

## Unit 6. Investment-Financing Relationship

- 6.1. Business Risk and Financial Risk
- 6.2. Weighted Average Cost of Capital
- 6.3. Adjusted Present Value (APV)
- 6.4. The Effects of Leverage on Expected Cash Flows and Discount Rates

### Basic bibliography:

ROSS, S; WESTERFIELD, R; JAFFE, J. (2010)  
Chapters 3.2 (formulas 3.15 and 3.16), 16.3-5, 17.1, 17.4, 18.1, 18.3-4

### Introduction

**Units 2 to 5:** We have been assuming that our investment projects will be financed with equity; no debt will be involved in the funds required to finance the project => **All-equity firms**

However, in

**Units 6 to 8:** We introduce **debt**, and its consequences, in the valuation of investment projects, in the firms' valuation.

We can classify the funds that we can raise to finance our investment projects into two types:

**Equity:** our own money; we do not need to pay it back to anybody [*recursos propios, patrimonio neto*].

**Debt:** money that is owed to someone else. An obligation to pay money back: debt is a deferred payment [*deudas*].

### **6.1. Business Risk and Financial Risk**

We start by illustrating, with Problems 1 and 2, the effects of **capital structure** on **business risk** and **financial risk** and, therefore, on **business return (ROA)** and **financial return (ROE and Rs)**.

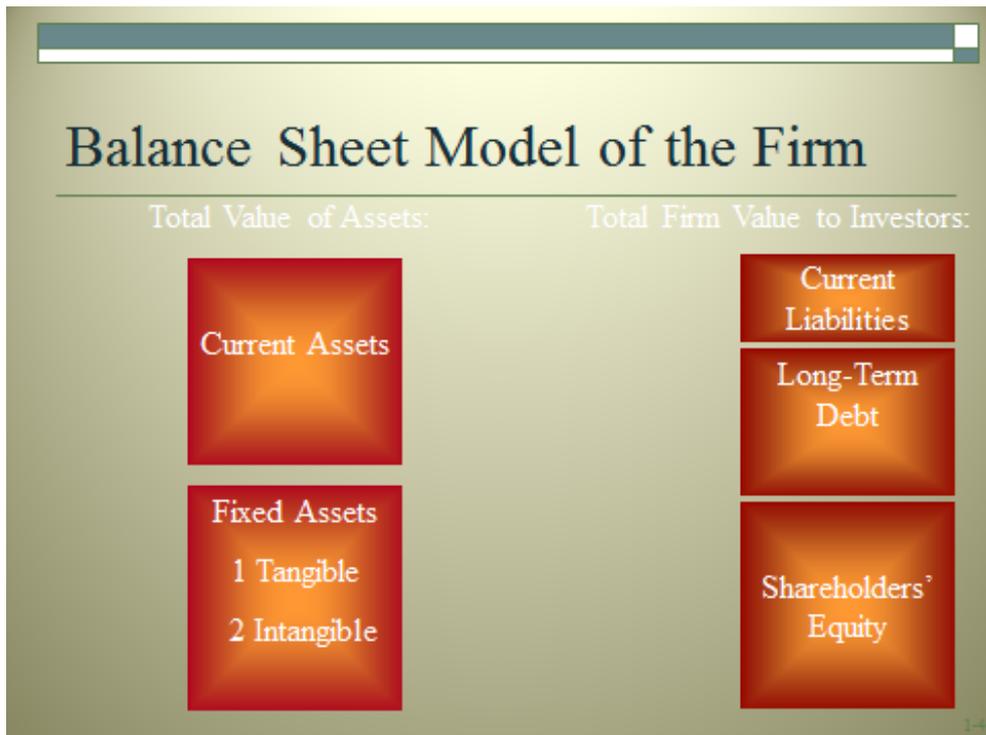
**Capital Structure:** debt capital versus equity capital. Capital structure is otherwise called **leverage ratio** or **financial leverage** = Debt/Equity = B/S

\*B stands for bonds and S stands for stocks

Do you remember Unit 1?

