Optimal Resource Allocation

OCP Group

Evaluation and management of investments

Executive Summary & FAQ

Version 1.35
March 28, 2024

Executive summary

Investment decision-making should be based on a rigorous analysis of the project's financial performance.

An investment mobilizes financial resources that, if invested on the financial market, would have generated a certain level of profitability: the company, by investing in the project, makes a commitment to exceed market performance by generating cash flows that reimburse financial resources and remunerate them beyond the market's yield offer.

Based on the Investor Profitability Requirement (WACC), we compare the return on the investment (flow of funds) with the return on the same amount invested on the market. The difference, when it is positive, reflects the creation of value, the latter consisting, therefore, in "beating the market". At the same time, the respective market-required (WACC) and project-generated (IRR) rates of return are compared. Value creation occurs when IRR exceeds the WACC, confirming that financial profitability is the one and only source of financial value (FAQ #1).

Net Present Value is calculated by discounting nominal operating cash flows (taking into account the different inflation rates that apply to revenues and costs) to WACC (nominal). All flows must be taken into account, including the change in WCR and the residual value, as well as the potential reaction of competitors to the implementation of the project (see game theory) (FAQ #2).

The Internal Rate of Return is an understandable and very effective communication tool, but it has limitations, first and foremost the reinvestment of intermediate cash flows at the same rate, which overestimates its value. The calculation of a Modified Rate of Return is closer to "real" performance (FAQ #3).

An investment decision is built on forecasts that may not be realized. It is important to take a cautious view and measure the minimum operating time (*payback*) as well as the minimum level of activity (break-even point) of the project that ensures its profitability. The figures obtained are compared with the robustness of the forecasts in order to estimate the level of risk of the project (FAQ #4).

Understanding the level of risk is fundamental to the calculation of investors' profitability requirement. Financial creditors take the risk that the company will

not meet its contractual commitments (risk of default). Shareholders include the stock in a portfolio whose diversification eliminates any source of variability except for sensitivity to macroeconomic conditions (systematic risk measured econometrically by the ß, portfolio theory). These two risks must be remunerated beyond the simple tying up of capital, which is satisfied with the risk-free rate over the period. The WACC is equal to the profitability required by each category of funding source, in proportion to their respective contributions, calculated on a market value basis. It is important to note that the WACC is not very sensitive to the firm's indebtedness. One may be tempted to increase the debt ratio in order to favour the "cheapest" resource, but this operation is perfectly illusory, because by doing so, we only increase the risk and therefore the demand for returns for both shareholders and financial creditors. The only source of "value creation" generated by debt comes from the tax deductibility of financial expenses (pay attention to the local tax context) (FAQ #5).

In the case of an industrial holding company with activities with differentiated levels of risk, it is necessary to calculate a WACC per activity. The business is then considered as an independent entity, which makes it possible to calculate its debt capacity and its systematic risk by mobilizing comparable firms. Proceeding for all activities results in WACCs whose average is greater than the WACC of the group, as the latter takes advantage of the size and diversification effect to access cheaper financial resources. The difference between the WACC of the group and the average WACC of the activities is part of the economic and financial justification of the holding company (FAQ #6).

The level of risk was addressed through the *payback* and the break-even point. An exhaustive analysis must be carried out on all the parameters used in the financial forecasts in order to sort out sensitive and non-sensitive parameters. The latter have no influence on NPV and IRR, so they do not merit further study or special control. The sensitive parameters are subject to specific modelling and will be the basis of the project control system if the decision is positive.

It is important to remember that the sensitivity analysis of a parameter does not consist of measuring the impact on NPV by varying it by a certain percentage such as +/- 5% or +/- 10%. It is built on the basis of **scenarios** that are the consequence of business situations (appearance of a competitor, evolution of a regulation, etc.) (FAQ #7).

These same scenarios can lead to changing the perspective of a project. If, for example, there is a high risk to the ultimate volume of a contract, it may be a good idea to proceed in successive stages in the implementation of the capacity. While the cost of industrial investment may be higher, it reduces the likelihood (and cost) of having unused capacity. This approach to flexibility and reversibility in investment decisions is based on the concept of real options that differ from financial options not only in the nature of the underlying asset, but also in the valuation methods. The concept is very powerful, but its application is delicate, especially in the context of R&D projects or projects with a strong innovative component (FAQ #8).

Investments made outside the national territory deserve special treatment.

First of all, as with any significant project, it is necessary to carry out a complete forecast of the financial statements in addition to the simple calculation of cash flows and the WACC. These calculations must be made in local currency. Indeed, the project will often be developed within a dedicated company (SPV) whose financing will have to be ensured locally and the accounts produced both to the local authorities and to potential partners. Choosing a currency that is foreign to the context of the project unnecessarily complicates the calculation and loses sight of the economic and financial conditions under which the activity is carried out.

As a result, a WACC must be calculated based on the local context, both for the shareholder return requirement and for the remuneration of creditors. This calculation assumes a debt structure of the project. However, any financial calculation around NPV shows that the financial debt ratio of a project is not constant unless the equity is adjusted by contributions or returns (dividends, repayment of shareholder loans, etc.). The financial modelling of the balance sheet will thus make it possible to determine what the contribution of the shareholders should be in the first years of the project, and then what will (potentially) be returned to these same shareholders in order to maintain a constant gearing. These contributions and returns, converted to a spot exchange rate forecast determined by the theory of Purchasing Power Parity, make it possible to calculate a shareholder IRR for the Moroccan investor. The theoretical justification for this process is detailed in the procedure (see section 5.1). The calculated shareholder IRR will be compared with the investor's profitability

requirement calculated according to the usual process (CAPM) by adding a country risk premium. There is no consensus on how the latter should be calculated. It is suggested to refer to the CDS rate of sovereign debt which characterizes a local probability of crisis (FAQ #9).

When the Group is a significant supplier to the project (e.g. extracted and processed rock), caution should be exercised in calculating NPV. Indeed, the risk is to confuse the financial performance of the two stages of operations, extraction and processing. If we lump together the cash flows, we can possibly present an overall NPV of the project that is positive while the extraction subsidizes a transformation with a negative NPV. A distinction must be made between the investments and profits generated by each stage of the process and considered as two separate investments if the first step can be carried out without the need for the second. In addition, it is also important not to deviate from the Group's procedures relating to intra-Group transfer pricing (FAQ #10).

It is possible to describe the life of a company as a series of investments that, each year, build the future of the firm. So, the method used, the FCF discounted at the WACC, is mobilized with some minimal technical transformations and a little mathematical calculation to evaluate the terminal value. This method is universally used by companies seeking to calculate a so-called "fundamental" value based on their own assumptions, including the potential synergies generated by an acquisition. This is the so-called "majority" valuation. It is opinion-based, therefore sensitive to a certain subjectivity and often optimistic about the sustainability of the performance as anticipated in the calculation of the terminal value. It is complementary to an approach closer to the firm's transaction value based on the calculation of value multiples observed in comparable firms. This second approach indicates the "average" opinion of the market (a transaction is the result of two similar but discordant opinions), which allows, for example, to test a hypothesis of the price offered during an IPO. These two approaches are not in opposition, they are complementary (FAQ #11).

While the FCF method is criticized for the high sensitivity of the result to the choice of parameters, the comparable method shows its fragility when it comes to identifying truly "comparable" firms. It is possible to draw up a list of economic and financial characteristics that make it possible to estimate a kind of

"proximity" between two firms, but the process does not escape a realistic vision of the diversity of firms that one wishes to compare (FAQ #12).

From the moment a project is decided, industrial project or acquisition, the question of financing arises. If we see that the ROCE far outweighs the interest rate on the debt, it is conceivable to take advantage of a positive leverage effect by increasing the gearing. This decision has two limitations: the firm's debt capacity (limited by its operating risk measured by the variability of EBIT and FCF) and the increase in the probability of default, which increases the cost of debt. However, for shareholders anxious to limit their equity commitment, the leverage effect combined with a modest distribution policy makes it possible to increase the firm's ability to grow autonomously.

