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BLAB

HANDOUTS

FINANCIAL MANAGEMENT AND FINANCIAL MARKETS

-FIRST PARTIAL-

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FINANCIAL MANAGEMENT AND FINANCIAL MARKETS

What are the **responsibilities of a CFO**?

- *Managing Cash Flow* -> the company *needs cash in order to make investments and be solvent for its obligations*. At the same time, we *don't want to just have too much cash*, as its return is low and you won't have enough return. We have to determine the correct amount of cash depending on the time horizon (the cash variables influencing our need for our daily/weekly purchases are different from the one needed for paying back a 10-year loan), using different tools.
- *Capital structure* -> *debt management*, *issuing debt for equity*, *when doing it and identify what is the optimal capital structure* (the right combination of debt and equity that minimize the cost of the financial structure), *understanding which kind of debt best meets our needs* (is it better a loan from a bank? A bond? Which kind of bond? ...), *raising funds*, *negotiate with financial players* (such as banks, investors…)
- *Capital allocation* -> how to invest your money to support growth
- *Risk Management* -> we have to *protect cash flow against volatility* of interest rate risk, exchange rate risk, commercial risk by using the adequate tools

A solid foundation in financial management opens doors to a **variety of careers** including:

- *Risk Analysts and Portfolio Managers*, who rely on financial principles to evaluate investment opportunities and safeguard assets.
- *Corporate Finance Roles*, such as financial controllers, treasurers, and business analysts, who shape capital structure and funding strategies.
- *Regulatory and Governance Positions*, where knowledge of financial systems is critical for ensuring compliance, stability, and transparency.
- *Executive Leadership*, up to the CFO role, where financial acumen is indispensable for guiding strategy, capital allocation, and shareholder value creation.

Mastering financial management is critical for professionals aiming to achieve certifications like FRM (Financial Risk Manager) or CFA (Chartered Financial Analyst).

FINANCIAL PLANNING

INTRODUCTION TO FINANCIAL PLANNING

You **need cash flows** to make *investments*, for *capital budgeting* (how to allocate cash*), carrying M&A deals,* pay *interest and fulfil your obligations*, operational purposes, dividends. **Why firms fail to manage CF?** The most common reasons are:

- Not enough profits (profitability is different from liquidity, as companies might be profitable on paper but still fail)
- Too much debt (you have a lot of fixed costs)
- Poor cash management
- Bad strategies and leadership (a poor strategic choices will lead to waste).

An example of the effects bad CF management has on company is possible to see in the case of “Toys “R” US”, a company meant to produce toys for kids in the US. As this company was able to produce wide amounts of liquidity, it has been the target of several Leverage buyout operations (an operation where the attacker gets lots of debt for buying a company that generates high amount of liquidity, with the purpose of using its assets to pay back the loans) from different players, leading to an increase in debt. Because of external threat coming from the increasing market share owned by e-commerce companies and a shift in customers behaviours, profitability decreased as well as what happened with CF -> the high level of debt increased its impact on company’s ability to make investments (to modernize stores and follow the evolution of market) and sustain operating activities, also caused because there weren’t different source of CF -> bankruptcy.

We need to **sustain in the long term 3 equilibrium**:

- *Income statement equilibrium* -> *Income needs to be higher than costs* and *increase the margines*
- *Cash Flow equilibrium* -> you have to be *prepared to respect financial obligations* and cover financial needs
- *Balance Sheet equilibrium* -> *solid capital structure*, *avoid too much leverage* (as it is going to create fixed costs that I might not face)

It is very difficult to keep all equilibriums together, and this is the challenge of a CFO. Why should a firm **focus on value creation**?

- *Rational*: value creation reflects a company’s ability to grow and develop over the long term -> unlike other metrics such as market share or revenue, which don’t necessarily correlate with sustainable success.
- *Broadly accepted*: since long-term value creation aligns with the interests of key stakeholders, it is widely embraced.
- *Sector and lifecycle agnostic*: applicable regardless of industry or corporate life cycle.
- *Measurable*: techniques for a firm equity and enterprise valuation are available.

$$\begin{aligned} &Operating\ income\ after\ taxes\ (which\ needs\ to\ be\ positive) \\ &\quad - Reinvestment\ in\ short\ term\ (\Delta Working\ Capital) \\ &\quad - Reinvestments\ in\ long\ term\ (Net\ Capital\ Expenditure) \\ &\quad = \boldsymbol{Free\ Cash\ Flow} \end{aligned}$$

➔ if this is positive, you have money to pay debt services (interest and principal) and equity (dividends and buybacks).

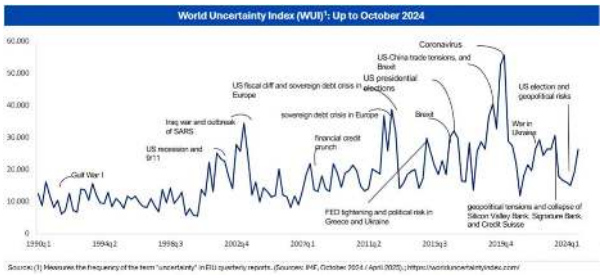
In case the company faces an **Operating Loss** (Operating Income < Operating Costs) **and/or company has large investment needs** (both for working capital or net capital) -> usually leads to **negative CF** -> in order to cover it, you can use your existing cash balance or raise new CF, both using *equity and/or debt.* This situation is common if the company is a start-up (when companies find easier to rise funds through equity rather than debt), but it can also happen when the company is mature -> it is **connected to the life cycle**.

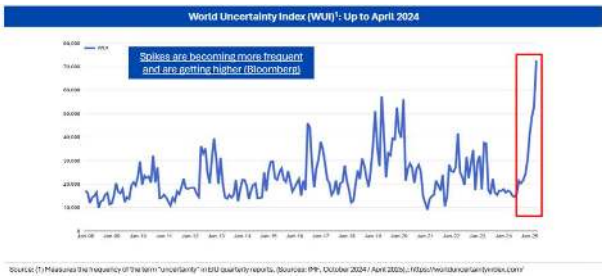
Why the need of Business Planning? The **business plan (industrial plan)** aims to simulate the company's overall future trajectory. The financial profile of the business plan (financial plan) helps assess whether the business model is sustainable. The financial plan *identifies financial goals aligned with business strategy* → Financial objectives and constraints are critical to managing business development. The financial plan is useful not only for financing or restructuring purposes, but it can also serve multiple functions if embedded in a structured planning process:

- *Clarifies business content and feasibility*.
- *Moves beyond the "idea" stage to test realism and sustainability* -> You need to be proactive while making and adjusting the financial plan.
- *Supports performance tracking* (forecast vs actual).
- *Acts as a management tool*.
- *Facilitates communication and negotiation with markets* (debt, equity) -> if the planning is clear and communicated properly, it is easier for the CFO to raise funds.

Main challenges in planning:

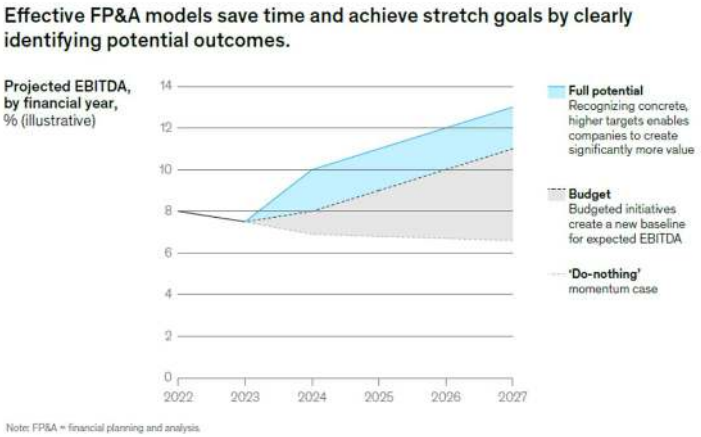
1. Greater volatility in results -> there are several indicators that help us understand the level of uncertainty around the world, such as the "World Uncertainty Index".
2. Larger discrepancies between forecasts and actuals (it has an impact on stock prices) -> you need to revise models and include *different tools* (scenario analysis, sensibility analysis, simulations…) to get the expected value and the sigma gives you the magnitude of uncertainty you are going to face.
3. Increased uncertainty and dispersion in indicators and scenarios.
4. More frequent revisions to estimates.





Six practices to improve the accuracy of FP&A (Financial Planning and Analysis) under uncertainty.

1. Use explicit probability values for all assumptions → Include scenarios based on clear probability estimates (most of the time the probability of a certain value is not stated). Assign a model owner (ideally Head of FP&A) to ensure consistency.
2. Build a "momentum case" → Start forecasts from a baseline "do-nothing" scenario (so a situation where a company decides to not take any action). After that, you have to build the scenarios where you, on the other hand, decide to take any kind of action, and compare the results (it would be better if it is possible to visualize these results is a single graph). Layer management initiatives on top (building blocks). This enhances accountability and sets realistic targets.
3. Make the "bear case" explicit → Include a plausible downside scenario (full potential scenario is still enough, we don't have to put the best scenario). Helps adjust assumptions as warning signals emerge and avoids decision paralysis.
4. Ensure clarity and consistency in macro assumptions → Use consistent and credible sources (e.g., GDP growth), you have to be clear with the assumptions and be consistence with the sources used (in particular if the assumptions are connected to macroeconomic variable). Prefer weighted averages from independent forecasts and compare to historical data.
5. Disaggregate inflation rates → Avoid using a single CPI rate. Model key business components (raw materials, services) individually. Align cost and revenue-side inflation to avoid inconsistencies.
6. Back testing → Regularly revise models (e.g., weekly), comparing forecasts with actuals.



There are **different tools for different purposes**, which requires more complex and complete information.

	Cash Budget	Financial Budget	Financial Plan
Structure	Cash inflows and outflows	BS – IS – CF statements	BS – IS – CF statements
Frequency	Monthly/Weekly	Annual/Quarterly	Annual
Horizon	Short term (6 months/1 year)	Medium term (1 year)	Medium-long term (3,5 or 7 years)
Granularity	High	Medium-high	Medium-low
Use	Treasury and liquidity management	Operational and investment budgeting	Strategic and financial planning
Purpose	Ensure solvency and manage cash	Align resources with goals & monitor performance	Support long-term vision and assess funding needs

CASH BUDGET

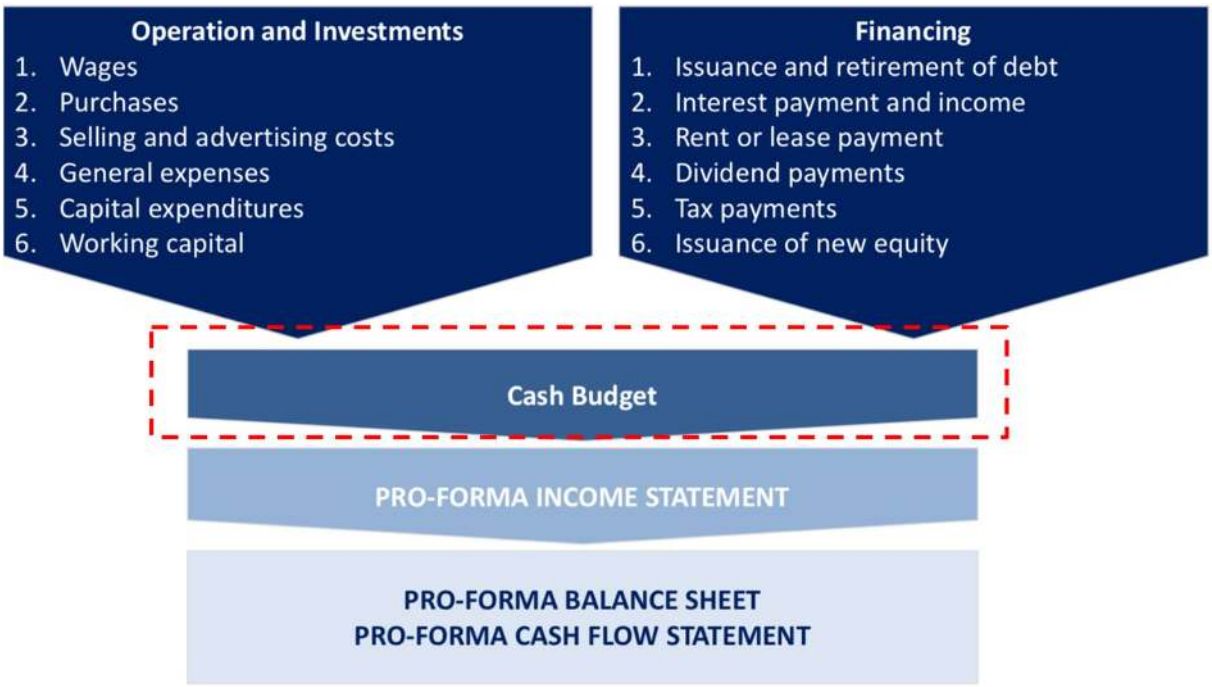
What is the **purpose** of cash budget? Forecast periodic cash balances to plan funding needs or potential surplus use in order to understand the sustainability of your business.

Cash Budget Logic:

- Translate accounting (accrual-based) events into cash flows.
- Record an inflow when revenue / asset transforms in cash.
- Record an outflow when a cost / liability transforms in cash (so we don't take in consideration depreciation for example)

Why are **cost/revenue ≠ cash inflow/outflow**?

- Timing mismatch (accrual vs cash basis)
- Non-monetary events
- Events outside the income statement (e.g., loan repayments)



You usually need to connect with all the functions of the company in order to build it, as an external analyst would have much less information (about everything, like taxes, dividends…) and need to make assumptions. **Step by step for building a cash budget**:

1. *Forecast the sources of cash*. The largest source of cash usually comes from payments by the firm's customers.
2. *Forecast the uses of cash*.
3. *Calculate whether the firm is facing a cash shortage or surplus*. The company then uses these forecasts to draw up a plan for raising or investing cash.

At the end, there is a summary of the cash movements:

		Jan	Feb	...	Dec
1	+ Sources of cash				
2	- Uses of cash				
	= Sources minus uses (change in cash balance)				
	= Cash at start of period (BOP = beginning of period)				
	+ Change in cash balance				
	+ Financial income (charges) paid on cash balance				
3	**= Cash at end of period (EOP = end of period)**				

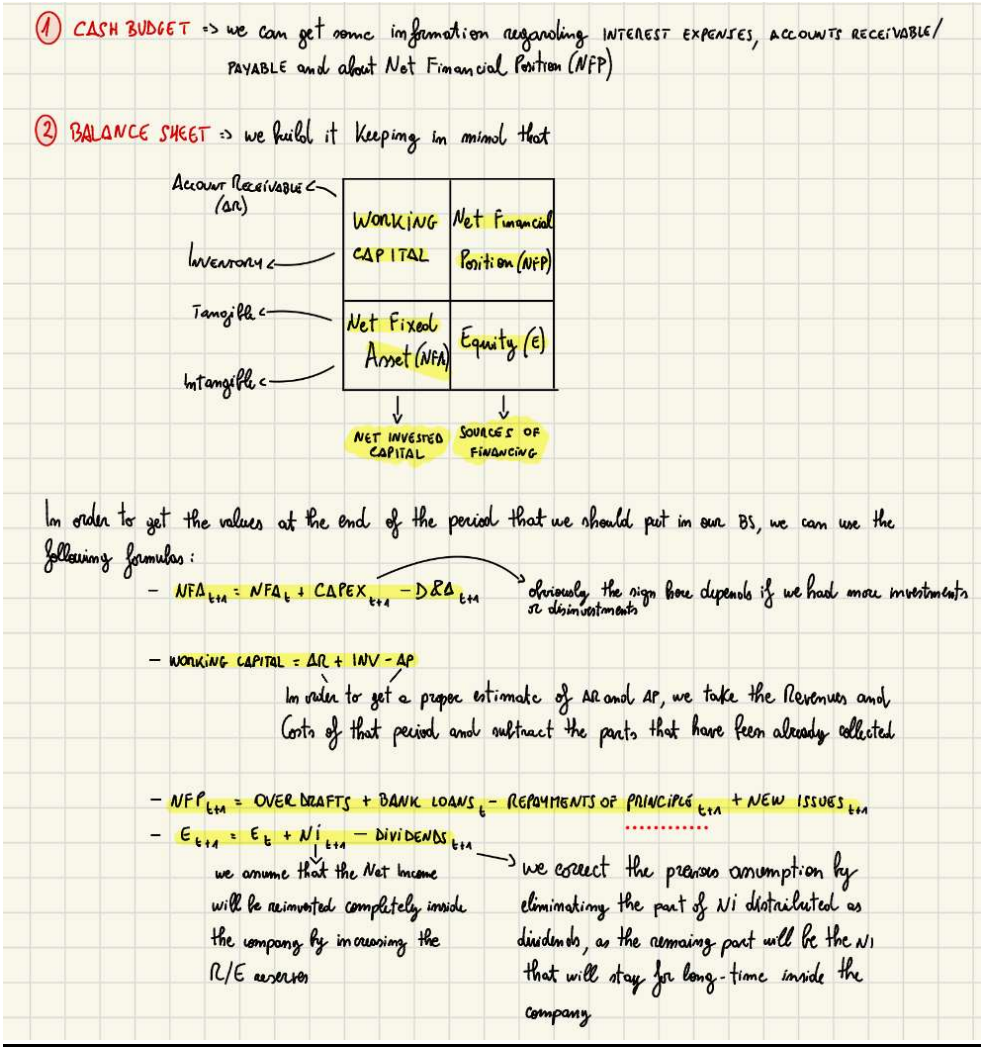
Examples of **sources of cash (inflows)**:

- *Operating activities* -> Collections from sales (recurring over time, but we have to face the delays in payments), collections of previous year trade receivables (that can be found in the BS)
- *Investing Activities* -> Sale of property, plant, and equipment, sale of securities and equity stakes, sale of intangible assets
- *Financing activities* (usually one-time flows, which means we don't have CF on a monthly base from these activities) -> Proceeds from paid-in capital increases, bond/loan issuance
- *Other Activities* (could be either one time or recurring over time): Interest income, dividend income, royalties, rental and ancillary income

Examples of **uses of cash (outflows)**:

- *Operating Activities*: Cash purchases, payments for prior period purchases, salaries, payroll taxes, employee benefits, utilities, rent, leasing, production costs, sales expenses (commissions, promotions, transport), taxes
- *Investing Activities*: Purchase of PPE, purchase of securities and equity stakes, purchase of intangible assets
- *Financing Activities*: interest payments, principals repayments, dividend payments, cash outs
- *Other Activities*

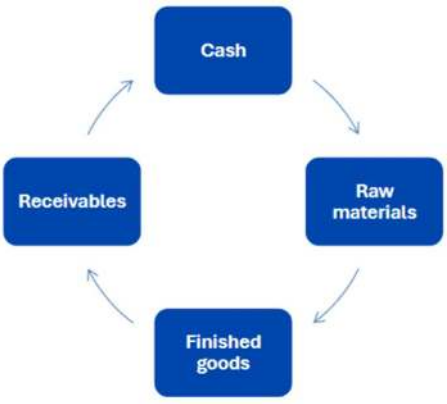
From cash budget to financial statement



WORKING CAPITAL MANAGEMENT

Working capital management

We can find the **WC (Working Capital)** both in the *Asset side* or in the *Sources*, depending on its sign. Normally, it is considered an asset that doesn't generate any return, so it needs to be funded. So, we need to *collect new funds* (in Debt or Equity) or *turn it in Negative WC* (as, in this case, we'll turn an expensive debt in a no expense debt, allowing you to have the money to make investments -> not always possible, depending on the type of company we are analysing), in order to minimize the cost of the WC.



A fundamental element we have to use in order to analyse the WC management is the **Cash Cycle** -> the firm buys raw materials, processes them into finished goods, and then generally sells these goods on credit -> **CCC (Cash Conversion Cycle)** measures for *how long your cash is tied up in the net working capital (receivables + inventory – payables)*.

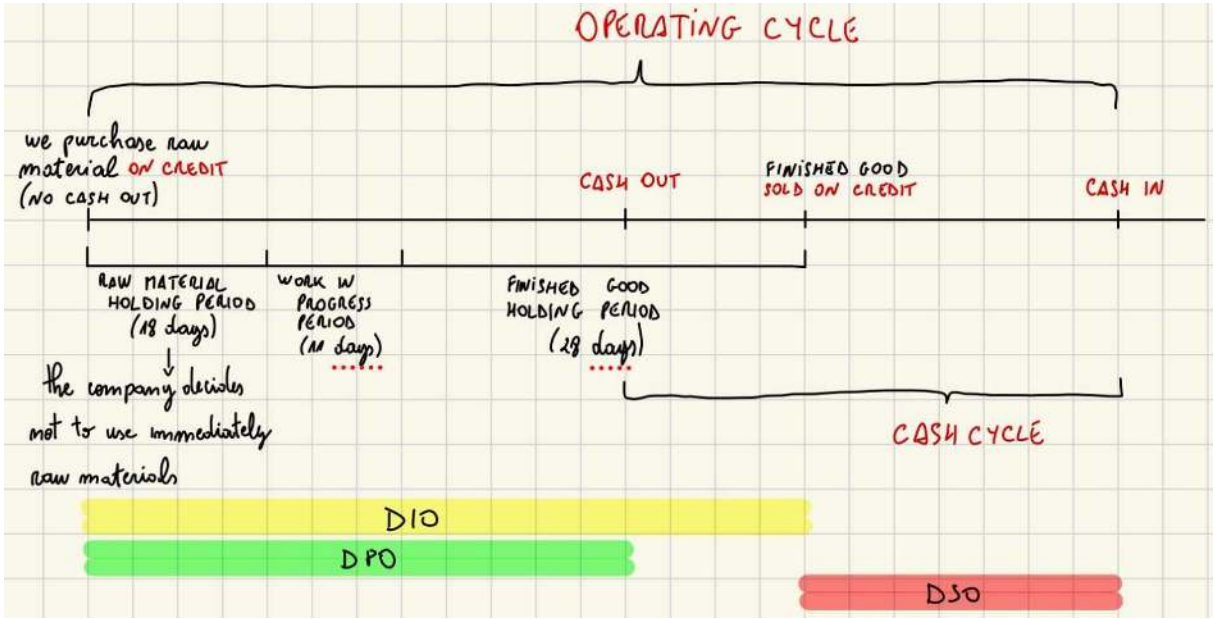
Three indicators that can help us in this situation are:

- **Accounts Payables Period (or DPO)***: the delay between the purchase of raw materials and the payments of raw materials*.
- **Inventory period (or DIO)**: *the delay between the initial investment in inventories and the final sale*.
- **Accounts Receivable Period (or DSO)**: *how long it takes a company to collect its accounts receivables*

$$\boldsymbol{Cash\ Cycle} = \boldsymbol{Receivable\ Period}\ (\boldsymbol{DSO}) + \boldsymbol{Inventory\ Period} - \boldsymbol{Accounts\ Payables\ Period}\ (\boldsymbol{DPO})$$

➔ It indicates how efficiently you manage WC

Example of Cash cycle of a manufacturing company (usually it is considered the most complicated scenario as it is possible to see all the phases):



In case we summarise all the timing available, it is possible to determine that the duration of the Cash Cycle is DSO + DIO – DPO = 52 days + (18 days + 11 days + 28 days) – 45

days = 52 days + 57 days – 45 days = ***64 days*** -> it means the company is out of money for 64 days (on average) before collecting money from clients = the longer the Cash Cycle is, the longer period will be covered by the funding we have to collect, which will be more expensive.

How do we calculate the different ratios?

$$DIO = \frac{Inventory}{\frac{(Cost\ of\ Goods\ Sold)}{365}}$$

$$DPO = \frac{Trade\ payables}{\frac{(Cost\ of\ Goods\ Sold)}{365}}$$

$$DSO = \frac{Trade\ receivable}{\frac{(Sales)}{365}}$$

$$Inventory\ Turnover = \frac{365}{Days\ of\ Inventory}$$

➔ In case we want to understand how changes in these ratios (for example, the marketing team decides to give longer DSO in order to make it more probable the deal to be closed) would affect the WC, we have to use the inverse formula, usually assuming that Sales or COGS are going to be the same (unless there has been specific estimates and forecasting for these dimensions)

From these ratios, it is possible to understand that, in case the DSO increases, we both have a longer Cash cycle and an increase in Account Receivable. In addition, the DPO decreases, the Account Payable decreases and the Cash Cycle is longer.

