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University

Project Financial Management

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Lecture 6

PMG 615

Financial Modeling and Evaluation (part one)

Objective of this lecture

This lecture covers:

- The input assumptions for the financial model
- The output assumptions for the financial model
- Project costs and funding



Financial modeling

Financial modeling is the task of building an abstract representation of a real world financial situation. This is a mathematical model designed to represent the performance of a financial asset or portfolio of a business, project, or any other investment.



Financial model

An adequate financial model is an essential tool for financial evaluation of the project. It serves several purposes:

Pre-Financial Close

- Initial evaluation and reevaluation of the project's financial aspects and returns for the Sponsors during the development phase.
- Formulating the financial provisions of the Project Contracts (including use as a bidding model to calculate a Tariff if the Sponsors have to bid for the project, checking LD calculations, etc.)
- Structuring the finance and reviewing the benefits to the Sponsors of different financial terms
- As part of the lenders' due-diligence process
- Quantifying critical issues in the finance negotiations

Financial model

An adequate financial model is an essential tool for financial evaluation of the project. It serves several purposes (continued):

Post-Financial Close

- As a budgeting tool
- As a basis for lenders to review the changing long-term prospects for the project and thus their continuing exposure

Financial model

The financial model covers the whole of the Project Company's operations, not just the project, and thus takes into account, for example, tax and accounting issues that may affect the final cash flow of the Project Company. Although separate and parallel financial models may be developed by the Sponsors and the lenders, it is often more efficient for a single model to be developed jointly. This may mean that the Sponsors develop the model initially and then work on it jointly with the lenders, depending on the timing of the lenders' involvement in the project. The Sponsors may then use the model to calculate their own returns, taking into account the ownership structure of the Project Company, the results of which are not of concern to the lenders.

Financial model

MODEL INPUTS

- The input assumptions for the financial model for the Project Company can be classified into five main areas:
 - Macroeconomic assumptions
 - Project costs and funding structure
 - Operating revenues and costs
 - Loan drawings and debt service
 - Taxation and accounting

These inputs need to take account of the terms of the Project Contracts, including expected and required completion of construction, timing of payments or receipts, and calculation of penalties or bonuses.

Financial model

1. MODEL INPUTS (continued)

These input assumptions are used to calculate projections of the project's cash flow, which serves as a basis for calculations of investors' returns and lenders' debt cover ratios. The model must be able to calculate a reasonable range of sensitivity scenarios.

The inputs are usually entered in separate input sheets (e.g., one for specific assumptions such as project costs, and one for long-term macroeconomic and operating assumptions that cover the life of the project). Inputs should not be scattered throughout the model, as someone not familiar with it will find it much harder to understand what is going on.

Financial model

MODEL INPUTS (continued)

To calculate the investors' returns correctly the financial model should cover the whole period from when the initial development costs on the project are incurred to the end of the project life, although for the purposes of the lenders the model is only needed from Financial Close, with past expenditure on project development being “day 0” figures.

Financial model

MODEL OUTPUTS

- **The model outputs are a series of calculations:**

- Construction phase costs
- Drawdown of equity
- Drawdown and repayment of debt
- Interest calculations
- Operating revenues and costs
- Tax
- Profit and loss account (income statement)
- Balance sheet
- Cash flow (source and use of funds)
- Lenders' cover ratios and investors' returns

- **A summary sheet usually sets out the key results on one page, such as:**

- Summary of project costs and funding
- Cash flow summary
- Lenders' cover ratios
- Investors' returns

Financial model (Inputs)

1. MACROECONOMIC ASSUMPTIONS

Macroeconomic input assumptions are those that are not directly related to the project, but that affect its financial results. Such assumptions may include:

- Inflation
- Commodity prices
- Interest rates
- Exchange rates
- Economic growth

Ideally, macroeconomic assumptions for modeling projections should be taken from an objective source unconnected with the Sponsors; for example, most major banks produce general economic research with generic projections that can be used for this purpose.