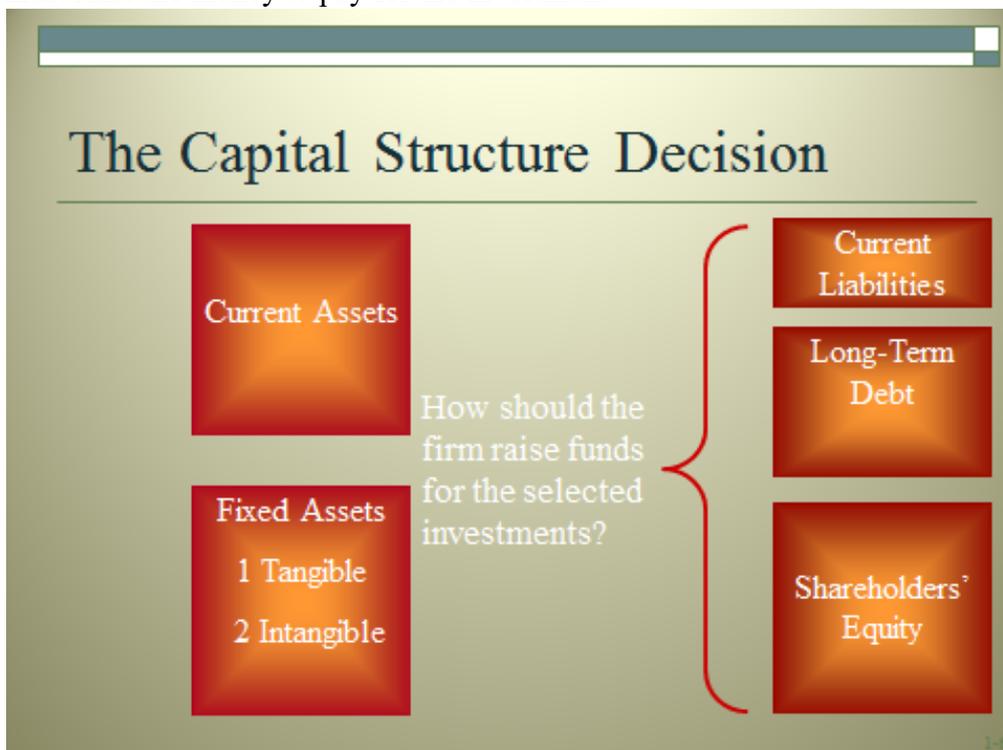
“The answer to the second question is the firm's **financing decision**.”

When an investment opportunity or “project” is identified, the financial manager first asks whether the project is worth more than the capital required to undertake it. If the answer is yes, he or she then considers how the project should be financed.



Financing decisions involve the choice of whether to borrow money to buy the assets or to issue new ownership shares. Financing decisions show up on the right-hand side of the balance sheet.

Before a company can invest in an asset, it must obtain financing, which means that it must raise the money to pay for the investment.”



**Problem 1. Business Risk and Financial Risk. Weighted Average Cost of Capital**

Company X, Company Y and Company Z are identical firms in all matters except for their capital structure. X is all-equity financed; Y and Z use both stock and long-term debt:

<b>Company</b>	<b>X</b>	<b>Y</b>	<b>Z</b>
Debt	0	250	400
Equity	500	250	100

The interest rate of debt is 6% (constant) for the three companies.

Calculate the return on assets (ROA) and the return on equity (ROE) assuming earnings before interest and taxes (EBIT) of 10, 20, 30, 40 and 50 monetary units. Ignore taxes.

Represent the return on equity as a function of the EBIT.

Calculate the cost of equity ( $R_S$ ), the cost of debt ( $R_B$ ), and the weighted average cost of capital ( $R_{WACC}$ ).

Represent the cost of equity ( $R_S$ ), the cost of debt ( $R_B$ ), and the weighted average cost of capital ( $R_{WACC}$ ) as a function of the company's leverage (B/S).

**Video 6.1 from a to k** → **Important: watch the videos with paper and pencil while working with the material.**

**Live video session (with Kahoot questions!!!)**

**(Use this space to write your own ROA table)**

**Business risk = economic risk** → relates to variations in economic return = ROA

**Financial risk** → relates to variations in financial return = return on equity (ROE) =  
The return that **the owners** get

**Examples of business risk:** Changes in raw material costs; Changes in our product sales due to an increase in competition... or to consumers' confinement! It comes from anything that can modify the economic profits = EBIT. See Aula Virtual for another example.

