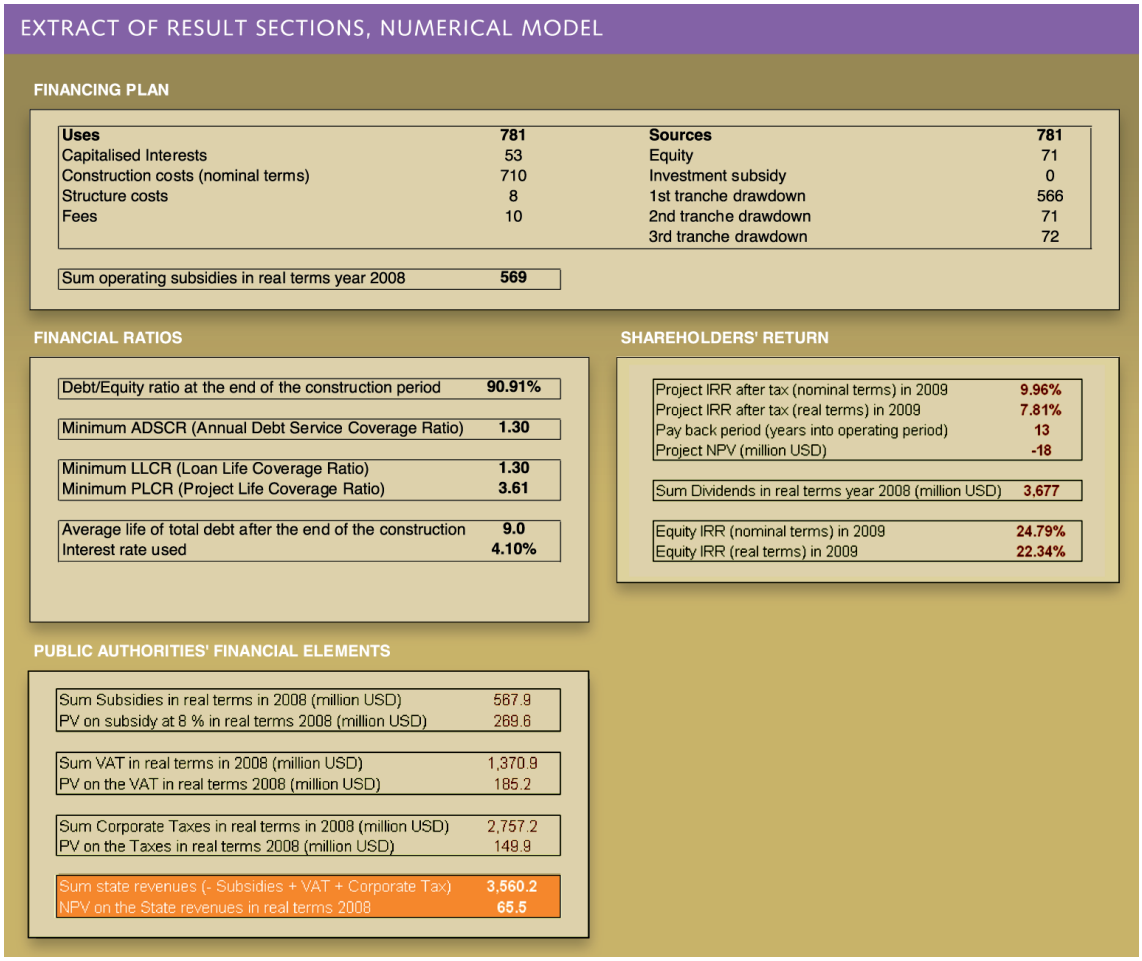
Input and assumption sheets: gather all the input data necessary for the model, classified as follows:

- economic data (inflation, tax rate, etc.)
- construction data (construction costs and planning, etc.)
- source of funds and amount (equity, loans, bonds, subsidies, etc.)
- financial data (characteristics of the loans, bonds, etc.)
- operation data (operation cost, traffic forecast, toll rate, etc.).

Results and summary sheets (including the financial analytical tools described below).

Sheets with cash-flow statement, profit & loss account and balance sheet.

Various calculation and work sheets dealing with taxation, loan structure and other relevant aspects required to generate the cash-flow, profit & loss account and balance sheet for the project.



EXTRACT OF RESULT SECTIONS, NUMERICAL MODEL

FINANCING PLAN

Uses	781	Sources	781
Capitalised Interests	53	Equity	71
Construction costs (nominal terms)	710	Investment subsidy	0
Structure costs	8	1st tranche drawdown	566
Fees	10	2nd tranche drawdown	71
		3rd tranche drawdown	72

Sum operating subsidies in real terms year 2008	569

FINANCIAL RATIOS

Debt/Equity ratio at the end of the construction period	90.91%
Minimum ADSCR (Annual Debt Service Coverage Ratio)	1.30
Minimum LLCR (Loan Life Coverage Ratio)	1.30
Minimum PLCR (Project Life Coverage Ratio)	3.61
Average life of total debt after the end of the construction	9.0
Interest rate used	4.10%

SHAREHOLDERS' RETURN

Project IRR after tax (nominal terms) in 2009	9.96%
Project IRR after tax (real terms) in 2009	7.81%
Pay back period (years into operating period)	13
Project NPV (million USD)	-18
Sum Dividends in real terms year 2008 (million USD)	3,677
Equity IRR (nominal terms) in 2009	24.79%
Equity IRR (real terms) in 2009	22.34%

PUBLIC AUTHORITIES' FINANCIAL ELEMENTS

Sum Subsidies in real terms in 2008 (million USD)	567.9
PV on subsidy at 8 % in real terms 2008 (million USD)	269.6
Sum VAT in real terms in 2008 (million USD)	1,370.9
PV on the VAT in real terms 2008 (million USD)	185.2
Sum Corporate Taxes in real terms in 2008 (million USD)	2,757.2
PV on the Taxes in real terms 2008 (million USD)	149.9
Sum state revenues (- Subsidies + VAT + Corporate Tax)	3,560.2
NPV on the State revenues in real terms 2008	65.5

A data book is also provided to assist in the assessment of results.

