Erasmus+: Strategic Partnership

DEFINE - Digitalized Financial Education for Seniors -Interactive Scenario Gaming Solutions for Increasing Online Financial Literacy of Seniors

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General Information

- Erasmus + Strategic Partnership
- DEFINE - Digitalized Financial Education for Seniors - Interactive Scenario Gaming Solutions for Increasing Online Financial Literacy of Seniors
- Coordinator: FH JOANNEUM Gesellschaft mbH (Austria)
- Partners: VOLKSHOCHSCHULE HANNOVER (Germany), UNIVERSIDAD DE ALICANTE (Spain), E-SENIORS (France), ASSOCIAZIONE PROGETTO MARCONI (Italy), VITALE TECNOLOGIE COMUNICAZIONE – VITECO SRL (Italy), WIRTSCHAFTSKAMMER STEIERMARK (Austria)
- Project Duration: 1.10.2019-31.3.2022
- Join us on:

https://define.fh-joanneum.at/

https://www.facebook.com/FinancialEducation4Seniors/

MODULE 2
Money management for seniors

Introduction

This second module is a continuation of module one on basic terminology of digital financial services.

*It is a basic approach to **financial decision-making for individuals** in a context of certainty and provides the basis for understanding **financial transactions** in more complex environments.*

*Therefore, this module is essential in the process of financial literacy for seniors. The understanding of the different **financial decisions** an individual faces as well as the understanding of their **temporal dimension** is essential in **everyday activities**, for instance when **managing** their **accounts, saving and investing money, buying properties, applying for a pension plan, applying for loans, using alternative tools of payment**, etc.*

Introduction

Expected learning outcomes

Seniors will acquire basic knowledge to monitor the ***evolution of their income and expenses*** *from a time dimension, using digital tools. In particular, they will become aware of how they should* ***approach their savings****, what their* ***attitude*** *should be* ***towards a loan*** *and what* ***role*** *the* ***interest rate*** *plays. All of this, bearing in mind that these acquired skills are valid regardless of their size or whether they are adopted in face-to-face or online contexts.*

Source: https://pixabay.com/

Chapters

- ***Topic 1: Budgets and individual financial decisions*** *(face to face, on-line tool & virtual game)*
- ***Topic 2: Time value of money*** *(face to face)*
- ***Topic 3: Investment evaluation*** *(face to face)*

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Chapter 1: *Budgets and individual financial decisions*

1. ***What** is a personal budget?*
2. *What is the **use** of a personal budget?*
3. ***Steps** in the elaboration of a personal budget?*
4. ***Tools** for the elaboration of a personal budget*
5. ***Financial decisions***

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1.1 What is a personal budget?

A **personal budget** is a document that allows you to **visualize and quantify** the **income and expenses** that a person expects to have over a fixed period of time.

In this way, the personal budget is nothing more than a **tool** that **allows each individual to improve the use of his or her money** and, additionally, to acquire the necessary discipline to comply with what has been planned.

A budget is the **essential tool to take control of your personal finances**.

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1.2 What is the use of a personal budget?

The elaboration of a **personal budget**:

- makes it possible to **better manage the finances** of each individual
- contributes to **maintaining an orderly economy**
- allows you to visualize your **current income level** and analyse additional **income needs**.
- decides on which **expenditures** can be actively influenced **to be reduced**
- **prioritise expenditure**
- allows designing a **debt policy** as well as **setting limits**
- allows you to know your **available capital** and make important **financial decisions**

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1.2 What is the use of a personal budget?

The elaboration of a **personal budget**:

- allows you to set aside some amount every month to **save**, taking into account long-term goals.
- helps you to accumulate an **emergency fund**
- allows you to **live within our possibilities**, with the peace of mind that this entails.
- allows you to **make forecasts** for the future
- allows you to **keep track and control** so as not to deviate.

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1.3 Steps in the elaboration of a personal budget

1. Set your financial goals

What do you want to achieve this year?

- **Controlling expenses** to make it to the end of the month
- **Saving** more
- Reducing or eliminating **debts**
- Making plans for **retirement**
- ….

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1.3 Steps in the elaboration of a personal budget

2. Gather all necessary documents

- **Receipts** for direct debits, purchases and ATMs, **bank** or **credit card statements**, **payslips**..
- If you don't have all this information, don't worry. You can use **estimated quantities**, but we advise you to check them later and adjust them to reality.

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1.3 Steps in the elaboration of a personal budget

3. Work out your income

- **Income:** we start by listing all the money entries. The most important ones are usually the payroll or the social security pension in case of retirees, but do not forget other possible incomes such as alimony, interest from bank accounts, subsidies, extra jobs and payments from social security systems.

  - Wages
  - Retirement pension
  - Extra income (rent, financial investments,...)

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1.3 Steps in the elaboration of a personal budget

4. Work out your expenses

- **Expenses:** the expenses are all the money outflows. To really know where we stand, you have to include all current expenses, from housing to small daily outlays. And you should not forget other occasional ones such as holidays, birthday presents and Christmas shopping.
  - **Fixed costs:** accommodations expenses (rent or mortgage), insurances (home, life, car..), loans, credit card payments, bank fees, taxes, pension plan contributions, savings…
  - **Variable costs**: food, electricity, gas, water, telephone, home maintenance, clothing & footwear, pharmacy, medical expenses, education, transport, gym, restaurants, holidays…

You can write your income and expenses down, use an excel template or an on-line tool.

Source: https://unsplash.com/

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1.3 Steps in the elaboration of a personal budget

5. Compare your income to your expenses

- If, on a monthly or yearly basis, you receive more income than you spend in expenses, then your budget is in **surplus**. This is often a good thing, as there's money left over that could be put towards your goals.
- If you spend more money per month or per year than you receive in income, then your budget is in **deficit**. This could indicate a problem, which may need to be addressed to bring your finances back under control.

it is advisable that expenses do not exceed 90% of income, in order to save at least the remaining 10% each month. This 10% can be used to reduce debt, to set up an emergency fund and to achieve medium- and long-term financial goals, such as accumulating capital for a major purchase and preparing for retirement. Without savings, none of this is possible. Without savings you will never have control over the situation.