**Income statement**

Business risk depends on the variability of EBIT  
(it is not affected by interest payments on debt)

+ Total operating revenues  
- Total operating costs

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**Operating profit = EBIT**

- Interest expense

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**Pretax income**

- Taxes

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**Net profit**

Profit that belongs to the owners →

**Return on equity: ROE = Net profit/Equity = (EBIT-Interest)/Equity**

The return that the owners get = financial return = ROE

Profit that belongs to the owners → Net profit

Owners' investment in the firm → Equity

**ROE**

EBIT	X	Y	Z
10	$[10-(0.06*0)]/500=0.02$	$[10-(0.06*250)]/250=-0.02$	$[10-(0.06*400)]/100=-0.14$
20	$[20-(0.06*0)]/500=0.04$	$[20-(0.06*250)]/250=0.02$	$[20-(0.06*400)]/100=-0.04$
30	$[30-(0.06*0)]/500=0.06$	$[30-(0.06*250)]/250=0.06$	$[30-(0.06*400)]/100=0.06$
40	$[40-(0.06*0)]/500=0.08$	$[40-(0.06*250)]/250=0.1$	$[40-(0.06*400)]/100=0.16$
50	$[50-(0.06*0)]/500=0.1$	$[50-(0.06*250)]/250=0.14$	$[50-(0.06*400)]/100=0.26$

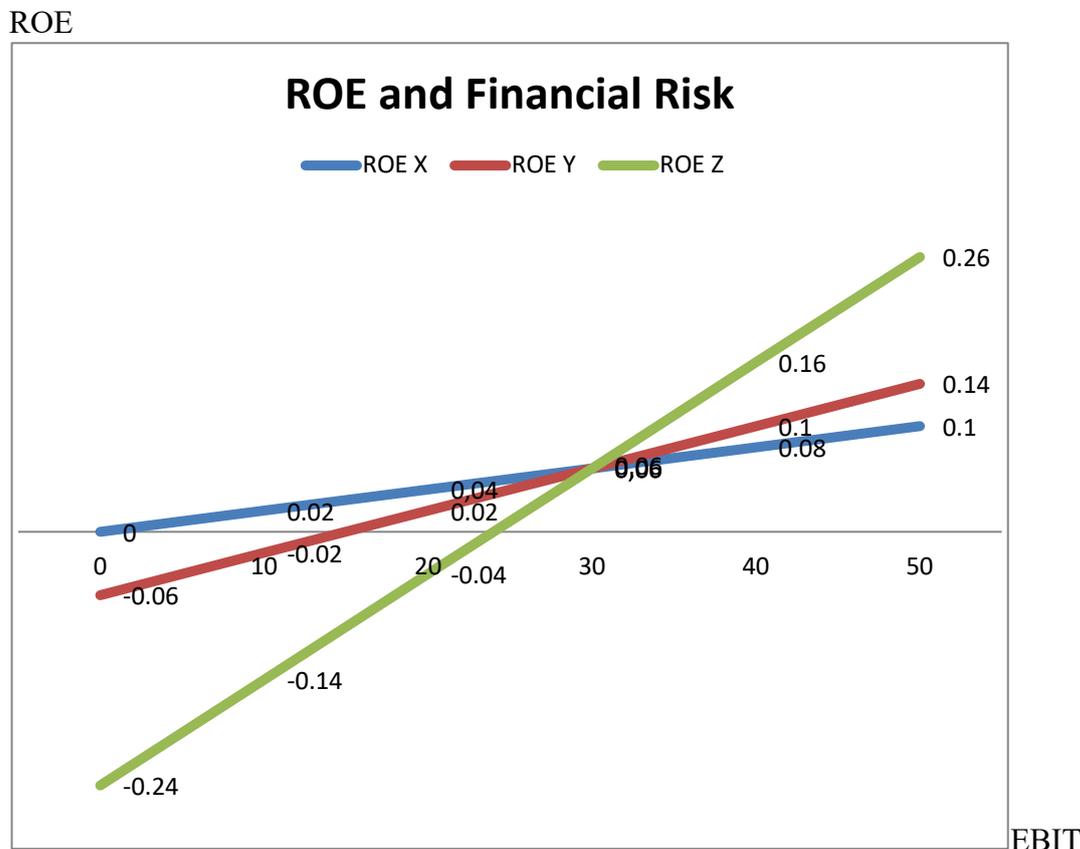
Interest expense  $x = 0$ ; Interest expense  $y = 15$ ; Interest expense  $z = 24$

**From the ROE table we learn:**

**1) The financial return does change with capital structure:  $ROE_x \neq ROE_y \neq ROE_z$**   
which means that the return that the owners get depends on the firms' leverage. How? See graph on next page.

