

CHAPTER 3: REQUIRED RETURNS & COST OF CAPITAL.

Definition.

The **Cost of Capital** is defined as the **required rate of return** on the various types of financing. So, the amount that the company is paying for the financial resources.

The **overall cost** of capital is a weighted **average of the individual required rates of return**.

Relation with the Value Added.

We know that the **main objective** of the firm is to create value. There are two ways of doing that:

- **Maximization of Free Cash Flows (FCF):** If we receive more incomes from the investment, we will increase even more the value of the company.
- **Minimizing the Cost of Capital:** If the cost of our financing is low, we will have a bigger margin.

Mathematically is like this.

$$V = \frac{FCF_1}{(1+K_0)} + \frac{FCF_2}{(1+K_0)^2} + \frac{FCF_3}{(1+K_0)^3} + \dots$$

$\text{Max } V \Rightarrow \text{Max FCF}$
 $\Rightarrow \text{Min } K_0$

1. **Numerator:** Free Cash Flow.

2. **Denominator:** $(1 + \text{Cost of Capital})$

Also this correlation with the Value Added comes from the expectations of future Cash Flows that the company will obtain, in order to increase the value added.

Key sources of Value Creation.

There are two ways, not mathematically speaking, that you can increase the value of the firm.

- A. Industry Attractiveness:** When the company benefits from the tendency of the industry, allowing it to grow without any real competitive advantage. It depends on:
- ✓ **Growth phase of your product cycle:** You need to know if you have a mature, growing or decline product in order to decide what to do.
 - ✓ **Barriers to competitive entry:** We need to rely on a market which entering is really difficult, when we are alone, better for our interests.
 - ✓ **Other factors:** Patents, temporary monopoly power, oligopoly...

Jokes.

- What do you call a father that walks upstairs?
- A **step**-dad.

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B. Competitive Advantage: Characteristic, strategy, values... which differentiate your company from the other and provides you an advantage towards the final customer. It depends on:

- ✓ **Cost:** Have lower costs than the other agents.
- ✓ **Marketing and price:** Lower prices combined with marketing which provides sales records.
- ✓ **Perceived quality:** Increasing the willingness to pay and the price establishment by the company.
- ✓ **Superior organizational capability:** You just rock it with the organization.

Definition of Capital.

One of the main problems in **Costing Capital** is the definition of capital.

There are 3 different types of Capital that we can use in order to determine the **Cost in Capital**:

- I. **Common stock (Capital Social):** Defined as the normal capital that we all know from either the balance sheet or, to be more exact, the market value, as it includes the expectations.
- II. **Equity:** Combination of **Common stock + More (Reserves)**
- III. **Long term resources:** Defined by the **Equity + Long-Term Debt + Preferred Stock (Acciones preferentes)**

Note: Preferred Stock are those stocks which function as a loan, they are temporal, give right to its owner to get dividends and the money is paid back afterwards. But they are not allowed to vote in the decision of the management.

Also, we are not using the short-term liabilities as you can see. **The combination of these different long-term resources gives us the Wage Average Cost of Capital (WACC)**, which is also de cost of Capital or the return of investment if we are the investors.

Example I and II: Microsoft.

We take from the Balance Sheet this: **Book Value** is 118.304

And from the **Market Capitalization**: 1.671.391,8.

We can see there is a lot of difference. The Market Capitalization is more exact as it reflects the **expectations** on the cashflows of the company.

As for the **Equity Example**, instead of only getting the common stock, we get the overall equity.

Jokes.

- What do you call a crying sister?
- A cri-sis
- What is a T-rex favourite way to invest?
- For-ex

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Example III.

<u>Type of Financing</u>	<u>Mkt Val</u>	<u>Weight</u>
Long-Term Debt	\$ 35M	35%
Preferred Stock	\$ 15M	15%
Common Stock Equity	\$ 50M	50%
	<u>\$ 100M</u>	<u>100%</u>

This is the proforma of how the **long-term resources** definition of capital works.

Cost of Debt.