Source: https://unsplash.com/

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1.3 Steps in the elaboration of a personal budget

6. Make adjustments

Adjust your budget, whether you have trouble making ends meet or would like to save a little more. There are only two options: increase your income or reduce your expenses.

If your budget is in **deficit**, think about what steps you can take:

- **Reduce expenses**: A distinction should be made between:
  - **Compulsory fixed costs**: such as the mortgage or rent of the house and instalments on other loans. Their amount does not vary much from month to month.
  - **Necessary variable expenses**: food, clothes, electricity, etc.
  - **Discretionary expenses**: all other expenses which, if necessary, could be reduced or eliminated.

When savings are needed, it is usually easier to start with discretionary expenses.

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1.3 Steps in the elaboration of a personal budget

6. Make adjustments

If your budget is in **surplus**, think about where the extra money could best be used to help you achieve your goals:

- Put it in a savings account or term deposit to earn interest and grow your wealth
- Add it to your pension plan to help grow your savings for retirement
- Make extra repayments on your home mortgage (if you have one) to pay off more of your property, which can help reduce your interest charges
- Invest your spare money in shares or other assets i.e real state, buying a property, deposits, savings accounts, etc…

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1.3 Steps in the elaboration of a personal budget

7. Implement the new budget and monitor it

The aim is that **our income should cover all our expenses**, including the **10% set aside for monthly savings**.

Once you have identified the cuts needed to achieve this, draw up your budget and commit to it.

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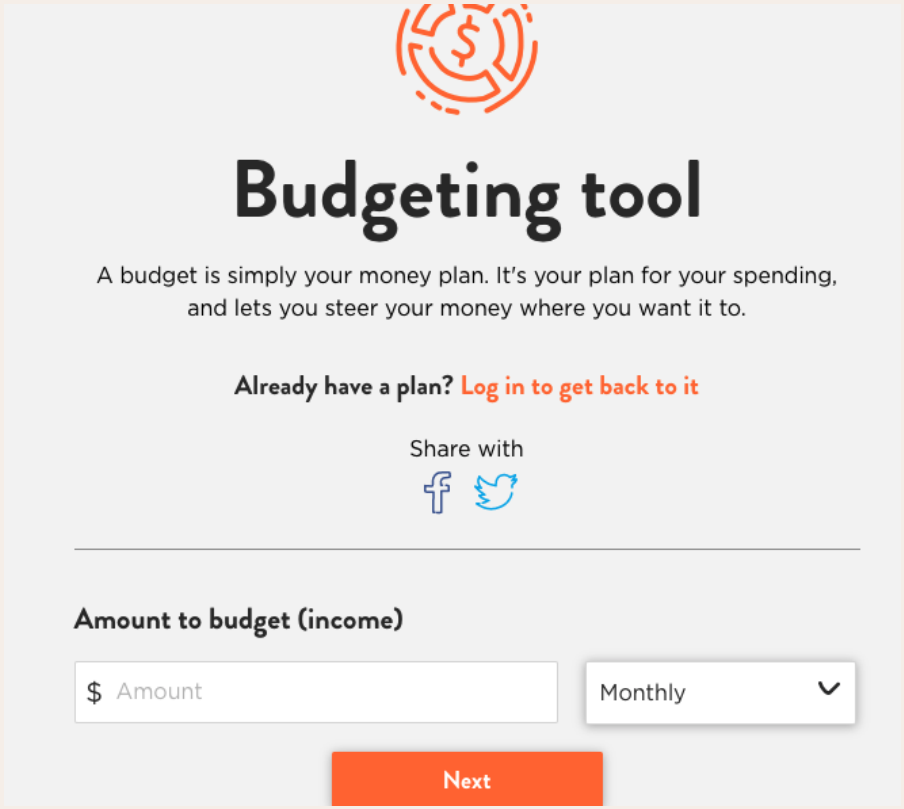
1.4 Tools for the elaboration of a personal budget

1. Excel sheet
2. On-line tool



Senior Budget Planner

Planning out a monthly budget for seniors in large type.

Monthly Income	Expected	Actual	Difference
Salary/Wages			
Interest/Dividends			
Social Security			
IRA/Keogh			
Pension/Profit Sharing			
Rental Income			
Reverse Mortgage			
Other			
Other			
Total			

Monthly Expenses	Expected	Actual	Difference
Housing			
Insurance			
Maintenance			
Electric, gas, water			
Groceries			
Cable			
Auto Payments			
Medical/Dental			
Clothing			
Entertainment			
Travel			
Gifts			
Other			
Other			
Total			
Total Income			
Difference			

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1.5 Financial decisions

- At a general level, **financial decisions are no different from other type of decisions**. Every decision...
  - is based on the **prior comparison of alternatives** or courses of action.
  - pursues a certain **objective**.

  To make a decision, all the alternatives must be **expressed in the same units**, and these units must be related to or **referred to the objective pursued.**

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If this is not the case, no comparison can be made.

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1.5 Specific features of financial decisions

- Financial Decisions are characterised by the confluence of three elements:

  - They have consequences that can be translated into economic **(monetary)** terms.
  - These consequences are projected over **time.**
  - Decisions involve a greater or lesser level of uncertainty **(risk)** about the final outcome.

Let's take a closer look.

Source: https://unsplash.com/

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1.5 Specific features of financial decisions

A. BASIS OF COMPARISON: MONETARY UNITS

- All financial decisions have **consequences that can be expressed in monetary units**, and more specifically in Cash Flows (changes in wealth).

- In general, **this is the natural basis for making economic decisions**: more (less) wealth means more (less) consumption, and therefore more (less) utility (satisfaction).