Financial model (Inputs)

1.1. INFLATION

- Inflation should be taken into account in the financial model, as it may be misleading to draw up projections on a “real” basis.
- **Different indices may need to be used as a basis for projections of inflation in different types of revenue or cost, for example:**
 - Consumer price inflation (CPI) in the Host Country for general operating costs
 - Indices of employment costs in the country of suppliers or providers of services to the project, in relation to these costs
 - Industrial price inflation for the cost of spare parts
 - Specific price indices for commodities produced by or purchased by the project (supply and demand in the commodity's own market may affect its price more than general inflation)

Financial model (Inputs)

1.2. COMMODITY PRICES

One of the key problems of project finance is that projects are often developed when commodity prices are high, and assume that these high prices will continue, underestimating the effect of the development of the project itself, and others like it, on the market for the commodity. (Or conversely, if a project is developed using a commodity as a fuel or raw material when it is at a low price, it is assuming that this low price will continue.)

Commodity price movements may be very violent on a short-term basis, whereas project finance is inevitably a long-term business; therefore, it must be demonstrated that the project is robust enough to deal with significant fluctuations in commodity prices

Financial model (Inputs)

- **1.3. INTEREST RATES**

If the interest rate on the debt is to be fixed throughout the term of the debt, the assumption for this rate should be used for projections. However, even in such cases, another floating (short term) interest rate will probably have to be projected for earnings on surplus funds held by the Project Company as security for lenders or prior to distribution to investors.

Financial model (Inputs)

- **1.3. INTEREST RATES (continued)**

There are two approaches to projecting short term interest rates: either (a) an assumption can be made as to the rate itself, or (b) “real” interest rates (i.e., the interest rate after allowing for inflation) can be used for this purpose, and the actual interest rate is determined by the assumed CPI rate. In the latter case, as shown in Table 12.1, if a real interest rate of, say, 4% is used, the projected nominal interest rate is the real interest rate adjusted for the rate of inflation using the **“Fisher formula:”**

Table 12.1
Interest Rate Projections

	Year 1	Year 2	Year 3
(a) Projected real interest	4.00%	4.00%	4.00%
(b) Real inflation rate	5.00%	4.00%	3.00%
Nominal interest rate $[(1 + (a)) \times (1 + (b)) - 1]$:	9.20%	8.16%	7.12%

Financial model (Inputs)

- **1.4. EXCHANGE RATES AND CURRENCY OF THE MODEL**

If a Project Company raises debt and equity funding in its Host Country's currency, and all its construction and operating costs and revenues are in that currency, the question of exchange rates becomes irrelevant. If this is not the case, the financial model should still be prepared in the Host Country's currency, with the ability to make assumptions about long-term exchange rate movements between this currency and other currencies used for the costs or funding of the project. Overseas investors and lenders may feel it preferable to have the model in their home currency, but this is likely to give inaccurate or misleading results (e.g., because of the effect of exchange rate movements on tax payments, and because some costs will inevitably be in the Host Country's currency). It is not difficult for the model to generate reports that translate the results of projections in the Host Country's currency to the relevant foreign currency, thus maintaining the accuracy of the calculations, but presenting the results in a more convenient form.

Financial model (Inputs)

1.4. EXCHANGE RATES AND CURRENCY OF THE MODEL

There are two approaches to projecting exchange rates between currencies, similar to those for projecting interest rates: either (a) specific assumptions can be made as to the future exchange rates, or (b) purchasing power parity rates can be used. The latter calculation takes the difference in projected inflation rates between the two currencies and adjusts the exchange rate accordingly, based on the assumption that the future exchange rate between the two currencies will move in line with their inflation differential (see Table 12.2. In year 1, with a difference between the two inflation rates of 6% in favor of Currency B, Currency A depreciates against Currency B by 6%, and so on.