How much do the creditors ask the company to repay the debt? Is the **required rate of return on investment of the lenders of a company**. Formula:

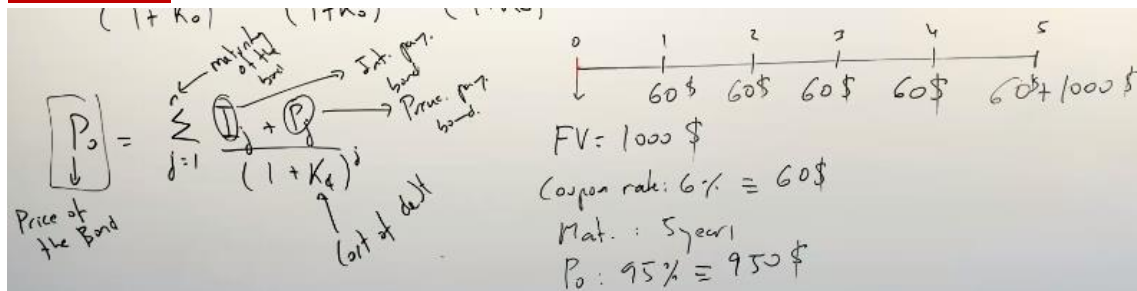
$$P_0 = \sum_{j=1}^n \frac{I_j + P_j}{(1 + k_d)^j}$$

This formula is defined as:

- ✚ K_d = Cost of debt
- ✚ n = maturity of the bond
- ✚ P_0 = Price of the bond
- ✚ i = Interest to pay to the bond.
- ✚ P_1 = Price to pay for the bond.

Another Formula.

$$K_d = \frac{\text{Coupon} + \frac{P_0 - P_1}{n}}{\frac{P_0 - P_1}{2}}$$

Mathematic

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Explanation.

In year 1, 2, 3 and 4 only pays the interest, no principal. But in year 5 the last coupon of 60 \$ and the **principle** of the bond has to be paid. That leads to:

Result.

$$950 = \frac{60}{(1+Kd)} + \frac{60}{(1+Kd)^2} + \frac{60}{(1+Kd)^3} + \frac{60}{(1+Kd)^4} + \frac{1000+60}{(1+Kd)^5} = 7,23 \%$$

Comment.

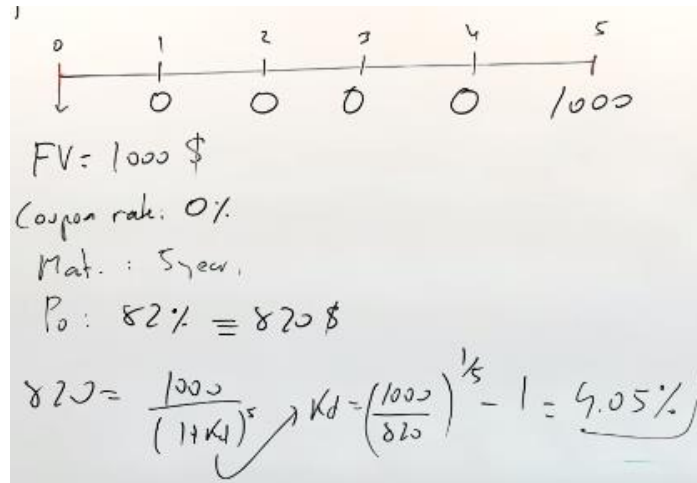
As we can see the **Internal Rate of Return** has the same formula. Because of it we can determine that the **7,23 %** for the investor is the **return it will get** but for the borrower or the one who emitted the bond is the **cost of capital, the percentage it will have to pay back.**

Note: Alternative Formula.

There is an alternative formula in order to make it easier for everyone to subtract the **WACC or Cost of Capital**. Even though, the today's calculators do it automatically. Which now that I look for it, I do not see it, so you might have to ask the professor.

0 % Coupon rate.

We sell the bond and the investor gets 0 \$ for the cashflows and in the end gets the full invest. We do not use the alternative formula that I can't find.

**Explanation.**

The **4,05 %** means you have the bonds and you pay back all at the end, on the last year of maturity, in the **middle there is no cost or paying back the interest.**

Is quite easy the formula as you can see on the bottom.

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Loan.

Loan: 1 \$ M

Maturity: 5 years.

Annual Pay: 250.000 \$

We do the same than with the bond, but with changing the name to loan.