In this context, it may be possible to replace equity with financing instruments that will be similar to debt or equity depending on their nature: high-yield debt is a financial debt, a bond redeemable in shares is a deferred capital increase. Another way to differentiate between "intermediate" (mezzanine) financing tools is to identify or not an optional dimension in their engineering. Thus, a bond redeemable in shares is a "firm" tool (no deferred decision), whereas a bond convertible into shares is an "optional" tool (decision of the investor based on the value taken by the underlying asset). Finally, it is essential to respect the hierarchy of rates in the engineering of these instruments, i.e. compliance with the correlation rule between perceived risk and expected profitability (FAQ #13).

Once the operation has been carried out, the problem arises of the accounting of the firm (SPV) in the group's accounts. The legal accounts will show a financial fixed asset corresponding to the amount invested by the firm. The consolidated financial statements offer a more "business" approach by proposing to show the stake in more or less detail depending on the control exercised by the parent company over the stake shareholding.

In the event of a significant impact without control, consolidation is carried out using the equity method: financial fixed assets show the percentage held in the company multiplied by its shareholders' equity, the P&L receives the company's net income multiplied by the percentage of ownership and the cash receives the dividend. If the holding company exercises a real strategic and operational control, it is carried out by full integration by adding the subsidiary's accounts to the accounts of the holding company, line by line with the exception of intra-

group flows, as if there were no legal barrier between the two entities. Minority interests will be recognized if part of the subsidiary remains held by external investors. A distinction will then be made between consolidated net income and net income – group share after deduction of the share of profit that goes to minority shareholders.

The concept of "control" is not limited to a percentage of ownership. It may be that a company owns only 40% of a company, but that the additional investors are "dormant" and that the parent company has a privileged economic relationship (sale price, royalties on patents or trademarks, re-invoicing of holding fees, stock options at discount prices) for the external auditors to consider that there is effective control.

Finally, regardless of the method chosen, the relative evolution of currencies must be taken into account in the consolidation process: if the working currency of the group appreciates (or depreciates) against the currency of the shareholding, a loss (or gain) in the value of the assets will be recognised and will not appear in the consolidated net income, but in the comprehensive result (FAQ #14).

While the purely financial logic remains fundamental in decision-making (the destruction of value, in the financial sense of the term, leads to the disaffection of investors and the disappearance of the firm), it is accompanied by an increasingly precise analysis of the impact of the firm and its investment and development projects on its environment. This new **materiality** involves the stakeholders and must gradually enter not only into the firm's objectives, but also into its information (financial and extra-financial) and into its economic decisions. The landscape is far from being stabilized and the world has no shortage of initiatives and actors involved in the process, but, around the central concept of **impact**, a set of standards produced by credible organizations is being built, as well as an attempt to quantify it through, in particular, a cost per ton of CO_2 emitted. The link between CSR and value may or may not exist, depending on the authors, but, while the path remains to be traced, it seems that the objective is unavoidable (FAQ #15).

FAQ #1 : What is the relationship between performance, cash-flow discounting and value creation?

An investment is characterized by the time lag between when one spends and when one generates the profits generated by the investment.

But spending today is only possible if you have the funds. These are provided by investors who are attracted by the expected return of the project. These investors, shareholders and financial creditors, have the opportunity to invest their capital in the financial markets in comparable risk categories and at an average rate called the (weighted average) cost of capital, or WACC.

Let's take the example of an investment that costs $100 and is expected to yield $120 in a year.

It is intuitive to conclude that it generates a 20% return.

The financial creditors (banks) agree to finance the project up to half, i.e. 50. The shareholders will provide the top-up, 50. Creditors expect 6% of their investment in the project (the company) and shareholders can find assets on the financial market with the same level of risk and an expected return of 10%. They will demand at least the same return on investment. As financial expenses are deductible from taxable income (see FAQ #5) and taking a profit tax rate equal to 1/3, the average return expected by the different investors (shareholders and creditors) is equal to 50% * 10% + 50% * 6% * (1 – 1/3) = 7%.

In their eyes, the project (or company) is only efficient and attractive if it generates a rate of return higher than what the market offers (WACC).

Financial performance is measured by comparing the return on investment of the asset with the rate of return that investors expected to obtain in the market with the same level of risk (WACC).

It is, therefore, fundamental for a company to be familiar with its WACC, which is equal to the weighted average of the return expected by shareholders and financial creditors in proportion to their respective contributions to the financing.

This translates into the calculation of the economic profit for the **firm** , which reflects its **financial performance**:

$$\text{Economic profit} = EBIT * (1 - T) - CE * WACC$$

At the project level, the Internal Rate of Return (IRR) is calculated, which must be higher than the WACC: the project must yield more than its cost of financing.

By comparing what a project has brought in and what investors could have generated by investing in the markets, we measure the value created (positive difference) or destroyed (negative difference) and we observe that it is the **financial performance** that contributes to the **creation of value**.

Reconciling flows generated at different times in the life of the project is an exercise in financial mathematics called "discounting" and which is, again, based on the opportunity for investors to select financial assets from which they hope to earn a return, the WACC, from the markets.

Let's go back to the investment that costs $100 today and pays off $120 in a year. The method used to "compare" two flows generated at different periods is to take into account that the amount invested must reimburse the funders and remunerate them up to, at least, the rate they could obtain on the financial market, the WACC.

By investing 100 today, they expect to receive 107 in a year.

By investing in the project, they can claim to receive $120.

The amount of 120 outweighs 107 by 13. This figure measures value creation, is called Net Future Value, and is calculated as follows:

$$NFV = - 100 * (1 + 7\%) + 120 = 13$$

Multiplying 100 by (1 + 7%) capitalizes the investment flow. The calculation (1 + 7%) should be understood as a "repayment, principal + interest".

The concept of NFV is valid, but not used because it does not allow for a simple comparison of investments of different durations. So, instead of **capitalizing** the amount of the investment, we **discount** the flow generated by the investment:

$$NPV = - 100 + \frac{120}{(1+7\%)} = -100 + 112.1 = 12.1$$

NPV measures the value created. It is positive, because the investment generates a return equal to 20%, which is higher than what the market offers in the same risk category.

Performance and value creation are, therefore, linked (see FAQ #3).

FAQ #2: How is NPV calculated?

NPV is an **indicator** that measures the **value created** by a project by generating operating cash flows greater than the sum of the cash contributions required for its implementation and the investors' return requirement.

The NPV does not appear in the company's accounts at the time of implementation of the investment and is not a cash amount, it is only an **indicator**.

The Net Future Value is closer to a cash position recognized at the end of the project's operation, but it is not used because it does not allow an easy comparison of the value created by projects of **different durations** (see FAQ #1).

The generic formula for NPV is:

$$\text{NPV} = -\text{Investment} + \sum_{k=1}^{k=n} \frac{\text{FF(k)}}{(1+\text{WACC})^{\text{k}}}$$

First of all, it is important to remember that we are discounting **cash flows**, not profits. This is because **investors** measure their own returns from fund flows, so you have to take the same perspective.

In applying the formula, the following elements should be taken into account:

1/ The investment amount is not limited to industrial investment alone and must take into account all financing needs related to the project, in particular the increase in working capital requirement (capacity investment, *make-or-buy*). The ΔWCR can be treated in two different ways: either by assessing the amount year after year, with full recovery at the end of the project's operation, or by calculating the cost of financing the WCR each year and deducting it from the operating cash flow (both methods lead to the same result)

2/ The project may require additional investments and fixed assets may be sold at the end of operation. They must be taken into account for their nominal amount (after tax, if any, for the residual value) at the time of their implementation.

The general wording of the NPV becomes:

$$\text{NPV} = \sum_{k=1}^{k=n} \frac{\text{FCF(k)}}{(1+\text{WACC})^{\text{k}}}$$

FCF (year k) are the net operating cash flows:

$$\text{FCF} = \Delta\text{EBITDA} * (1 - \text{T}) + \text{T} * \Delta\text{Depreciation and Amortization} - \Delta\text{WCR} - \text{Investments net of disposals}$$

The " Δ" symbol has two meanings:

1/ Applied to WCR, it represents the difference between the WCR at the end of the year and the WCR at the beginning of the year, i.e. the increase (or decrease) of the WCR during the

financial year. Note the link between EBITDA and ΔWCR, which complement each other in the calculation of **funds from operations** with the EBITDA - ΔWCR formula.