Financial analysis indicators

Although each party may have its own specific tools to analyze the robustness of a project and the best way of structuring the financing, the following indicators are the most used and recognized for project finance.

Project Internal Rate of Return (or Project IRR)

This represents the financial return or yield of the project regardless of the financing structure. The project Internal Rate of Return (r) is calculated on the basis of the following equation:

$$\sum \frac{Ri - Ii - Ci}{(1+r)^i} = 0$$

whereby:

Ri is the operating revenue at year i

Ii is the amount invested at year i

Ci is the operating cost at year i

The project is considered to be financially viable when r is above a benchmark rate of return with respect to the country, sector and project characteristics. Generally it should be above 7% - 8% in real terms, depending upon countries and financial markets.

Return on Equity, ROE (or Equity IRR)

This represents the yield of the project for the shareholders through the remuneration of their investment with dividends. The Internal Rate of Return (r) on equity is calculated on the basis r of the following equation:

$$\sum \frac{Di - Ii}{(1+r)^i} = 0$$

whereby:

Di is the dividend at year i

Ii is the amount invested by the shareholders at year i

The project is profitable for the shareholders when r is high. Generally, a minimum expected return rate (real return) is 10% (Shadow Toll) or 17% (Toll Roads).

Annual Debt Service Cover Ratio (ADSCR)

This represents, for any operating year, the ability for the project company to cover/ repay the debt bearing in mind the assumptions taken into account in the model. This ratio is determined as follows:

$$ADSCRi = \frac{CBDSi}{DSi}$$

whereby:

CBDSi is the net cash flow before debt service at year i (i.e. the amount of cash remaining in the project company after operating costs and taxes have been paid)

DSi is the debt service remaining at year i (principal and interests)

The project is estimated viable for the lenders when the ADSCR is greater than 1 (and usually much more than 1.0) for every year of the project life. This means that if, for whatever reason, the project revenue is below what has been forecast in the financial model at year i, the project company should nevertheless be at least able to repay the debt. Generally, the minimum ADSCR should be greater than 1.2 and sometimes 1.4 is used where risk is assessed to be higher.

Loan Life Debt Service Cover Ratio (LLCR)

This ratio indicates, for any one operating year, the capacity for the project company to bear an occasional shortfall of cash due to discrepancies in the assumptions taken into account in the model whilst maintaining its debt service to the end of the debt. This ratio is calculated as follows:

$$LLCRi = \frac{NPV(CBDSi \rightarrow end)}{DSi \rightarrow end}$$

Whereby :

NPV(CBDSi-end) is the net present value of the cash flow before debt service from year i to the end of the debt repayment period (net present value is used to neutralize the effects of inflation).

DSi-end is the total of debt service remaining at year i (principal and interests).

The project is estimated viable for the lenders when the LLCR is high for every year of the project life. This means that the project company should be able to maintain its debt repayments during a period of cash shortfall.

The ADSCR and LLCR are used by the lenders, to check project capacity to repay debt in adverse risk scenarios, including if revenues are below forecasted levels.

Net Present Value (NPV) of Subsidies

In case the public entities have to subsidize the project over several years, the net present value of these payments gives the real amount of subsidies as if they were paid in a lump sum at present year. The net present value neutralizes the effects of inflation and gives a precise idea of values taken into account in the future. In this case, the discount rate is not the private sector discount rate (WACC) but rather the real public sector rate, indicated at 8% pa.

Financial impacts (sensitivity analysis)

Using the simulation model attached to this Toolkit as a basis, it is possible analyze the impacts of the following Financial Analysis Indicators:

- concession life (currently set at 25 years),
- length of the construction period (currently set at 3 years),
- amount of capital subsidies (currently set at 0),
- amount of fixed annual operational subsidies (currently set at 0),
- equity - debt structure (currently assumed 20/80 after deducting capital subsidies),
- loan maturity period (currently set at 15 years),
- loan grace period (currently set at 4 years),
- loan repayment profile (currently set at Annuity Repayment),
- discount rate for subsidies (currently set at real annual rate of 5%).

Inputting these assumptions provides the estimated financial performance of the initial or base scenario.

Subsequently, by changing each or all of the above assumptions, it is possible to test the robustness of the financial structure related to the changes made including project parameters comprising the following; normal changes for negative risk scenarios are as shown (+,-):

- changes in investment costs due to higher construction costs or cost savings (+ x%)
- changes in operating costs (+ x%)
- changes in traffic either due to changes in initial traffic (- x%) or due to changes in annual growth rates (-x% per year)
- changes in inflation (+ x% per year)
- changes in interest rates (+ x% per year).

The graphic financial model (Module 6 -> Financial Models) shows the sensitivity of a BOT financial structure related to the 13 key parameters shown below the graph.

EXTRACT OF THE RESULT SECTION, GRAPHIC MODEL