➔ Potential liquidity issue even though there are no consequences on profitability

What **financial strategies could the CFO use to reduce the liquidity gap**?

- Improve efficiency by decreasing the DI or increase Inventory turnover
- Factoring: Sells accounting receivable to banks to get immediate cash (it is not free, as most of the time we do not receive the total amount but just a part of it, maybe the 97%)
- ask clients to pay earlier, usually offering a discount, in order to decrease the DSO
- short-term loans and credit lines to cover temporary shortfall -> usually very expensive

What are the most common **6 mistakes in managing working capital**?

- *Focusing only on the Income Statement equilibrium* (the one that says a company should aim at generating revenues higher than costs) -> Let's assume a company might decide to decreases the DSO in order to collect earlier the cash -> *it makes customers unhappy, making them decide to buy less products -> can lead to a decrease in the price and in EBIT. On the other hand, it allows the company to have immediate cash* -> it's a trade off

- *Rewarding the Sales Force for Growth Alone* -> we want to increase the revenues at all costs -> *it could lead to the company to buy more inventory than needed*, increasing costs
- *Excessive importance to Quality target and control* -> it leads to *more complex production processes and higher DI*. In addition, most of the time customers reach a *limit in the appreciation of the product's quality*, most of the time because they do not have the knowledge to identify and appreciate the increase of quality, seeing no reason in price increases. What a company could do is outsourcing some of the components of the productive process, in order to decrease the DI and save cash that could be used for making new investments (by keeping the same quality at the same time).
- *Tying receivable to payable* -> companies try to *mirror the relationships with customers with the relationships with customers, even though it is not a good idea to tie them up*. For example, if our suppliers might decide to give us 30 days to pay them, not necessarily it is a good idea to give our client the same amount of day to pay us, also because they depend by different factors -> DSO can be seen as a *function of bargaining power, competition, industry structure* (B2B has longer collection periods than B2C), *customers behaviour* (if we are dealing with long paying). DPO is a *function of bargaining power, competition*
- *Only rely on current* ((Liquidity + Inventory + Trade receivables)/Trade payables) *and quick ratio* ((Liquidity + Trade receivables)/Trade payables) -> the difference between them is subtracting the inventory from the current ratio. *A company might decide to increase these ratios in order to show investors the capability of the company to have a good BS equilibrium*. The problem is that this objective can be easily achievable by just *increasing AR or reducing AP*, but the more closely a company follow this practice, the more probable the company would face liquidity issue
- *Benchmarking competitors* -> just looking at your competitors might not be a good strategy, as first you have to define who they are, and sometimes it is better to look outside of your industry to have a good benchmarking -> Companies should focus on understanding customers and productive process rather than comparing with your competitors

By looking at the composition of the Working Capital of a company, it is possible to predict which would be the sector in which the company operates. Let's take the following examples:

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Exhibit 1 Balance Sheet Percentages and Selected Financial Data for Unidentified Industries

Line		A	B	C	D	E	F	G	H	I	J	K	L	M	N
	Balance Sheet Percentages														
1.	Cash and Marketable Securities	12	6	31	1	52	1	15	13	4	49	15	11	4	22
2.	Accounts Receivable	5	16	10	5	10	4	2	9	61	7	3	11	4	19
3.	Inventories	4	0	14	1	1	55	25	2	0	0	0	48	18	0
4.	Other Current Assets	3	3	0	3	3	4	2	7	24	1	2	0	4	4
5.	Property, Plant, and Equipment	8	54	35	64	11	15	49	4	1	16	59	14	57	9
6.	Other Assets	68	21	10	26	23	23	8	64	10	26	22	16	13	47
7.	Total Assets[a]	100	100	100	100	100	100	100	100	100	100	100	100	100	100
8.	Notes Payable	6	3	0	3	2	0	1	6	75	0	3	1	10	5
9.	Accounts Payable	3	6	30	3	3	26	17	15	0	NM	1	13	16	NM
10.	Accrued Items	1	10	16	2	2	15	7	6	0	3	12	17	3	6
11.	Other Current Liabilities	8	0	6	2	15	18	15	10	4	1	9	30	10	37
12.	Long-term Debt	20	29	9	29	28	9	33	36	7	0	21	11	32	3
13.	Other Liabilities	21	15	15	35	18	8	14	14	4	8	19	28	11	4
14.	Total Liabilities	58	63	77	72	68	76	88	87	89	12	65	100	81	55
15.	Retained Earnings + Accumulated Loss	44	46	5	10	37	-12	56	-7	11	42	38	35	44	-2
16.	Treasury Stock	-52	-15	-2	-1	-32	-64	-79	-1	-4	-2	-5	-47	-39	0
17.	Other Equity Accounts	50	6	21	18	28	100	35	21	3	48	2	13	14	46
18.	Total Equity	42	37	23	28	32	24	12	13	11	88	35	0	19	45
19.	Total Liabilities and Equity[a]	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	Selected Financial Data														
20.	Current Assets/Current Liabilities	1.4	1.4	1.0	1.1	2.9	1.1	1.1	0.8	1.1	12.9	0.8	1.2	0.8	0.9
21.	Cash, MS, AR/Current Liabilities	0.9	1.2	0.8	0.6	2.7	0.1	0.4	0.6	0.8	12.6	0.7	0.4	0.2	0.8
22.	Inventory Turnover (X)	1.5	N/A	7.7	8.5	14.4	2.7	4.9	21.9	N/A	N/A	N/A	1.5	14.6	N/A
23.	Receivables Collection Period (days)	57	47	22	60	88	6	3	52	4678	52	16	41	5	136
24.	Total Debt/Total Assets	0.25	0.32	0.09	0.30	0.29	0.09	0.34	0.42	0.82	0.00	0.24	0.12	0.42	0.08
25.	Payables Period (days)	151	41	105	92	82	66	52	114	N/A	25	13	65	22	10
26.	Revenue/Total Assets	0.31	1.25	1.63	0.29	0.43	2.09	1.91	0.64	0.05	0.48	0.74	1.01	3.30	0.50
27.	Net Profit/Revenue	23%	7%	2%	11%	33%	-3%	3%	-5%	29%	39%	13%	9%	2%	1%
28.	Net Profit/Total Assets	7%	9%	3%	3%	14%	-7%	5%	-3%	1%	19%	10%	9%	5%	1%
29.	Total Assets/Equity	2.4	2.7	4.3	3.6	3.1	4.2	8.3	8.0	9.3	1.1	2.9	224.1	5.4	2.2
30.	Net Profit/Equity	17%	24%	12%	12%	44%	-30%	45%	-25%	13%	21%	28%	1990%	28%	1%
31.	EBIT/Interest Expense	9.7	8.7	8.6	2.8	12.8	2.2	6.8	-1.4	3.5	N/A	12.2	28.6	3.5	2.7
32.	EBITDA/Revenue	36%	12%	9%	24%	41%	3%	10%	7%	36%	57%	21%	13%	4%	10%

Source: Compiled from company annual reports.

Note: N/A = Not applicable; NM = Not meaningful, negligible amount.

[a]Column totals may not add to 100 due to rounding.

If we would like to identify the **service companies**, something that can be very useful is looking at the inventory level. This is because service companies have 0% inventory, which is something different from having 1% inventory -> B/I/J/K/N are service companies.

Once we have identified the service companies, we have to identify the **commercial bank**, which is an outlier. So, we have to identify the only company within the 5 previously detected that have something different from the others -> we can look at the Account Receivables, as most of the time they represent the loans the bank -> it's I

If we would like to identify which is the **airline company** among the service ones, we have to usually combine two factors: PPE (this is because if the company owns the plane used for the service, which are very expensive and are used for several years) and Receivable collection period (as the airline companies usually interface with customers, they can expect a lower value for this indicator) -> it's K, as it is one of the service companies with the highest percentage of PPE (59%) and lowest Receivables collection period days (16).

Let's suppose we want to identify the **retailer companies**. This is not a service company, so we can exclude companies B/I/J/K/N. Within the remaining companies, a good indicator can be the Inventory Receivable Collection Period, as they usually buy products to be sold on a monthly basis -> we can identify the companies that are retailing companies by looking at those who have the indicator lower than 30 -> C/F/G/M are the retail companies.

Lastly, if we want to understand which is a **retail grocery store**, we have to look at Inventory Turnover. This indicator, calculated by dividing 365 days in a year by the DI of the company, tells us how many time we are able to renovate the Inventory along the year -> the longer the DI, the lower the Inventory Turnover. Retail grocery stores have very high inventory turnover rates, that combined with the low Receivable Collection Period indicator, we can say that it is M.

Managing Inventories

Firms need to strike a sensible balance between the benefits of holding inventory and the costs.

- *Benefits of holding inventory*: *delivery on time, purchase in bulk* (discounts), *meet unexpected*
  increase in demand.
- *Costs of holding inventory*: *carrying cost* (cost of storage, opportunity cost of capital), *order cost* (handling and delivery cost)

The optimal inventory levels involve a trade-off between carrying costs and order costs.

Essential features of inventory management:

- Optimal inventory levels involve a trade-off between carrying costs (cost of storing goods as well as opportunity cost of capital) and order costs.
- A firm can manage its inventories by waiting until they reach some minimum level and then replenish them by ordering a predetermined quantity (*reorder point*).
- When *carrying costs are high* and *order costs are low*, it makes sense to place more frequent orders.
- Inventory levels do not rise in direct proportion to sales -> As sales increase, the optimal inventory level rises, but less than proportionately.

Inventory management strategies -> **Just in time**: it works when the flow of production is steady and predictable, so no significant buffer is needed

Account Receivable Management

Management of trade credit requires answers to four sets of questions:

- *Terms of sales*. How long do you give customers to pay their bills? Are you prepared to offer a cash discount for prompt payment?
- *Credit analysis*. How do you determine which customers are likely to pay their bills?
- *The credit decision*. How much credit are you prepared to extend to each customer?
- *Collection policy*. How do you collect the money when it becomes due? What do you do about
  reluctant payers or deadbeats?

Terms of Sales -> *How long do you give customers to pay their bills? Are you prepared to offer a cash discount for prompt payment?* **Not all sales involve credit**. Generally speaking, each industry has its own logic -> Firms selling consumer durables may allow the buyer a month to pay, while those selling perishable goods typically demand shorter payment term. Sellers may allow more extended payment if:

- its *customers are in a low-risk business*
- Their *accounts are large*
- They *need time to check the quality of the good*
- The *goods are not quickly resold*.

To encourage customers to pay before the final date, it is common to offer a cash discount for
prompt settlement. Calculating interest rates on trade credit involves the following formula:

$$annually\ compounded\ rate = \left(1 + \frac{discount}{discounted\ price}\right)^{\frac{365}{extra\ days\ credit}} - 1$$

Credit analysis -> *How do you determine which customers are likely to pay their bills?* Not all the customers pay their bills at the due date. For new customers:

- *Check the customer's financial statement to make your own assessment* (check the financial
  sustainability ratio, liquidity ratio, etc.)
- *Seek the views of a specialist in credit assessment*:
  - Dun and Bradstreet, Cerved for small companies
  - Moody's and Standard and Poor's for firm's bonds
- *Focus should be on big clients within the portfolio*.

Credit decision -> *How much credit are you prepared to extend to each customer?*

- If you refuse to make credit you make neither a profit or a loss -> **Exp. gain (Refuse credit) = 0 $**
- If you offer a credit, there is a probability p that the customer will pay you and will make "revenues – cost" as total profit. There is a probability of "(1-p)" that the customer will default and you will lose the cost. **Exp. gain (grant credit) = p x PV(rev – cost) – (1-p) x PV (cost)**

Collection policy -> *How do you collect the money when it becomes due?* What do you do about reluctant payers or deadbeats? To keep track of how promptly bills are paid, firms generally keep an *aging schedule*, which shows the *proportion of accounts that are mildly or badly overdue*. It is possible to create a synergetic link between the *sales department* and the *collection department* (i.e., granting a customer a loan when it is cut out off by its own bank). If the *bank is unwilling to lend*, does it make sense to continue to extend trade credit? Yes if:

- You have more information than the bank about the customer's business.
- You need to look beyond the immediate transaction and recognize that your firm may
  stand to lose some profitable future sales if the customer goes out of business.

Large firms can reap economies of scale in record keeping, billing and collection, but a small firm may not be able to support a fully-fledged credit operation. However, the small firm may benefit by farming out part of the job to a factor.

Like all financial decisions also credit allocation requires judgement. Few things to remember:

1. **Maximize profit**. As a credit manager you should *not minimize the number of bad accounts, your job is to maximize the present value*. You must weight the chances between optimal scenario (client pays on time) and worst scenario (client default). If margin of profit is high you are justified in a more liberal credit policy; if it is low, you cannot afford many bad debts.
2. **Concentrate on the dangerous accounts**. You should not expend the same efforts on analysing all credit applications -> *focus on large/doubtful accounts*.
3. **Look beyond the immediate order**. The credit decision is a dynamic problem. You cannot look only at the present. Sometimes it is worth accepting a *relatively poor risk* if there is a good chance that the customer will become a regular and reliable buyer.

Writing your plan – how to build financials and forecasts

Business planning - overview

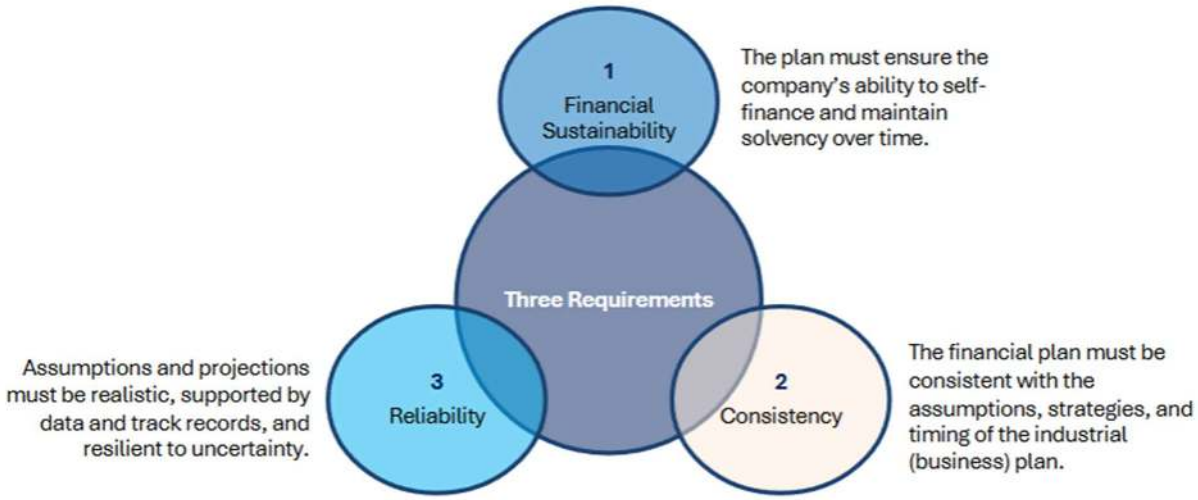
Writing and composing a plan is a complex procedure, that usually involves relate with colleagues from different departments and has several preparatory phases before really writing it. Obviously, as it is possible to see from the table below, the level of detail shown by the financial plan is different depending on the target and the user of the plan, as we have to show *different plan*, *different level of detail*, we have to publish it with a different periodicity -> the first thing we have to ask ourselves is what is the purpose of the financial plan and who is going to be the client.

	Internal use in a company	Investment bankers / M&A – IPO	Bankers for equity research	Debt restructuring
User	Management	Bankers with clients	Research Analyst	Companies or their advisors
Purpose	LT strategic plan Variance analysis	Valuation backup in M&A	Investment recommendation	Renegotiating debt terms
Level of details	Very high	High	Low	High (individual creditors)
Available sources	Mgmt estimates and targets	Public and by the management	Public only	Public and the client
Lenght	Budget: 1 year BP: 3-5 years	3/5 years	3/5 years	3/5 years
Periodicity	Budget: W / M BP: M / Y	Quarterly / yearly / montly (i.e., in IPO)	Yearly	Monthly / quarterly
Valuation	No	Yes	Yes	No

For example, when *analysing a startup*, the object is to raise funds, usually by equity -> they have to convince investors, they have to propose them their value proposition, their idea, their competitive advantage, their history (as they do not have some historical data regarding their performances). At the same time, investors want the highest possibly return with the lowest risk -> companies could be optimistic, but they have to stick to reality in order to be reliable.

Another example, when companies *face the need for funds from banks* -> in this case the company has to show its capability to create constant and positive cash flows, together with the possibility to give securities and collaterals (as banks want the lowest risk as they are naturally very risk analysis). So, in addition to our Financial Statement, we would have to give some probability analysis and show which would be our plans to protect us from dangerous situations.

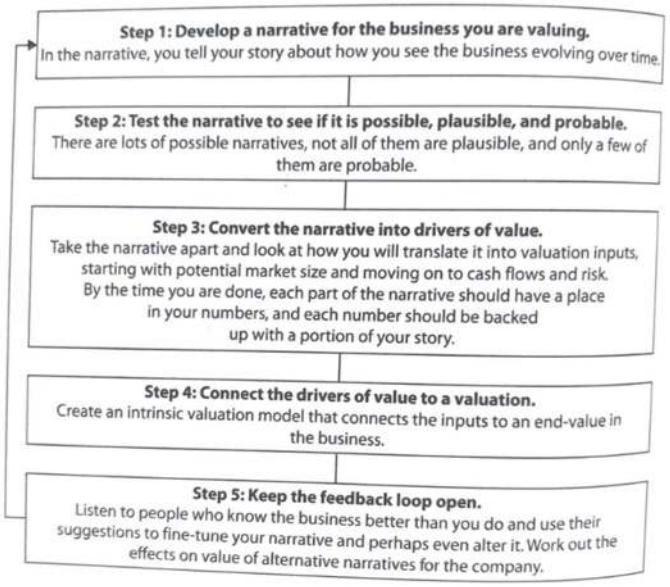
The business plan outlines the company's strategic and operational direction, defining its objectives, business model, investment needs, and organizational structure. It *translates strategic intentions* into *actions*, generating both *economic performance expectations* and *capital requirements* -> foundation for financial planning.



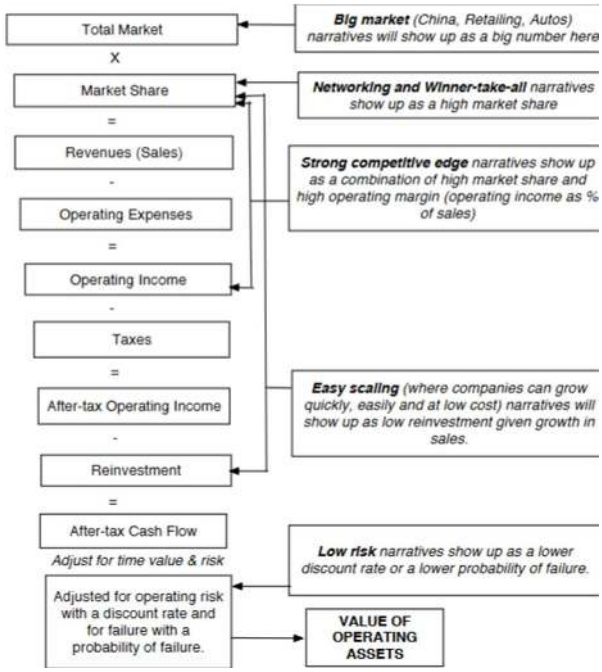
Regarding the Financial Sustainability, a key factor is "*over time*" -> it is not required just next year, but over 3/5 years -> we could find some strategy to push CF/sales for the next year maybe, but after that we have to make it sustainable.

In addition to these requirements, you have to remember the **6 Cs** -> Clear (we have to show our information in a way that anybody who has a general understanding of financial planning is capable of understanding its content and assumptions), Crisp, Concise (no one want to read hundreds of pages, because no one will read them. Usually there is a summary), Consistent, Credible and Convincing.

In order to get this result, you have to combine both numbers and narrative -> you have to convert them in **6/7 KPIs** (so that you are consistent through your analysis) that can cover different factors of the company (like the past or predicting the future), and you have to start from the narrative before working on the numbers. Usually, some previous important steps we have to follow are *Research* (we have to collect the data from different sources) and *Organization* (organize the planning team and the work they have to do).

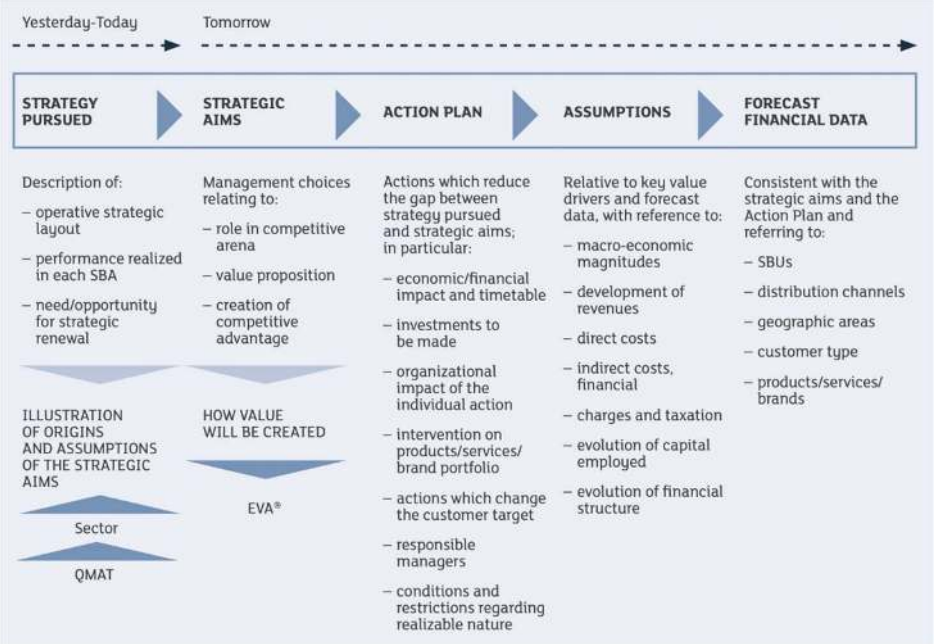


How do we connect the narrative to key drivers of value?



We have to keep it simple -> the first line is always the *sales*, so we have to make assumptions about the *price* (which is influenced by both macroeconomic and microeconomic factors) and *quantity* (which depends by the market share -> if the market we are in or we are aiming to enter in is big or small, we can set a different narrative). After that we have the Operating Expenses, which allow us to show practically the competitive advantage we'll have (thanks to the margin we are able to set, the market shares…).

Contents of the Business Plan:



How to build a Financial Plan

Often cash flows forecasts are needed. For example, for long-term financial planning, M&A or valuation (i.e., programming an exit plan). Forecast financials (Financial plan) are part of a wider strategic business plan. Financial modelling is the technical activity to convert and represent the business plan in Excel, as a set of integrated, dynamic BS (Balance Sheet), IS (Income Statement) and CF (Cash flow statement) statements.