2/ Applied to EBITDA and depreciation, it reflects the fact that the investment aims to improve the company's cash generation and that cash flows compare the situation "**with**" the project vs. " **without**" the same project.

This last point is fundamental and answers the question: what would have happened if the investment had not been made? Only **cash flow variations** should be taken into account. This is particularly important in the analysis of a productivity project in which the production costs and depreciation generated by two machines are compared.

Discounted cash flows do not include **any element of investor remuneration** such as financial expenses. Indeed, the remuneration of the contributors of funds is fully taken into account in the **WACC.**

Inflation is taken into account in the calculation of cash flows, in the evolution of both selling prices and production costs. **Nominal** cash flows discounted at a **nominal** WACC should be calculated. Otherwise, the analysis would not take into account the **differential** inflation between the different parameters. For example, macroeconomic inflation (used in WACC) can be 4%, selling prices can increase to 3%, and the cost of raw materials can increase by 5%. This **risk** must be reflected in the calculation of nominal flows.

The calculation of net income and cash flows raises questions about the **stability** of the **financial structure** used to calculate the WACC. In the first analysis, a WACC calculated on the basis of market conditions observed at the time of the decision is used and the respective contribution of shareholders and financial creditors will be considered to be stable over the life of the project. Maintaining this stability requires capital flows, which will be explained in certain cases specific to the Group, the first of which is dedicated to the development of a project in India. A section will be devoted to it in the "Deepening" chapter (#5).

Finally, cash flows are estimated on the basis of forecasts. The latter should not limit the perspective to the Group alone, but should include the potential **reaction** of economic actors to the implementation of the project. Game Theory is devoted to the rational strategic interaction between actors.

FAQ #3 : Calculation, Limits and Alternatives to IRR?

The Internal Rate of Return (IRR or TIR) is a very useful complement to NPV, as it gives an indication of the **performance** of the project in relation to the **WACC.**

Thus, with identical NPVs, a project "A" with an IRR equal to 20% will be preferred to a project "B" with an IRR equal to 15%. Moreover, it is understandable that, for a WACC equal to, for example, 10%, an IRR of 12% characterizes a project that is "barely profitable", on the other hand an IRR of 30% makes the project very attractive.

To calculate the IRR, we look for the **discount rate** that **cancels out the NPV**. The reasoning behind the calculation has its origins in the relationship between performance and value creation. If investors see that the return on the project is exactly **equal** to what the market can offer (WACC), then there will be no value creation or destruction. So, we're looking for the rate that gives NPV = 0. The discount rate is then confused with the intrinsic return of the project, which is the IRR.

The investment equal to 100 and generating a flow of 120 was assumed to generate a return of 20%. We check that $-100 + \frac{120}{(1+20\%)} = 0$.

The calculation is more difficult when the investment lasts several years, which is the general case.

Any spreadsheet such as Excel offers, in its financial functions, the automatic calculation of the IRR from successive approximations.

However, the concept has significant technical and **economic** limitations .

At the technical level:

1/ It may not be possible to calculate an IRR due to the sequence of cash flows.

2/ More troublesome, the calculation of the rate can give **several solutions**: this is often the case of projects that require significant costs of remediation of end-of-life exploitation sites; if the solution of the equation NPV(irr) = 0 gives several solutions, then the concept of IRR is no longer applicable; the calculation of the Modified Rate of Return (below) solves this problem.

At the economic level, the calculation of the IRR presupposes the **reinvestment** of the intermediate cash flows at the same rate, which overestimates the profitability thus calculated when the IRR is higher than the WACC.

Let's take the example of a project with an IRR of 30% with a WACC of 10%. It is obvious that intermediate cash flows can be reinvested at a rate of at least 10%, either in new profitable projects or by returning the funds to investors who will themselves reinvest them at the required rates. On the other hand, there is no guarantee of reinvestment at the rate of 30%, which is well above the WACC

In order not to overestimate the profitability measured in this way while solving the problem of multiple IRR, it is desirable to calculate a Modified Rate of Return (RT) as follows.

1. In order to avoid the problem of multiple IRRs, all **negative flows** (generally corresponding to industrial investment flows) are **discounted** to the WACC to obtain a discounted and cumulative investment in year 0.
2. In order to avoid overvaluation linked to the reinvestment of intermediate cash flows, all **positive cash flows** (generally corresponding to the project's operating cash flows) are **capitalized** at the WACC to calculate the financial equivalent in year n, which characterizes the end of the life of the project.

For a project that lasts 10 years, an investment in year 4 will be divided by $(1 + WACC)^4$ and an operating cash flow generated in the same year will be multiplied by $(1 + WACC)^6$.

This leaves two fund flows, one negative, positioned at year 0, the other, positive, positioned at year n.

The flow n is divided by the flow 0, the "n-th" root of the result is calculated, and then 1 is subtracted to obtain the MRR.

This figure is significantly lower than the IRR when the latter far outweighs the WACC, but it is more "realistic" from an economic and financial point of view.

Finally, even if the underlying principle is the same for ROCE and IRR (what the operation brought in compared to what was invested), the IRR of a project is not equal to the average of the after-tax ROCE recorded over the life of the project. Among the various reasons, the most important is that the ROCE is not subject to earnings discounting at the WACC.

FAQ #4 : How to Integrate Payback and Break-Even Into Valuation?

Some of the main risk factors in project evaluation include:

1. The possibility that the project will be interrupted before the envisaged term (emergence of a strong competitor, adverse changes in the legislation relating to the products sold, technological risk, etc.)
2. A reduction in sales volume compared to initial estimates.

It is, therefore, legitimate to ask two questions:

1. What is the minimum operating period that allows the initial investment to be repaid?
2. What is the minimum volume of sales that ensures the financial equilibrium of the operation?

The answer to the first question is called the "repayment term", more commonly referred to as the "payback" of the project.

Payback is, sometimes, defined by calculating the cumulative sum of operating cash flow year after year and observing the year in which the cumulative cash flow becomes greater than the initial investment. This result makes it possible to measure the time needed to **repay** the capital invested, but neglects the **remuneration** of investors, it is a nominal but incomplete payback.

To properly estimate the payback, the same calculation must be made, but by calculating the sum of the operating flows **discounted** to the WACC. The result is a ***discounted* payback** that reflects the minimum amount of time required to not only reimburse investors, but also remunerate them.

Once the calculation has been made, you have to compare the payback obtained with the visibility you have on the project. Common sense leads to accepting a payback, for example, of 7 years if you have good visibility over 20 years (patent, contract). The same payback over a total period limited to 10 years without a guarantee on volumes will be more problematic. Finally, we should not expect a "short" payback for an innovative project, but it must produce positive effects in the long term to contribute to value creation.

The same problem of discounting the break-even point.

By subtracting the unit variable cost from the unit selling price, the unit variable cost margin is obtained. By dividing the fixed costs by the margin on the unit variable cost, we obtain the number of units sold to cover the costs, thus balancing the profit.

To calculate fixed costs, depreciation must be added to the monetary fixed costs. You can even add an estimate of the average financial costs over the entire duration of the project.

The break-even point thus obtained balances the income statement (operating income or profit before tax), but not the net present value of the project. Indeed, it takes into account the remuneration expected by shareholders which, by definition, does not appear in the income statement.

Let's assume a stable volume for the duration of the project. The break-even point will be calculated from the NPV and using the "target value" to calculate the volume that allows the NPV to reach equilibrium. The resulting figure will necessarily be higher than the "P&L" break-even point.

If, for example, the project takes the form of an increase in capacity and volume, followed by a stabilized maximum volume (peak sales) with, possibly, a decrease, we can determine the volume of peak sales that allows the NPV to be balanced.

As with the payback analysis, it will be necessary to compare the volumes calculated with the visibility of the sales forecasts from the Marketing function.

FAQ #5: How is WACC calculated in the case of a "local" investment?

The WACC is the average return required by investors who contribute the resources to **finance** the **project** / **firm**.

Shareholders and financial creditors have the opportunity to invest in the capital markets. In order to attract them, the company will **promise** them that the project will generate a higher return than what is observed in the markets. Generating an IRR above the WACC fulfills the promise, thus creating value and increasing the firm's credibility capital, which contributes to its liquidity.