Table 12.2
Purchasing Power Parity

	Now	Year 1	Year 2	Year 3
Projected inflation rates				
Currency A		9%	10%	9%
Currency B		3%	4%	3%
Projected exchange rates				
Currency A / Currency B	10.00	10.60	11.2	11.80

Financial model (Inputs)

1.5. GDP AND TRAFFIC GROWTH

Infrastructure projects may be affected by the general growth rate of the economy, which translates itself into traffic for the project. For example, there has been a fairly consistent ratio between the rate of long-term growth in air travel and GDP, with air travel's growth at twice that of GDP. Thus, assumptions in the GDP growth rate are crucial for an airport-related project. A similar situation is likely to apply for a project involving road traffic or other forms of transportation.

Financial model (Inputs)

2. PROJECT COSTS AND FUNDING

The next stage in the detailed modeling process is the preparation of a budget for the construction costs from the Project Company's point of view and determining how these are to be funded.

2.1. PROJECT COSTS

The project cost budget takes into account costs incurred since the beginning of the project development and covers the period until the project is complete and ready to operate. **A typical budget for a process plant or infrastructure project is likely to include:**

Development costs. These are the costs incurred by the Sponsors (and charged on to the Project Company), or by the Project Company itself, in the period prior to Financial Close. Sponsors need to agree among themselves to a methodology for allocating their own costs to the project, including staff overheads and travel costs, which are likely to be significant over a long development period. Costs of the Sponsors' or Project Company's advisers also need to be taken into account.

Financial model (Inputs)

2.1. PROJECT COSTS (continued)

Development fees. Project economics may allow one or more Sponsors to take out an initial fee from the Project Company for developing the project, and thus realize an upfront profit. This figure may fluctuate (or be eliminated entirely) as the financial evaluation of the project develops.

Project Company costs. These include costs after Financial Close such as:

- Personnel costs
- Office and equipment
- Costs for Permits and licenses
- Owner's Engineer costs (for construction supervision)
- Training and mobilization costs.

Financial model (Inputs)

2.1. PROJECT COSTS (continued)

Construction phase insurance.

EPC Contract price.

Start-up costs. These are costs for any fuel or raw materials used by the EPC Contractor during the testing and start-up of the project, before final completion; in some projects it may also be possible to earn some revenue from the project's output during this period to offset these costs.

EPC contract: A form of building contract used for a large or otherwise complex project under which the builder (the **EPC contractor**) will deliver a completed project on a turnkey basis. **EPC** contract is an abbreviation for engineering, procurement and construction contract.

Financial model (Inputs)

2.1. PROJECT COSTS (continued)

Initial spares. These are costs for initial stocks of spare parts (if these are not included in the EPC Contract).

Working capital. The working capital required for operation of the project is the amount of money required to cover the time difference over the Project Company's invoicing cycle between payment of operating costs and receipt of revenues in cash. The initial working capital requirement can be calculated as the costs that the Project Company has to incur until it receives its first revenues. These costs may include:

- Initial inventories of fuel or other raw materials
- Office and personnel costs
- The first operating insurance premium
- Any timing differences between payments for input supplies and product outputs

Financial model (Inputs)

2.1. PROJECT COSTS (continued)

Taxes. These include taxes payable on the various project costs, such as VAT or sales taxes.

Financing costs. These include:

- Loan arrangement and underwriting fees
- Loan or security registration costs
- Costs of lenders' advisers (both before and after Financial Close)
- Interest during construction (IDC)

Contingency. The contingency needs to be added to the project costs.

Contingency reserves

Contingency reserves are established to cover project risks that are identified and unknown. When, where, and how much money will be spent is not known until the risk event occurs.

Project “owners” are often reluctant to set up project contingency funds that seem to imply the project plan might be a poor one. Some perceive the contingency fund as an add-on slush fund. Others say they will face the risk when it materializes. Usually, such reluctance to establish contingency reserves can be overcome with documented risk identification, assessment, contingency plans, and plans for when and how funds will be disbursed.

Contingency funding

In practice, contingencies run from 1 to 10 percent in projects similar to past projects. However, in unique and high-technology projects it is not uncommon to find contingencies running in the 20 to 60 percent range. Use and rate of consumption of reserves must be closely monitored and controlled.

In practice, the contingency reserve fund is typically divided into **budget** and **management reserve funds** for control purposes. Budget reserves are set up to cover identified risks; these reserves are those allocated to specific segments or deliverables of the project. Management reserves are set up to cover unidentified risks and are allocated to risks associated with the total project.