1	**Fitness for purpose**	– When **designing** and building a model, consideration must be made of the models proposed end use
2	**Simplicity**	– The model should be as **simple** as possible, whilst meeting the needs of its users
3	**Clarity**	– The model should be **understandable** by its users
4	**Efficiency**	– Model design should facilitate speed of development, calculation, **ease of use** and subsequent maintenance
5	**Consistency**	– Should be applied to the model structure and underlying logic to **reduce risk of error,** both from usage and from future model changes
6	**Integrity**	– The **integrity** of output is of paramount importance

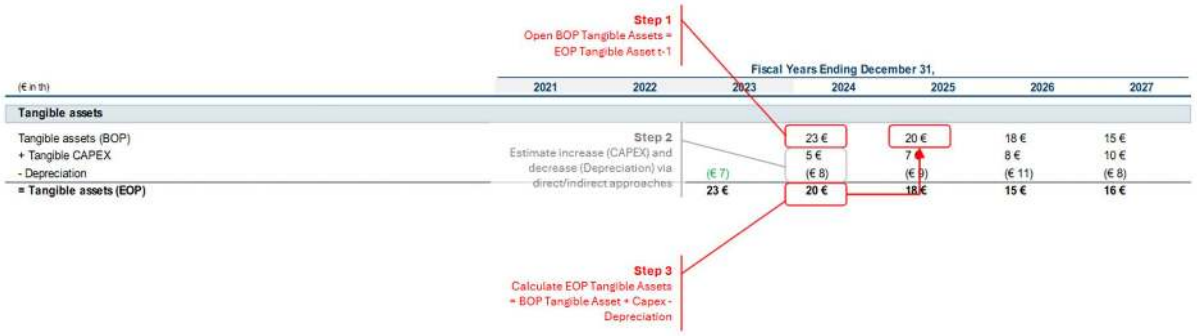
The first thing we have to collect are the **input**. Usually, in order to forecast we have to consider the financial data from the previous years, at least 3 years (even though there are different ways to predict the values).

When we have to insert the input, we can classify them in 2 categories:

- *Direct* -> we know exactly the amount of that variable (like new issues of long-term bank debt)
- *Indirect* -> Forecasting indirectly based on a driver (like service costs scaled on revenues)

Regarding the value we insert in the data, we can make insert the historical data (in case these are pretty stable) or we can change them (but we have to give a reason behind).

Control account (BS items only) -> "Closing the account" introduces no new forecasting assumptions, while the increases and decreases are forecast separately



The steps for building a financial plan:

1. Reorganize historical financials -> Reorganize BS and IS, then build new CF.
2. Operational forecast -> Sales (IS) and operating costs (IS)
3. Investment forecast -> CAPEX (BS), working capital (BS), D&A (IS)
4. Other items forecast -> Other op. A&L (BS) , non-recurring income (IS).
5. Tax forecast -> Income taxes (incomplete)
6. Equity forecast -> Retained earnings (BS), dividends (BS) (incomplete) -> it links Net income into equity
7. Debt and cash forecast -> Loans / bonds (BS), cash (BS) (incomplete), link cash flows into net debt, Interests (IS) (now complete)

➔ The model becomes circular

Reorganize Balance Sheet and the Income Statement

STEP 1: REORGANIZE BS & IS

Income statement	2017	2018
Sales	1.784,7	1.849,3
Costs	(1.381,7)	(1.431,8)
D&A	(58,8)	(71,3)
Interest income	9,3	10,3
Interest expense	(75,2)	(75,2)
Net income	**189,8**	**191,9**

Balance sheet	2017	2018
Working capital	527,9	547,0
Fixed assets	3.219,0	3.274,7
Other operating assets	(552,5)	(552,5)
Surplus assets	94,8	94,8
Invested capital	**3.289,2**	**3.364,0**
Gross debt	1.625,1	1.625,8
(Cash)	(369,1)	(429,7)
Net debt	1.256,0	1.196,2
Equity	2.033,2	2.167,8
Sources	**3.289,2**	**3.364,0**

Cash flows	2017	2018
FCFO	**116,0**	**161,4**
Interest income	9,3	10,3
Interest expense	(75,2)	(75,2)
Tax shields	20,9	20,6
Change in debt	0,6	0,7
FCFE	**71,7**	**117,8**
Change in equity	(56,6)	(57,3)
Change in cash	**15,0**	**60,5**
Beginning cash	354,1	369,1
Ending cash	369,1	429,7

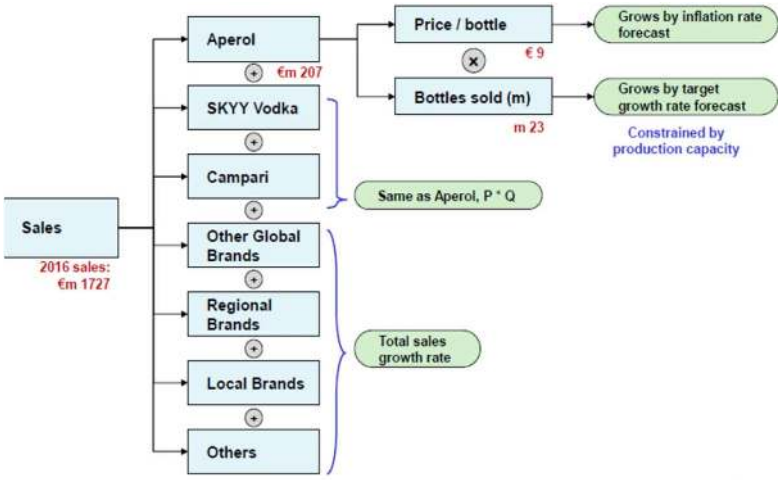
Operational Forecast

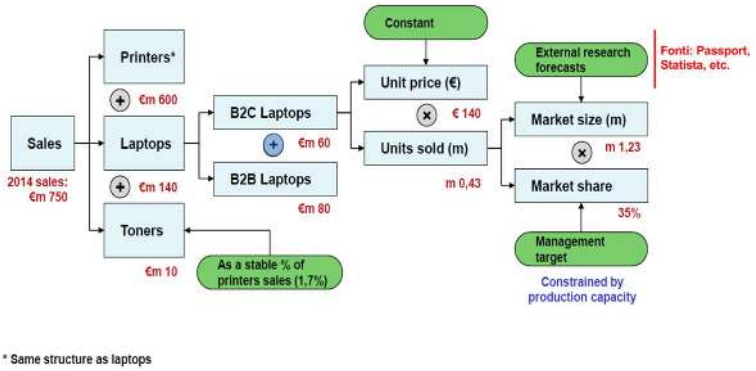
We have to predict the level of Sales and Operational Costs the company will face in the future. There are two main procedures to conduct this kind of forecasting:

- Top-down procedure -> we estimate the whole industry size and then we estimate the company's market share in it -> Revenues = (Market volume * Market price) * Market share
- Bottom-up -> the company is divided into several business units (depending on the region, the sales channel, product class…) and the forecast of the sales is the sum of the forecasts of the single business units' sales

➔ Critical issues -> Organic growth (internal) growth and M&A growth (external) + Consider constraints, such as space or production / labour capacity

Sales expectation





Opex (Operative Expenditure) forecast -> Variable operating costs (OPEX) usually approached with an indirect driver, such as percentage of sales or percentage of production volumes. The estimate might be an historical average or a given management target. The driver might change throughout the forecasting timeline:

- Constant ("flatlined")
- Growing evolution (e.g. economies of scale)
- Management target at the last forecast year, to be achieved gradually

➔ Critical issues: Distinguish between variable and fixed costs (fixed costs are “fixed” when benchmarked against revenues but they can be attached to other indicators)

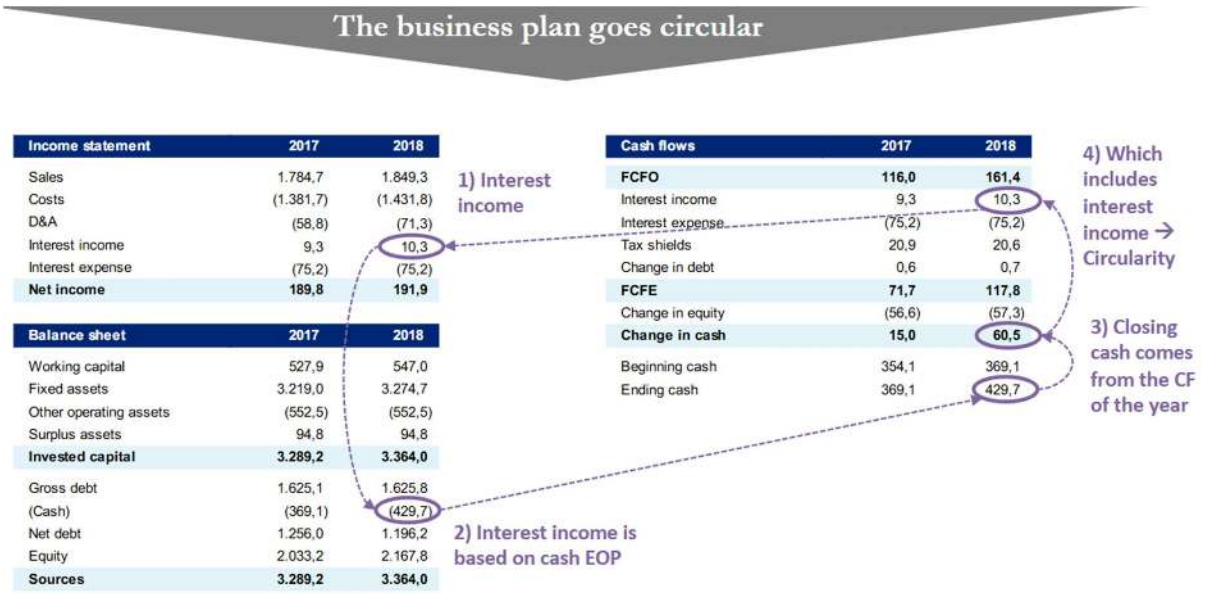
Investment forecast

This part regards the prediction of the D&A on the IS and the Working Capital and Fixed Assets in the BS. Regarding the D&A, there are two approaches:

- Synthetic approach -> we calculate the D&A as a percentage of CAPEX
- Detailed approach -> Each year's CAPEX is depreciated with a target useful life (years -> we can calculate it by dividing the Asset for the useful life or multiply the value of the Asset for the amortization rate). "Past CAPEX" (i.e. historical EOP fixed assets) is amortized as well until its expiration -> by best practice, first year's D&A for each CAPEX is halved

Regarding the other elements of the investment part, we have:

- CAPEX -> we can calculate it as an indirect driver (like a % of revenues) or direct driver.
- Working capital forecast with an indirect driver -> Trade receivables we use DSO, Trade payables we use DPO, Inventory we use Days inventories and Other assets & liabilities we calculate them as a % of sales / Or by building a specific "days" ratio
- Alternatives:
    - Constant ratios
    - Declining DSO and days inventories or longer DPO would signal higher bargaining power for the company and less financing needs
- Extraordinary profits / losses are assumed to be zero and surplus assets are supposed to be constant



Determine Tax

Two alternatives:

- Driver: historical effective tax rate -> Historical effective tax rate = taxes / EBT (earnings before taxes)
- Model taxes according to each Country's tax system (E.g. Italy: IRES 24% and IRAP 3,9%)

At this stage, taxes will be incomplete because the tax base EBT is missing interests, recorded above it.

Equity forecast

Let's analyse the different elements:

- Share capital -> stays constant if no rights issued / no capital increase. Direct input based on approved capital increase (distinguish between pre-money and post-money valuation, e.g. in IPOs)
- Dividends -> % of NI, based on the payout ratio
- Record retained earnings -> BOP retained earnings + Net income$_{t-1}$ – Dividends = EOP retained earnings

➔ At this stage, retained earnings will be incomplete because net income is missing interests, recorded above it, and has incomplete taxes

Debt forecast

- Gross debt (loans, bonds…) -> Model specific debt maturities by looking at financial statements: BOP debt + New issues – Repayments (principal) = EOP Debt -> it forecasts issues / reimbursements and then closes debt as a control account. Therefore, it does not assume that new debt is raised
- Use a target or historical financial leverage (ND/E) as driver for EOP gross debt. It forecasts EOP debt at once. Therefore, it implies a net effect of debt raising and repaying

Cash forecast

Cash flow of the year and EOP cash -> Close-up the cash flow statement dragging its historical structure, finding the cash flow of the year. At this stage, CF of the year is incomplete because interests are missing and taxes are incomplete. EOP cash in the balance sheet is then: BOP Cash + Cash flow of the year = EOP cash.

Model interest income and interest expenses separately, due to their high difference in rates (e.g.
1/2% for income, 5/6% for expenses):

- Interest expenses driver: Effective interest payments rate on gross financial debt -> Interest charges / average gross financial debt (BOP e EOP)
- Financial incomes driver: Effective interest income rate on cash -> Financial incomes / average cash (BOP e EOP)

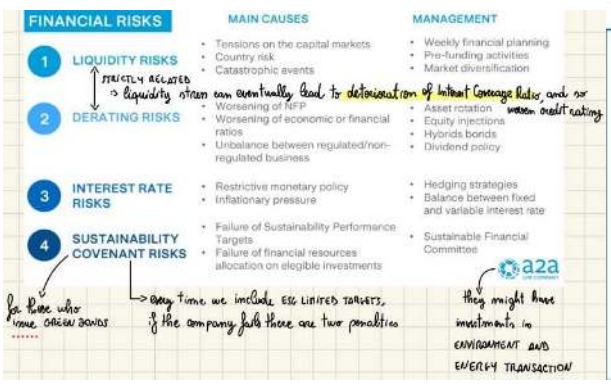
Corporate Financial Risk Management

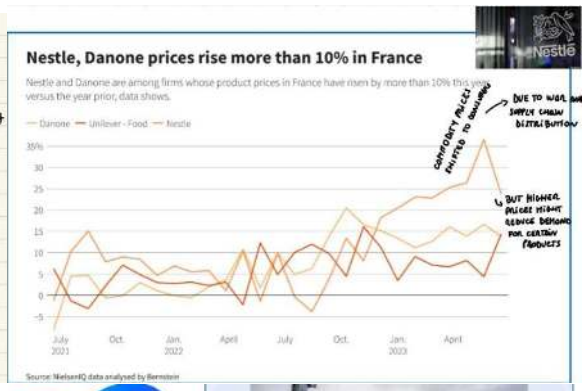
Managing Transaction Exposure

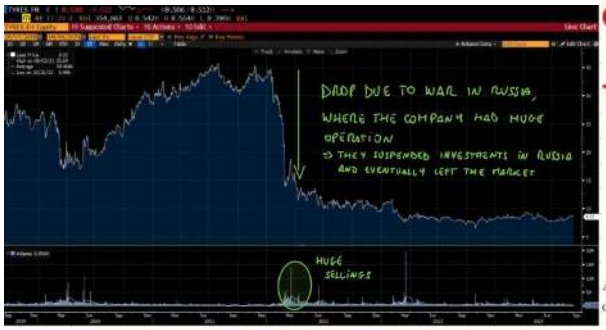
Introduction to Financial Risk Management

There are **different types of risks** a company may face -> *market risk* (the possibility of economic downturn or political instability), *credit risk* (risk that a borrower will default on its risks), liquidity risk (the company is not able to pay its short-term payments -> we can hedge against this risk), *operational risk* (risk arising from managerial failure -> we cannot really hedge against this risk, we can just mitigate it), *foreign exchange risk* (risk that in the foreign exchange rate will change in a direction that is unfavourable to us -> we can hedge against it), *interest rate risk* (risk that the interest rate imposed by the central bank will rise, making our debts more expensive -> we can hedge against this risk), *business risk* (the ability to generate profits), *reputational risk* (risk that our reputation to customers or other stakeholders might change -> we can mitigate it but don't hedge against it), *commodity risk* (risk that the prices of our input will increase)…

Risks are interconnected, and understanding the connections between them is crucial for risk management. Let's see some examples from real world.







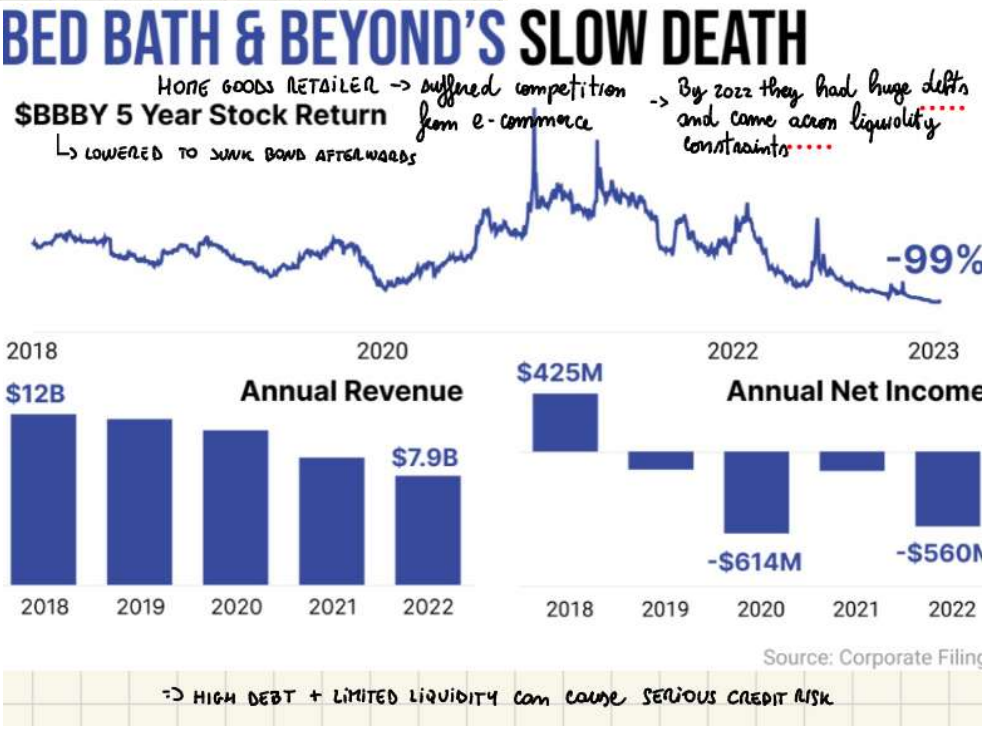
TotalEnergies

-> COUNTRY RISK PREMIUM (due to the war in Ukraine) has an impact on cost of capital and is related to operation

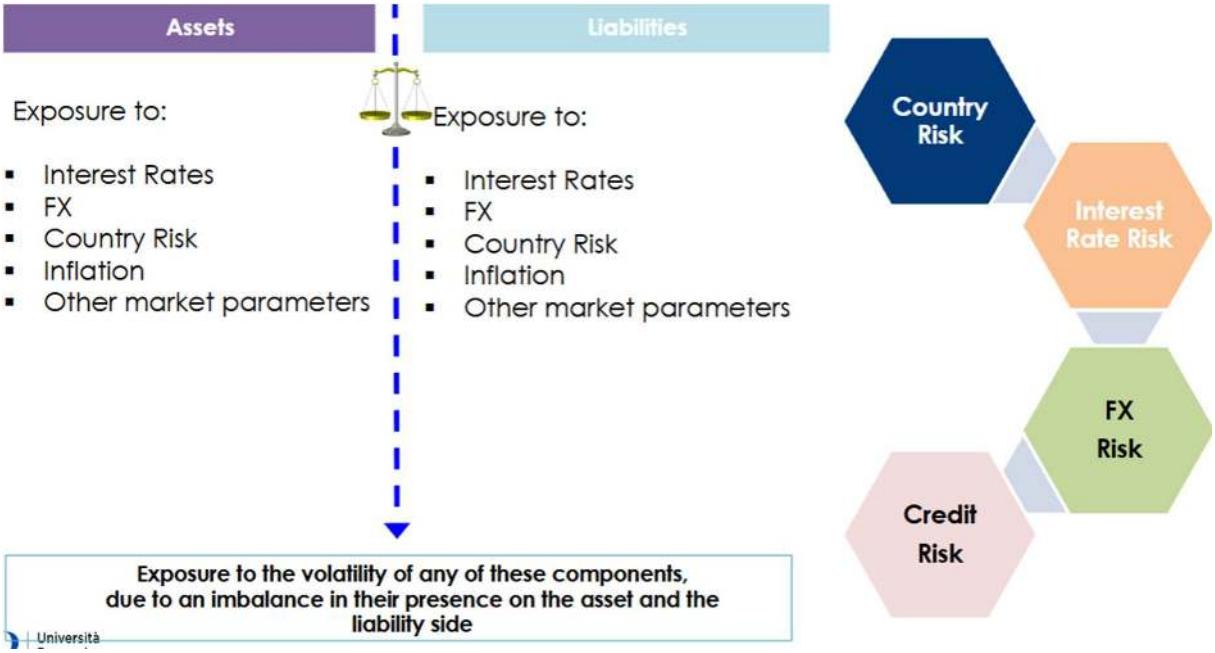
Offshore Technology

TotalEnergies to withdraw from Russian oil project

Another example of country risk affecting a company can be seen in the case of TotalEnergies and its operations in Russia in 2022-2023.



Management of Transaction Exposure



Whenever we talk about the exchange rate, we have to make a distinction between *Spot market* and *Forward market*.

Spot market: involves almost immediate purchase or sale of foreign exchange currencies. In general, $S_{j/k}$ (the price of 1 unit of currency k in terms of currency j -> *how many units of j you need to buy k*) will refer to the price of one unit of currency k in terms of currency j.

Direct vs indirect quotations -> From the point of view of a European investor

- *Direct quotation*: €/$ (how many € per each $)
- *Indirect quotation*: $/€ (how many $ per each €)

The **relationship** between direct and initial quotation is:

$$Direct\ quotation = \frac{1}{indirect\ quotation}$$

Forward market: involves contracting today for the future purchase or sale of foreign exchange = *no money changes hands upon entering the contract today*, but we just set the rules that will start operating at maturity when the sales/delivery occurs. Multinational corporations and financial institutions use forward contracts to either hedge foreign currency exposure (when a company has to pay or receive money in a different currency from the one usually used, these instruments can be used to protect themselves from the changes in exchange rate. For example, it is possible to set the price of foreign currency we'll have to buy at maturity, independently by the exchange rate at that time) or to speculate in the foreign exchange market. The *forward premium or discount* is the percentage difference between the spot and the forward exchange rate, stated in annual percentage terms.

It is common to compare the forward and the spot market for specific currencies to find the discount rate or the premium price people expect for the future. The **formula for**

calculating the forward premium or discount for currency j over N period in American terms (a direct quote from the U.S. perspective) is:

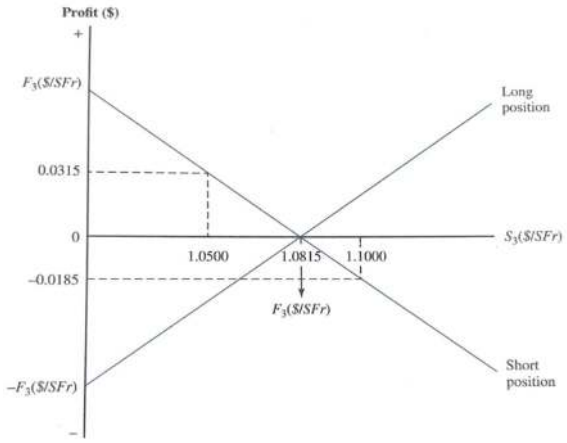
$$f_{N,j} = \frac{F_N\left(\frac{\$}{j}\right) - S\left(\frac{\$}{j}\right)}{S\left(\frac{\$}{j}\right)} * \frac{360}{days}$$

If the 6m forward indirect rate $/€ is 1.1299 and the spot rate Is 1.1235, the forward is:

$$\frac{1.1299 - 1.1235}{1.1235} * \frac{360}{180} = 1{,}14\%$$

➔ it is expected the euro to appreciate compared to dollars (which means it will take more dollars to buy the same quantity of euros)

The **result of a forward contract** can be summarized with the following graph:



In this graph, it is possible to see the indirect quotation of the 3M spot rate of the Dollars against a foreign currency. **Long position** means that we buy dollars, **short position** means we are going to sell dollars. If we expect the American dollar to appreciate (so we are moving to the left from the current forward rate) it would *be better to be in a short position* in the forward contract, as it will be possible for us to sell at 1.0815 a currency that is worth 1.05. On the other hand, in case the spot rate increases, we'll lose money. Opposite consequences if we are in the Long position.