Investors are taking a **risk** represented by the **potential variability** in the rate of return generated by their respective contributions relative to what was expected.

Variability, or volatility, is measured **statistically** by various indicators, the best known of which is the standard deviation of return.

Shareholders and financial creditors do not share the same posture with regard to risk.

Financial creditors sign a debt **contract** with the company (bank or bond debt) and take the risk that the provisions of the contract will not be fulfilled by the borrower. The latter then puts himself at fault. Risk analysis, for the creditor, therefore consists of estimating the probability of default and multiplying it by the expected loss *"in case of default"*. A contractual relationship results in contractual remuneration and a risk which is **non-compliance with** the contract.

The shareholders, being the **owners** of the firm, are primarily interested in the evolution of its **value**. This will be affected by various risks, i.e. sources of variability. Almost all (specific) risks will disappear through diversification by integrating the stock into a portfolio. One risk that remains and cannot be diversifiable is the sensitivity of the firm's value to macroeconomic conditions. Diversifiable risks are referred to as specific, non-diversifiable risks as **systematic**.

Since risk is represented by variability, we naturally calculate how much the value of the firm will vary in relation to the only risk associated with it, the variability of the stock market. The systematic risk factor that measures the correlation between market performance and stock return is called **ß**.

The formula for calculating the ß of asset "i" is: $ß_i = \frac{\mathrm{Cov(Ri\,;\,Rm)}}{\mathrm{Var(Rm)}}$

The ß of a publicly traded company can be calculated, but the calculation only reflects the firm's **past risk**. However, investors look to the future to make their decisions, and the econometric ß gives only a limited indication of **the firm's** future systematic risk.

In addition, when a company is not listed, there is no data available to calculate any correlation. So, we identify one or more "**comparable"** firms to calculate the ß, and then we calculate the ß "equivalent-unlevered" of each company to estimate the **non-indebted ß** of the analyzed company. Finally, the ß is re-indebted using the firm's target financial structure. To make the link between indebted and non-indebted, we use Hamada **'s formula**:

$$ß_L = ß_U * (1 + (1 – T) * D / CP).$$

This process is fragile because, on the one hand, "comparable" societies are never perfectly comparable, and on the other hand, the econometrically calculated ß remains turned towards the past.

This process must, therefore, be complemented by an **economic analysis** of the firm by trying to determine whether the firm's value will change in its sensitivity to macroeconomic conditions in the future, in what direction and with what intensity.

Once the ß is estimated, the model used to estimate the shareholder's expected return calculates the shareholder return requirement as the sum of the risk-free interest rate and the risk premium, which in turn is the product of the risk factor (ß) and the average equity market risk premium (EMRP).

This process makes sense: if, for example, the ß is equal to 1.5, it means that the change in the asset price is 50% higher than the market, so the asset must generate a return that is 50% higher than the market return.

$$E(ROE) = RF + ß * EMRP$$

The **EMRP** is calculated by deducting the risk-free interest rate from the return generated by the stock market (S&P 500, IBEX 35, etc.) over a long period of time. The figure is provided by more or less credible websites and financial institutions. Professor **Damodaran**'s website (NYU) is often used to obtain a reliable figure.

Caution should be made against figures provided by institutions that give a value, both for the ß and for the PRMA, based on recent data. This is because **both ß** and **PRMA fluctuate significantly** over time. The ß, in particular, will vary greatly for a company operating in a **cyclical sector**. As the **commodities** and **mining sectors** are cyclical, it is important to estimate any parameters based on long-term observations.

Once the returns required by the various investors have been determined, the Weighted Average Cost of Capital can be calculated.

The WACC formula is as follows:

$$\textbf{CMPC} = \textbf{EQ(\%)} * \textbf{E(ROE)} + \textbf{D(\%)} * \textbf{I}_{\textbf{D}} * (1 - \textbf{T})$$

EQ(%) and D(%) represent the respective shares of shareholders and financial creditors in the financing of the firm or project.

E(ROE) is the shareholder return requirement (see CAPM), I_D is the average interest rate on the debt and T is the tax rate on profits and reflects the tax deductibility of financial expenses (this fiscal point needs to be checked in different environments).

To calculate the respective shares of shareholders and financial creditors, the **financial value** of equity and debt, not their book value, is used. Indeed, if the company has excess cash and has financed all the projects identified as generating an IRR above the WACC, it will return the funds to the contributors without changing its financial structure, the market value of the equity (market capitalization if the firm is listed) and the actuarial (financial) value of the debt. This process allows the funds to be invested exactly at WACC, hence the use of financial values for the calculation of weights.

It is very important to note that the **WACC** is **not very sensitive to the financial structure** chosen.

Indeed, as indicated above, the return on equity requirement is sensitive to the financial structure (gearing = D / EQ), with Hamada's formula giving the relationship between the ß with debt and the ß without debt:

$$ß_L = ß_U * (1 + (1 - T) * D / EQ)$$

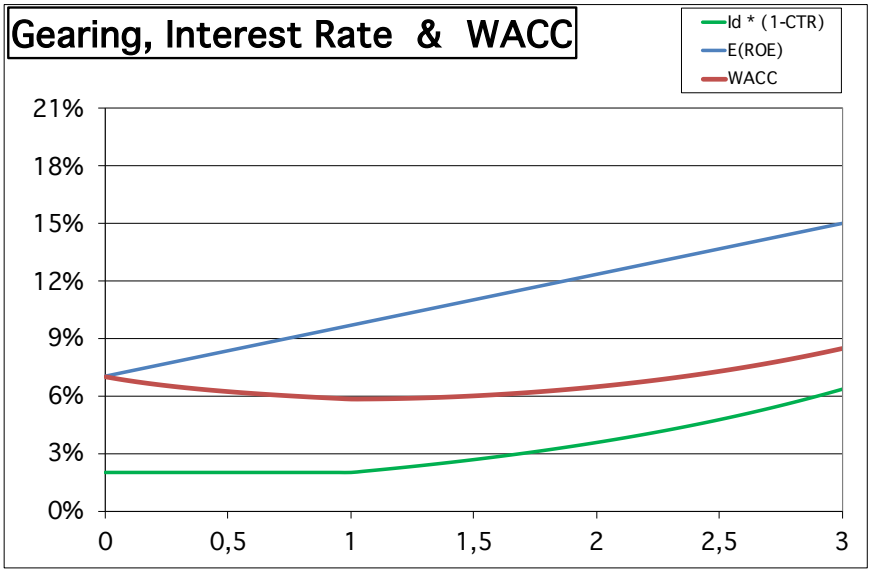
Any **increase in leverage** will increase the least expensive share of financing (the risk taken by creditors is less than the risk taken by shareholders, so the required return is lower), but, at the same time, the return expected by shareholders will increase. In addition, any increase in debt increases the risk of default, and therefore the interest rate demanded by financial creditors. So, in a nutshell, you replace the "most expensive" resource with the "cheapest" resource, but at the same time, you **increase** the **cost of both resources**.

It is **demonstrated** that:

1/ The WACC is **insensitive** to the financial structure in the absence of taxes and assuming the debt is not risky (interest rate does not vary with gearing)

2/ The WACC decreases by adding debt to a non-indebted structure, due to the **tax deductibility of financial expenses**, i.e. in the case where profits are taxed, but keeping the assumption of non-risky debt

3/ The WACC goes down a bit by adding debt from a non-indebted structure, then rises again when the interest rate on the debt increases taking into account its risky nature:



Finally, a Group must calculate the Group WACC in order to assess its own **performance**.

However, if they are involved in **different businesses** with different risk profiles, it is necessary to calculate **a WACC per SBU,** per Strategic Business Area.

Within an SBU, if a project itself has a different risk profile from the risk of the SBU, it is, again, necessary to calculate an "individual" WACC that is consistent with the systematic risk of the project and its funding structure.

FAQ #6: Choosing a Group vs. SBU vs. Project WACC

The WACC of the Group is calculated according to the formula explained in FAQ #5 and Part 3 of the procedure (sections 3.1 and 3.2).

The Group's ß reflects the sensitivity of its value to macroeconomic fluctuations and its financial structure is determined by a series of factors, including its desire to maintain a certain strategic flexibility, with the constraint of a debt capacity limited by operational risk (variability of EBIT and FCF).