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1.5 Specific features of financial decisions

- Initial definition of Cash Flow:

A Cash Flow at time *t* is the difference between receipts (money flow in favour or inflows) and payments (monetary flow out or outflows) that generates the decision at that time:

CF(t) = Receipts(t) – Payments(t)

Source: https://unsplash.com/

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1.5 Specific features of financial decisions

B. TIME DIMENSION

- The financial decisions have **long-term consequences**: the decision is taken today, but its results extend into the future. In other words:

- **Financial Decisions generate Cash Flows over time.**

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1.5 Specific features of financial decisions

B. TIME DIMENSION

- This leads to a **problem** in comparing alternatives: **individuals do not perceive the same Cash Flow available at different times in the same way.**

- The reason is that we have **temporary preferences for consumption**: **we are only ready to give up current consumption in exchange for greater consumption in the future.**

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1.5 Specific features of financial decisions

1ST FUNDAMENTAL PRINCIPLE OF FINANCE:

TIME VALUE OF MONEY

A MONETARY UNIT AT THE PRESENT MOMENT IS MORE VALUABLE THAN AT ANY FUTURE MOMENT OF TIME

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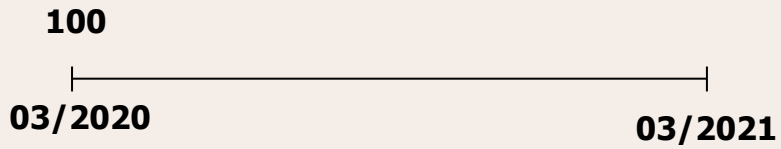
1.5 Specific features of financial decisions

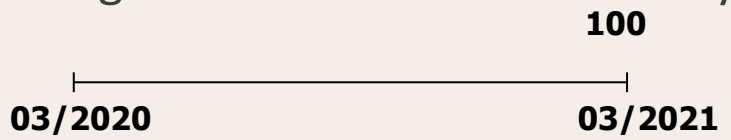
Example: *Given the following alternatives:*

- Alternative A: generates a CF of 100€ at the present time

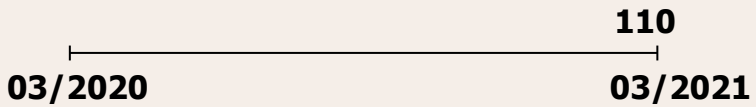


- Alternative B: generates a CF of 105€ at the present time

- Alternative C: generates a CF of 100€ next year



- Alternative D: generates a CF of 110€ next year



Source: https://unsplash.com/

Which alternative is better if we prefer more wealth?

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1.5 Specific features of financial decisions

- B **is better than** A (B≻A) : Between two monetary amounts available at the same time, the larger amount is preferable.

- A **is better than** C (A≻C) : For equal amounts, the alternative received earlier is preferable.

- D is higher in monetary terms than B (advantage), but is charged a year later (disadvantage). **It is not clear which option is better.** Some people would say B, but others would say D.

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1.5 Specific features of financial decisions

Financial decisions whose cash flows are obtained at different points in time cannot be directly compared.

Source: https://unsplash.com/

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1.5 Specific features of financial decisions

SOLUTION:

- **Move all the Cash Flows to a single moment in time and make the comparison there.**

- The **comparison** can be made **at any time**. As the decision is made at the current time, the Cash Flows are normally moved to the current time.

Source: https://unsplash.com/

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1.5 Specific features of financial decisions

C. RISK (UNCERTAINTY OF RESULTS)

- All financial decisions involve a greater or lesser degree of **uncertainty**. On the one hand, **the time dimension makes it impossible to know exactly what will happen in the future**. On the other hand, **there are decisions with a higher intrinsic risk than others** (*for example*, investing in the stock market is riskier than opening a **bank account**).

- The problem of risk is similar to that of time: **individuals do not perceive the same Cash Flow in certainty as in uncertainty, because we prefer certain consumption to uncertain consumption.**

Source: https://unsplash.com/

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1.5 Specific features of financial decisions

2ND FUNDAMENTAL PRINCIPLE OF FINANCE:

RISK AVERSION

A MONETARY UNIT IN CONDITIONS OF CERTAINTY IS MORE VALUABLE THAN A MONETARY UNIT UNDER A RISKY SCENARIO

Source: https://unsplash.com/

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1.5 Specific features of financial decisions

Comments:

- **Risk Aversion** means that:

  A person will only take risks if he/she expects to get an adequate reward. The greater the risk, the greater the compensation (reward) demanded.

- Risk Aversion DOES NOT mean that:

  We will never take any kind of risk, or avoid it.

There is a relation between the risk borne and the expected return on investment.

Source: https://unsplash.com/

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1.5 Individuals' Financial Decisions

(A) CONSUMPTION/SAVINGS DECISION (CONSUMPTION PLAN)

Deciding which part of the wealth is to be consumed and which part is to be saved (decided one, decided the other). This decision is considered given in Financial Economics.

(B) INVESTMENT DECISION (INVESTMENT PLAN)

Distribution of income (wealth) saved among the various assets available on the market.

Asset: Any element that has economic value. Types:

- **Real Assets** (Buildings, Machinery,...): They have value by themselves
- **Financial Assets** (Shares, Bonds,...): They have value because they represent rights over Cash Flows

Source: https://unsplash.com/

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1.5 Individuals' Financial Decisions

C) **FINANCING DECISION (FINANCING PLAN)**

Use other individuals' savings for consumption or investment when one's own income is not sufficient.

(D) **RISK MANAGEMENT DECISION (COVERING PLAN)**

Decisions with the aim of increasing or reducing financial uncertainty and how to do it.

Source: https://unsplash.com/

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1.5 The Financial Objective

Financial decisions must serve a purpose or objective. This is the **objective** in the case of individuals:

MAXIMIZE YOUR WEALTH

In this way, and in this context, the level of individual satisfaction is maximized

Source: https://unsplash.com/

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Game “money management”

Source: https://pixabay.com/

- **Aim of the game**: in this game you will have a concrete simulation of money management.
- **Rules of the game**: the game is divided into 24 levels that represent 24 months. Each month you will receive your salary but you have to face some expenses. Moreover, you have to turn every month a card and randomly something can happen, it can be good card, it means you earn money, a bad card, it means you lose money, or a white card, that means that nothing happens.