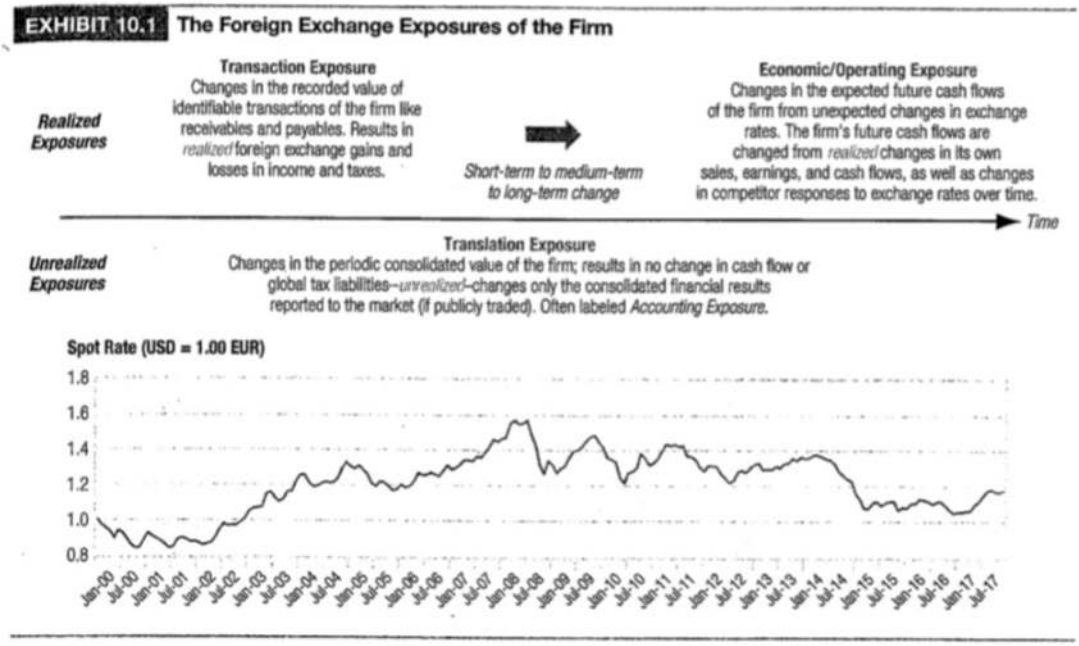
Types of FX rate risk exposures:

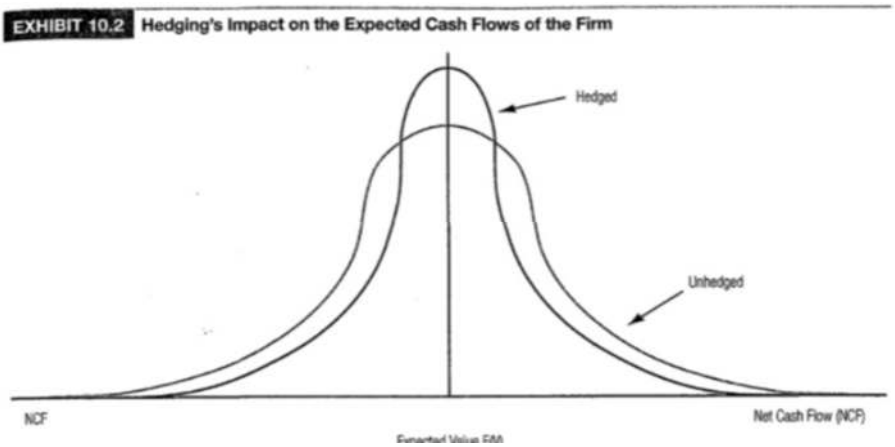
1. **Transaction exposures** -> measures changes in the value of outstanding financial obligations. Thus, it deals with *changes in cash flows that result from existing contractual obligations*
2. **Operating/economic exposures** -> focuses on expected future cash flows that might change because a change in exchange rates *affected international competitiveness* (for which the company would have to put in practice different policies, such as diversifying)

3. **Translation/accounting exposures** -> <u>impact of FX volatility on the consolidation process</u> of
   subsidiaries with different currencies, which can cause some losses

➔ Transaction exposure measures gains or losses that arise from the settlement of existing <u>financial obligations</u> whose terms are states in a foreign currency. The *types of transaction* exposure experienced by a multinational firm arise from a <u>variety of business</u>:

- *Purchasing or selling goods or services* when price and settlement are stated in foreign currencies
- *Borrowing or lending funds* when repayment is to be made in a foreign currency
- *Acquiring assets or incurring liabilities* of any kind denominated in a foreign currency





The aim of a hedging strategy is to protect the value of the company. The graph above shows the difference on the volatility (variance) of the enterprise value of a company that uses hedging strategies (higher one), over one who doesn't (lower one). It's important to underline that the mean of the enterprise value of both of the companies is the same, but the range of the volatility of the unhedged one is way more spread.

What are the **most relevant benefits of hedging** the foreign exchange rate? This does not hold in an increase in CF (as, on the other side, you might pay), but at the same time what you get is:

- *Reducing the uncertainty and variability of CF* -> if we see the CF as an expected value, because you don't know what the exact value will be, it comes with the risk that we made the wrong calculations -> we have to look at the standard deviation to understand the volatility of the company -> we use hedging to get a reliable estimate in the value of the company or of the CF.
- Let's assume we have the value of the company that is lower than the expected value (for example, the value of the company is 60 and the expected value is 100) -> *it sets the point of financial distress*, where if the actual value is lower than this value, we reach the tail of the distribution and there is a higher probability to default -> *hedging is capable of reducing this barrier* and reduce the probability of default

Once we have understood that we are in a situation where hedging might be useful, the **most relevant hedging alternatives** are:

- *Remain unhedged* -> do nothing is an alternative for our strategy, becoming the benchmark
- *Hedge in the forward market*
- *Hedge in the option market*

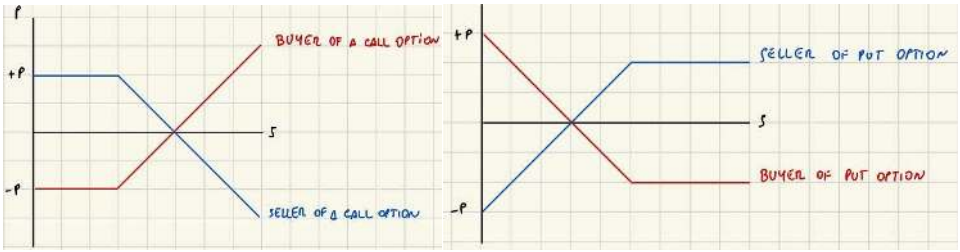
Forward contract:

- If you are going to *owe foreign currency* in the future, agree to buy the foreign currency now by entering into long position in a forward contract. The buyer of a forward is obliged to buy underlying asset at maturity and at the price previously established, the forward price.
- If you are going to *receive foreign currency in the future*, agree to sell the foreign currency now by entering into short position in a forward contract.

Hedging with options:

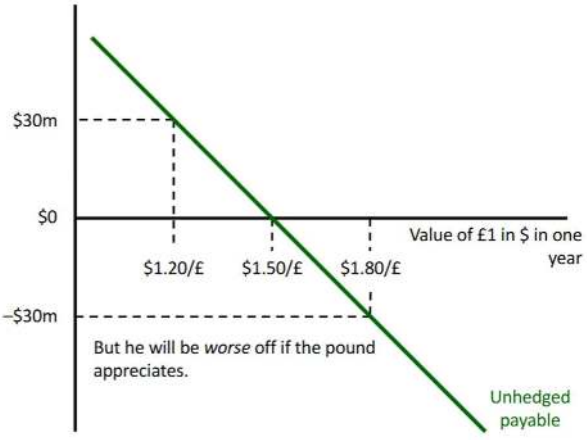
- *Importers* who *owe foreign currency* in the future should *buy call options* (which are the options where the buyer deserves for himself, in exchange of a price, the right to buy a specific resource at a fixed price set at t_0). If the price of the currency goes up, his call will lock in an upper limit on the dollar cost of his imports. If the price of the currency goes down, he will have the option to buy the foreign currency at a lower price -> the buyer of a call option (as shown in the graph below) hopes the price will increase, as he will be able to buy the underlying asset at a lower price than the market one. When considering the Net proceeds, we have to consider that we have to *sum the premium to the Gross proceeds*, as we have to pay the Account payable.

- *Exporters* with accounts receivable denominated in foreign currency should *buy put options* (which are the options where the buyer deserves for himself, in exchange of a price, the right to sell a specific resource at a fixed price set at t_0). If the price of the currency goes down, put will lock in a lower limit on the dollar value of his exports. If the price of the currency goes up, puts he will have the option to sell the foreign currency at a higher price -> the buyer of a put option hopes the price of the underlying asset will decrease, as he will be able to sell the asset at a higher price than the market one. When considering the Net proceeds, we have to consider that we have to *subtract the premium to the Gross proceeds*, as we have to receive the Account receivable



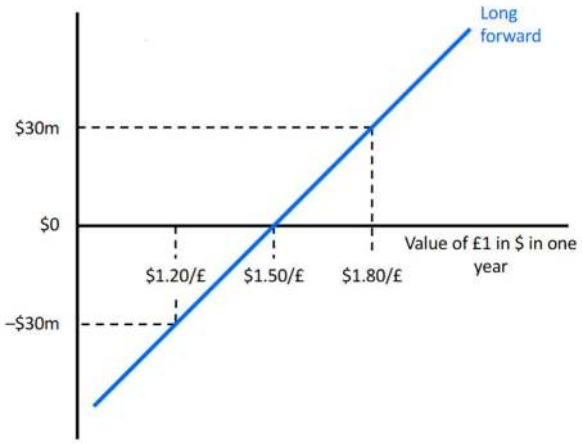
We are always going to see the view of the buyer of a call or a put, never the seller. At the same time, it is important to pay attention to the quotation when we deal with options with currencies.

You are a U.S. importer of British woollens and have just ordered next year's inventory. Payment of £100M is due in one year. Question: How can you fix the cash outflow in dollars? Answer: One way is to put yourself in a position that delivers £100M in one year -> a long forward contract on the pound. Because we have to pay, so we need more of the foreign currency, it is better to go long on pounds.



Suppose the forward exchange rate is $1.50/£. If he does not hedge the £100m payable, in one year his gain (loss) on the unhedged position is shown in green. The importer will be better off if the pound depreciates: he still buys £100m but at an exchange rate of only $1.20/£ he saves $30
million relatives to $1.50/£

If he agrees to buy £100m in one year at $1.50/£ his gain (loss) on the forward are shown in blue. If you agree to buy £100 million at a price of $1.50 per pound, you will make $30 million if the price of a pound reaches $1.80. If you agree to buy £100 million at a price of $1.50 per pound, you will lose $30 million if the price of a pound is only $1.20



Hedging Foreign Currency Receivables

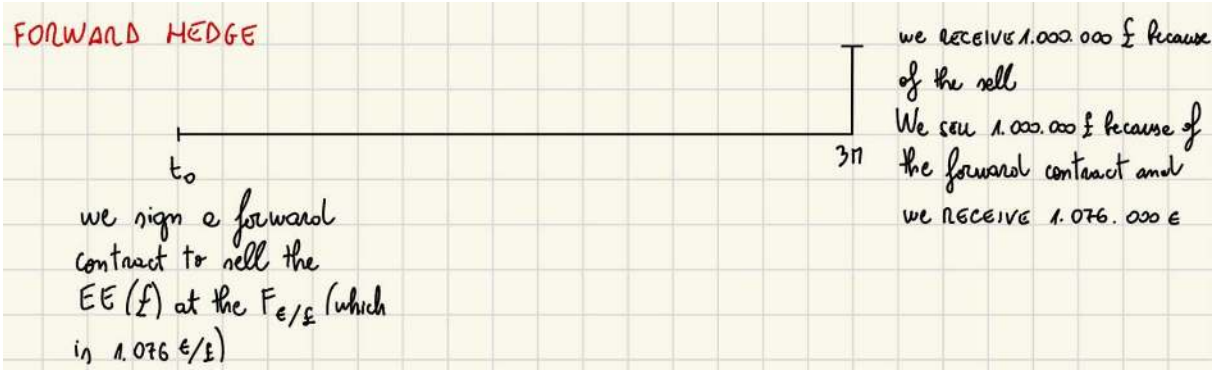
Aidan's in a European company (the euro is the home currency). The company has just concluded negotiations for the sale of some equipment to Regency, a British firm, for £ 1,000,000. This single sale is quite large in relation to Aidan's current business. Aidan has no other current foreign customers, so the currency risk of this sale is of a particular concern. The sale is made in March with payment due three months later in June. Differently from the previous case, because now we are an exporter, we want to maximise our return. The information available for this deal are the following:

- EE = Expected Exposure = the amount of money we want to protect = 1.000.000£
- Maturity = 3m
- 90 days $F_{€/£}$ = 1.076
- $S_{€/£}$ = 1.09
- Premium cost = 1,5%
- Strike price (€/£) = 1.07 €/£

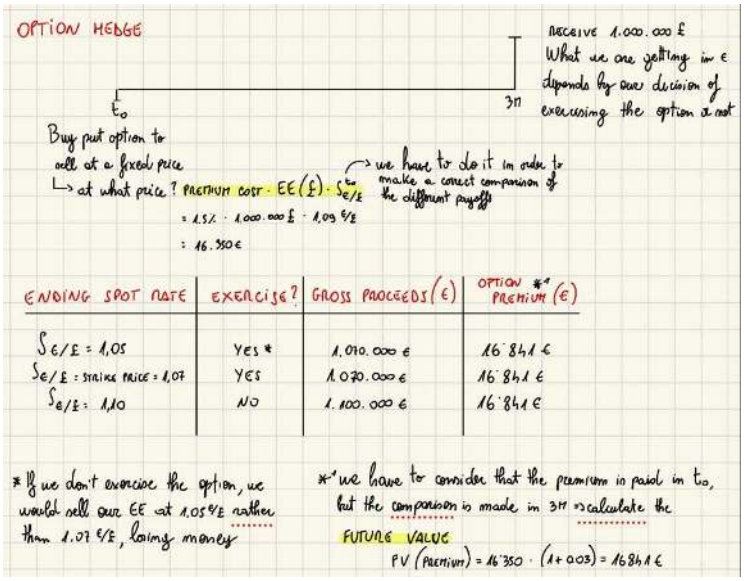
Just by looking at the forward and the spot rate, because the forward rate is lower than the spot rate (which means the euro appreciates compared to pounds, as it requires less of them to buy one pound), the seller is not happy as the pound is weaker, so it will receive less money. What are the most relevant alternatives?

Remain unhedged -> at t_0 we do nothing and in 3 months we are going to receive 1mln £ and convert them at the spot rate in 3 months (which I don't know) -> I can make a good deal (if the pound is going to appreciate) or lose money (on the other case)

Forward hedge -> at t_0 I have different possible decision, as I can a short or long position. In this case, it is better to take a long position, as we are expecting the exchange rate €/£ to increase (therefore the exchange rate £/€ to decrease), so we can get a profit.



Option hedge -> in this case, differently from the previous one, at t_0 we have to pay a price to get the option right. In this case we have to buy a put option in pound, as we are expecting the underlying asset to decrease, allowing us to sell it at a higher price.



The net proceeds is going to be the same whenever the spot rate is going to be lower than the strike price (with the option we are buying downside protection, which means we are protecting from the possibility we face an infinite downside). In we convert this number into an Exchange rate, we come up with a value that is called **floor rate** -> the minimum guaranteed exchange rate in the minimum scenario (it's a little a bit worse than the strike price as we have to take in consideration the price of the option). We calculate it:

$$Floor\ rate\ \left(\frac{€}{£}\right) = \frac{Net\ proceeds(€)}{EE(£)} = \frac{EE(£) * Strike\ price\left(\frac{€}{£}\right) - premium(€)}{EE(£)} =$$

$$\frac{1.053.159}{1.000.000} = 1.053$$

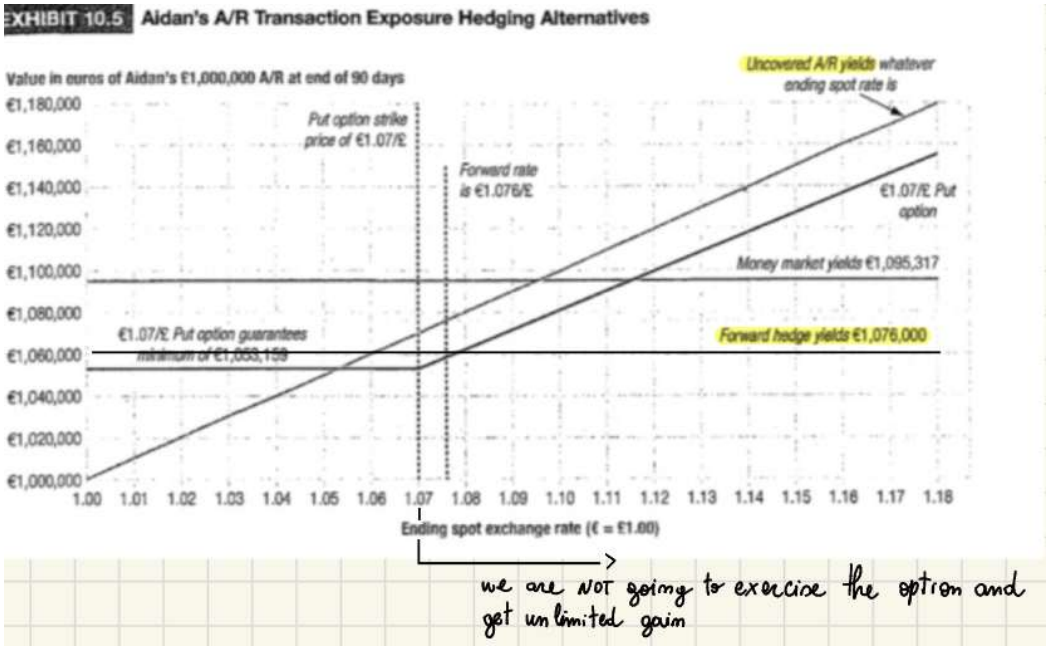
Alternatively, if we want to get the floor rate for the indirect quotation:

$$Floor\ rate\ \left(^{£}/_{€}\right) = \frac{EE(£)}{Net\ proceeds(€)}$$

Break even spot rate -> it's the spot rate where the company is indifferent between the payoff of the forward and the payoff of the option. We calculate it in this way:

$$EE(£) * S_{€/£} - premium(€) = Forward\ payoff\ (€)$$

Because the only element missing in this equation is the spot rate, we can easily calculate it (in our example, it is equal to 1.09).



What would be the decision of the CFO to get the best cover? It depends by our expectations on the exchange rate:

- If we are <u>confident that it is going to increase</u>, as it is possible to see from the graph, <u>both the forward and the option alternative are valid</u> -> the choice will *depend by the risk exposure* of the CFO and the company as a whole (in fact, even though maybe the CFO or a manager might have a lower risk aversion compared to the one of the company, they might be forced to prefer the safer alternative)
- On the other hand, in case we <u>expect the exchange rate to decrease</u>, the *option hedging alternative* is more suitable.

Boeing - IMPORTER [US]

- Domestic currency: $
- Foreign currency: £
- EE: 5 mln £
- T_1 = 1 year
- $S_{0\ \$/£}$ [DIRECT] = 1.80
- $F_{1\$/£}$=1.75

- Call $X_{\$/£=}$ 1.80
- Call premium= 1,8%
- K= 6%

Boeing's Exercise

Hedging Foreign Currency Payables

Suppose that Boeing Corporation IMPORTED a Rolls-Royce jet engine for £5 million payable in one year. The money market interest rates and foreign exchange rates are given as follows:

US interest rate (per annum)	6.00%
UK interest rate (per annum)	6.50%
Spot exchange rate ToSR ($/£)	1.80
Forward exchange rate F ($/£) - 1 year maturity	1.75

Please also assume that the option premium (price) is $ 0.018 per pound and the strike price is $ 1.80/£ (one year expiration).

Given exchange rate fluctuations, Boeing is concerned about the future dollar cost of this purchase. Facing an account payable, Boeing will have to try to minimize the dollar cost of paying off the payable.

Assignment:
- Explore the alternative hedging strategies (forward market hedge, options market hedge) for managing this transaction exposure and compare the different hedging strategies.
- Compute the "break-even spot rate" that would make Boeing indifferent between the two hedging tools.

Unhedged	Forward	Option
t_0: nothing T_1year: • Buy £ at the spot rate (1 year) • Pay 5 mln £	F_1 $/£ = 1.75 S_0 $/£ [DIRECT] = 1.80 It's obliged to sell t_0: sign the contract, entering a LONG position T_1year: • Buy £ at F_1year $/£ = 1.75 • Pay 5 mln £ to [R]	X $/£ = 1.80 - Premium: [0.018 $ * S_0 $/£] = 90,000 - Cost of capital = 6% Can decide whether or not to exercise the contract t_0: • Sign the contract, entering a CALL option • Pay the CALL PREMIUM upfront [162,000 $] ** T_1year: • Decide whether to exercise the option or not o If S_3months $/£ < X_3months $/£ ⇒ DO NOT EXERCISE o If S_3months $/£ > X_3months $/£ ⇒ EXERCISE • Pay 5 mln £ to [R]

**The put premium = 1.8%*Expected Exposure*$S_{0€/£}$ = 0,018*5000000=90000,0

SCENARIO 2: FORWARD CONTRACT

S 3 months €/£	**Total € in unhedge**	**Total € in hedge**	**GAIN / (LOSS) -1* (HEDGED - UNHEDGED)**
1.5	5 mln £ at 1.5 = 7500000	5 mln £ at 1.75 = 8.750.000	8750000-7500000=1250000
1.6	5 mln £ at 1.6 = 8.000.000	5 mln £ at 1.75 = 8.750.000	8.750.000 - 8.000.000 = 750.000
1.75	5 mln £ at 1.75 = 8.750.000	5 mln £ at 1.75 = 8.750.000	8.750.000 - 8.750.000=0

1.8	5 mln £ at 1.8= 9.000.000	5 mln £ at 1.75 = 8.750.000	8.750.000 - 9.000.000 = -250.000
1.9	5 mln £ at 1.9 = 9.500.000	5 mln £ at 1.75 = 8.750.000	8.750.000 - 9.500.000 = -750.000

Wether the company has gained or lossed out of a hedge position based on the spot rate

The company is sure that, whatever happens on the market, it's going to recieve 1.750.000, giving up the opportunity to partecipate the upsides ($S_{3\text{ months }€/£}$ = 1.8 or 1.9)

SCENARIO 3: PUT OPTION [CALL PREMIUM 162000€, ANNUAL COST OF CAPITAL = 6%]

$S_{3\text{ months }€/£}$	**Exercise at $X_{\$/£}$= 1.80**	**Gross € OUTFLOWS**	**FV CALL premium**	**Net € OUTFLOWS (gross + cost of capital)**	**Effective Effect (Net € inflows / EE £)**
1.5	NO, it's better to buy at 1.5 instead of 1.80	5 mln £ at 1.5 = 7500000	90000*(1+6%) = (95400)	7500000 + 95400 = 7595400	7595400 / 5.000.000 = 1,5191
1.6	NO, it's better to buy at 1.6 instead of 1.80	5 mln £ at 1.6 = 8.000.000	(95400)	8.000.000 + 95400=8095400	8095400/ 5.000.000=1,6191
1.75	NO, it's better to buy at 1.75 instead of 1.80	5 mln £ at 1.75 = 8.750.000	(95400)	8.750.000 + 95400=8845400	8845400/5000000=1,7691
1.80	==	5 mln £ at 1.8= 9.000.000	(95400)	9.000.000 + 95400=9095400	9095400/5000000=1,8191 => FLOOR RATE
1.90	YES, it's better to buy at 1.80	5 mln £ at 1.8= 9.000.000	(95400)	9.000.000 + 95400=9095400	9095400/5000000=1,8191 => FLOOR RATE

	instead of 1.90				

Breakeven: 8750000=5000000*x+95400

Breakeven rate= 1.731

Over-hedging

Let's assume we are in T_0 (BUDGET) and a European Company, which is exporting in the US, shows the following data:

- *Expected revenues* = 100 $ (100% revenues in US$)
- *Budget exchange rate* (objective for CFO) = $/€ 1.3 (indirect) and €/$ 0.77 (direct)
- *Expected costs* (100% in €) = 70€

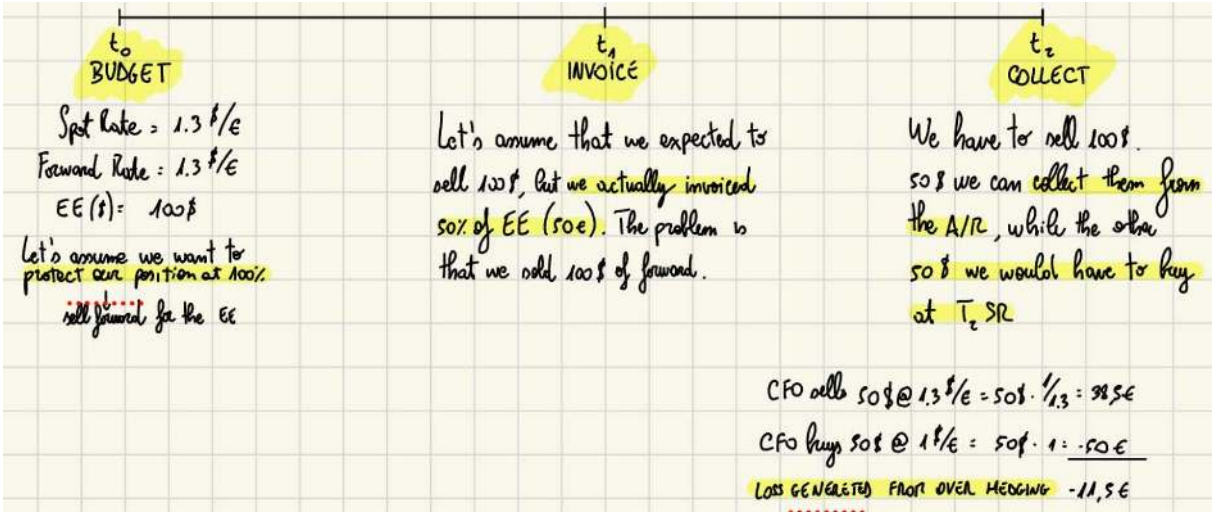
If we use the budget rate, we can get the **Expected Margin**: (100 $ · €/$ 0.77) – 70 € = € (77-70) = 7 €

Now, let's keep stable the hypothesis of 100 $ revenues and quantify the impact of FX rate volatility on
expected margin (in €) assuming two scenarios:

a) *Strong € and weak $* at $/€ 1.6 indirect (or €/$ 0.625 direct) -> worse scenario for us
   a. *Current margin would be*: (100 $ · €/$ 0.625) - 70€ = 62.5 € - 70 € = - 7.5 €
   b. *Unexpected loss equal to*: – (7 + 7.5) = - 14.5
b) *Strong $ and weak €* at $/€ 1.0 -> better scenario for us
   a. *Current margin would be*: (100$ · 1.0) - 70€ = 100 € - 70 € = 30 €
   b. *Unexpected gain equal to*: 30 - 7 = 23

Assume that a Forward at 1.3 $/€ (indirect quotation) were available in T_0 and the CFO hedges 100% of the expected 100 $. Selling forward at 1.3 to *reduce the impact of FX rate volatility on expected margin*. Is this approach reasonable or some problems may arise? What if expected revenues in $ were different from current revenues in $? There may be a "*quantity risk*", which means there could be situations where our client doesn't pay entirely its receivable. Now assume that in T_1 (INVOICING) *revenues are equal to 50$ instead of 100 $.* The *European company is invoicing less than expected*. This is a situation of **OVER-HEDGING**. Assume that in T_2 (COLLECTION) the FX spot rate is 1.0 $/€ (case of strong $):

- CFO receives 50 $ from revenues and sells them at the forward rate of 1.3 receiving 50 $ x (1/1.3) = 38.5€
- CFO is obliged to buy $ spot for 50 $ at the spot rate of 1.0 $/€ and deliver them at the forward rate of 1.3



CFO receives 50 $ paying	50 €
CFO sells 50$ receiving	38.5 €
Loss originated by over-hedging	(11.5 €)

The loss results from the speculative position: for the 50$ hedged with forward contract, that are not received from the sale, the company has to go to the market.

Current margin = Revenues – Costs (including the loss from over-hedging) = 38.5€ (which are the revenues from the sales) – 11.5€ (loss from over hedged position) – 70€ = -43€

Unexpected loss = (– 7 – 43) = 50 € consequence of over-hedging and of the expected budgeted margin.

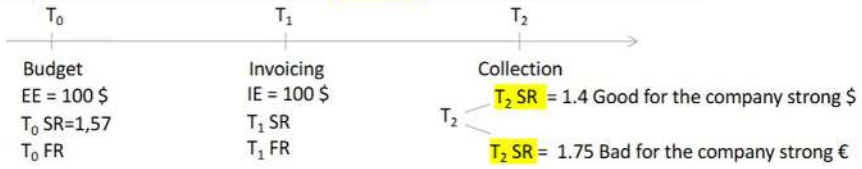
Key points to consider designing a proper hedging strategy -> When should I begin to hedge and why? (At budget or at invoicing?) and how much should I hedge? (100% or less?) Obviously there isn't a clear and absolute response, as it is always something of a trade-off:

- If we hedge at budget, we have a clearer definition on the EE, and usually CFOs who decide to hedge at this phase are more confident about the forward rate. At the same time there is a higher probability to suffer the loss from over hedging
- If we decide to hedge at invoice, usually CFOs tend to not hedge at 100% to avoid an excessive exposure hedge, but you will be less sure about the EE and you will be more exposed to the fluctuations of the future spot rate.

Let's see another example -> we have to understand whether it is better to hedge in T_0 or in T_1.We are going to consider two scenarios, a positive one (where the $ appreciate) and a negative one (where the $ depreciate).

European company exporting in the US

To = Time of Budget			
T1= Time of Invoicing			
T2 = Time of Collection			
EE = expected exposure in T0	100	$	
IE = invoicing exposure in T1	100	$	
	indirect	direct	
ToSR = Spot rate in T0	1,5758	0,6345983	
T1SR = Spot rate in T1	1,7	0,5882353	
Expected T2SR = Spot rate in T2	1,4	0,7142857	with probability 50%
	1,75	0,5714286	with probability 50%
ToFR = Forward rate in T0	1,54	0,6493506	
T1FR = Forward rate in T1	1,65	0,6060606	
BR = budget rate (expected and used within budget)	1,6	0,625	
To option price	0,02	$ per $ sold	



In T0, the company has to decide the best hedging strategy for its forward exposure. We have 3 alternatives:

- *Do nothing* -> companies go for the "do nothing strategy" when competitors are not hedging or when the risk is not relevant because it is a core business risk, or when they have excess of liquidity to cover for the eventual loss, or the possibility to increase debt or issue new equity, or
  eventually when the exposure is not generating indirect costs because it can be diversified away at shareholders level in their own portfolio
- *Forward contract* -> Sell 100 $ forward at the FX rate of 1.54 $/€
- *Option contract* -> we buy a put option (so we are going to sell dollars) at a strike price at T_0SR = 1.57 and option premium of 0.02$ (per $ sold)

In T_1, in case the company decides not to hedge in T_0, the company has 2 options:

- Do nothing and wait until T_2
- Sell 100$ forward at 1.65 -> The company is selling forward at 1.65 that is the current rate but
  it may not be the best option because it is destroying the value of its foreign revenues (and by
  extension it is destroying the expected margin)

We have to compare the outcomes of the alternative strategies (in terms of realized revenues denominated in the local currency: euro) assuming two different scenarios:

- Scenario 1: T_2SR = 1.4
- Scenario 2: T_2SR = 1.7

In T0 the company can underwrite a put option, with a strike price equal to spot rate in T_0 (T_0SR) = 1,5758 $/€ = 0.6345 €/$. The price of the option is 0.02 $ per $ sold (at the money spot option)

➔ Option premium = Premium in $ x EE x T_0SR = 0.02 $ x 100 $ x 0.6345 €/$ = 1,26917 €

If $T_2SR = 1.75$
Exercise the option and sell at the strike price

$$Floor = \frac{EE \cdot T_0SR(direct) - \text{premium in } € }{EE} = \text{(Strike price)}$$

$$Floor = \frac{100\$ \cdot (0.6345) - 1.26917}{100\$} =$$

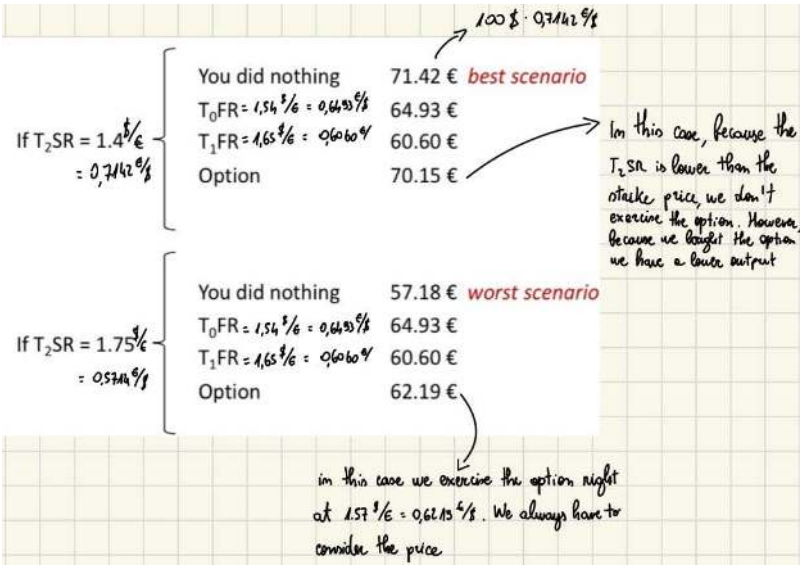
$$Floor = 0.6219(direct) / 1.60795(indirect)$$

If $T_2SR = 1.4$
Do not exercise the option, sell on the market

$$Floor = \frac{EE \cdot T_2SR - \text{premium in } € }{EE} =$$

$$Floor = \frac{100\$ \cdot (0.7142857) - 1.26917}{100\$} =$$

$$Floor = 0.715(direct) / 1.4253(indirect)$$



Managing Interest Risk

Debt Management

Debt is <u>one the 2 possible ways of funding together with *Equity*</u>. There are also the securities, which have some characteristics of both, but now we focus on Debt. In addition, when we talk about debt we have to figure out <u>how much</u> and <u>which kind of debt</u>. When we analyse debt, we have to <u>understand which are its characteristics</u>. The **most relevant factors that distinguish Debt** (such as Bank Debt, Commercial Papers and Corporate Bonds) **from Equity** (like Owner's equity, Venture Capital, Common Stocks, Warrants) are:

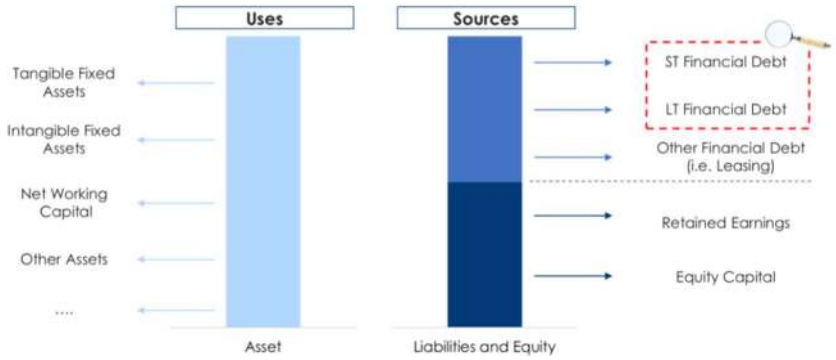
- <u>*Fixed Claim vs Residual Claim*</u> -> the contract behind a debt includes the constant and periodic repayments of a determined or determinable amount of money. On the other hand, the money the owner will receive will be residual after all the costs of the company are covered.
- <u>*Tax deducibility*</u> -> interest on debt is tax deductible, while the dividends are not
- <u>*High priority in Financial Trouble vs Lowest priority in Financial Trouble*</u> -> in case of the financial trouble, the first figures that are going to be refunded will be the

financial creditors, while the owner of the company will receive something only after all company creditors are satisfied

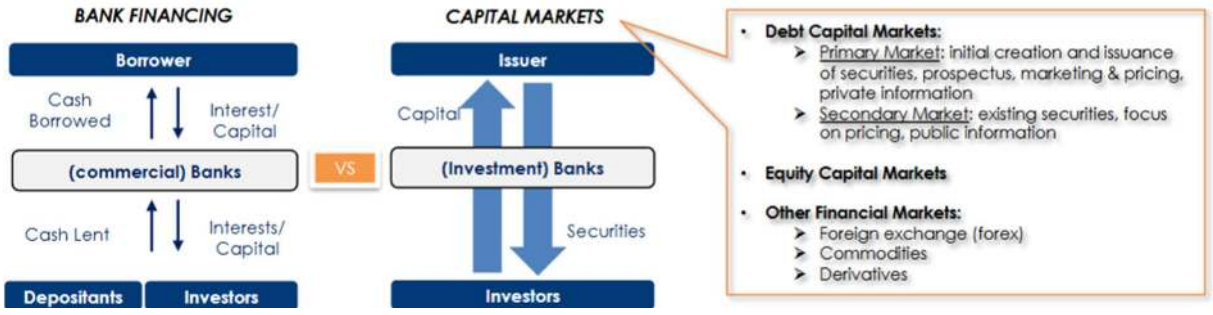
- *Fixed Maturity vs Infinite* -> the repayment of the debt occurs for a specific amount of time, while the repayment of the investment in equity will be repaid only when the company finishes its activity (which can last indefinitely) or when the shareholders leave the company
- *No Management control vs Management control*

Debt management is crucial to maximise the value of a company. Behind the word "debt" there are 50 shades that are hidden, and the finance department has to be familiar with all of them, in order to effectively cope with all the problems they create. Examples of these factors are the *Type of sources* (loan, bond…), *Rating, Ranking, Refinancing risk, ESG Finance, How to price a bond*…

A corporate has different funding needs, depending on the assets it has to finance. On the liabilities side of a BS, different tools are available. In your debt maturity analysis you have to mix different sources of debt, maximising maturity, pricing and pros/cons of the different instruments.



What are **Capital Markets**? Capital markets are financial markets that bring buyers and sellers together to trade financial assets. Capital markets are the exchange system platform that transfers capital from investors who want to employ their excess capital to businesses that require the capital to finance various projects or investments -> A capital market is a financial market in which equity or bonds are bought and sold, thereby connecting those who need capital with those who have capital.



What are the **most important types of bank debt**?

- *Revolving Credit Facilities* -> instrument of a loan market that enables a firm to borrow up to a pre-specified amount for an agreed period of time. As repayment of

outstanding balance are made, the loan facility is replenished -> can be potentially used for cheaper line, covering working capital or unexpected funding needs

- *Term Loan* -> bank lines that can be both secured and unsecured. Can take different forms: A (Amortizing), B (Bullet). Short to medium maturity (3-7 years). No rating needed -> can be used to finance general needs of corporate, take out the bridge loans.
- *Hot money lines* -> short-term uncommitted financing. From 24h to up to 3 months. Useful to deal the unexpected financial needs. This debt type is usually available for companies with high debt standards

➔ Companies need to balance their fundings sources in order to be efficient and exploit temporary advantages and avoid concentration on one channel

	Loan	**Bond**
Type	*Bank debt*	*Debt Capital Market*
Rating	*Not necessary*	*At least 2 needed* (even though they are expensive to receive)
Lien	*Secured* (asset to protect the money from the default risk)	*Unsecured*
Prepayment	*Yes*	Yes/No -> *callable option*, which give the right to pay back the bond at a fixed price before the maturity -> if the interest rate has increased, they might decide to exercise the right in order to avoid paying too much, in particular if we issued a bond with a floating rate. The presence of this option changes the risk balance of the contract in favour of the issuer
Upfront fee/agency fee	*Yes*	*Yes*
Price	*Floating rate -> cost of debt = base rate + margin*. Regarding the base rate, we have to fix it at the time of the signing contract how will it be identified. The margin is set at the signing contract and it depends: - If you are rated, the margin depends by the rating of the enterprise and the function used by the bank	Market might be more expensive, *usually fixed rate debt*

	- If you are unrated (because you haven't issued a bond or got any loan), we use 2 financial leverage ratios, NFP/EBITDA and EBIT/(Int exp)	
Amount	*Depending on bank availabilities*, €500m-1bn are the average size	*Depending on bank availabilities*, €500m-2bn are the average size
Tenor	*Usually 3-5 years*, longer tenors are more difficult	*Usually 3-30 years*, depending on the creditworthiness and the market conditions
Sustainability	*Green, Social or Sustainability Linked features available*	*Green, Social or Sustainability Linked features available*

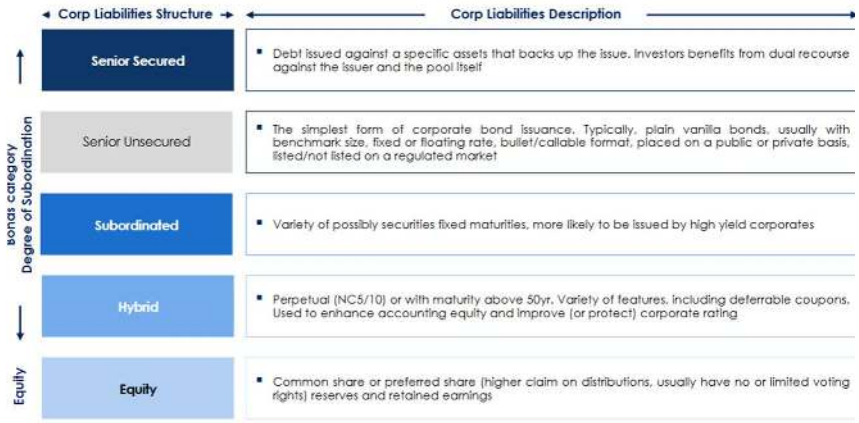
Debt Capital Market

The so-called **debt capital market (or DCM)** is the market in which bonds are issued. The debt capital market can be divided into various categories according to:

- *Issuer* -> *Corporate*, *financial*, *Sovereign Supranational and Agencies*
- *Rating* -> *Investment Grade* (high rated companies), *Crossover* (companies that are in between high rates and low rates zones), *High Yield* (low rated), *Unrated* -> usually we use the term "rising star" when there is a company starting from being high yield to investment grade, while "fallen angle" for companies that went in the opposite direction
- *Placement* -> *Public*, *Private*

Depending on the **frequency** with which issuers decide to tap the debt capital market, the offering **documentation** (Prospectus) can be

- *"Stand alone" document* -> *Cheaper* if not frequent issuer, but *higher time to market*
- *A programme (called EMTN – "Euro Medium Term Notes")* updated periodically -> *Lower time to market* and you deliver a *standard documentation*, already available to investors, but it needs to be *updated periodically* (making it more expensive) and *cannot be used in case of company events* that require ad hoc documentation



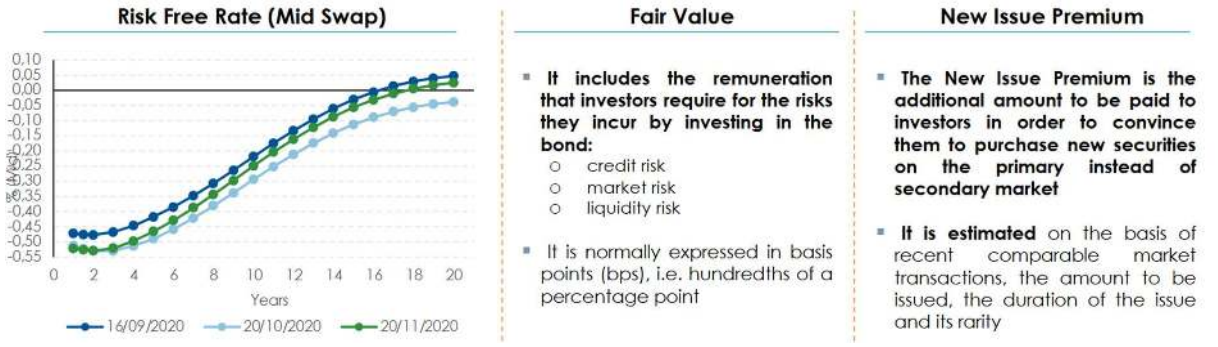
Why should a company issue a 0-coupon bond? It is usually done to *finance long-term projects without the need to cash out* and you can manage to *align future cash-in with the repayment* of the principle.

Pricing of a New bond

The **pricing** of a new bond is not the issue price in cents, but the yield to maturity which will be required by the investors at issuance (and which is paid by the issuer through coupons and issue discount)

$$\sum_{n=1}^{n} \frac{Copons\ and\ Nominal\ Value}{(1+YTM)^n} = Price\ in\ 100\%$$

$$Yield\ to\ Maturity = Risk\ Free\ Rate + Fair\ Value + New\ Issue\ Premium$$



To define the pricing (i.e. YTM) and the price in cents of a new bond therefore:

i. the YTM is calculated
ii. on the basis of the YTM (i.e 1.432%) the coupon is rounded to the lower 1/8 (the coupon rounding is just a convention widely, but not always, used on the market. In this case, the closest to the YTM is 1.375%)*
iii. the price in cents is derived

Managing interest rate risk

We have to consider that whenever there is an increase of interest rates, the cost of

investments rises and people start to spend less. We have also to consider that it has been measured that in the markets where there is an higher percentage of floating rate there is an higher volatility, (????)

Consider the following three different debt strategies being considered by a corporate borrower. Each is intended to provide $1 million in financing for a three-year period.

- *Strategy 1: Borrow $1 million for three years at a fixed rate of interest* -> you maximise the predictability of the CF connected with the loan, lose flexibility (that's the main price of this bond, as in case the interest rates would go under the rate of this loan, you have to be sticked with the one in your contract), you don't face interest risk
- *Strategy 2: Borrow $1 million for three years at a floating-rate (SOFR) + 2%, to be reset annually* -> you eliminate credit risk, but you have interest rate risk, even though its increases flexibility
- *Strategy 3: Borrow $1 million for one year at a fixed-rate; then, renew the credit annually* -> reinvestment risk (the risk that when you have to make a new investment or renew a contract you'll have to face worse conditions), more flexibility + more risk, as it is strictly connected to the current yield curve -> for short time, yield curve has lower interest rates but it much more volatile than the long term

Compute the expected interest rates and cash flows associated with a 3-years $10,000,000 floating-rate loan. The company pays an initiation fee of 1.5% of principal up-front (which reduces proceeds)

Notional amount of debt	10 Million $
Maturity	3Y
Reference rate (SOFR)	Floating rate
Credit spread (fixed)	1.5%
Up-front fee	1.5% of the notional
Current SOFR	5%

Cost and cash flows in serving a floating-rate loan

Loan Interest Rate	Year 0	Year 1	Year 2	Year 3
SOFR (floating)	5.00%	5.00%	5.00%	5.00%
Spread (fixed)		1.50%	1.50%	1.50%
Total Interest payable		6.50%	6.50%	6.50%

Interest Cash Flows on Loan		Year 0	Year 1	Year 2	Year 3
SOFR (floating)	5.00%		500,000	500,000	500,000
Spread (fixed)	1.50%		150,000	150,000	150,000
Total interest			650,000	650,000	650,000
Loan proceeds and repayment		9,850,000.00			10,000,000
TOTAL CASH FLOWS		**9,850,000.00**	**(650,000)**	**(650,000)**	**(10,650,000)**

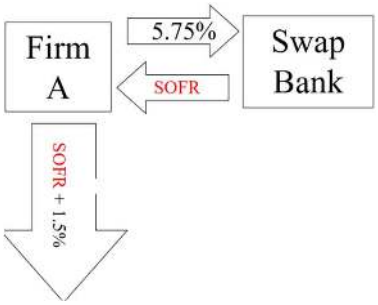
IRR of total cash flows ("all-in-cost" AIC)	7.072%

SENSITIVITIES TO FLOATING RATE	SOFR (yr-0)	SOFR (yr-1)	SOFR (yr-2)	SOFR (yr-3)	AIC
Baseline case above	5.00%	5.00%	5.00%	5.00%	7.072%
Floating rate rises 25 basis points/yr		5.25%	5.50%	5.75%	7.565%
Floating rate falls 25 basis points/yr		4.75%	4.50%	4.25%	6.578%

What can I do to hedge against the rising risk? **Interest Rate Swap** -> it is a contract where the company impose themselves to pay to a bank a fixed rate and receive a variable one, OR viceversa, depending on our needs.