When a firm includes **several activities**, the question arises of the use of a common WACC or a differentiation of the WACC according to the risk of each **SBU.**

If the activities are very similar in terms of risk, market, etc., the question does not arise.

If the economic and financial characteristics of the SBUs are far apart, **a WACC per SBU should be calculated**.

The method is simple in theory and complex in practice. The principle is that the SBU's WACC is the one it would use if it were an **independent company**. The SBU's debt capacity is therefore defined (value modelling, sensitivity analyses, Monte Carlo, Value@Risk, etc.) and its financial structure is decided according to the strategic objectives already mentioned. To calculate the ß, we use the "comparable" approach (see FAQ #12). It should be remembered that systematic risk (ß) is not the total risk (debt capacity); for example, pharmaceuticals are a very risky sector (innovation, R&D) and non-indebted, while its ß is around 0.5: R&D is a **specific risk**.

It is important to understand that the Group's WACC is not the same as the **average** WACC of the different SBUs. Indeed, the size of the Group and the diversification of its activities make it possible to envisage a higher debt by pooling the risk of the SBUs. As a result, the cost of debt is lower, which benefits the SBUs without giving them credit. The difference between the Group's WACC and the average SBU WACC is part of the Holding Company's economic and financial justification.

The differentiation of WACCs has financial and managerial implications.

Let's take the example of a Group with a WACC of 7% in which an SBU operates with a WACC of 10%. What decision should be made for a project proposed by the SBU with an IRR of 8%? It meets the performance criteria of the Group, but not of the SBU, and must therefore be rejected. Two comments on this decision, one is financial, the other managerial.

First of all, it could be objected that the project will improve the performance of the Group, whose objective is to generate a profitability of more than 8%. This is a mistake, because belonging to a higher risk class, the project will amplify the firm's sensitivity to macroeconomic

conditions and increase its cost of financing beyond the envisaged gain. When a firm is listed, awareness of the increase in risk may be delayed over time, which can create short-term windfall effects, but the market will understand the evolution and make the adjustment, sooner or later. If the holding company is not listed, the question of information asymmetry does not arise.

The **managerial** dimension is of prime importance. If the SBU's WACC is 10%, it means that firms belonging to this risk class and the same sector are able to attract investors with projects with an IRR of more than 10%. However, this project only yields 8%, which leads to an economic and managerial reflection: has this project been properly built, can more profitable projects be envisaged, why do competitors identify more tempting opportunities, is the strategy relevant, does the quality of execution need to be improved? Etc.

In the event that the SBU's WACC is lower than the Group's WACC, symmetrical reasoning applies by adding a complement.

By investing in projects with an IRR higher than the SBU's WACC, but lower than the Holding's WACC, there is a risk of a deterioration in the Group's ROCE which, in the short term, may cause negative market reactions. This is why, faced with this situation and observing the persistence of negative reactions, some firms, or even entire sectors, have decided to list on the stock exchange the subsidiaries housing the activities generating positive economic results, but whose ROCE is lower than the ROCE of the Group. This is the case of telecommunications operators who have massively outsourced the portfolio of "towers" that carried their communication equipment, revealing the "true" value of this real estate activity (low WACC).

The question of the **project** is close to that of the **SBU.** A project whose economic and financial characteristics are different from those of the Group must be evaluated using a differentiated WACC (see calculation above). These characteristics will be identified through the **sensitivity analysis** (FAQ #7, section 3.3 of the procedure), which reinforces the need to conduct project analysis through an **effective interaction** between **finance** and **operational staff**.

To conclude, the issue of differentiated WACC includes **financial** aspects, obviously, but also **managerial aspects**.

FAQ #7: How to perform a sensitivity analysis?

All forecasts are based on assumptions.

By forecasting the project's accounting and financial statements and discounting the funds flows to the WACC, a set of assumptions is assumed that cannot be robust.

What matters is not whether a hypothesis is robust or not, but understanding the **impact** of a forecasting error on value creation, and therefore on the investment decision.

In concrete terms, a parameter used in the forecast can take on very different values in the future and, therefore, be qualified as risky (variability) without this volatility having a significant impact on NPV. The **decision** is not **affected** by the value of the parameter, which is risky, but not sensitive.

The first task is to list all the parameters that go into the forecasting and calculation of NPV and IRR?

These parameters are then modelled and **scenarios** constructed. This last point is important, because it is not enough to vary the parameters by +/- 10% to make a sensitivity analysis, it is necessary to **identify the causes and intensity of this variation**. For example, the potential emergence of a competitor, technological uncertainty, or variability in the price of a commodity.

It is important to be careful not to make hasty generalizations in the characterization of a sensitivity: the residual value of a machine in 10 years is unlikely to be sensitive. The resale value of a building in 10 years is, most likely, a sensitive parameter.

Introducing the parameter variations into the calculation allows the sensitivity of NPV and IRR to be measured to these variations. For all parameters that generate low sensitivity, there is no need to delve into the subject. On the other hand, it is necessary to identify the list of sensitive parameters and draw all possible lessons from their modelling.

The first lesson is the overall risk level of the project. Is it a high risk or not, of a specific nature (with no impact on the ß) or systematic (ß, financing structure?). Should this project use a WACC that is different from the Group WACC and/or the SBU? In parameter modelling, it is important to identify possible correlations, which can have a significant impact on the level of risk.

Then, it is necessary to analyze the sensitive parameters to learn from them.

For example, if the cost of a raw material is sensitive, is it possible to negotiate a price revision clause with the customer(s)?

If the volume of sales is risky, what are the evolution scenarios, should the strategy of ramping up industrial capacity be adapted (see FAQ dedicated to Real Options)? It is certainly more expensive to set up a lower initial capacity and reserve the possibility of increasing it, but only

if necessary, than to build the plant on the basis of the full potential capacity, but this is to run the risk of having unused capacity.

In order to carry out the analysis mentioned above, it is essential to speak with the **owner** of the parameter. Who is in charge, who provided the parameter, who is **responsible for** it?

Finally, it is necessary to build the **project control/steering** system from the list of **sensitive parameters**.

For example, for a productivity investment, we will monitor the evolution of production volumes and raw material costs. For a capacity investment, we will particularly monitor sales prices and price/volume sensitivity. Etc.

If a sensitive parameter deviates from its anticipated trajectory and the scenarios built around its potential variation, it is necessary to discuss with the person responsible for the parameter and try to identify whether this error of assessment was foreseeable from the origin or not.

In addition to project management based on the list of sensitive parameters, a **post-audit** can often be very useful. At the end (or during the course of the project), we review the process of evaluating and validating the hypotheses in order to identify the sources of improvement and implement them in the following projects.

FAQ #8: How can we create value through uncertainty by mobilizing the optional approach and the concept of a real option?

In "classical" finance, risk is perceived negatively.

Indeed, higher risk corresponds to a higher return requirement from investors, therefore a higher WACC and a lower NPV: risk is value-destructive.

The sensitivity analysis provided a list of parameters that condition the success of the project and were subject to an in-depth validation built from scenarios.

The principle behind the optional approach is based on common sense. Let us take the example of a market of 100,000 units per year. If the figure is **certain**, we will build a production unit whose capacity corresponds to the anticipated volume. If the volume can be equal to 50,000 or 150,000 with the same probability, a plant with a capacity of 100,000, representing the **average** of the expected volume, will be overcapacity with a probability of 50% and will be unable to supply one-third of the potential market with a probability of 50%. It is, therefore, necessary to ask the question of the **flexibility** of the production tool. Linked to flexibility, the notion of **reversibility** also takes on its full meaning in an uncertain world. If you decide to build a plant with a capacity equal to 150,000, you are embarking on a very costly **irreversible** process in the event of an error in estimation. It is then imagined to start operations with a reduced capacity, giving oneself the possibility of increasing it **if and only if** necessary. Setting up a capacity in two instalments is always more expensive than setting it up in its entirety immediately, but it avoids the costs associated with unused capacity.

That is the whole point of the optional approach.

