INTERNATIONAL FINANCE
FINANCIAL MODEL
Lesson 6

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Summary

- Lessons 1-5 summary – main topics
- Excercises
- Overview of risk analysis

Main topics

Financial model

Being able to draw a simple financial model from some identified input

- Profit & Losses structure
- Cash Flow structure (before/after debt)
- Some good practise for financial modelling

Different model architectures

Different approach in project and project evaluation

- Corporate model
- Project finance model
- (Leverage buyout model)
- (Integration model)

Sponsor and Lender ratios

Starting from a defined model, assessing the main ratios for project evaluation

- Sponsor Ratios: IRR, NPV, Payback
- Lender Ratios: DSCR, LLCR, D/E
- Comparables: Ke, WACC
- Discounted Cash Flow
- Yield vs IRR

Sensitivity and Risk analysis

Identify, evaluate and eventually mitigate possible risk factor

- Risk matrix
- Sensitivity
- Scenario analysis
- Stress test

Yet to be discussed

P&L - Profit and Losses (Income statements)

(+) Revenues

(-) Operating Costs

(=) EBITDA ***(earnings before interests, taxes, depreciation and amortization)***

(-) D&A – depreciation and amortization

(=) Ebit *(earnings before interests and taxes)*

(-) Interests

(=) Ebt *(earnings before taxes)*

(-) Taxes

(=) Net Profit

BS - Balance Sheet *(simplified)*

Assets	Liabilities
Property, plant & equipment	Equity and retained earnigs
(Capex/investements)	Shareholder loans
Cash and associated	Financial debts *(loans, etc.)*
Working capital	Other liabilities
(+) Receivables, (-) Payables, (±) VAT/tax credit/debit, etc.	***Total Liabilities***
Financial investments	
Other assets	
Total Assets	

Cash Flow Available for Debt Service

Two ways to calculate the cash flow:

From Net Profit			From Ebitda	
(+)	Net Profit			
(+)	D&A	=	(+)	Ebitda
(+)	Financial Interests		(-)	Taxes
(-)	Investments (disinvestments)		(-)	Investments (disinvestments)
(+/-)	Working capital variation		(+/-)	Working capital variation
(=)	**Cash Available for Debt Service**		**(=)**	**Cash Available for Debt Service**

Net Profit = + Ebitda –D&A – Financial interests - Tax

Project IRR
Project NPV

To be discussed next lesson

Levered vs Unlevered evaluation

Cash Flow for debt service (unlevered cash flow)

- Unlevered IRR
- Unlevered NPV
- Unlevered payback (simple and actualized)

Free Cash Flow (after debt) (levered cash flow)

- Levered IRR
- Levered NPV
- Levered payback (simple and actualized)

These values should be somehow related (we will discuss during the next lessons)

Free Cash Flow after debt

(+) Cash Available for Debt Service

(+) Debt increase (drowdown)

(-) Principal variation

(-) Financial interests

(-) Other debt related expenses / flows (commissions, agency fee, DSRA)

(=) Free Cash Flow

[Distribution rules]

(=) Cash Flow for the shareholders

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FINANCIAL MODEL
Different architectures

Corporate model	• Usually up to 5-10 years • Historic analysis first with some kind of terminal value assumption because the cash flows are not projected forever.
Project Finance model	• Different investment phases (i.e. construction, operation) • Usually no project history • Focus on cash flows and generally cover the entire defined lifetime of the project
Leverage buyout model	• Different stages: entry price, holding period and exit price • Strong focus on the way the acquisition is financed • Manner in which alternative financing sources are repaid and computation on the sponsors' return
Integrated consolidation model	• Focus on earnings per share and other ratios before and after an acquisition • Takes into account the specific financing and accounting of the transaction as well as cost savings

FINANCIAL MODEL
Valuation analysis in different architectures

	Corporate Model	Project Finance
Model evaluation	• Present value of DCF • Multiples	• Equity IRR vs Market hurdle rate to drive investment decision and evaluation
Base Case risk measurement	• WACC • Multiples • Terminal growth	• Debt capacity • Debt terms
Risk evaluation (Equity side)	• Sensitivity analysis and scenario analysis of DCF and multiple value	• Sensitivity and scenario analysis on equity IRR
Risk evaluation (Debt side)	• Break-even analysis for refinancing and maintaining credit rating ability	• Stress test to break covenant