Firm A has a floating-rate loan. Firm A can enter into an additional agreement with a bank or a swap dealer in which Firm A will pay fixed-rate payments to the SWAP bank at 5.75% against receiving floating. In this way, the interest rate payments on the floating-rate loan would become fixed.

➔ Net interest = 5.75% + SOFR +1.5% - SOFR = 5.75% + 1.5% = 7.25% -> we are fixing the total amount of interest we are going to pay



Combined Loan and Swap Position		Year 1	Year 2	Year 3
SOFR on loan	Paying	5.00%	5.00%	5.00%
Spread (fixed)	Paying	1.50%	1.50%	1.50%
Pay fixed on SWAP	Paying	5.75%	5.75%	5.75%
Receive floating floating on SWAP	Receiving	-5.00%	-5.00%	-5.00%
Net Interest due after swap		**7.25%**	**7.25%**	**7.25%**

Combined Loan and Swap Position		Year 0	Year 1	Year 2	Year 3
SOFR on loan	5.00%		500,000	500,000	500,000
Spread (fixed)	1.50%		150,000	150,000	150,000
Pay fixed on SWAP	5.75%		575,000	575,000	575,000
Receive floating floating on SWAP	-5.00%		(500,000)	(500,000)	(500,000)
Net Interest (=fixed rate on Swap + Credit Spread)			**725,000**	**725,000**	**725,000**
Loan proceed (= Notional amount - up front fee 1,5%)		**9,850,000.00**			**10,000,000**
TOTAL CASH FLOWS		**9,850,000.00**	**(725,000)**	**(725,000)**	**(10,725,000)**

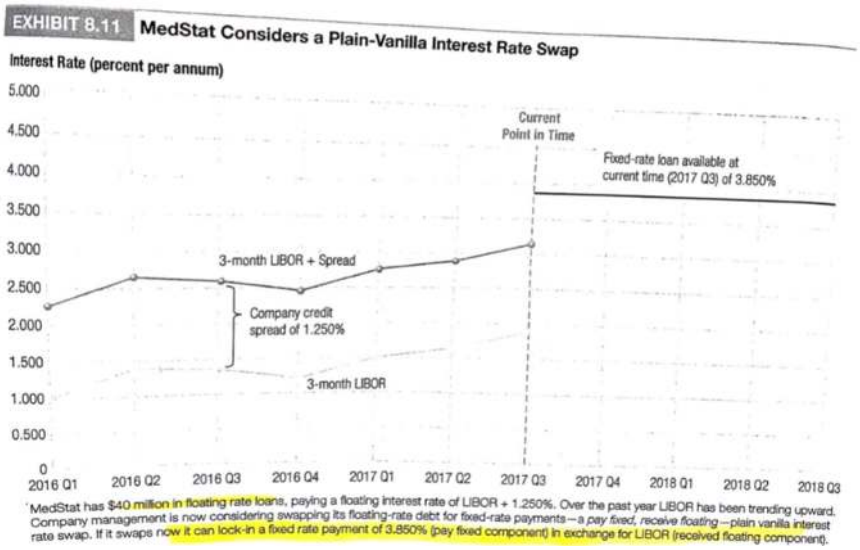
IRR of total cash flows ("all-in-cost" AIC)	7.830%

Another example: MEDSTAT'S FLOATING RATE DEBT

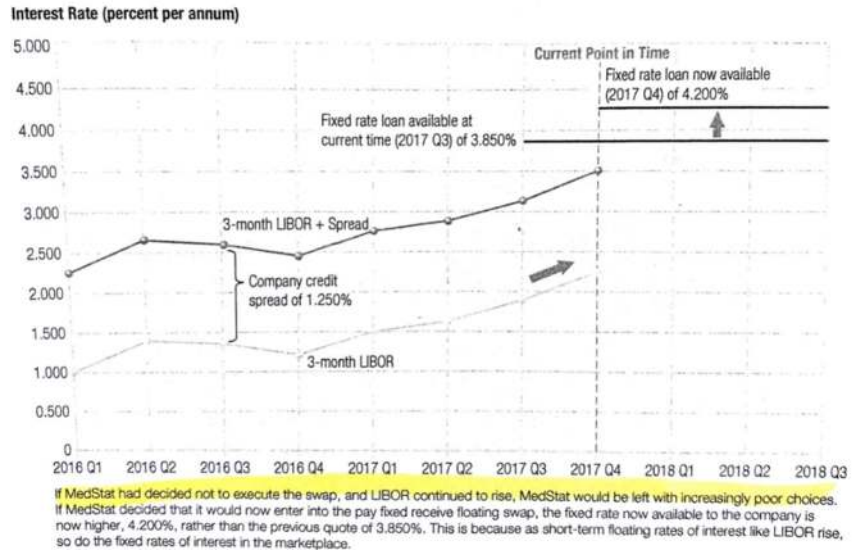
MedStat is a US-based firm with a $40 million floating-rate bank loan. The company ended the first two years of the loan agreement, with 3 years remaining. The loan is priced at the 3-month LIBOR rate + 1.25% credit risk premium. MedStat will receive a floating-rate payment from the bank of LIBOR, which is then used to pay the LIBOR component on its floating-rate loan. What then remains for the company is to pay the fixed-rate spread on the loan (1.25% spread) plus the fixed rate payment of the swap of 3.85%, for a total of 5.1%. The fixed rate quoted to the company is based on a corporate issuer of AA quality for a 3-year maturity, which is the length of time the swap needs in order to cover the floating-rate loan.

Debt/Swap Component	Floating	Fixed
Floating-rate loan	(LIBOR)	(1.250%)
Swap (pay fixed, receive floating)	LIBOR	(3.850%)
Floating-rate loan after swap	–	(5.100%)

The recent movements of LIBOR and MedStat's floating rate debt are depicted in the following graph:



Because following the historical movement of the LIBOR index it is reasonable to predict the index will increase, and it could be reasonable to sign a IRS pay fix receive floating contract. At this point, the decision will be decide when the company should hedge. This is because if the company decides to hedge in Q3 2017, the fix rate it will pay in the end is going to be 3.85%. If the company might decide to not hedge now but wait, there could be some problems with the interest rate risks, like it is shown in the following graph:



PLAIN-VANILLA SWAP STRATEGIES -> The use of the plain-vanilla swap market by firms can be divided into two basic categories:

- *Debt structure*: all companies will pursue a target debt structure that combines *maturity*,
  currency of composition and *fixed/floating pricing* (which is one of the most difficult for many companies to determine). Companies that have very high credit quality and therefore advantaged access to the fixed-rate debt markets, A or AA companies like Walmart or IBM, often raise large amounts of debt at fixed rates and then they

use the plain-vanilla swap market to alter selective amounts of their fixed-rate debt into floating-rate debt to achieve their desired objective.

Need to **balance fix/float exposure**, in line with internal policies, without changing T&C of the existing debt or doing additional debt to rebalance

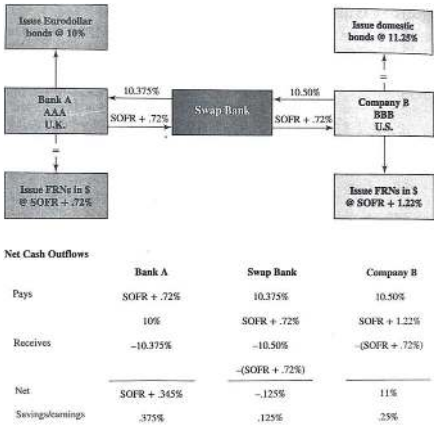
- *Debt cost*: all firms are always interested in opportunities to lower the cost of their debt. The plain-vanilla swap market is one *highly accessible* and *low-cost method* of doing so.

IRS: QUALITY SPREAD DIFFERENTIAL -> We have to compare the fixed market spread, 7%-5% = 2% and the floating market spread (LIBOR+1%) – (LIBOR + 0.5%) = 0.5%

➔ QSD = 1.5%

A swap bank is familiar with the financing needs of BANK A and COMPANY B and has the opportunity to set up a fixed-for-floating IRS that will benefit each counterparty and the swap bank. Assume that the swap bank is quoting five-year US dollar IRS at 10.375%-10.5% against 12-month SOFR + 0.72%. The key, or necessary condition, giving rise to the swap is that a positive quality spread differential (QDS) exists.

	Company B	Bank A	Differential
Fixed-rate	11.25%	10.00%	1.25%
Floating-rate	SOFR + 1.22%	SOFR + .72%	.50%
			QSD = .75%



Cost of Capital and Capital Structure

What is the **cost of capital**? In corporate finance, the cost of capital plays a central role in investment analysis, capital structure and dividend policy, helping to *determine whether*

and where a business should invest, *how much it should borrow* and *how much it should return to stockholders*. In capital budgeting decisions:

- **Accounting Test** -> Return on Invested Capital (ROIC) > Cost of Capital
- **Time Weighted CF Test** -> NPV of the project > 0
- **Time Weighted % Return** -> IRR > Cost of Capital
- **Cost of capital for an investment** -> it should reflect the risk of the investment (not the entity taking the investment) and should use a debt ratio that is reflective of the investment's CF

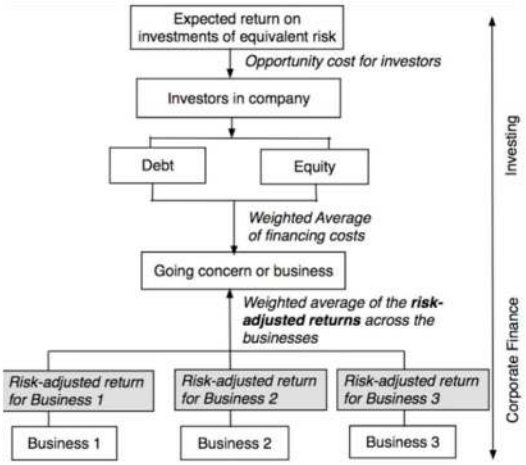
The cost of capital can also operate as an *optimizing tool*, where the mix of debt and equity that minimizes cost of capital is the one that the business should aspire to have, since, in effect, it maximizes the value of the business. In valuation, the cost of capital operates as the primary mechanism for measuring and adjusting for risk in the expected cash flows. In fact, when we consider the value of a company, we have to consider that the simplest formula is:

$$V_a = \sum_{t=1}^{\infty} \frac{FCFF_t}{(1+WACC)^t}$$

Where the **WACC** is the **Weighted Average Cost of Capital** and considering that the company is expected to live forever (that's why we calculate the summatory goes to infinite) -> in order to increase the Value of the company, we have to decrease the WACC -> we have to look a good combination of debt/equity, which kind of debt, which one is the least expensive…

What is the cost of capital?

It is an opportunity cost for investors. We might have a single value of the WACC, but there could be *different business units*, so we need *different WACC*, as different projects can face different risks which generates different cash flows. In case the risk is the same, we can use the general WACC for the company as a whole.



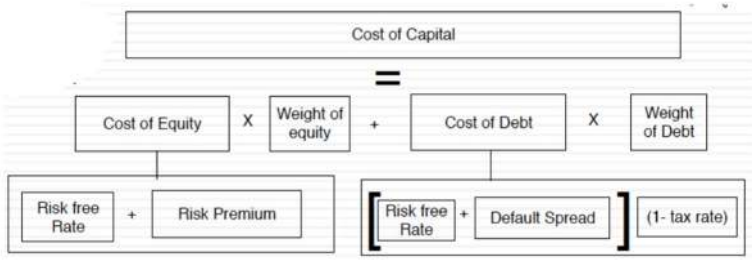
How do we calculate the WACC?

$$WACC = K_d(1-t_c) * \frac{D}{D+E+S} + K_e * \frac{E}{D+E+S} + K_s * \frac{S}{D+E+S}$$

Where K_d, K_e and K_s are, respectively, the cost of debt, the cost of equity and the cost of securities (if present). For the K_d, we have to consider also the effect of taxes, so we discount it.

If I'm not using any debt, the WACC will be only the cost of equity. If we add some debt to the capital structure, it is going to reduce the WACC because the cost of debt is lower. The effect of the lower cost of debt is possible to see from the following Bloomberg interfaces:

If we consider only Debt and Equity in our capital structure, the **general formula** is:



From this picture it is possible to understand that there are *several questions we have to ask in order to identify the WACC*. For example, *what should we use as a risk-free rate, what risk equity are rewarded, if we should scale the equity risk across companies, how do we measure the risk premium per unit of risk, how do we identify the default spread, what corporate tax rate we should use* etc.

Estimating the cost of debt

The general equation to come up with the cost of debt we have to sum the *Risk-free rate + default spread* (which measure that the holders might not be able to pay). The sum of the two is a pre-tax value.

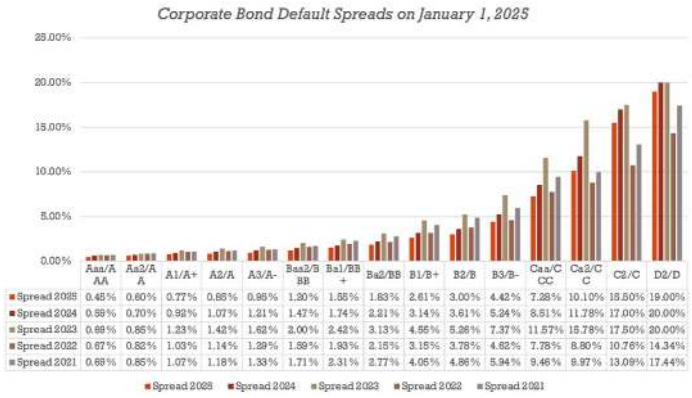
The **cost of debt** is the rate at which you can borrow money, long term right now. It will reflect not only *your default risk* but also the *level of interest rates in the market* -> the cost of debt is not the rate at which you have borrowed money in the past or a current book interest rate (interest expense/debt). The two most widely used approaches to estimating cost of debt are:

- Looking up the **yield to maturity on a straight bond outstanding from the firm** (if the firm issue bonds). The limitation of this approach is that very few firms have long term straight bonds that are *liquid* and *widely traded*.
- Looking up the **rating for the firm and estimating a default spread based upon the rating**. While this approach is more robust, different bonds from the same firm can have different ratings -> use a *median rating for the firm*. The risk-free rate is a

market data, while the credit default spread *can be obtained*. The company is rated, you look at it and you can link the rating to the Default Spread by looking at the tables provided by the rating companies (the lower the rating, the higher the default spread is going to be charged

- When in trouble (either because you have no ratings or multiple ratings for a firm), estimate a **synthetic rating for your firm** and the cost of debt based upon that rating. This rating is not the official one (which means there hasn't been a rating company conducting its evaluations), but you can look at the *Interest coverage ratio* (ICR, calculated as *EBIT/Interest Expenses*, which is the most used financial ratio to explain the differences in the debt coverage capability of a company), and then you look at the Default Spread associate to the ICR (we have to pick the correct table, that can be influenced by different factors such as the size of the company)

➔ These are not fixed numbers, **can change between the different years**, as it is possible to see from the following graph:



There are two simple rules that are worth reemphasizing when it comes the cost of debt:

- The first is to **keep it current**, reflecting the company's current default risk standing rather than the one it had when it actually borrowed the money. Thus, if your company was Aaa rated, when it borrowed its money, but has now slide to Baa rating, you will need to use the higher default spread associated with the latter in estimating its cost of debt. The other aspect of aspect of being current is to update the cost of debt for the risk-free rate today, rather than the rate at the time of the borrowing.
- The other rule for the cost of debt is to **stay currency consistent**. Consequently, if you are looking at a *Nestle project*, with *cash flows denominated in Indian rupees*, you will need to estimate a *current long-term cost of debt for Nestle in Indian rupees*, even if it has no rupee debt outstanding.

Estimating the Cost of Equity

When we have to estimate the cost of Equity, we can use the CAPM (Capital Asset Pricing Model) formula:

$$CAPM = r_f + \beta_i * (Equity\ Risk\ Premium) = r_f + \beta_i * (r_i - r_f)$$

Where:

- r_f -> Return of the risk-free asset, usually a long-term, default free bond -> varies across currencies and across time
- β_i -> Relative measure of risk added to a diversified portfolio -> it depends by the risk of the business(es) the company is involved in, which might be more or less sensitive to macroeconomic changes
- ***Equity Risk premium*** -> premium investors demand above the risk-free asset for investing in equity as a class

Let's analyse the different elements.

The **equity risk premium** is the premium that investors demand for investing in stocks, relative to the risk-free rate. As a general proposition, this premium should:

- *be greater than zero*
- *increase with the risk aversion of the investors in that market*
- *should change over time*, as economic circumstances change and investor composition also changes

We are using a *long-term rate* because we are evaluating a company (which, like we said before, it is expected to last forever). If we are going to *evaluate a project*, we should use the risk-free rate with the same maturity. On a risk-free asset, the actual return is equal to the expected return -> **no variance** around the expected return. For an investment to be risk-free two conditions have to be met:

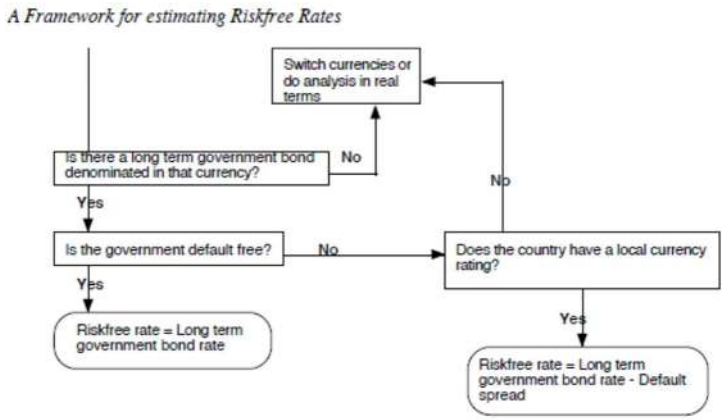
- There *has to be no default risk*, which generally implies that the *security has to be issued by the government.* Note, however, that not all governments can be viewed as default free. Some governments face default risk and the rates on bonds issued by them will not be risk-free.
- There can be *no uncertainty about reinvestment rates*, which implies that *it is a zero-coupon security with the same maturity as the cash flow being analysed* (no reinvestment risk)

The risk-free rate that you use in an analysis should be in the same currency that your cashflows are estimated in. In other words, if your cashflows are in U.S. dollars, your risk-free rate has to be in U.S. dollars as well. If your cash flows are in Euros, your risk-free rate should be a Euro risk-free rate. The conventional practice of using the government bond rate as the risk-free rate *works only if the government is perceived to have no default risk*. If the government is perceived to have default risk, the government bond rate will have a default spread component in it and not be risk-free.

So, for example, if we have the Indian government had 10-year Rupee bonds outstanding, with a yield to maturity of about 7.73% on January 1, 2016. In January 2016, the Indian government had a local currency sovereign rating of Baa3. The typical default spread (over a default-free rate) for Baa3 rated country bonds in early 2016 was 2.44%.

The risk-free rate in Indian Rupees is:
a. The yield to maturity on the 10-year bond (7.73%)
b. The yield to maturity on the 10-year bond + Default spread (10.17%)
c. The yield to maturity on the 10-year bond – Default spread (5.29%)
d. None of the above

➔ C is the answer, as the risk-free rate is calculated as *Long term government bond rate – Default spread*



The **equity risk premium** is the premium that an equity investors demand for investing in stocks, relative to the risk-free rate. When investing in equity you are *facing a higher risk than the risk free asset*. Some stocks can be riskier than other, but we have also to check the overall stock market. As a general proposition, this premium should:

- *be greater than zero*
- *increase with the risk aversion of the investors in that market*
- *should change over time*, as economic circumstances change and investor composition also changes

Within the financial community, there is no clear consensus over what number should be used for the equity risk premium in the calculation of the cost of capital:

- Assume that the actual premium delivered over long time periods is equal to the expected premium - i.e., use *historical data*.
- *Survey investors* on their desired risk premiums and use the average premium from these surveys.
- *Estimate the implied premium in today's asset prices*.

Historical data

We can keep the same data forever or adjust it. The premium (we have to look at long term) can be calculated as the difference between the *average return of the equity market* and the h*istorical average return of the risk-free asset (bond market)*. Be aware that this estimation must deal with noisy estimates (volatility) and survivorship bias (on the long term only the companies who haven't failed are making up the indicators we're considering). There are three reasons for why the premium estimated may differ:

- *How far back you go* (usually we use the longest period available, in order to get a normalised value)
- *Whether you use T. Bill or T. Bond rates* (You have to be consistent. Since I will be using the T. Bond rate as my risk-free rate, I will use the premium over that rate) -> depends on the project we are using, as for shorter periods it is better to use T. Bills
- *Whether you use arithmetic or geometric means*.

Example:

Nominal				
	Arithmetic Average		*Geometric Average*	
	Stocks - T. Bills	Stocks - T. Bonds	Stocks - T. Bills	Stocks - T. Bonds
1928-2024	**8.44%**	**7.00%**	**6.63%**	**5.44%**
Std Error	*2.01%*	*2.12%*		
1975-2024	**9.25%**	**7.03%**	**8.02%**	**6.22%**
Std Error	*2.30%*	*2.67%*		
2015-2024	**12.34%**	**13.54%**	**11.22%**	**12.71%**
Std Error	*5.04%*	*3.84%*		

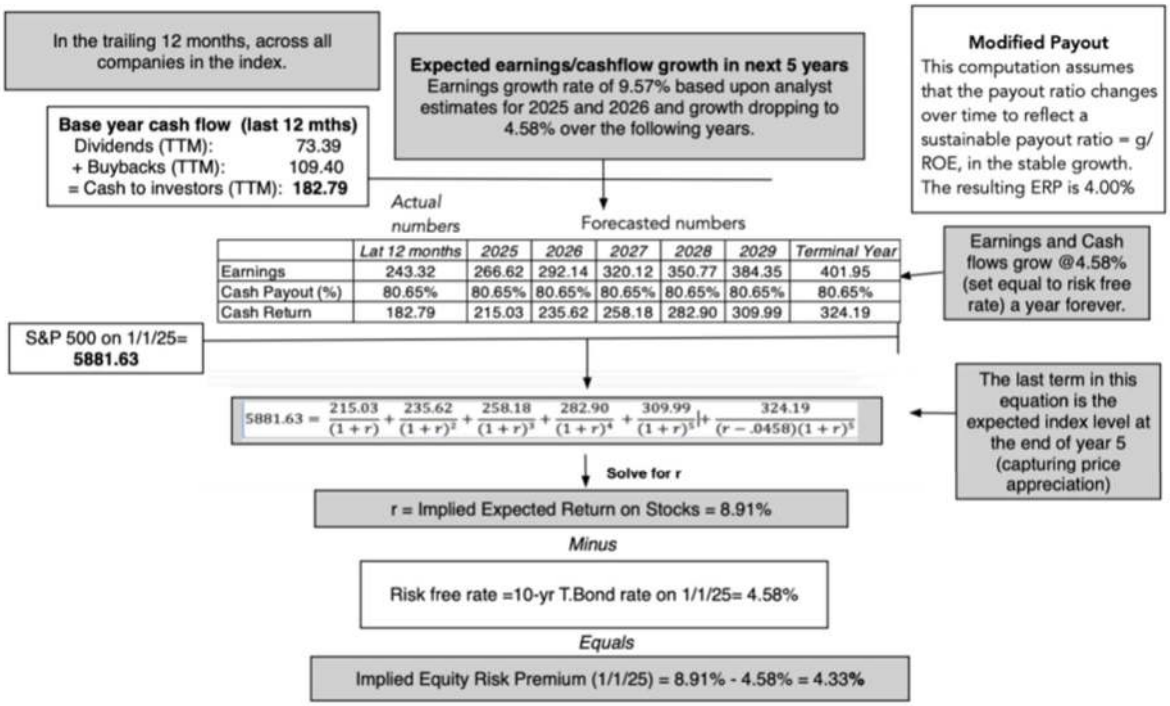
Survey approach

Surveying all investors in a marketplace is impractical. However, you can survey a few investors (especially the larger investors, with no precise formulas and only collecting information about the value of companies in that particular day when the survey is conducted) and use these results. In practice, *surveys of money managers' expectations of future expected returns on stocks*. This translates into surveys of the following:

- Mutual fund managers about equity returns in the future
- A random sample of investors about what they think stocks will do in the future
- CFOs about a reasonable equity risk premium
- Academics about a reasonable equity risk premium

The **limitations** of this approach are:

- there are no constraints on reasonability (the survey could produce negative risk premiums or risk premiums of 50%)
- they are extremely volatile
- they tend to be short-term; even the longest surveys do not go beyond one year



	Lat 12 months	2025	2026	2027	2028	2029	Terminal Year
Earnings	243.32	266.62	292.14	320.12	350.77	384.35	401.95
Cash Payout (%)	80.65%	80.65%	80.65%	80.65%	80.65%	80.65%	80.65%
Cash Return	182.79	215.03	235.62	258.18	282.90	309.99	324.19

Intuitions about ERP (Equity Risk Premium)

If you know the price paid for an asset and have estimates of the expected cash flows on the asset, you can estimate the IRR of these cash flows. If you paid the price, this is your expected return.