The concept of a real option applies to different industrial situations:

- There is a high degree of variability in selling prices (prices of raw materials extracted from a mining activity) and the question arises as to whether a site should be closed temporarily or permanently when there is a very significant drop in prices
- You have the option of carrying out a project immediately or later and you wait until the economic conditions are more favorable before launching the investment: a typical case of real estate development
- We don't know the stabilized volume of a market and we invest in stages to adjust capacity to actual demand
- There is uncertainty about the respective success of two products, so you invest in the production line so that it is able to manufacture one or the other indifferently
- During the course of the project, you retain the possibility of withdrawing by selling your stake or the assets already implemented.

These situations often lead to more investment in order to better "profit" from uncertainty. can be modelled and evaluated, but caution should be exercised in the use of option pricing models developed for **financial** options because the conditions of application are not the same, which casts doubt on the results obtained.

Some situations are optional in nature and their implementation is more a matter of strategy than economic analysis: the construction of skills and human capital, the reputation of the firm, the flexibility of the organization, etc.

Innovation deserves a specific analysis.

An R&D project only becomes an option when the feasibility, both technical and commercial, has been demonstrated and the construction of the industrial capacity is envisaged. An R&D project is, therefore, an **option-building** process, not an option. A project, which we know will not be profitable, but that it opens doors and allows us to envisage other attractive opportunities, can be analyzed as the premium of the **growth option** constituted by a sequence of projects constituting a development program. The "program" logic prevails over the individual assessment of the project with a negative NPV.

When identifying an option within the firm, it is important to identify whether it is the only one with it or whether this opportunity is shared with competitors. The value of the option and the decision to exercise it will be highly dependent on ownership of the option.

FAQ #9: What is the evaluation process for a Cross-Border investment?

The first question that arises is the choice of **the working currency**.

It is highly recommended to choose the currency of the **country** in which the investment is going to be **made**.

The project will most likely lead to the creation of a permanent establishment in the form of a company. It will provide accounting and financial information according to local rules, perhaps welcome local industrial and financial partners or operate according to local rules, generate flows of funds in local currency, receive contributions from shareholders and financial creditors in local currency, etc. Choosing a different currency leads to the application of economic and financial parameters that are valid in another environment, but different from the local operating conditions.

In this paper, we address the issues of the WACC and the analysis of the project and the performance of investors.

Let's start with the **WACC**.

When considering a project developed abroad in a currency other than the MAD and under local operating conditions, a WACC corresponding to the economic and financial conditions of the country hosting the project should be calculated.

We will therefore build the business plan in INR, calculate the WACC from local interest rates (sovereign debt and corporate debt) and choose local comparable firms in the estimation of the ß.

Nominal cash flows will thus be discounted at a nominal and local WACC rate.

Obviously, certain economic parameters (selling prices, production costs of certain materials) are initially denominated in another currency. In this case, they must **be converted** into local currency (the management of **transactional exchange rate risk** is not the subject of this document).

The last point is the "country" risk.

In the case of a project developed outside Morocco, there will initially be a contribution of funds in MAD converted into the local currency to ensure financing, then the project will generate flows towards investors, the combination of the two flows making it possible to calculate a Moroccan shareholder IRR.

This IRR will be compared to the return requirement of the Moroccan shareholder investing in a project whose location and financial structure are known, but operating in a country that may present a certain risk for the investor.

The costs related to the transfer of funds from the country of operation to Morocco will be allocated to the flow of funds (dividends, repayment of shareholder loans, etc.).

The risk linked to the country in question (international relations, etc.) is **non-diversifiable**, so it must be taken into account through an additional risk premium.

A conceivable risk premium is the sovereign debt CDS rate, which expresses the market's view of the insurance premium linked to the country and its risk.

The **financial analysis** of the project is based on a Business Plan.

The construction of the Business Plan leads to a **forecast** of all **the accounting and financial documents** over the entire life of the project. This process is necessary, not only to build the **forecast of the cash flows** (EBITDA, WCR and Capex) discounted to the WACC, but also to assess the **overall financial balance** of the project and to have the necessary information to structure its financing. For example, if you want to integrate subordinated debt into the financing, you have to build it according to the project's ability to remunerate it and repay it after the senior debt. In addition, it is necessary to identify the amount and timing of contributions and returns of funds to and from shareholders.

The **financial analysis** of the project itself follows the classic evaluation process with calculation of NPV, IRR and payback, sensitivity analysis and possible mobilisation of the optional approach in order to capture the opportunities generated by uncertainty.

On the other hand, a **fundamental specificity** will emerge in terms of contributions and returns to shareholders.

The WACC is calculated on the basis of an assumption of **stability in the financial structure**. For example, the debt-to-equity ratio is equal to 20% for the duration of the project. The financial analysis of the accounting documents shows that this stability is only respected when **annual adjustments** are made to the amount of shareholders' equity by increasing the share capital if funds are needed, by returning funds to shareholders if there is a surplus of capital (dividend, repayment of shareholder loans, etc.). This sequence of **inputs/returns** is used to calculate a **shareholder IRR**. For local shareholders, the calculation is immediate. For the OCP, it is necessary to convert local currencies into Dirhams by mobilizing the theory of **Purchasing Power Parity** which stipulates that currencies adjust between them according to the inflation differential between countries. For example, currency A will devalue by 5% against currency B if A's inflation is 5% higher than the inflation measured in country B. Despite the fragility of this theory, it allows for spot exchange rate projections to **convert** the foreign currency into Dirhams.

OCP **Group**'s **IRR** is calculated on the basis of shareholder flows expressed in **Dirhams** after conversion. It differs from the "local" shareholder IRR by the exact amount of the **inflation differential** between the two countries.

However, this IRR must be **compared** with the Group's performance requirement in order to measure financial performance. "Local" shareholders calculate their performance by comparing the "local" IRR with the return on equity requirement used for the calculation of the project WACC. The Group will calculate the return requirement by adding, to the Moroccan risk-free rate, the risk premium using the $ß_L$ of the project multiplied by the Moroccan EMRP, and by adding a country risk premium corresponding to the uncertainty relating to the host country of the project. The CDS rate can be taken as a measure of this risk. Other alternatives are possible.

To **sum up**:

The project's IRR is compared with the WACC to measure performance.

The "local" shareholder IRR is compared with the return on equity requirement used in the WACC calculation to assess the performance of "local" investors.

We compare the Moroccan IRR, calculated from the conversion of contributions and returns into Dirhams (PPP theory), with the Group's return requirement using Moroccan market data, the ß of the project (indebted) and the risk premium of the country in which the project is carried out.

The **consolidation** of the project company in the Group's financial statements will be carried out in accordance with the terms consistent with the level of control – equity method, full consolidation, with or without minority interests. The comparative evolution of exchange rates will lead to the appearance of a **translation difference**, positive or negative, depending on whether the foreign currency appreciates or devalues against the Dirham.

FAQ #10: How to evaluate the performance of an investment to which the Group is a supplier?

When the Group sells a finished product resulting from the transformation of the extracted rock, the industrial process consists of two steps:

1- The extraction itself
2- Its transformation into a finished product.

Each of the stages requires specific investments and the question arises as to whether the project should be analysed as a whole in terms of value creation or whether the respective contributions of each stage should be distinguished, possibly equalising between them.

The example used envisages the construction of a rock processing plant to sell a certain volume of finished products. The rock is purchased at the price at which the Group sells it in the case of export to an external customer. The NPV is negative.

However, the Group made a profit by selling the rock. Therefore, two additional calculations are carried out to measure this impact:

1- What happens to NPV if 50% of the rock is exported and 50% processed?
2- How can the NPV of processing be improved by reducing the price at which rock is sold to the processing business?

Both NPVs become positive, but give a **possibly** erroneous **picture** of economic reality.

The decisive question in evaluating the project is: if the **extracted rock** is not **processed**, will it be **sold** and at what **price**?

In the event that the extracted rock finds its market outside the processing activity, the price at which the rock would be sold outside the Group must be taken into account in the economic calculation.

Two complementary calculations can be used to inform the decision:

1- What is the value created by an investment to extract the rock for sale outside the Group?
2- What should be the EBITDA generated by the processing activity so that the NPV integrating extraction and processing is the same as the 100% extraction NPV calculated previously?