Different model architectures

FINANCIAL MODEL
Structure of different architectures

	Corporate Model	Project Finance
Information Base and model starting point	• Financial statements (historical) • Market analysis • Company forecast	• Long term contracts • Framework analysis • Sources and uses
Cash flow process	• Dividends (usually driven by income)	• Cash flow waterfall
Debt analysis	• New and existing	• New debt taylored for the project
Model lifetime	• Arbitrary period	• End of project life
Model complexities	• Losses, capital structure, circularity, D&A	• Losses, cash traps, cash sweep construction period, DSRA, debt sculpting
Model output	• DCF valuation • EPS and P/E • Credit quality	• Equity IRR • Project IRR • Cover ratios

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Different perspectives: Lender vs Sponsor

Different perspectives according to different roles, strategies and risk profiles

Risk based remuneration
Sensitivity analysis
Multiple Scenario

Lower remuneration
Lower risk
Stress test to avoid default

Ratio
(IRR, ROE, NPV, EPS)
DCF, Payback period

Covenant
(DSCR, LLCR, D/E)
Stress test

Main Sponsor’s ratios

IRR Internal rate of return	• The "annualized effective compounded return rate" or rate of return that makes the net present value of all cash flows (both positive and negative) from a particular investment equal to zero.
NPV Net present value	• Measurement of the profitability of an undertaking that is calculated by subtracting the present values (PV) of cash outflows (including initial cost) from the present values of cash inflows over a period of time
Payback period	• Length of time required for an investment to recover its initial outlay in terms of profits or savings (simple or actualized).
[ROE Return on equity]	• Amount of net income returned as a percentage of shareholders equity. Return on equity measures a corporation's profitability by revealing how much profit a company generates with the money shareholders have invested.

Ke - Calculation

- Capital Asset Pricing Model (CAPM) is applied to estimate the risk-adjusted rate for a project.
- The capital asset pricing model yields the following expected return:

$$\text{Ke} = \text{Riskfree rate} + \text{Beta} * \text{Risk premium}$$

- To use the model we need three inputs:

  Riskfree rate = The current risk-free rate

  Beta = The beta of the asset being analyzed.

  Risk premium = The expected market risk premium (the premium expected for investing in risky assets (market portfolio) over the riskless asset)

- Ke formula is univocal, while some argumentations can be behind the single factors, to identify the right values *(which riskfree, beta, risk premium to be used?)*

WACC

Weighted average cost of capital (WACC) is a calculation of a **firm's cost of capital** in which each category of capital is proportionately weighted.

All sources of capital, including common stock, preferred stock, bonds and any other long-term debt, are included in a WACC calculation. A firm's WACC increases as the beta and rate of return on equity increase, as an increase in WACC denotes a decrease in valuation and an increase in risk.

To calculate WACC, multiply the cost of each capital component by its proportional weight and take the sum of the results. The method for calculating WACC can be expressed in the following formula:

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

- **Tc = corporate tax rate**
- **Re = cost of equity**
- **Rd = cost of debt**
- E = equity
- D = debt

- V = E + D = enterprise value
- E/V = equity / enterprise value
- D/V = debt / enterprise value

Discounted Cash Flow (DCF)

- Discounted Cash Flow (DCF) is a valuation method used to estimate the **attractiveness of an investment opportunity**.
- DCF analysis uses **future free cash flow projections and discounts** them by a defined rate of return to identify a present value. If the present value is higher than the possible investment cost, the opportunity may be a good one.
- DCF analysis is frequently used in Merger & Acquisition (M&A) deals.

$$DCF = \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \ldots + \frac{CF_n}{(1+r)^n}$$

CF = Cash Flow

Cost of equity required by the sponsors ≈ hurdle rate

Yield

Definition

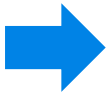
The yield is the income return on an investment, such as the interest or dividends received from holding a particular security. The yield is usually expressed as an **annual percentage rate based on the investment's cost, current market value or face value.** Yields may be considered known or anticipated depending on the security in question as certain securities may experience fluctuations in value.