Price of the Bond

$$P_0 = \sum_{j=1}^n \frac{C}{(1+K_d)^j} + \frac{P}{(1+K_d)^n}$$

Cost of debt

Loan: 1 M \$
Mat.: 5y.
Ann. Pay: 250.000 \$

$$1000000 = \frac{250000}{(1+K_d)} + \frac{250000}{(1+K_d)^2} + \frac{250000}{(1+K_d)^3} + \frac{250000}{(1+K_d)^4} + \frac{250000}{(1+K_d)^5}$$

✓ $K_d = 7.93\%$

Note: All the Costs of Debts we where studying was for **pretax**. But that it is inconsistent.

After tax cost of debt.Explanation for the need of an after-tax cost debt.

When an enterprise has **interests**, these are reduced thanks to a **tax reduction**. This is one of the benefits of having debt, as you may see below.

On the other hand, when we are calculating the **Free Cash Flow**, we take into account the taxes so, in other to be **consistent**, we need to apply the taxes in the Cost of Capital as well.

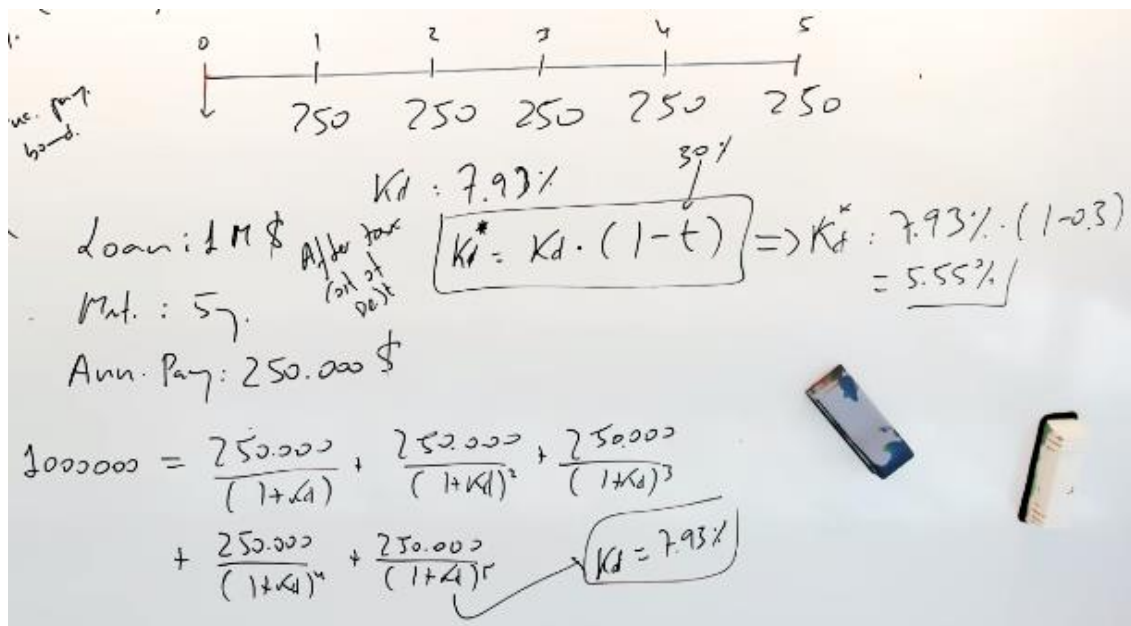
Tax reduction

A	B
D = 0	D = 2 M \$
	(Kd: 5%)
EBIT: 200.000 \$	200.000 \$
I = 0	-50.000 \$
EBT = 200.000 \$	150.000 \$
Taxes: -60.000 \$	-45.000 \$

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Formula

$$k_i = K_d (1 - t)$$



If you want another example you have it on the slides. I will not put it here.

Preferred Stock.

It is defined as the required rate of return on the investment of the preferred shareholders of the company.

Characteristics.

- **No maturity:** They are perpetuities.
- **Dividends:** They are preferred dividends. They are constant over years, on the contrary as the normal dividends.
- **No political rights:** They cannot participate on the annual meeting decisions.
- **Secure:** You will perceive before the common stocks.
- **Preferences:** Over common stockholders in case of bankruptcy.
- **Not conditioned to a positive net income:** Net income is conditioned in the normal dividend

This is not common in Spain. Usually the cost of preferred stocks is higher than the debt.

Formula

$K_P = (D_P / P_0) \Rightarrow$ The preferred dividend divided by the price of the preferred stock.

Joke.