The result of the latest calculation gives an EBITDA target that the processing activity must achieve in order to justify the investment.

FAQ #11: How to Value a Business?

The price an investor is willing to pay to take a stake in a company depends on the opinion he or she has formed about the company's future development.

If he takes control, the investor will transform the company in order to integrate it into the group's strategy and operations by maximizing its financial efficiency through the implementation of synergies. This is why it is common to observe acquisition transactions settling at a purchase price that is 50% or more higher than the target's share price before the process begins. The acquirer forms its opinion based on its estimate of the target's ability to generate results transformed into cash flows. The valuation of such an opinion is carried out by means of the method of **discounted free cash flows at the WACC,** commonly summarized as "DCF" for *discounted cash-flow*.

However, prior to the acquisition initiation, the target company posted a daily share price that was a continuous reflection of transactions between a buyer and a seller. But, if the buyer and seller agreed on a **price**, it means they had different opinions about the **value.** So, we can say that the price reflected a kind of **average market opinion** of the fundamental value of the firm.

Since it is not possible to ask every market participant to communicate his or her opinion on the value of a firm, the aim is instead to observe the **effects** of this opinion on the price by comparing the market value with a number of accounting measures that are supposed to influence it. For example, the stock price is compared to net earnings per share, which gives the famous P/E ratio. This operation consists of calculating ratios that express a value in **multiples** of accounting data such as sales, profit or capital invested. When this method is used to value an unlisted firm, we will look for **comparable** companies (cf. FAQ #11) whose multiples **will be calculated** in order to deduce a theoretical valuation of the firm.

Multiples and comparable are approaches that measure the average market option. The DCF method builds the buyer's opinion. No one method is preferable to the other, they simply have **different goals** and are **complementary**.

The **multiples method** therefore consists of calculating ratios that compare "value" and "accounting data" in order to try to determine the ratio(s) that bring together the majority of investors in their assessment of the firm.

"Value" can mean "value of equity", i.e. market capitalization. The following ratios are calculated:

- P/E = earnings per share / number of shares outstanding (excluding treasury)
- Price / Cash Flow by replacing EPS with Cash Flow per share
- Price-To-Book = market capitalization / shareholders' equity – Group share

"Value" can also refer to enterprise value (EV = market capitalization + financial debt net of cash):

- EV / Revenue
- EV / EBITDA (widely used by M&A teams)
- EV / (EBITDA – Capex)
- EV / EBIT
- EV / Capital Employed = Market-To-Book

If you want to list a company on the stock exchange, you identify **comparable** companies, and then, in calculating these ratios, you try to identify the ratio(s) that constitute a kind of market consensus and apply it to the firm to deduct the price offered at the IPO. This method is also used to identify "errors" in market assessment if, for example, a firm is under- or overvalued by comparing its multiples with the group of comparable.

The difficulty is twofold:

1- Identify comparable that never really are
2- The method does not explain, it observes.

The **DCF method** is very similar to an NPV calculation. The value of a firm lies in its ability to generate cash flows. In the case of a project, a distinction is made between the outflow of funds during implementation and the inflow of funds during operation (typical time lag of investment). Valuing a firm means considering that it will generate and consume funds in the long term, so we calculate the funds flows net of reinvestment, called Free Cash Flows, and we discount them at the WACC.

In general, there are two periods:

1- "Transformation and growth": FCFs are not simply deducted from each other, the business is in significant growth or restructuring, or a combination of both
2- "Stability": FCFs grow "infinitely" at a stable growth rate close to inflation. This is called the **terminal value**.

This method has a considerable advantage over multiples and comparable: FCFs reflect the investor's strategic and operational vision, so we can, for example, confront strategic alternatives in terms of value creation.

Clearly, the major disadvantage of the method lies in the very high sensitivity of the result obtained in relation to practically all parameters, which can lead to overly optimistic evaluations. This is particularly true at the level of the terminal value, which increases FCF in the very long term without really questioning the resilience of the level of performance. This is why discounting economic profits in the long term by forecasting a decrease in the percentage ratio is a relevant alternative calculation.

FAQ #12: What are the characteristics that make firms comparable?

The following list of comparability criteria makes it possible to evaluate, not without a certain subjectivity, the "proximity" of several firms:

1- The industrial sector: market, regulatory environment, growth prospects
2- Size: revenue, sales volume, balance sheet total, market capitalization, enterprise value (EV)
3- Geographical presence: the different markets, global or regional, the suppliers (degree of upstream integration), the location of the factories
4- Financial strategy: shareholding structure, financial leverage (D/EBITDA), gearing (D/EQ in book and stock market values), debt maturity (short/medium/long term), possible mobilization of hybrid financing (convertible bonds, etc.), shareholder return policy (dividends, share buybacks)
5- Products and services offered: market segmentation, distribution channels, more or less strong contractual customer relationship, price/volume sensitivity, revenue recurrence
6- Financial performance: commercial profitability (ROS: gross margin, EBITDA, EBIT) and economic profitability (ROCE), degree of integration of production and productivity of assets, value added, WCR
7- Competitive environment: oligopoly vs. fragmented market vs. monopoly, monopsony, competitive aggressiveness, relative market share, barriers to entry/exit
8- Technology Environment: Mature vs. Emerging Technology, Technology Leadership
9- Potential growth: existing market, development opportunities, lifecycle positioning, maturity vs. emergence
10- Risk level: total risk, systematic risk (ß with and without debt)
11- Economic environment: stability, inflation, commodity sensitivity, role of the State in economic activity
12- Regulatory constraints: impact on costs, foreseeable changes in legislation
13- Societal environment: sector/firm reputation capital, ESG rating.

The relevance of the criteria varies by sector. It is possible to carry out a multi-criteria analysis by listing the relevant criteria and weighting them, and by assessing the greater or lesser proximity of the firms concerned.

FAQ #13: What are the main elements to consider when structuring a financing?

First of all, it is important to recall the relationship between gearing and financial profitability: the leverage formula shows that financial profitability (ROE = net income / shareholders' equity, return on investment of shareholders) is positively correlated with the gearing (gearing, or debt ratio = net financial debt / equity) if the ROCE is higher than the interest rate on the debt. Therefore, provided (see below) that the debt capacity exists, the firm's debt can improve the nominal return to shareholders, and therefore, via the calculation of sustainable growth, the firm's autonomous growth capacity.

Therefore, in order to limit the consumption of capital in an investment or acquisition transaction, it may be possible to finance a project and/or an acquisition by **substituting** alternative financing lines for equity, the remuneration and repayment of which will be **subordinated** to the servicing of the so-called "senior" debt, i.e. first rank debt.

There are an (almost) infinite number of different ways to structure financing between two lines that characterize, on the one hand, the top of the balance sheet with equity, and on the other hand the bottom of the (financial) balance sheet with senior debt. As it is an intermediary structure, it is often referred to as "mezzanine debt".

However, a number of **principles** must be respected and the **instruments** that can be mobilised can be subject to a reduced taxonomy.

In terms of **principles**, the first of these consists in estimating the **debt capacity** of the project, of the firm. The lower the operating risk, which translates into stable and predictable results and cash flows, the higher the debt capacity. For example, the company operates in a low-competitive sector with a limited number of competitors, a low probability of new entrants, and barriers to exit. Another situation is the protection of the business by technology, size and economies of scale, or the regulations in force. If, on the other hand, the variability of flows and profits is high, then the debt capacity is low because the probability of not being able to service the debt quickly becomes too high.

The second principle is that it is necessary to have a forecast that demonstrates the **financial equilibrium** of the structure that carries the contractual financing, i.e. the debt. Will the company generate enough funds to pay coupons and financial charges, and repay the principal of the liabilities? This last point is consistent with the general principle that the evaluation of a project is not limited to an estimate of EBITDA, WCR and Capex, but a complete accounting forecast is constructed to highlight the foreseeable evolution of the financial structure.

At the level of **instruments**, two criteria are used to define a taxonomy.

The first criterion is the **relative proximity** of the instrument to, respectively, conventional **debt** or **equity**.