Yield vs IRR

- IRR (total return) expresses what an investor is expected to earn during a certain time period. It includes interest, dividends and capital gain. The time period is **all the investment life**
- Yield is more an annual concept, a kind of **annual rate** an investment is expected to return.
- Yield is frequently used to measure bond or debt performance, or in the real estate sector, while IRR is more used in private equity and infrastructural investments *(without terminal value)*

Summary

Lessons 1-5 summary – main topics



Excercises

Overview of risk analysis

Excercise (A)

Under the following assumptions:

- Asset Value at year 0 of 150 M€, to be amortized in 3 years with a fixed value
- Investment and project life 3 years (years of investment + 3 years)
- Revenues 120 yearly + inflation rate (starting at year 1)
- Costs 60 yearly + inflation rate (starting at year 1)
- Inflation rate 1%
- Tax rate 35% on EBT
- No Working Capital
- Debt structure: repayment in 3 years with fixed rata (principal + interests) with interest rate of 6.0%

Please calculate the optimal leverage (D/E ratio) to maximize Levered IRR, with the following covenants: min DSCR, average DSCR, min LLCR, and average LLCR > 1.4x

Excercise (B)

A financial investor is considering the possibility to invest in a hydroelectric power plant in Laos, thought an SPV named “Alfa”. The project is fully authorized and has to be built.

Total construction cost is considered (capex) of **1.450 M$,** already including some contingencies for unexpected works. Construction works are expected to be done in 1 year. D&A: Plant amortization in fixed value during the plant life *(if the plant life is 15 years – 1/15 every year)*

The financial structure considers a leverage of 70%, to be repaid in 12 years with a fixed repayment (capital repayment + financial interests = fixed value every year, use the excel formula “rata” or “pmt”). Financial interests are 8% every year. No financial interests during the grace period (during construction). Financial interests start once the plant is operating

Alfa has signed a power purchase agreement with a governative body, to sell the entire electricity production. Also according to detailed technical studies on the historical water flows, Alfa can expect annual revenues of 400 M$, yearly adjusted according to inflation rate.

Alfa expects around 200 M$ of annual costs (whereof 110 M$ for maintenance, 20 M$ for insurance, 40 M$ for royalties and the remaining part for general costs or contingency.

Tax rate is the 20% of EBT, and inflation rate is 2.5%, starting from the first year of operation

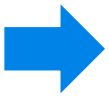
Please write or calculate:

- Some project risks and how they have been covered in the structure
- P&L, cash flow to identify IRR and NPV
- Ke and WACC based on market estimations

Summary

Lessons 1-5 summary – main topics

Excercises



Overview of risk analysis

Risk analysis

Sensitivity
Stress test

Risk identification

Technology

- Delay in construction
- Lower performances
- Higher degradation
- Higher operating costs
- Extraordinary maintenance

Counterpart

- Delay in construction
- Default during construction
- Default during operation

Market

- Higher construction budget
- Lower revenue drivers
- Higher operation costs

Macro economy

- Different inflation rate
- Commodity price

Political

- Delay in construction
- Change in law
- Tax rate change

Finance

- Different financial conditions
- Higher interest rate

Risk adversion – Sponsor vs Lender

Different perspectives according to different roles, strategies and risk profiles

Sponsor

- The trade-off between risk and economic outcome is the «decision maker»
- How to maximize the economic return, considering a fair risk reduction?

Lender

- The outstanding repayment plus interests has to be secured, with the guarantee to be repaid
- The more the risks can be covered, the more the lender is secured

Sensitivity analysis

- A sensitivity analysis is a technique for evaluating **how different values of an input variable could change the economic outcome**.
- Sensitivity analysis – *also called as what-if or simulation analysis* - is a way to predict the economic outcome of different input values.
- The more the input variable are **correlated**, the more the sensitivity analysis is complex.
- The sensitivity analysis is the **result of the risk analysis**, that identify which input variables can change and their possible range of variation
- While a sensitivity analysis aims to quantify the possible outcome of a variable change, a **scenario analysis** aims to identify possible scenario and their related economic outcome

Stress test analysis

- A stress test is the analysis to determine the ability of a given project to deal with a "**worst scenario**"
- Starting from a base case scenario, a stakeholder (sponsor or lender) may do stress testing to **prove the robustness of the project to mitigate possible crashes**
- Some questions to be asked by a stress test analysis:
  - What happens if the inflation rate goes below the base case value?
  - What happen if the interest rates goes over the base case value?
  - What happens if oil prices rise of a defined percentage?
  - What happens if my construction budget does not meet my base case budget?
- Two ways to build-up a stress test analysis: (i) by calculating the impact on the economic return, with the maximum change in the variables, or (ii) by calculating the maximum variation in the variables to keep a sustainable economic outcome