Be careful not to forget to achieve your goals!

Let’s play!!!

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Chapter 2: *Time value of money*

1. ***Introduction***
2. ***Discount** and **Capitalization***
3. ***Cash Flow sequences***
4. ***Constant Cash Flows***

Source: https://unsplash.com/

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2.1 Introduction

- In the previous session we have seen that **in order to be able to take financial decisions it is necessary to homogenize the different alternatives** with regard to three aspects:
  - Express them in the same monetary units (money).
  - **Refer them to the same moment in time**.
  - Refer them to the same level of risk.

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2.1 Introduction

- As for the second one, **since individuals have preferences for liquidity**, they will be willing to exchange today's consumption for future consumption at a rate called the **intertemporal marginal preference rate**, which is different for each individual. **This rate is the price that each individual assigns to money over time.**

- **Example:** A person is asked to choose between obtaining €1000 at the present moment or €1000 in a year's time. ***Which would be his or her choice?***

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2.1 Introduction

As we have seen, according to the first principle of finance, this person would choose to access €1000 at the present moment.

What amount would this person ask for if he/she were given the possibility to choose the second alternative?

As previously indicated, for this person to be indifferent to the current amount or the amount to be received in a year's time, the latter would have to be greater than €1000, the difference between this final amount and the initial amount being attributable to the interest requested for delaying consumption for one year.

Source: https://unsplash.com/

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2.1 Introduction

- **The financial market** is the **mechanism that offers individuals the possibility of transferring consumption over time. The interest rate** is the price of money on the market (price of time).

- If we assume that **the interest rate is unique**, we will have a valid rate for transferring consumption over time.

- Therefore, it is the interest rate that will allow us to take into account **the time value of money** and, therefore, allows us to relate present and future cash flow values.

Source: https://unsplash.com/

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2.1 Introduction

- The mechanisms that allow us to move cash flows over time are **capitalization** (moving money forward in time) and **discounting** (moving money backwards in time).

- To understand how these mechanisms work it is useful to see how money is paid back over time under **Compound Capitalization**.

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2.1 Introduction

Compound Capitalization is a system that **allows the calculation, for any financial capital (cash flow), its equivalent at a later time** with the particularity that **interests are accumulated to the capital to produce new interests.**

Source: https://unsplash.com/

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2.1 Introduction

- Let us suppose that a person today has 100,000 euros at his disposal. According to the time value of the money we know that in one year this 100,000 Euros will be less valuable than today even if the amount is the same.

- However, if this person considers making a deposit that provides him with an annual interest rate of 3% and we use the logic of **compound capitalization**. We will see how with this system, at the end of each period of time the accumulated capital generates interest in the following period.

Source: https://unsplash.com/

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2.1 Introduction

Capital Start Period	Interest Period	Capital End of Period
100,000	100,000 * 0,03 = 3.000	103,000
103,000	103,000 * 0,03 = 3090	106,090
106,090	106,090 * 0,03=3182.7	109,272.7

Interest is generated on an increasing amount, in particular on the capital at the beginning of each period **including accrued interest**. In this situation it is the same for an individual to have 100,000 euros at the beginning as it is to have 109,272.7 at the end of the period.

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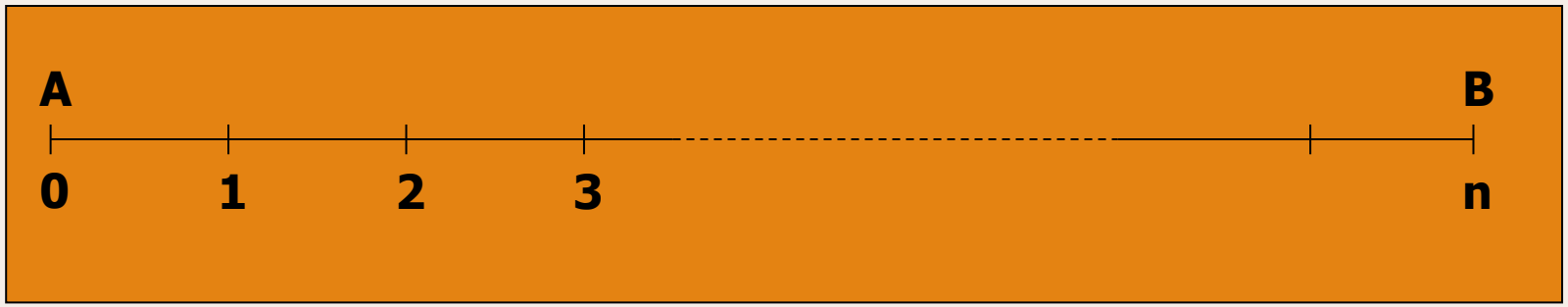
2.2 Discount and Capitalization

- As we have just seen, if we have two capitals A and B expressed in the same monetary unit and with the same level of risk (for convenience, zero risk). We know that they cannot be directly compared because they correspond to different moments in time. If we also assume that the interest rate for each period is the same.



Source: https://unsplash.com/

- In order to compare these two capitals, they must both refer to the same moment. Two options:

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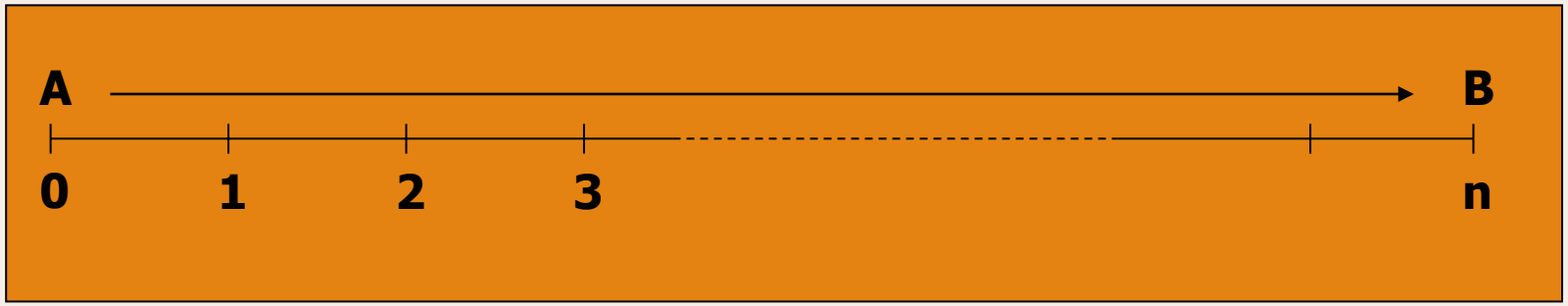
2.2 Discount and Capitalization