- In the bond market, that is exactly what we do when we compute the yield to maturity on a bond.
- If you assume that stocks are correctly priced in the aggregate and you can estimate the expected cashflows from buying stocks, you can estimate the expected rate of return on stocks by finding that discount rate that makes the present value equal to the price paid.

Subtracting out the risk-free rate should yield an implied equity risk premium. This implied equity premium is a forward-looking number and can be updated as often as you want.

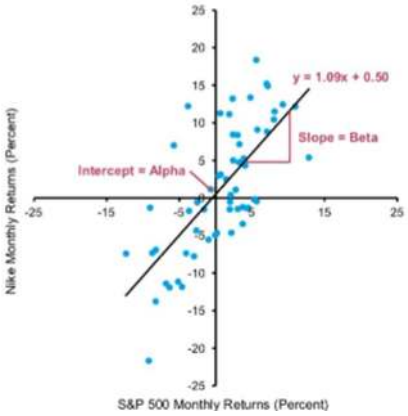
The Equity Risk Premium is also influenced by the country in which the company operates. In fact, it is possible to calculate it as it is:

$$ERP = Base\ Premium\ for\ mature\ equity\ markets + Country\ premium$$

To have the country premium, there are tables that are periodically updated by financial institutions, where we have just to look for the country of our interest, similar to the following:

Country	Rating	Default Spread	CRP	ERP
Abu Dhabi	Aa2	0.46%	0.60%	4.72%
Albania	B1	4.24%	5.50%	9.62%
Andorra (Principality of)	Baa1	1.50%	1.95%	6.07%
Angola	B3	6.12%	7.94%	12.06%
Argentina	Ca	11.29%	14.66%	18.78%
Armenia	Ba3	3.38%	4.39%	8.51%
Aruba	Baa3	2.07%	2.68%	6.80%
Australia	Aaa	0.00%	0.00%	4.12%
Austria	Aa1	0.38%	0.49%	4.61%
Azerbaijan	Ba1	2.36%	3.06%	7.18%
Bahamas	B1	4.24%	5.50%	9.62%
Bahrain	B2	5.18%	6.72%	10.84%
Bangladesh	B1	4.24%	5.50%	9.62%
Barbados	B3	6.12%	7.94%	12.06%
Belarus	C	17.50%	22.72%	26.84%
Belgium	Aa3	0.56%	0.73%	4.85%
Belize	Caa2	8.47%	11.00%	15.12%
Benin	B1	4.24%	5.50%	9.62%
Bermuda	A2	0.80%	1.03%	5.15%
Bolivia	Caa3	9.41%	12.22%	16.34%
Bosnia and Herzegovina	B3	6.12%	7.94%	12.06%
Botswana	A3	1.13%	1.46%	5.58%

Estimating Beta – Top-down approach



The standard procedure for estimating betas is to regress stock returns (Rj) against market returns (Rm. The slope of the regression corresponds to the beta of the stock, and measures the systematic risk of the stock.

The beta of a company is usually calculated as:

$$\beta_i = \frac{Cov(r_i, r_m)}{Var(r_m)}$$

Where r_i is the return of the single company and r_m is the return of the market.

Let's consider the example of Disney to identify the beta.

- Period used: 5 years (2008-2013)
- Return Interval = Monthly
- Market Index: S&P 500 Index

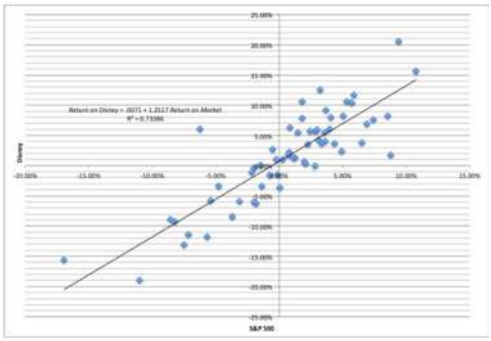
For instance, to calculate returns on Disney in December 2009:

- Price for Disney at end of November 2009 = $ 30.22
- Price for Disney at end of December 2009 = $ 32.25
- Dividends during month = $0.35 (It was an ex-dividend month)
- Return = ($32.25 - $30.22 + $ 0.35)/$30.22= 7.88%

To estimate returns on the index in the same month

- Index level at end of November 2009 = 1095.63
- Index level at end of December 2009 = 1115.10
- Dividends on index in December 2009 = 1.683
- Return = (1115.1 – 1095.63+1.683)/ 1095.63 = 1.78%

By plotting all the estimated results of the market and those of Disney, it is possible to have the following graph and equation.



Return on Disney = .00712 + 1.2517 *Return on Market* $R^2 = 0.73386$
(0.10)

The information we obtain from this situation are:

- The slope of the line -> 1.2517 is the beta of Disney for the period taken in consideration, which means that if the market return increases by 1%, on average the Disney's return increases by 1.2517%. This means that using a different time period for the regression or different return intervals (weekly or daily) for the same period can result in a different beta
- R squared of the regression = 73% -> This statistic suggest that 73% of the risk (variance) in Disney stock comes from market sources and that the balance of 27% the risk comes from firm-specific components
- Standard Error of Beta = 0.10 -> This statistic implies that the true beta for Disney could range from 1.15-1.35 (subtracting or adding one standard error to the beta estimate of 1.25) with 67%
  confidence and from 1.05 to 1.45 (subtracting or adding two standard error to the beta estimate of 1.25) with 95% confidence

Steps in Estimating Beta of the Company's Common Stock

1	Choose a market index (links to the market risk premium estimation process)
2	Choose an estimation period (length of period and specific dates)
3	Choose the periodicity for the stock return (daily, weekly, or monthly interval)
4	Collect the necessary data and estimate the market model
5	Make adjustments, if any, for mean reversion and other effects

We have to consider that:

- Historical returns: The use of a longer time period allows for a greater number of observations in the regression. Longer time periods, though, might be biased due to structural changes in the firm/industry risk profile. This is the main reason to support the use of a shorter period of historical records in the range between 2 and 5 years.
- Returns: Both stock returns and market returns should be calculated considering both the capital gains and the dividends received during the period under consideration. Some sources calculate stock and market index returns only based on price changes without considering dividends.
- Frequency (Return Interval): Using daily returns increases the number of observations in the
  regression.
- The market index: Due to the emergence of internationally diversified investors who allocate their assets in different markets, it is becoming increasingly common to calculate β with respect to international indices, (e.g. Morgan Stanley Capital Index).

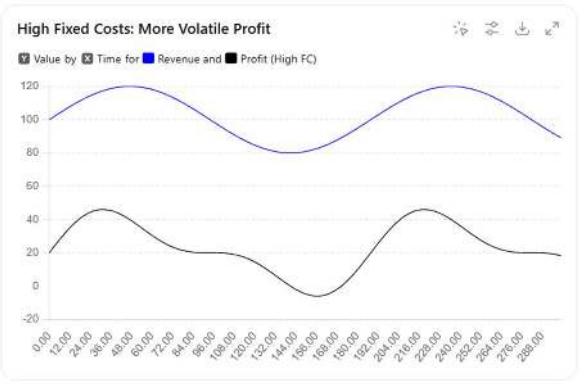
Some Checks:

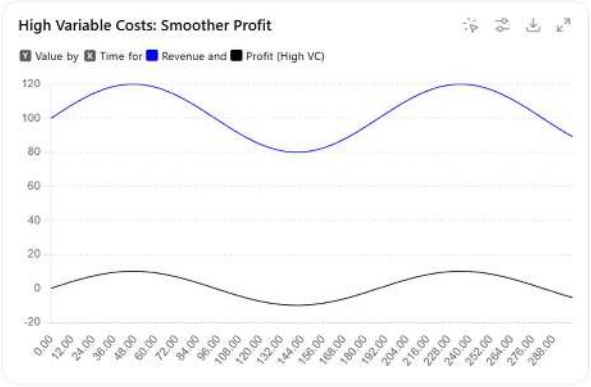
- Check correlation coefficient (R2) -> E.g. and R2 of 31% implies that 31% is market risk, 69% is diversifiable risk (not rewarded)
- Check impact of historical time period
- Check the proper market index:
    - The Local Solution: Estimate the beta relative to a local index, that is equally weighted or more diverse than the one in use.
    - The U.S. Solution: If the stock has an ADR listed on the U.S. exchanges, estimate the beta relative to the S&P 500
    - The Global Solution: Use a global index to estimate the beta (MSCI)
- Check for unusual events during time period -> Historical betas may not be a good indicator of future risk

Beta of Equity (Levered Beta) -> it is composed of two main parts:

- Financial Leverage -> Other things remaining equal, the greater the proportion of capital that
  a firm raises from debt, the higher its equity beta will be -> Highly levered firms should have higher betas than firms with less debt. $Equity\ beta\ (levered\ beta) = Unlevered\ beta/(1 + (1 - t) * \frac{Debt}{Equity}\ ratio$. In this way, we can clean the effect of financing decisions of a company (between debt and equity), making it possible to be analysed with the beta unlevered of comparable companies.
- Beta of Firm (Unlevered Beta) -> we have to consider two factors:
    - Nature of product or service offered by company -> other things remaining equal,
      the more discretionary the product or service, the higher the beta -> implications:
        - Cyclical companies should have higher betas than non-cyclical companies.
        - Luxury goods firms should have higher betas than basic goods.
        - High priced goods/service firms should have higher betas than low prices goods/services firms.
        - Growth firms should have higher betas
    - Operating Leverage (Fixed Costs as percent of total costs): Other things remaining equal the greater the proportion of the costs that are fixed, the higher the beta of the
      company -> implications:
        - Firms with high infrastructure needs and rigid cost structures should have higher betas than firms with flexible cost structures. That's because in the first type, the break-even point would be more difficult to reach in the case of a recession of the sector. The latter, instead, thanks to the variable structure, would follow the trend of the market, granting a steadier margin on income, also in the case of a crisis. The less amount of variance on the net income, would make it easier to estimate cashflow, giving a less risky estimation.
        - Smaller firms should have higher betas than larger firms.

- Young firms should have higher betas than more mature firms





Bottom-up: an example

Hypothetical Company: "LussoVivo S.r.l.", sector: Luxury goods (fashion, leather goods), not publicly traded and target D/E= 0.4.

Step 1: Select comparable listed luxury companies

Company	Country	Equity Beta	D/E Ratio	Tax Rate
LVMH	France	1.05	0.20	25%
Kering	France	1.10	0.30	25%
Moncler	Italy	0.95	0.15	27.5%
Hermes	France	0.90	0.05	25%

Step 2: Unlever the equity betas:

Using Hamada's formula:

$$\beta_{\text{unlevered}} = \frac{\beta_{\text{equity}}}{1 + (1 - \text{tax rate}) \times \frac{D}{E}}$$

Calculations:

- LVMH:

$$\frac{1.05}{1 + (1 - 0.25) \times 0.20} \approx \frac{1.05}{1.15} \approx 0.91$$

- Kering:

$$\frac{1.10}{1 + (1 - 0.25) \times 0.30} \approx \frac{1.10}{1.225} \approx 0.90$$

- Moncler:

$$\frac{0.95}{1 + (1 - 0.275) \times 0.15} \approx \frac{0.95}{1.1125} \approx 0.85$$

- Hermès:

$$\frac{0.90}{1 + (1 - 0.25) \times 0.05} \approx \frac{0.90}{1.0375} \approx 0.87$$

Step 3: Average unlevered beta -> it is going to be used as benchmark of the systematic riskiness of the sector.

$$\beta_{\text{asset}} = \frac{0.91 + 0.90 + 0.85 + 0.87}{4} \approx 0.88$$

Step 4: Re-lever the beta for LussoVivo -> By re-leveraging the beta with the debt structure of the company in objective, we can define the effective riskiness of the company. Starting from the unlevered beta, we multiply 1 + (1-tax rate), times the relation of the target company's debt over its equity.

$$\beta_{Li} = \beta_S \times \left[1 + (1 - \text{Taxrate}_i) \times \frac{D_i}{E_i}\right]$$

Where:

- β_{Li} = is the beta unlevered of a company
- β_S= is the Beta levered of the average betas in the market
- D_i = amount of debt of a company
- E_i = amount of equity of a company

Assume:

- Target D/E = 0.40
- Tax rate = 27.5%

$$\beta_{\text{levered}} = 0.88 \times [1 + (1 - 0.275) \times 0.40] \approx 0.88 \times 1.29 \approx 1.14$$

Step 5: Calculate Cost of Equity using CAPM

Assume:

- Risk-free rate (10Y BTP) = 3.5%
- Market risk premium = 5.5%

$$\text{Cost of Equity} = R_f + \beta \times \text{MRP} = 3.5\% + 1.14 \times 5.5\% \approx 9.77\%$$

Step 6: Calculate the WACC

Assume:

- Pre-tax cost of debt = 5.0%
- Effective tax rate = 27.5%

$$\text{After-tax Cost of Debt} = 5.0\% \times (1 - 0.275) = 3.625\%$$

$$\text{WACC} = 0.714 \cdot 9.77\% + 0.286 \cdot 3.625\% \approx 6.976\% + 1.037\% \approx \boxed{8.01\%}$$

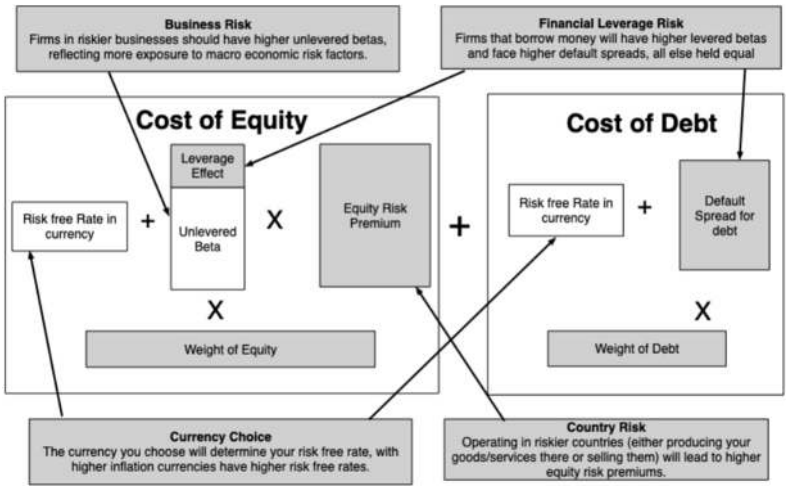
Let's now compare the behaviour of two companies with different betas. The two graphs above show the movement on the expected return given on the market (red line) and the expected return of a company (black line).

In the graph on the left, we're analysing the reaction on the expected return of a company characterised by a beta > 1. This means that at a variation of 1% on the return on the market, the expected return on the company will be greater than 1%. Indeed, we can notice that the black line is typically over or under the red one, meaning that the behaviour of the company would be to emphasise the effect occurred in the market, in both a positive and negative way.

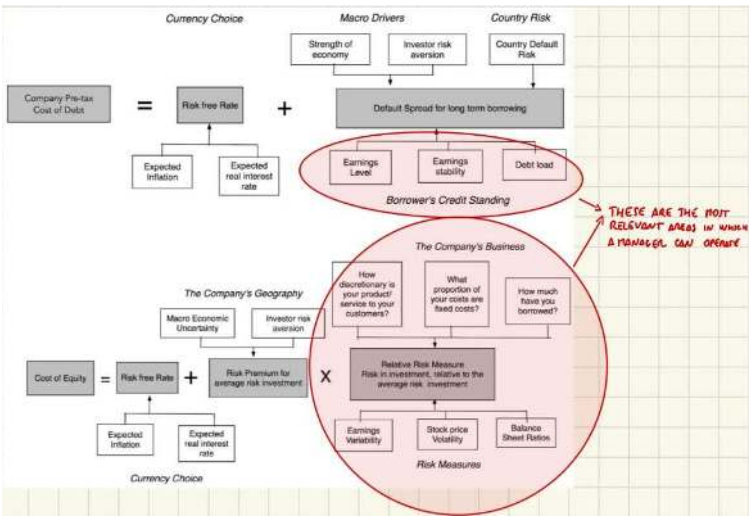
The graph on the right, instead, pictures a company having a beta < 1. This means that at a variation of 1% on the return on the market, the expected return on the company will be smaller than 1%. The behaviour of the company, indeed, would be to mitigate the shocks happening in the market. As you can see, the black line in this case is always less spread than the read one. A typical example of a sector with this type of beta would be the consumer goods sector: people would always need primary goods for living, even in the case of a crisis.

Optimal Capital Structure

Let's consider the general formula used for calculating WACC:



At this point we can wonder, **can managers influence the cost of capital**? We have to keep in mind which are the *factors that influence both the cost of equity and the cost of debt*.



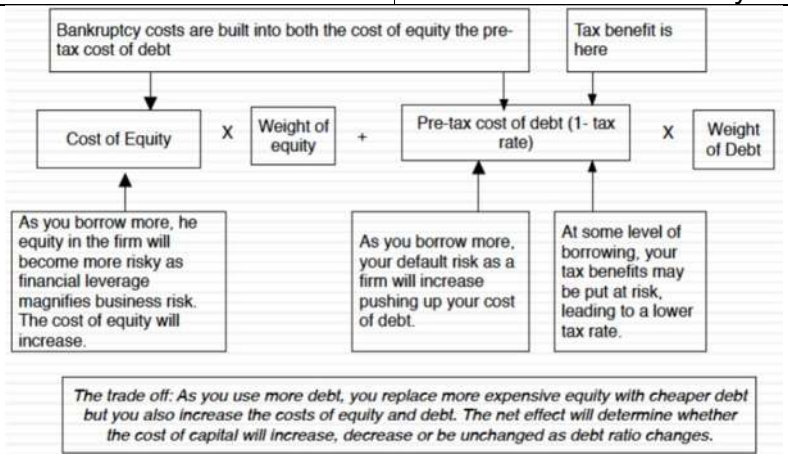
The cost of capital as an optimizing tool

As we have seen at the beginning of this chapter, **minimizing the cost of capital** for a company is a fundamental tool for increasing the value of a company. This is because if the WACC decreases, as it is possible to notice from the formula on the right, the overall value of the company (or of the project) will increase. In order to achieve a specific valuation, it is necessary to find the **right combination of Debt and Equity**. This is because Equity, on average, is much more expensive than Debt, causing problem in the goal of maximising the corporate valuation. Despite that, we have to be careful when using debt, as it represents a trade-off:

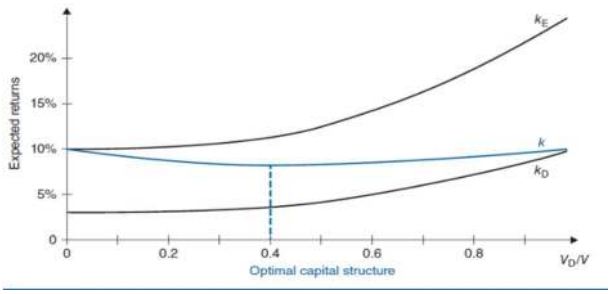
$$DCF = \sum_{t=1}^{n} \frac{FCF_t}{(1+k)^t}$$

Advantages of Debt	***Disadvantages of Debt***
Tax benefits -> interest expenses on debt are tax deductible but cash flow from equity is generally not -> the higher the marginal tax rate, the grater the benefit of debt	*Expected bankruptcy costs* -> the expected cost of going bankrupt is a product of the probability of going bankrupt and the cost of going bankrupt. The probability of going bankrupt will be higher if the company faces more volatile earnings and the cost of bankruptcy will also vary across businesses. Implications: - Firms with more stable earnings should borrow more, for any given level of earning - Firms with lower cost of bankruptcy should borrow more, for aby given level of earning
Added discipline -> Borrowing money can force managers to be aware of the consequences of an investment decision more carefully and can reduce the risk of bad investments -> as the separation between managers and shareholders increase, the benefits of debt increases	*Agency costs* -> actions that benefit equity investors may hurt landers. The greater the potential of this conflict of interest, the greater the cost borne by the borrower (as higher interest rates and more covenants) -> firms where landers can monitor/control how their money is being used should be

	able to borrow more than firms where this is difficult to do.
	Loss of flexibility -> Using up available debt capacity today will mean that you cannot draw on it in the future. This loss of flexibility can be disastrous if funds are needed and access to them is reduced. Implications: - Firms that can forecast better future funding needs should be able to borrow more - Firms with better access to capital markets should be more willing to borrow more today



The **trade-off theory in capital structure** suggests that firms balance the benefits and costs of debt when determining their optimal capital structure. According to this theory, companies weigh the *tax advantages of debt* (interest payments are tax-deductible) *against the costs of financial distress* (such as bankruptcy risk and agency costs) that arise from too much debt. The evidence from the "real world" shows that an optimal capital structure can be achieved with some, but not too much, leverage.