- I thought about going on an all-almond diet.
- But that is just **nuts**

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Mathematical.

$$\begin{aligned}
 & \text{Timeline: } 0 \quad 1 \quad 2 \quad 3 \quad \dots \quad r \quad \infty \\
 & \text{At } t=0: \text{Price } P_0 = 94\$ \\
 & \text{At } t=1, 2, 3, \dots: \text{Dividend } D_p = 6\$ \\
 & P_0 = \frac{D_p}{(1+K_p)} + \frac{D_p}{(1+K_p)^2} + \frac{D_p}{(1+K_p)^3} + \dots \\
 & P_0 = \frac{D_p}{K_p} \Rightarrow K_p = \frac{D_p}{P_0} \\
 & K_p = \frac{6}{94} = 6.38\%
 \end{aligned}$$

Conclusion.

It goes until the end. The **6,38 %** is a cost for the firm as well as the rentability for the investor.

After tax cost

We do not do this as the company does not save money through the dividend, as they are not considered to be an expense. They are **not tax deductible**.

There is an example in the power point.

Cost of Equity.

It is **perpetual**, obviously. It is **the required return of common stockholders**.

The **required return** of a common stockholder is more difficult, and we have two approaches:

1. **Dividend discount Model:** Really similar to the IRR.
2. **CAPM:** Different.

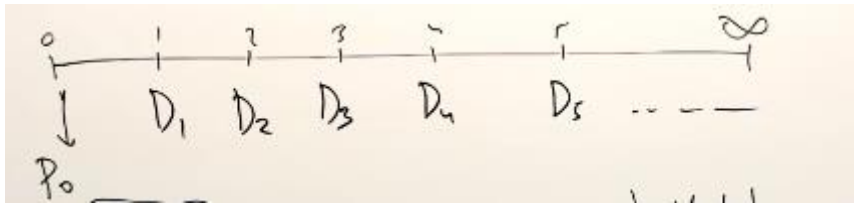
Joke.

- What is faster, hot or cold?
- Hot, because is easy as hell to catch a cold.

I got a story to tell you all.

- The first time I use dan elevator it uplifted me...
- The second time it **let me down**.

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1. Dividend Discount Model.

$$P_0 = \frac{D_1}{1+K_e} + \frac{D_2}{(1+K_e)^2} + \frac{D_3}{(1+K_e)^3} + \frac{D_4}{(1+K_e)^4} + \dots$$

Unfortunately, we are making too many assumptions in order to calculate as the common dividend changes its value every time.

Different assumptions.

❖ **Future dividends to grow in a constant rate in perpetuity:** We will call it "g"

In this case we just do:

$D_2 = D_1 (1 + g)$... $D_3 = D_2 (1 + g)$ leading to:

$$P_0 = \frac{D_1}{1+K_e} + \frac{D_1 \cdot (1+g)}{(1+K_e)^2} + \frac{D_1 \cdot (1+g)^2}{(1+K_e)^3} + \frac{D_1 \cdot (1+g)^3}{(1+K_e)^4} + \dots$$

$$P_0 = \frac{D_1}{K_e - g} \Rightarrow K_e = \frac{D_1}{P_0} + g$$

We end up with this last fraction that allows us to **isolate the cost of equity**.

When we are expressing the price of the stock, we can result the price of the stock and compare it with the compare value of the market stock. Telling us if it is a good investment or not.

Example: Telefonica.

Handwritten calculation for Telefonica (TEF) stock price. It shows the following values: $D_1 = 0.40 \text{ €}$, $g = 1\%$, and $K_e = 10\%$. The formula used is $P_0 = \frac{0.4}{0.10 - 0.01} = \frac{0.4}{0.09} = 4.44 \text{ €}$.

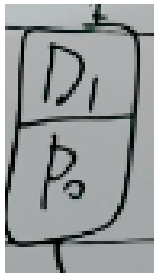
If the stock market is lower than that price we should pay, it is a good investment.

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The price of the stock depends on:

- **Time – Dividend:** When the dividend paid the following year increases, the prices of the stock increases. The expectations of the dividends.
- **Time – g:** If the growth of dividends increases, the price of the stock increases. We know that as the denominator of the value of the stock will decrease (formula)
- **Time – Cost of equity:** When shareholder demand a higher return for the share of the company, the price of the stock decreases. If you want to get a higher return, you need to buy the stock cheaper.