CAPITALISING *(Moving forward in time): Taking Capital A from 0 to n*



In order to move forward in time, as we have seen, it is multiplied by (1+i) as many times as periods we want to move forward, always making sure that *i* and *n* are expressed in the same unit of time. FV is the capitalised value in n or ***future value*** of capital A.

Source: https://unsplash.com/

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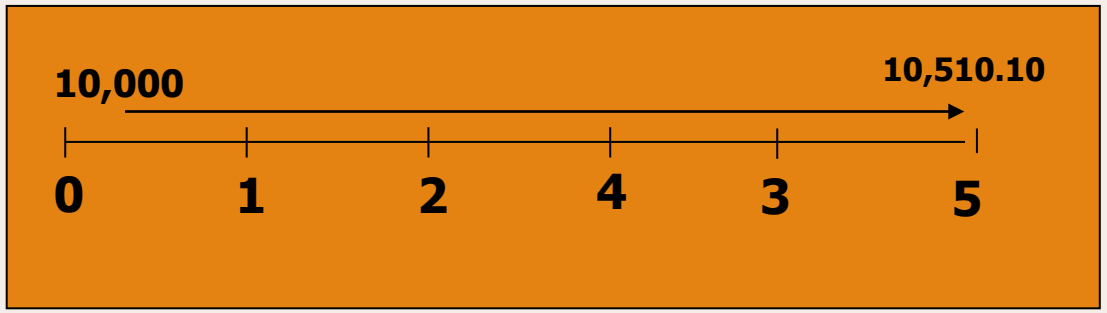
2.2 Discount and Capitalization

Example: A person has €10,000 at his/her disposal and considers that he/she will not need it in the next five years. If the annual interest rate offered by a financial institution is 1%, how much would he/she obtain in the fifth year if he/she decides to deposit that amount in that institution?

As we have just seen, to move the money from the present to the future we would have to multiply €10,000 by (1.01) as many times as the number of years (i.e. five times the number of years):

$$10,000 * (1.01)^5 = 10,000 * 1.05101 = 10,510.10$$



Source: https://unsplash.com/

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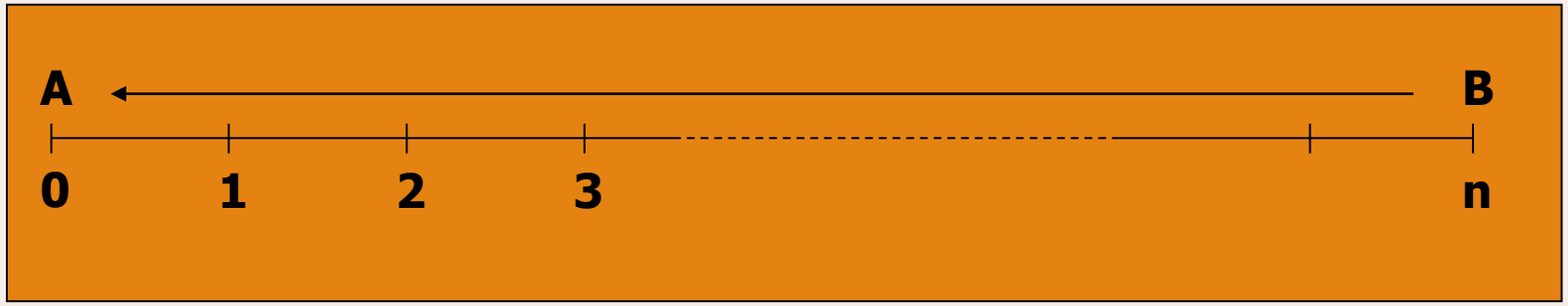
2.2 Discount and Capitalization

DISCOUNT (Go back in time): Take the Capital B from n to 0:



To turn a capital back in time, logically, it is divided by (1+i) as many times as periods we wish to go backwards, always taking into account that *i* and *n* refer to the same unit of time. CV is the value discounted to 0 or **current value** of capital B.

Source: https://unsplash.com/

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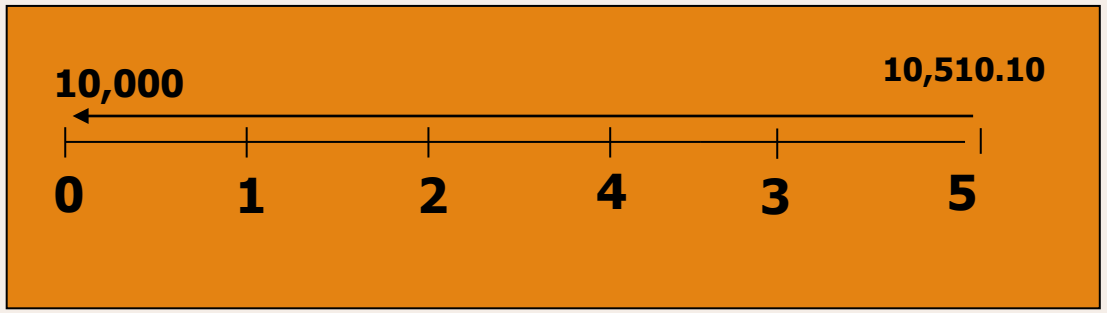
2.2 Discount and Capitalization

Example: A financial institution offers deposits at an annual interest rate of 1%. If a person wants to have 10,510.10 in five years' time, how much should he or she deposit with the financial institution today?