A high-yield subordinated debt is a contract, therefore generates a contractual remuneration (for example, fixed or revisable according to the evolution of rates such as LIBOR or sovereign debt) and carries the risk of **default on the investor**. The assessment of the probability of default and the rating of the debt are the fundamental elements in the appreciation of the value of the security for the investor. It is closer to debt than equity and the assessment of its performance will be linked to the probability of default. A convertible bond or a bond redeemable into shares, share warrants, alone or in combination with a pure bond, are closer to equity, because the estimation of their performance requires a forecast of the value of the shares at maturity. Thus, during an evaluation, the estimation of the **terminal value** takes on a double importance. On the one hand, it determines an often very high percentage of the enterprise value, and on the other hand, the value of the shares deducted from the calculation is the most important input in estimating the return on the financing instrument. When calculating the IRR of the holder of a bond redeemable into shares, the bulk of the return comes from the value of the shares that constitute the return of principal at maturity.

The second criterion is the "**firm**" or "**optional**" nature of the instrument.

Subordinated debt is a **firm** instrument if the remuneration consists of fixed or variable coupons, with a possible redemption premium, but the investor does not **choose** his financial status (creditor or shareholder) according to the evolution of, for example, the share price. A bond **redeemable** in shares belongs to the same category, as it is, in fact, **redeemed** in a certain number of shares automatically at maturity. A convertible bond and a share warrant are **optional instruments** (call options) because, ultimately, the investor will choose its status by maximizing its gain.

The calculation of the return expected by the investor will depend heavily on the firm vs. optional nature of the instrument:

- A firm and contractual instrument will be evaluated based on its probability of default
- An optional instrument will be valued based on the estimated value of the underlying asset (share) at the time of decision-making, whether or not the option is exercised.

Finally, it is necessary to check that the hierarchy of interest rates is respected on the principle of risk aversion: an instrument with a higher perceived risk must generate a higher return for the investor.

FAQ #14: What are the basic principles and techniques of consolidation?

The consolidation of the financial statements consists of showing in the consolidated financial statements of the shareholder Group all the **shareholdings** held by providing **information** relevant to the degree of **strategic and operational** control.

When a company has only a **small stake** in a firm that does not involve it in strategic and operational decisions, it shows the amount invested in "financial fixed assets" as an asset and recognises in the income statement any dividends received as "financial income", which are generally not taxed.

If the shareholding does not result in strategic and operational control of the shareholding, but is significant (e.g. 30% to 40%) and reflects a real involvement in the life of the company, it will be decided to consolidate by **equity method**. On the assets side of the balance sheet, a financial asset will appear representing the percentage of ownership multiplied by the company's equity. The cash flow statement will recognize the dividend received as a cash inflow. The income statement will include the net income of the joint venture multiplied by the percentage held by the Group. This triple consideration ensures that the balance sheet is balanced. Indeed, shareholders' equity will include net income in reserves, cash will increase by the amount of the dividend and financial fixed assets will increase as a result of the increase in the consolidated company's retained earnings (retained earnings = net income – dividend).

A 100% stake will be fully consolidated, which means that all net assets will be added to the Group's net assets on a line-by-line basis. The dividend paid by the subsidiary to the Group will not appear in the financing statement under the principle of **elimination of reciprocal benefits**. On the other hand, the subsidiary's net income will be fully integrated into the Group's income statement, not in the form of a separate line (as in the equity method), but distributed line by line in the consolidated P&L.

If the shareholding is less than 100% but the subsidiary is effectively controlled by the Group, there will be full consolidation again, but the net result will be broken down into "net income – Group share" and "share of net income accruing to minority shareholders". In addition, on the liabilities side of the balance sheet, the financial involvement of minority shareholders will appear, which complements shareholders' equity – Group share to obtain consolidated shareholders' equity.

Finally, it should be remembered that the consolidation of the accounts takes into account the respective evolution of the Group's currency and the country in which the shareholding is located. If there is a devaluation of the foreign currency, the balance sheet will show some kind of loss in the book value of the holding in the form of a **translation adjustment**. The income statement will record the share of the subsidiary's net income in the Group's net income and the translation difference in comprehensive income.

FAQ #15: Considerations for ESG Dimension

The investment decision is traditionally linked to the financial performance of the project and this point is not going to go away.

However, it will be supplemented by a study of the impact of the project on the company's exterior. The key word is "**impact**." The sensitivity analysis (see FAQ #7) makes it possible to identify external elements whose impact is strong enough on the profitability of the project that they require in-depth analysis, relevant modelling and ongoing monitoring. Such items are referred to as "**material**" in the accounting sense of the word. Materiality is a well-known accounting concept that involves providing information to investors.

It has been supplemented by "**double materiality**" since the revision of sustainability performance standards published in 2006 by the Global Reporting Initiative[i] (GRI). In addition to the simple materiality (financial, "Outside-In") there is the "Inside-Out" materiality, which focuses on the impact of the firm's activities on the environment and society as part of its Social and Environmental Responsibility (CSR).

At the company level, the European Union has required companies to provide information on double materiality since the CSRD directive[ii] of November 2022.

It is clear that an investment project must include double materiality in its evaluation and management process.

Linked to the concept of double materiality, the **double materiality matrix** has appeared, which presents the company's ESG issues in order of importance and impact. This matrix can include impacts as they are analysed and communicated by the company, but also stakeholders' opinions on these same topics, highlighting points of consensus and disagreements.

At the top of the list of impacts that are the subject of precise communication is the emission of greenhouse gases (GHGs[iii]), which is often confused, but is not limited, to CO_2 emissions. GHGs include methane CH_4, nitrous oxide N_2O (agriculture, fertilizers), etc.

Companies are making GHG reduction commitments, starting with carbon dioxide. This starts with an inventory of the quantities and sources of emissions, the carbon footprint of firms. A distinction is made between:

- Scope 1: **direct** emissions generated by the company's activity in its industrial and economic process (factories, company vehicles, etc.)
- Scope 2: **indirect** emissions generated by the production of energy, electricity, heat or steam **purchased** by the company
- Scope 3: emissions associated with activities **upstream** or **downstream** of the value chain (production and transportation of products purchased from suppliers of products

and services, transportation, use and disposal – recycling of products sold to customers and consumers)

In order to achieve the carbon neutrality objectives imposed and/or announced, companies are implementing action plans in line with the scientific recommendations drawn up at the end of COP21 (2015). These recommendations are known as SBTi[iv] and the action plans are subject to validation.
Scopes 1 and 2 concern the company internally, Scope 3 is externally oriented. The latter is often superior to Scopes 1 and 2 combined, but the company starts with what is under its control, i.e. Scopes 1 and 2. Sometimes the improvement in Scope 1 is due to the outsourcing of industrial production, with the emissions generated by it being transferred to the upstream Scope 3 (and appearing in the supplier's Scope 1). Clearly, this is greenwashing and not an improvement in the planet's climatic conditions...

When it comes to the evaluation of investment projects, it is important to take into consideration CO_2 emissions in order to contribute to the company's objectives, but also from a purely financial perspective: this is the issue of carbon credits. These allowances are "rights to pollute" that are distributed free of charge to companies as part of emission reduction targets (objective: neutrality by 2050). When firms do not consume all of their allowances, they can sell them on a market to companies that consume too much. The transaction price is set according to a logic of supply and demand. After reaching a maximum of €100 per tonne, the price is around €65 per tonne in March 2024.
When selecting a supplier, it is therefore necessary to make a total carbon footprint, including the supplier's country of origin, the "quality" of its electricity, the emissions generated by the transport of products, etc. A supplier that is "far away" and develops its activity in a country with little concern for sustainable development will possibly be cheaper in MAD, but more "emitting" in CO2. The price per tonne of carbon allows for a financial quantification of the additional emissions generated by this supplier.

Finally, the industrial project (from R&D to production) must integrate the dimensions of "recycle – remanufacture – repair – reuse" in a spirit of moderate consumption of non-renewable resources.

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[i] GRI is an independent organization founded in 1997 that publishes requirements and guidelines for companies to communicate their sustainability performance
[ii] Corporate Sustainability Reporting Directive
[iii] Green House Gas
[iv] Science-based Targets Initiative, a collaborative project under the auspices of the United Nations Global Compact, the World Resources Institute (https://www.wri.org/about/history) and the Carbon Disclosure Project (https://www.cdp.net/fr), the latter two providing data and technological information