Company valuation: DCF Model

DCF: asset-side valuation

With this model, we calculate the **value of a company** by calculating the present value of the CF generated by the company. In particular:

- *Cash flow considered* are the *ones from the assets, prior to any debt payments, but after the firm has invested to create growth asset* -> Free Cash Flow from Operating assets
- *Discount rate* reflects the *cost of rising both debt and equity financing*, in proportion to their use

➔ Present value is the value of the entire firm, and reflects the value of all claims of the firm

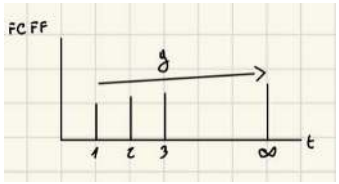
$$Value\ of\ asset = \frac{E(CF_1)}{(1+r)} + \frac{E(CF_2)}{(1+r)^2} + \cdots + \frac{E(CF_n)}{(1+r)^n}$$

The building block of Valuation

Choose a			
Cash Flow	*Dividends* Expected Dividendis to Stockholders	*Cashflows to Equity* = Free Cash flow to Equity (FCFE) [	**Cashflows to Firm** EBIT (1- tax rate) - (Capital Exp. – Deprec'n) - Change in Work. Capital = Free Cash flow to Firm (FCFF)
& Discount Rate	*Cost of equity* *Basis*: The riskier the investment, the greater is the cost of equity. *Models*: **CAPM: Riskfree Rate + Beta (Risk Premium)** APM: Riskfree Rate + ∑ $Beta_j$ (Risk $Premium_j$): *n factors*		*Cost of Capital* **WACC = k_e (E/(D+E)) + k_d (D/(D+E))** K_d = Current Borrowing Rate (1-t) E,D: Mkt Val of Equity and Debt

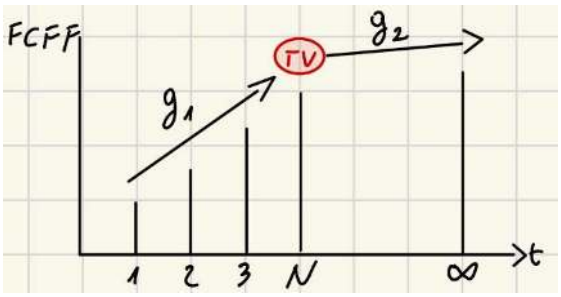
After doing this, we have to choose the **growth pattern**. There are 3 possible choices:

- *Stable growth* -> typical choice analysts make when they analyse a company that has reached its maturity (so not adequate for evaluating a start-up) -> we assume the FCFF are going to increase at a stable level *g* forever (usually not a high number, like risk free rate). In this case, the Value of the enterprise is going to be:



$$V_{ent} = \frac{FCFF_t}{WACC - g} \rightarrow if\ g = 0, we\ have\ a\ \boldsymbol{perpetuity}$$

- *Two-stage growth* -> it is usually used with companies where there is still some room for growth, as we *split the lifetime of an enterprise into two stages*: high growth period (which usually last 1-3 years, depending on the company) and stable period = two growth rate, g_1 and g_2 where it is necessary that $g_1 > g_2$. The period N in which there is the passage between one stage to the other, we have to calculate the

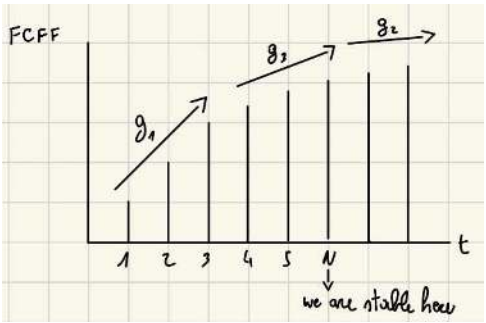


Terminal Value (TV), which is the discounted FCFF from the period N+1 until the end of the company -> we have to *discount the TV to t=0*. Because of this, if we take only in consideration the time N, we have to discount both the $FCFF_N$ and TV, like what it happens with bonds (where, at maturity, we have to discount both the principal payment and the coupon). The formula for calculating the enterprise value, in this case, is:

$$V_{ent} = \sum_{t=1}^{N} \frac{FCFF_t}{(1+WACC)^t} + \frac{TV}{(1+WACC)^N}$$

We have to keep in mind that the discount rate we use to calculate TV might be different from the discount rate we use in the period before N (both because the composition of D and E might be different or because the cost of both might be different). But, once we have both values at time N, we have to use the same WACC in order to stay consistent. In this context, how do we give more importance to the first part of the equation?

- We can be more conservative about g_2 (even though it is already a small number)
- Increase the length of the high-growth period (in order to rely less on the TV) -> as a trade-off, we are going to be less sure about the analysis -> we could extend it like to 10 years, but because the uncertainty of economies is increasing every year more, it is difficult to do so



- *Three-stage growth* -> it is the *most suitable for evaluating start-ups*, as we *divide the life of the company into 3 stages*, one with a high growth period (with a growth rate g_1, like 15% for 3 years), a stable one (in the long term, with a growth rate g_2 very low, like 2%) and in the middle we need to adjust gradually in order to pass from g_1 to g_2 -> we need g_3, where $g_1 > g_3 > g_2$

Example for evaluating the company value

The Singer Corporation maintains a capital structure with 10% debt and 90% equity. The firm generates annual after-tax free cash flows of $92,400, which are expected to continue indefinitely (so we are in the context where we have a constant growth rate). The company's cost of debt is 10%, while the cost of equity is 21%. The corporate tax rate is 34%, and the company has 100,000 shares outstanding. Given these assumptions, how much are you willing to pay for this stock? Required:

a) Compute the firm's Weighted Average Cost of Capital (WACC).
b) Estimate the total value of the firm (V).
c) Determine the value of equity (E) and the stock price per share (P_0)

Step 1: Compute the Weighted Average Cost of Capital (WACC)

$$WACC = \frac{E}{V} * r_e + \frac{D}{V} * \ r_d * (1 - T_C)$$

Given D/V = 0.1 -> E/V = 1-D/V = 0.9

$$WACC = 0.9 * 0.21 + 0.1 * 0.1 * (1 - 0.34) = 0.1956 \ or \ 19.56\%$$

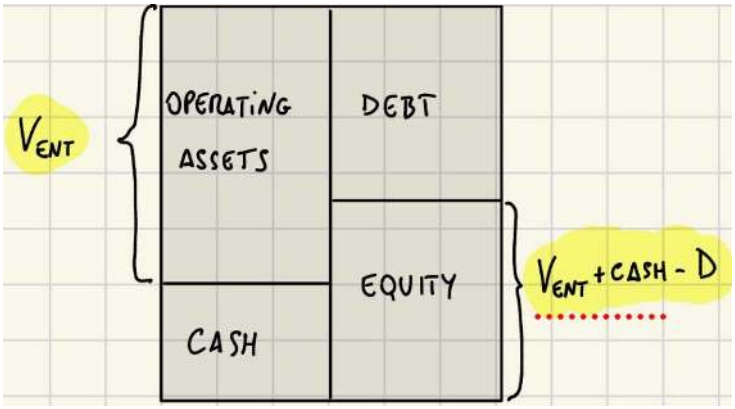
Step 2: Compute the Firm Value (V)

Since the Free Cash Flows to the Firm are perpetual (as the text does not give us any growth rate), the enterprise value is:

$$V = \frac{FCF}{WACC} = \frac{92{,}400}{0.1956} = \$472{,}478.88$$

Step 3: Compute the value of Debt (D) and Equity (E)

In order to do so, we have to keep in mind that the *formulas for calculating the enterprise value allow us only to get the value of the operating asset*, as is it possible to notice from the following graph:



As the text doesn't provide us any information about cash, the Value of the enterprise we have calculated before is the value of the firm. As a consequence, the value of D and E are:

$$D = 0.1 * \$472{,}478.88 = \$47{,}247.89$$

$$E = 0.9 * \$472{,}478.88 = \$425{,}230.99$$

Step 4: Compute the stock price per share

$$P_0 = \frac{E}{nr \ of \ shares} = \frac{\$425{,}230.99}{100{,}000} = \$4.25 \ per \ share$$

Two-Stage Growth Model

Let's assume we are in a Two-stage Growth Model. As we have seen before, an important element of the formula is the **Terminal Value at time N (TV_N)**. How do we identify it?

$$TV_N = \frac{FCFF_{N+1}}{WACC - g_2}$$

In case we have the normalised FCFF along the years, we can obtain $FCFF_N$ -> If we know also the growth rate at which the FCFF moves across the year (that, as we have said before, g_2 is usually low, similar to the risk-free asset), we can calculate the $FCFF_{N+1}$.

Regarding the *WACC* used in this formula, as we said before is going to be *different from the WACC we use in the general formula for calculating the Enterprise value*. This for 2 main reasons:

- Here we consider *the Target capital structure*, which can be different from the current one both for composition and cost of debt and equity
- $\beta \simeq 1$ -> because we are considering the long period, it is assumed that, independently if the company is conservative or defensive, beta is going to converge to 1.

Arrived at this point, the main issue is to calculate $FCFF_{N+1}$. This is because not always it is directly available, so we have to estimate it in 2 possible ways:

- $\boldsymbol{FCFF_{N+1} = NOPAT_N + D\&A - CAPEX \pm \Delta WC}$, where NOPAT is Net Operating Profit After Tax and can be obtained by EBIT * (1-t). Let's assume some values, for example $FCFF_{N+1} = 100 + 20 - 40 - 10 = 70$. If we consider only $D\&A - CAPEX \pm \Delta WC$ we have the amount of money the company has invested both in long-term and short-term assets -> we can represent it as a percentage of NOPAT, obtaining the *Reinvestment Rate* (*RR*, which, in this case, is 30/100 = 0.3)
- $\boldsymbol{FCFF_{N+1} = NOPAT_N * (1 - RR)}$

➔ We obtain the *same result*, but with *different levels of detail*!

How we obtain the RR?

$$g = RR * ROIC \rightarrow RR = \frac{g}{ROIC}$$

Where, in order to get the ROIC, we have to calculate it:

$$ROIC = \frac{EBIT(1-t)}{BV\ Operating\ Assets} = \frac{EBIT_t * (1-t)}{BV\ Equity_{t-1} + BV\ Debt_{t-1} - Cash_{t-1}}$$

➔ In order to get the RR and, as a consequence, TVN, we have to make assumptions about g, ROIC and WACC -> we know that, in order to get a specific g, we can make combinations of RR and ROIC = if we have to increase g, we either have to Reinvest more or be more efficient -> growth is not for free!

What if ROIC=WACC?

$$TV_N = \frac{NOPAT_{N+1} * (1 - RR)}{WACC - RR * ROIC} = \frac{NOPAT_{N+1} * (1 - RR)}{WACC - RR * WACC} = \frac{NOPAT_{N+1} * (1 - RR)}{WACC * (1 - RR)} = \frac{NOPAT_{N+1}}{WACC}$$

EXAMPLE (Ruiz Enterprises):

You have been asked to value Ruiz Enterprises, a small publicly traded retail company, and have
been provided with the following estimates of earnings and cash flows for the company for the
next 3 years:

Year	Current	1	2	3
Expected growth		8%	8%	8%
EBIT (1-t)	$300.00	$324.00	$349.92	$377.91
+ Depreciation	$50.00	$54.00	$58.32	$62.99
- Cap Ex	$175.00	$189.00	$204.12	$220.45
- Change in WC	$75.00	$81.00	$87.48	$94.48
FCFF	**$100.00**	**$108.00**	**$116.64**	**$125.97**

Assuming that free cash flows (FCFF) are expected to grow at a constant rate of 4% per year after Year 3:

- Estimate the terminal value for the firm, assuming a WACC in the terminal value of 10%.
- Assuming that Ruiz has $ 1 billion in debt and $ 400 million in cash outstanding currently, estimate the value of equity in the company.
- Finally, assume that Ruiz has 80 million shares outstanding today trading at $40 share.
- Estimate the value of equity per share.
- Given your valuation, how under or overvalued is the stock today.

Let's consider the **first way for calculating the TV**:

Year	Current	1	2	3	TV
Expected growth (NOPAT)		8%	8%	8%	
EBIT (1-t)	$300,00	$324,00	$349,92	$377,91	
+ Depreciation	$50,00	$54,00	$58,32	$62,99	
- Cap Ex	$175,00	$189,00	$204,12	$220,45	
- Change in WC	$75,00	$81,00	$87,48	$94,48	
FCFF	**$100,00**	**$108,00**	**$116,64**	**$125,98**	**$131,01**
WACC		12%	12%	12%	10%
PV (FCFF)	**$279,08**	$96,43	$92,98	$89,67	
TV				**$2.183,58**	
PV(TV)	**$1.554,23**	85%			
ENTERPRISE VALUE	**$1.833,31**				
Enterprise Value	**$1.833,31**				
+ Cash	400				
- Debt	1000				
Value of equity	**$1.233,31**				
Number of outstanding shares	80				
Value per share	**$15,42**				
Stock price	**$40,00**				

→ 125.97 · (1+0,04)

131.01 / 0.1 - 0.04

* 2183.58 / (1+0.12)^3

* 279.08 + 1.554,23

Would you obtain a different valuation if we assume that, starting from year 3, after-tax operating profits (NOPAT) will grow at 4% per year in perpetuity, and that the return on capital earned forever will equal 12%?

Year	Current	1	2	3	TV
Expected growth (NOPAT)		8%	8%	8%	4%
EBIT (1-t)	$300,00	$324,00	$349,92	$377,91	$393,03
+ Depreciation	$50,00	$54,00	$58,32	$62,99	
- Cap Ex	$175,00	$189,00	$204,12	$220,45	131
- Change in WC	$75,00	$81,00	$87,48	$94,48	
FCFF	**$100,00**	**$108,00**	**$116,64**	**$125,98**	**$262,02**
Reinvestment Rate	67%	67%	67%	67%	33%
Implied ROIC		12%	12%	12%	12%
Expected growth (FCFF)		8%	8%	8%	
WACC		**12%**	**12%**	**12%**	**10%**
Discount Factor		89%	80%	71%	
PV (FCFF)	**$279,08**	$96,43	$92,98	$89,67	
TV				**$4.367,00**	
PV(TV)	**$3.108,35**	92%			
ENTERPRISE VALUE	**$3.387,43**				
Enterprise Value	**$3.387,43**				
+ Cash	400				
- Debt	1000				
Value of equity	**$2.787,43**				
Number of outstanding shares	80				
Value per share	**$34,84**				
Stock price	**$40,00**				

Steps:

1. *Estimate the expected NOPAT in Year 4 (TV)* -> $E(NOPAT_4) = NOPAT_3(1+g) = 378 * (1+4\%) = \$393.03$
2. *Estimate the expected Reinvestment Rate in Year 4 (TV)* -> $E(RR_4) = \frac{g}{ROIC} = \frac{4\%}{12\%} = 33\%$
3. *Estimate the expected FCFF in Year 4 (TV)* -> $E(FCFF_4) = NOPAT_4 - RR * NOPAT = 393.03 - 131 = \$262.02$
4. *Estimate the Terminal Value in Year 3* -> $TV_3 = \frac{FCFF_4}{WACC-g} = \frac{262.02}{10\%-4\%} = \$4{,}367$

Excess Returns and Terminal Value

		Growth rate				
		0%	2%	4%	6%	8%
ROIC	8%	3.779,1	3.613,8	3.275,3	2.503,7	-
	10%	3.779,1	3.854,7	3.930,3	4.005,9	4.081,5
	12%	3.779,1	4.015,3	**4.367,0**	5.007,4	6.802,4
	14%	3.779,1	4.130,1	4.678,9	5.722,7	8.746,0
	16%	3.779,1	4.216,1	4.912,9	6.259,2	10.203,7

The *greater the spread between ROIC and WACC, the higher the firm's value*, as this spread represents the *firm's ability to generate excess returns over its cost of capital*. However, growth does not necessarily create value. If a firm grows but its *ROIC equals its WACC*, it is merely expanding at a rate that earns the required return, without creating additional value for shareholders. In the long term, as companies mature and enter stable growth, excess returns typically decline toward zero. This implies that ROIC tends to converge to WACC, and similarly, ROE converges to the cost of equity. When ROIC = WACC, the terminal value in a DCF model simplifies to a perpetuity, because growth adds no incremental value, even if a positive growth rate is assumed.

Getting to stable growth

A **key assumption** in all discounted cash flow models is the *period of high growth*, and the *pattern of growth* during that period. In general, we can make one of three assumptions:

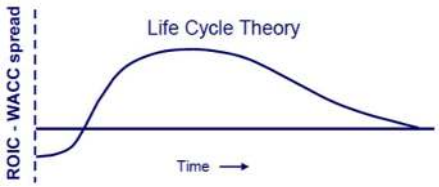
- there is no high growth, in which case the firm is already in stable growth
- there will be high growth for a period, at the end of which the growth rate will drop to the stable growth rate (2-stage)
- there will be high growth for a period, at the end of which the growth rate will decline gradually to a stable growth rate (3-stage)

The assumption of **how long high growth will continue** will depend upon several factors including:

- the *size of the firm* (larger firm -> shorter high growth periods)
- *current growth rate* (if high -> longer high growth period)
- *barriers to entry and differential advantages* (if high -> longer growth period)

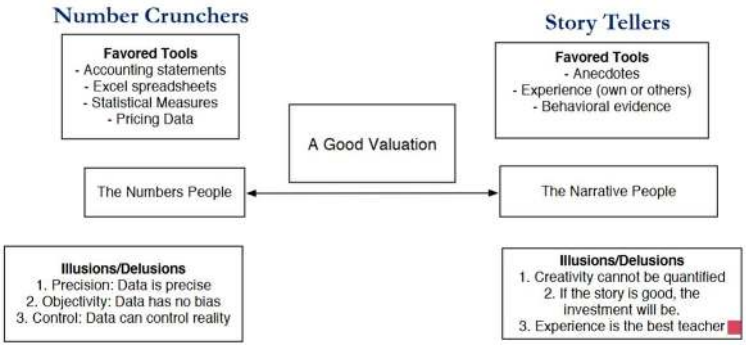
Commons mistakes in valuation:

- *Forecast horizon* (too short or too long?) -> One of the most common criticisms of DCF models is that any forecast beyond a couple of years is suspect. Investors, therefore, are alleged to be better off using more certain, near-term earnings forecasts. While analysts routinely assume very long high growth periods (with substantial excess returns during the periods), the evidence suggests that they are much too optimistic. Most growth firms have difficulty sustaining their growth for long periods, especially while earning excess returns.
- *Don't wait too long* -> A typical assumption in many DCF valuations, when it comes to stable growth, is that capital expenditures offset depreciation and there are no working capital needs. Stable growth firms, we are told, just have to make maintenance capex (replacing existing assets) to deliver growth. If you make this assumption, what expected growth rate can you use in your terminal value computation? How long would you set your high growth period?
- *Errors in estimating the discount rate or mismatching cashflows and discount rates* can lead to serious errors in valuation. At an intuitive level, the discount rate used should be consistent with both the riskiness and the type of cashflow being discounted. The cost of equity is the rate at which we discount cash flows to equity (dividends or free cash flows to equity). The cost of capital (WACC) is the rate at which we discount free cash flows to the firm.
- *Unrealistic terminal value* -> The terminal value component of a DCF model captures the firm's value for the time beyond the explicit forecast period, which can theoretically extend into perpetuity.



Sensitivity analysis -> when building a DCF model, something useful would be conduct a sensitivity analysis, which shows us how the value of the company would change in case we modify some assumptions, such as the discount rate or the long-term growth -> it tells us how we should behave with the long-term growth in case there is an increase in discount rate.

A good valuation can be a good bridge between the story you tell investors and stakeholders and all the people that are just focused on numbers:



In addition, just from looking at some data it's possible to understand some characteristics of the company. For example, let's assume you are looking at the valuation of a company, where the analyst has estimated a CAGR of 50% for the next 10 years, an operating margin of 20% in year 10 (twice the industry average), a low reinvestment (given growth) and a cost of capital of 7% in 10 year (below the market average). On each of the following dimensions, what is your implicit story?

a. Company size: small or large? Small, because the CAGR is very high
b. Total Market: stable or growing? Growing
c. Competitive Advantages: strong or weak? Strong, as it is capable of setting a high operating margin
d. Capital Intensity of business: Low or High? Low
e. Nature of product/service: discretionary/non-discretionary? Non-discretionary

➔ Even though we don't tell a story, our numbers will do it for us -> we need to be consistent

Three- Stage Growth Model: Disney Example

	High Growth Phase	Transition Phase	Stable Growth Phase
Lenght of Period	5 years	5 years	Forever after 10 years
Revenues	Current Revenues: $ 18,739; Expected to grow at same rate a operating earnings	Continues to grow at same rate as operating earnings	Grows at stable growth rate
Pre-tax Operating Margin	29.67% of revenues, based upon 1996 EBIT of $ 5,559 Million	Increases gradually to 32% of revenues, due to economies of scale	Stable margin is assumed to be 32%
Tax Rate	36%	36%	36%
Return on Capital	20% (approximately 1996 level)	Declines linearly to 16%	Stable ROIC of 16%
Working Capital	5% of Revenues	5% of Revenues	5% of Revenues
Reinvestment rate (Net Cap Ex + Working Capital Investments/EBIT)	50% of after-tax operating income; Depreciationin 1996 is $1,134 million, and is assumed to grow at same rate as earnings	Declines to 31.25% as ROC and growth rates drop: Reinvestment Rate = g/ROC	31.25% of after-tax operating income; this is estimated from the growth rate of 5% Reinvestment rate = g/ROC
Expected Growth Rate in EBIT	ROIC * Reinvestment Rate = 20% * .5 = 10%	Linear decline to Stable Growth Rate	5%, based upon overall nominal economic growth
Debt/Capital Ratio	18%	Increases linearly to 30%	Stable debt ratio of 30%
Risk Parameters	Beta = 1.25, ke = 13.88% Cost of Debt = 7.5% (Long Term Bond Rate = 7%)	Beta decreases linearly to 1.00; Cost of debt stays at 7.5%	Stable beta is 1.00. Cost of debt stays at 7.5%

	Base	1	2	3	4	5	6	7	8	9	10
Expected Growth		10%	10%	10%	10%	10%	9%	8%	7%	6%	5%
Revenues	$ 18,739	$ 20,613	$ 22,674	$ 24,942	$ 27,436	$ 30,179	$ 32,895	$ 35,527	$ 38,014	$ 40,295	$ 42,310
Oper. Margin	29.67%	29.67%	29.67%	29.67%	29.67%	29.67%	30.13%	30.60%	31.07%	31.53%	32.00%
EBIT	$ 5,559	$ 6,115	$ 6,726	$ 7,399	$ 8,139	$ 8,953	$ 9,912	$ 10,871	$ 11,809	$ 12,706	$ 13,539
EBIT (1-t)	$ 3,558	$ 3,914	$ 4,305	$ 4,735	$ 5,209	$ 5,730	$ 6,344	$ 6,957	$ 7,558	$ 8,132	$ 8,665
+ Depreciation	$ 1,134	$ 1,247	$ 1,372	$ 1,509	$ 1,660	$ 1,826	$ 2,009	$ 2,210	$ 2,431	$ 2,674	$ 2,941
- Capital Exp.	$ 1,754	$ 3,101	$ 3,411	$ 3,752	$ 4,128	$ 4,540	$ 4,847	$ 5,103	$ 5,313	$ 5,464	$ 5,548
- Change in WC	$ 94	$ 94	$ 103	$ 113	$ 125	$ 137	$ 136	$ 132	$ 124	$ 114	$ 101
= FCFF	$ 1,779	$ 1,966	$ 2,163	$ 2.379	$ 2,617	$ 2,879	$ 3,370	$ 3,932	$ 4,552	$ 5,228	$ 5,957
ROC	20%	20%	20%	20%	20%	20%	19.2%	18.4%	17.6%	16.8%	16%
Reinv. Rate		50%	50%	50%	50%	50%	48.875%	43.48%	39.77%	35.71%	31.25%

Year	1	2	3	4	5	6	7	8	9	10
Cost of Equity	13.88%	13.88%	13.88%	13.88%	13.88%	13.60%	13.33%	13.05%	12.78%	12.50%
Cost of Debt	4.80%	4.80%	4.80%	4.80%	4.80%	4.80%	4.80%	4.80%	4.80%	4.80%
Debt Ratio	18.00%	18.00%	18.00%	18.00%	18.00%	20.40%	22.80%	25.20%	27.60%	30.00%
Cost of Capital	12.24%	12.24%	12.24%	12.24%	12.24%	11.80%	11.38%	10.97%	10.57%	10.19%

Year	1	2	3	4	5	6	7	8	9	10
FCFF	$ 1,966	$ 2,163	$ 2,379	$ 2,617	$ 2,879	$ 3,370	$ 3,932	$ 4,552	$ 5,228	$ 5,957
Term Value										120,521
Present Value	$ 1,752	$ 1,717	$1,682	$ 1,649	$ 1,616	$ 1,692	$ 1,773	$ 1,849	$ 1,920	42,167
Cost of Capital	12.24%	12.24%	12.24%	12.24%	12.24%	11.805	11.38%	10.97%	10.57%	10.19%

- The terminal value at the end of year 10 is estimated based upon the free cash flows to the firm in year 11 and the cost of capital in year 11.
- $FCFF_{11}$ = EBIT (1-t) - EBIT (1-t) Reinvestment Rate
  = $ 8,665 (1.05) - $ 8,665 (1.05) (.3125)
  = $ 6,255 million
- Note that the reinvestment rate is estimated from the ROIC of 16% and the expected growth rate of 5%.
- Cost of Capital in terminal year = 10.19%
- Terminal Value = $ 6,255/(.1019 - .05) = $ 120,521 million

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