As we have just seen, to move the money from the future to the present we would have to divide the final amount, 10,510.10, by (1.01) as many times as the number of years (that is, five times):

$$\frac{10,510.10}{(1.01)^5} = 10,000$$



Source: https://unsplash.com/

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2.3 Cash Flow sequences

- Financial transactions often involve several cash flows (various capitals). In order to decide which alternative is optimal, it is necessary to consider all the cash flows associated with each of them and to value them at the same point in time.

Example: *the Cash Flow of 500 that occurs at moment 1 would have to be valued at moment 0 and so on. The Cash Flow of -800 that occurs at moment 2 would have to be valued at moment 0 and son on.*

Source: https://unsplash.com/

	500	-800	7.000	800
0	1	2	3	4

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2.3 Cash Flow sequences

Example: *we have the following two cash flow sequences:*

	-800	500	7.000	800
0	1	2	3	4

	500	500	3.000	3.500
0	1	2	3	4

Which of the two cash flow sequences is better?

Source: https://unsplash.com/

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2.3 Cash Flow sequences

If we ignore the time value of money, the two sequences generate the same total amount of cash (7,500 euros), so it could be **mistakenly** thought that they are **equivalent alternatives**.

If we take into account the time value of money, we must make the comparison by calculating the **equivalent value** of each decision at the present time.

Source: https://unsplash.com/

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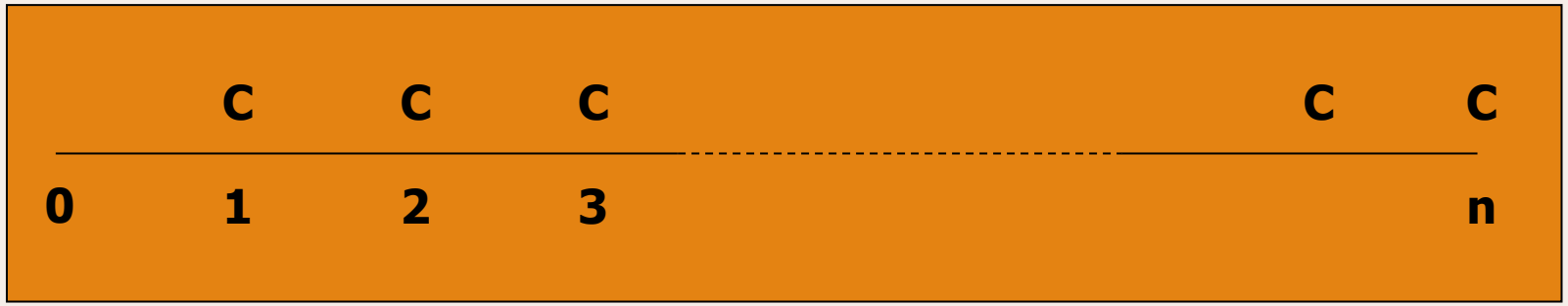
2.4 Constant Cash Flows

A possible case would be one where we consider financial alternatives that generate constant Cash Flows that are repeated at regular intervals of time, which is very common in everyday life (for example, when repaying a loan, when setting up a pension plan, ...)

Source: https://unsplash.com/



In those financial alternatives that generate constant CT, this would be the scheme.

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2.4 Constant Cash Flows

Example: If a person is offered two investment alternatives, with identical cost and maturity, providing €1,000 and €900 per year respectively. Which would be his or her choice?

	1.000	1.000	1.000	1.000
0	1	2	3	4

	900	900	900	900
0	1	2	3	4

Source: https://unsplash.com/

With this information, and irrespective of the interest rate, the decision would be to choose the first alternative.

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Chapter 3: *Investment evaluation*

1. ***Introduction***
2. ***Financial Foundations of Investments***
   - *Investment Decision. Concept and Relevant Variables*
3. ***Net Present Value (VAN)***
4. ***Internal Rate of Return (IRR)***

Source: https://unsplash.com/

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3.1 Introduction

We have seen that the financial goal for individuals is to maximize their level of wealth.

To assess which decision best meets this objective, we need some valuation methods.

A valuation method will determine the optimal alternative if:

Source: https://unsplash.com/

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3.1 Introduction

- It is able to identify the alternative that generates the **most wealth** (CFs) for individuals.
- Respects the Principle of the **Time Value of Money**.
- Respects the **Risk-Aversion** Principle: the greater the risk, the greater the return required (initially, we are in certainty).

Source: https://unsplash.com/

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3.2 Financial Foundations of Investments: concept

A) INVESTMENT CONCEPT

A decision to exchange **immediate and certain satisfaction for an acquired hope**, of which the invested asset is the support.

Alternatively, it can also be understood as the **allocation of money in the hope of a return in the future**.

"Immediate and Certain Satisfaction"

Initial Disbursement

Renouncing wealth (consumption) Today

“Acquired Hope"

Expected Cash Flows

Greater wealth (consumption) expected in the future

Source: https://unsplash.com/

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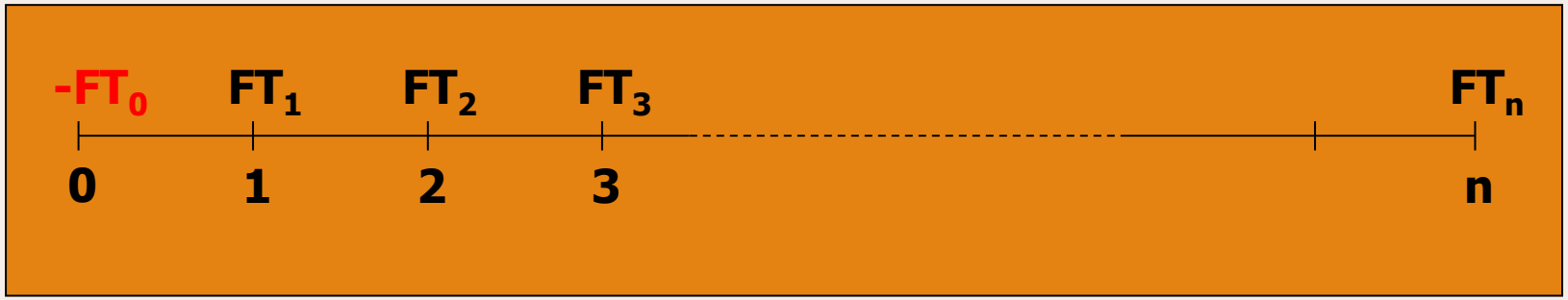
3.2 Financial Foundations of Investments: Relevant Variables