Dividend yield.



How much is the dividend going to **give you in return** from the investment you made.

And if you add the expected growth of the stock you have the cost of equity.

This model gives us the expected return,

2. Capital Asset Pricing Model (CAMP).

While the Dividend Discount model is based on the return that the investment is going to give the stockholders. The **Capital Asset Pricing Model** is based on the **risk on return** comparing it with the overall market.

Note: It means that as the investors do not like risk, then, if you want a higher return, you need a higher risk. So, every asset needs to provide a required return in respect to its risk.

Formula.

$$k_e = R_f + (R_m - R_f) B_j$$

R_f = Risk free assets. **Ex.:** Bonds.

B = Beta of the company. The level of risk of the stock. If it is higher than 1 is high risk, if lower is low risk. So, we will expect a greater return than the market if it is higher than 1.

The stock market is considered to have Beta = 1

R_m = Expected **market** return.

Risk Premium

$(R_m - R_f) B_j$ is defined as the **risk premium**.

The risk premium tells us how much it needs to be compensated in other for the investment to be good. Basically, what return should we offer to compensate the **risk** involved in the investment.

Differences between models.

In the end, most of the times, neither of both models should lead to the same Equity Cost. As one studies the return required for the investors in order for them to **compensate the risk (CPAM)**, the other one just focus on the return the investment will provide through the **dividends**.

WACC or Cost of Capital

Formula.

$$Kc = Kd * (\% \text{ hole financing}) + Kp * (\% \text{ hole financing}) + Ke (\% \text{ hole financing})$$

The percentage is in order to know how much are each of the three cost affecting on the finance of the company.

Limitations of the WACC.

I. Weighting System.

The weighting system is static as the capital raised could be different in structure after we calculate the WACC. A new WACC would be need it in every change there is in the business in order for it to be well balanced. So, it is outdated.

Marginal Capital Cost: We need to use the marginal cost of capital as the cost we need to pay is the one from now, not the following cost, we are financing now, and that is why we are using the marginal cost. So, in the IRR we always use the cost on today's date. **Ex.:** Exercise 2 of the Excel.

In the WACC this can stay out of date if we do not use the one from the same day. We need to have the **return need it for an investor to invest** in date. Something which changes in every financing.

II. Flotation Cost.

When they are considered, these costs increase the cost of debt, equity or the preferred stock. Basically, needing an adjustment on the Initial Outlay and the Discount Rate.

Flotation Cost.

If the price of the bond was 385,54 and the flotation cost were 10 \$ we would take 10 dollars from it. So, the company gets less than the real amount that it is reflected on the calculation.

In order to understand these chapter much better you should know how to do the exercises well. Review the excels.

Joke.

- What is the one thing a homeless man can't be?
- A homebody

Further Explanation of the Beta.

The Beta is the measurement that we used in order to establish the **level of correlation** between the market and the **specific business**. **Ex.:**

- **Beta:** 1.5
- **Increase in the Market:** 10 %
- **Increase in the Business:** 15 %

But there is another statistic tool that it is used in order to determine if an investment is riskier or not, the **standard deviation** or **sigma**.

Differences between Beta and Standard Deviation.

Both consider the **fluctuations of the business** and the **market** taken from the **variance**. But there is a slightly different that determines the usefulness of one or the other, and that is it the riskiness taken into account:

1. **Systematic risk:** This risk derives from a crisis or a phenomenon that affects the overall stock market where the firm is operating. Both, the **Beta and the Sigma take into account this risk**.
2. **Non-systematic risk:** Risk that comes from a specific company, it involves the different characteristics of the company but not the rest of them. This effect can be diversified through the purchase of other stocks in the stock market and thanks to this, be eliminated. This is **only considered by the Sigma**.

This little difference makes the Beta more useful as the **slope** of the graphic and its correlation, and it is what is used on the **CAPM model**.

Formula.

$$\text{Beta} = (K_e / R_m)$$

Covariance

It can be used as well in order to calculate that variation in rentability through the years or months. When more fluctuations are in a company, the less secure it will be.

Formula.

$$\text{Cov} = (\text{Variance} / (\text{Rentability of the Company} / \text{Rentability of the Market}))$$

It should give the same number as the Beta

Joke.

- What is orange and sounds like a parrot?
- A carrot

<https://youtu.be/mj1RAJ4JHzM>