- 2) **The variation of the financial return is:** [0.02 to 0.1] in scenario X (NO debt); [-0.02 to 0.14] in scenario Y (half debt, half equity); and [-0.14 to 0.26] in scenario Z (more debt than equity). **The higher the leverage, the higher the variation.**

Represent the return on equity as a function of the EBIT:



Suppose you are the owner of the company (Shoes' shops) and you expect, given the forecast, to get EBIT = 50 for the current year. What is the financial structure that gives you the highest return?

Z, that is to say, **the highest leverage = B/S**

However, suppose that in mid-March a virus called Coronavirus spreads out around the planet and you have to close your Shoes' shops (this is your business) for several months, so you NOW see that your EBIT is going to be close to 10. What is the return that YOU expect (ROE) given that you are in Z capital structure?

ROE = -14% **Very probably you are going to face bankruptcy.**

Thus, what is the financial structure (capital structure) that gives a better return to the owners when EBIT drops to 10?

X, no debt at all.

Financial risk does depend on capital structure: **the higher the leverage, the higher the variation:** ↑Leverage ratio= ↑Debt/Equity= ↑B/S => ↑Financial risk

**A firm with no debt has no financial risk! That firm faces only economic risk.**

**Example of financial risk and debt of Spanish companies:** see Aula Virtual

**Live video session (with Kahoot questions)**

**Important:** The interest from debt has to be paid regardless of the EBIT that the firm gets. Example Problem 1: Company Z has to pay 24 in interest from debt. If the firm gets EBIT = 50, no problem. However, if the firm gets EBIT = 10, as  $10 < 24$ , the firm has to pay 24 by selling company assets such as machinery, or by asking for a quick and expensive new loan, or by not paying the employees or providers. Anyway, insolvency costs scale up to an unbearable position, and bankruptcy possibility gets closer.

What about corporate tax? If EBIT gets reduced, corporate tax gets reduced too.

Many companies try to keep debt at a low proportion (low leverage ratio) in order to keep low financial risk. Example of **Mercadona**:

At the beginning of March 2020, **Mercadona** announced a sale and leaseback procedure: **Mercadona** needs cash to finance an important investment project related to the new “Listo para Comer” service.

Instead of financing part of this project with debt, it decides to sell some of their buildings (where they run some supermarkets), subject to a rent contract (leaseback): The new owners sign a contract in which they rent those buildings to **Mercadona** in order to keep those supermarkets working, and probably fix a price to re-sell those building to **Mercadona** after a pre-determined time period.

## 6.1 Self-assessment questions

1. Does coronavirus represent:
  - a) An economic risk?
  - b) A business risk?
  - c) A variation in economic return (ROA)?
  - d) All of the above
  
2. The firm's economic return (ROA) changes with:
  - a) Earnings before interest and tax.
  - b) The firm's volume of assets.
  - c) A drop in our products' consumption.
  - d) All of the above.
  
3. The firm's economic return (ROA) changes with:
  - a) Leverage.
  - b) Debt/Equity ratio.
  - c) The size of the firm's debt.
  - d) None of the above.
  
4. The net profit:
  - a) Is called operating profit.
  - b) Pays to creditors and owners.
  - c) Belongs to the firm's owners.
  - d) Pays the corporate tax.
  
5. Interest and financial costs:
  - a) Are part of the economic decisions.
  - b) Modify EBIT.
  - c) Have to be paid regardless of the size of EBIT.
  - d) Are paid after owners get their profit.
  
6. A firm's financial decisions include decisions:
  - a) On the leverage ratio = Debt/Equity.
  - b) On the relationship between equity and net profit.
  - c) such as "Should we finance the project with debt or with equity?"
  - d) All of the above.
  
7. The owners of a firm with high debt/equity ratio:
  - a) Get high return in expansion times.
  - b) Face high bankruptcy probability.
  - c) Face high financial risk.
  - d) All of the above.
  
8. The owners of an all-equity firm:
  - a) Get lower return in expansion times.
  - b) Face no financial risk.
  - c) Face lower bankruptcy probability.
  - d) All of the above.