B) RELEVANT VARIABLES

To determine the suitability of an investment it is necessary to take into account all the CF it generates:

We will use the Flow Timeline to represent the different investment alternatives:



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3.2 Financial Foundations of Investments: Relevant Variables

Three variables characterize an investment project:

1. $-CF_0$ = INITIAL PAYMENT

   - It represents the payment made to acquire the asset, plus all the payments necessary to put it into operation.
   - It is **always** a negative amount, it is the characteristic of investments. It represents **the wealth that you are prepared to give up** in order to make the investment.

Source: https://unsplash.com/

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3.2 Financial Foundations of Investments: Relevant Variables

2. CF_t = EXPECTED CASH FLOW IN *t*

- $CF_t = Receipts_t – Payments_t$
- They will be positive or negative depending on whether the expected cash inflows or outflows dominate (usually positive) .

3. n = Number of years (periods) or life of the project

Source: https://unsplash.com/

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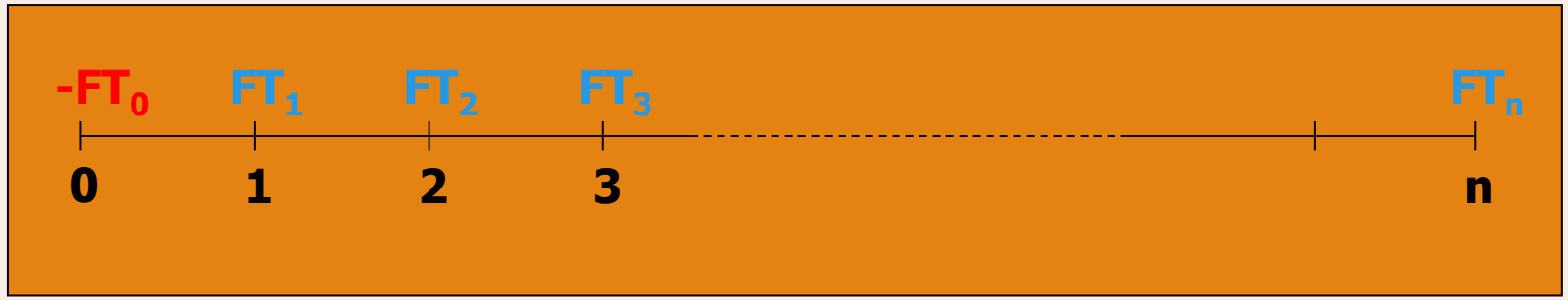
3.3 Net Present Value (NPV)

- The basic method for determining whether a project creates or destroys wealth is to **compare the amount of the initial outlay with the expected CF.**

- The disbursement is located at the initial (current) moment. In contrast, the expected CFs are distributed over the life of the project:



Source: https://unsplash.com/

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3.3 Net Present Value (NPV)

- In order to make the comparison, we must move all the CF to a single moment in time.

- By moving $\{CF_1, CF_2, ..., CF_n\}$ to a single moment, we carry out the **VALUATION** of the project:

  All flows in n: Final value

  All flows at 0: Present value

Source: https://unsplash.com/

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3.3 Net Present Value (NPV)

CURRENT VALUE OF AN INVESTMENT

Sum of the discounted values of the **expected** CF, using as a discount rate a return appropriate to the level of risk of the project. This rate is named by K (without risk, *i*).

Source: https://unsplash.com/

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3.3 Net Present Value (NPV)

After that, we find at 0 the **initial disbursement** and the **Present Value** of the project. All that remains is to compare which amount is greater by means of a simple difference.

Net present value (NPV) is the difference between the present value of cash inflows and the present value of cash outflows over a period of time.

So, we define the NET PRESENT VALUE (NPV) of a project as:

$$\mathbf{NPV = -FT_0 + PV}$$

NPV = Today's value of expected CF – Today's value of invested cash

Source: https://unsplash.com/

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3.3 Net Present Value (NPV)

Decision rule (same for funding)

- If **NPV > 0** The PV (Expected Return on Investment) is higher than the required disbursement, and the project is **ACCEPTED**.
- If **NPV < 0** The project does not generate enough wealth to offset the disbursement, and is therefore **REJECTED**.

- The NPV represents the increase in wealth of the company/individual or absolute profitability resulting from the acceptance of the project.

Source: https://unsplash.com/

NPV > 0 ⟹ Creates Wealth ⟹ Accepted

NPV < 0 ⟹ Impoverishes ⟹ Rejected

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3.3 Net Present Value (NPV)

Consequently, this method is directly related to the **individual's Financial Goal.**

To maximize the value of your wealth:

- **We will carry out all independent projects with positive NPV.**
- In the case of **mutually exclusive projects** (we can only accept one of several alternatives), **the one with the highest NPV is chosen.**

Source: https://unsplash.com/

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3.3 Net Present Value (NPV)

WHICH DISCOUNT RATE K TO USE?

A discount rate appropriate to the risk level of the project.

The discount rate is also called the "opportunity cost" or "minimum required return".

- **OPPORTUNITY COST**: It represents the return that could have been obtained by investing in the best alternative available in the market of equal risk to that of the project.

Source: https://unsplash.com/

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3.3 Net Present Value (NPV)

- **MINIMUM REQUIRED RETURN:** This is a consequence of the above. The investor, aware of the opportunity cost he bears, will demand at least a similar return from the project.

- We only know the value of K a priori in certainty. That is, in investments with a risk similar to that of term deposits in the Capital Market (usually denoted i).

$$K = i$$

Source: https://unsplash.com/

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3.3 Net Present Value (NPV)

If the project is at risk (general case), we can only say that $K>i$:

$$K = i + \delta$$

where $\delta > 0$ represents the additional return required for bearing risk (risk premium).