Contingency funding

1. Budget reserves

These reserves are identified for specific work packages or segments of a project found in the baseline budget or work breakdown structure. **For example,** a reserve amount might be added to “computer coding” to cover the risk of “testing” showing a coding problem.

The budget reserve should be communicated to the project team. This openness suggests trust and encourages good cost performance. However, distributing budget reserves should be the responsibility of both the project manager and the team members responsible for implementing the specific segment of the project. If the risk does not materialize, the funds are removed from the budget reserve. Thus, budget reserves decrease as the project progresses.

Contingency funding

2. Management Reserves

These reserve funds are needed to cover major unforeseen risks and, hence, are applied to the total project. For example, a major scope change may appear necessary midway in the project. Because this change was not anticipated or identified, it is covered from the management reserve. Management reserves are established *after* budget reserves are identified and funds established.

These reserves are independent of budget reserves and are controlled by the project manager and the “owner” of the project. The “owner” can be internal (top management) or external to the project organization. Most management reserves are set using historical data and judgments concerning the uniqueness and complexity of the project.

Table 7.1 shows the development of a contingency fund estimate for a hypothetical project. Note how budget and management reserves are kept separate; control is easily tracked using this format.

TABLE 7.1
Contingency Fund
Estimate (Thousands
of Dollars)

Activity	Budget Baseline	Budget Reserve	Project Budget
Design	\$500	\$15	\$515
Code	900	80	980
Test	20	2	22
Subtotal	\$1,420	\$97	\$1,517
Management reserve	—	—	50
Total	\$1,420	\$97	\$1,567

2. PROJECT COSTS AND FUNDING

2.2 PROJECT FUNDING

- Based on the cost plan, the funding plan is drawn up to cover the total amount of funding required, divided into debt and equity.
- The Project Company should not use a short-term loan to finance working capital; this is a permanent requirement, which should be covered by the long-term project finance. However, it may be useful to have part of the project finance in the form of a revolving credit for working capital (i.e., allowing the Project Company to repay some of the financing when it has surplus cash, and reborrow it again when cash is short). This may reduce the required level of Sponsors' equity and thus also be advantageous for this reason.
- Separate short-term funding may be required for VAT or other taxes payable during construction that are recovered from offsetting against taxes on revenues once operations begin.



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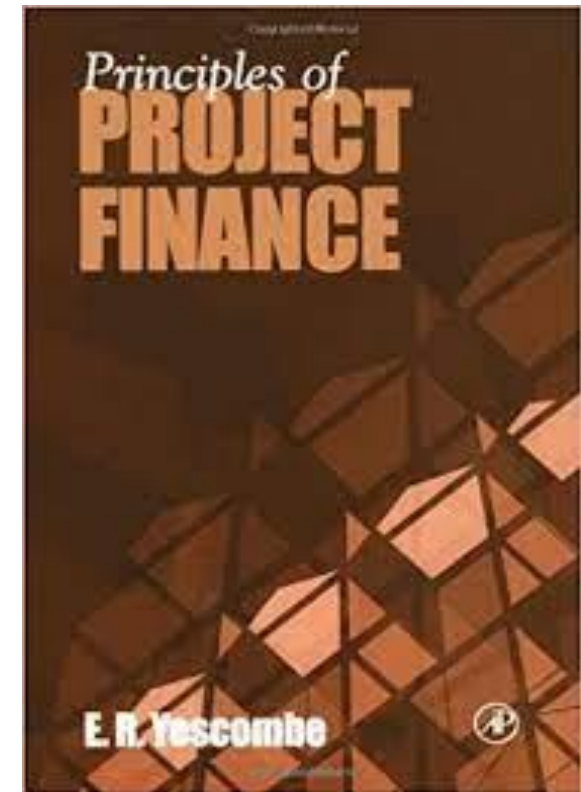
Resources:

Principles of Project Finance

By:E.R. Yescombe

First edition

www.yescombe.com





Thank you for your
attention!