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3.3 Net Present Value (NPV)

To determine δ we need:

- To learn to "measure" risk.
- To specify how higher returns are demanded or exchanged in exchange for bearing higher levels of risk (δ).

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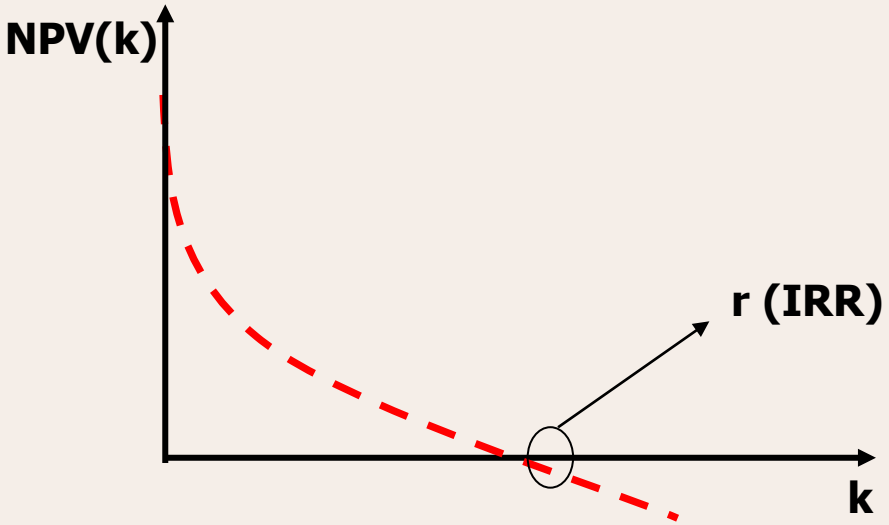
3.4 Internal Rate of Return (IRR)

To calculate **NPV**, we have applied the expression:

$$NPV = -FT_0 + PV$$

We know that NPV is usually a monotonous function that decreases with respect to the discount rate [**NPV(k)**].



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3.4 Internal Rate of Return (IRR)

We define **Internal Rate of Return (IRR)** as **the discount rate that applied to the NPV makes it zero**. Graphically it is the point of intersection of the NPV(k) function with the ordinate axis. It is the solution of:

$$NPV = -FT_0 + PV = 0$$

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3.4 Internal Rate of Return (IRR)

- The decreasing form of the NPV(k) function suggests a strategy for decision making. We will compare the relative return generated by the project (r or IRR) with the minimum return required by its risk, i.e. K.

- The IRR represents the **relative profitability** of the project (e.g. 8%). It is a measure of relative wealth. On the other hand, K represents the minimum profitability required (e.g. 5%).

- The methodology is as simple as calculating the r-value (IRR) and comparing it to K.

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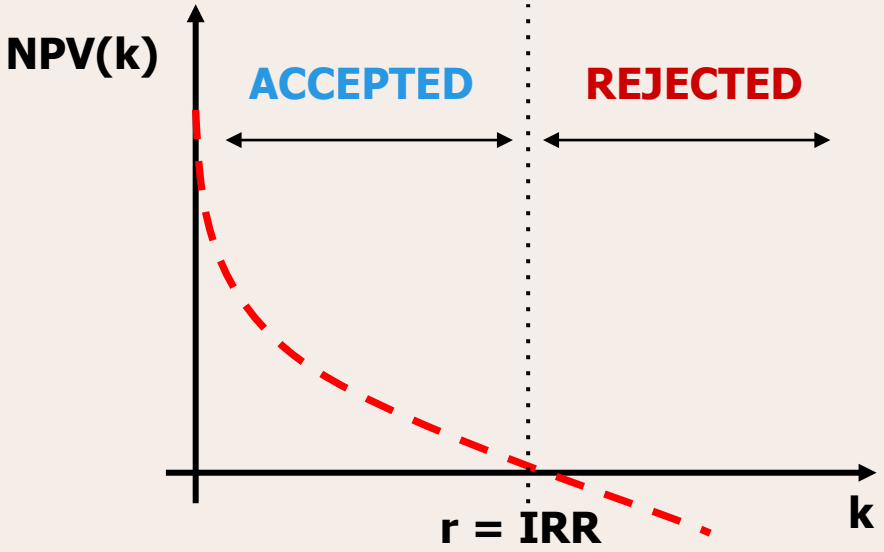
3.4 Internal Rate of Return (IRR)



Source: https://unsplash.com/

To the left of the cut-off point (IRR), the minimum profitability required is so low that the project is ACCEPTED.

To the right of the cut-off point, any discount rate applied makes the NPV negative and the project is REJECTED.

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3.4 Internal Rate of Return (IRR)

IRR METHODOLOGY

- We compare the relative profitability of the project (IRR) with the profitability required given the level of risk [K].

Decision rule:

IRR > K ⟹ ACCEPT (EQUIVALENT TO NPV> 0

IRR < K ⟹ REJECT (EQUIVALENT OF NPV< 0)

Source: https://unsplash.com/

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Useful glossary

Budget	Document that allows you to visualize and quantify the income and expenses that a person expects to have over a fixed period of time
Capitalization	Moving money forward in time
Cash Flow	It is the difference between receipts (monetary flow in favour or inflows) and payments (monetary flow against or outflows) generated by the decision at that time
Discount	Moving money backward in time
Interest rate	The price of money on the market (price of time). It will allow us to take into account the time value of money and, therefore, allows us to relate present and future cash flow values.
IRR	Internal Rate of Return is the discount rate that applied to the NPV makes it zero

Useful glossary

NPV	Net Present Value, represents the increase in wealth of the company/individual or absolute profitability resulting from the acceptance of the project.
Opportunity cost	It represents the return that could have been obtained by investing in the best alternative available in the market of equal risk to that of the project.
Risk	Uncertainty of results
Time value	A monetary unit at the present moment is more valuable than at any future moment of time

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