INTERNATIONAL BUSINESS SCHOOL

Principles and Practices of Business Finance

Dr. Sam Mohamad

Weekly Syllabus

Week	Topic
Week 1	The Time Value of Money
Week 2	Annuities and perpetuities and Loan amortisation
Week 3	Capital Budgeting and Investment techniques
Week 4	Financial needs of a corporation
Week 5	Financial Markets History Structure and Functions
Week 6	Valuing Shares
Week 7	Valuing Bonds
Week 8	Accounting definition Balance sheet and income statement
Week 9	Capital Structure and Cost of Capital
Week 10	Revision Practices
Week 11	Presentations
Week 12	Presentations

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The Time-Value of Money

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Agenda

1. Finance and Money
2. Time value of money concept
3. Simple and compound interest
4. Future Value and Present Value concepts
5. Effective Annual Interest Rate and Annual Percentage Rate
6. Inflation, Nominal and Real Rates

Finance and Money

What is Finance?

Finance is the management of money activities such as investing, budgeting, saving, and forecasting.

What is money?

A medium of exchange used to buy goods and services.

Functions: Store of Value, Unit of Account, Medium of Exchange.

Milestones in the Evolution of Money: Autarky, Barter, Commodity Money, Metal Coins, IOUs, Fiat Money, Crypto currency.

Time Value of Money Concept

- **Would you rather receive $100 today or in one year?**
  - At first glance, both options seem equal.
  - However, **$100 today is more valuable** than receiving the same amount in the future.

- **What is the Time Value of Money (TVM)?**
  - TVM states that money today is worth more than the same amount in
  - the future due to its earning potential.
  - This principle is central to business decision-making.

- **Why Does Money Lose Value Over Time?**

  - **Opportunity Cost** – Money today can be invested to generate returns.
  - **Inflation** – Reduces purchasing power over time.
  - **Uncertainty** – The future is unpredictable; having money now is more secure.

Time Value of Money Concept

The Time Value of Money serves as the foundation for several key financial concepts, such as:

- **Interest Rates** – The cost of borrowing or the return on investment.
- **Present Value (PV) & Future Value (FV)** – Comparing money now vs. later.
- **Inflation Rate & Real vs. Nominal Interest Rates** – Understanding purchasing power.
- **Annuities & Perpetuities**.

Nature of interest

Difference between amount borrowed or invested (principal) and amount repaid or collected.

The Interest Rate: Converting Cash Across Time

The Interest Rate is a Price of capital, the use of money.

Elements involved in financing transaction:

1. **Principal (*p*):** Amount borrowed or invested.
2. **Interest Rate (*r*):** An annual percentage.
3. **Time (*t*):** Number of years or portion of a year that the principal is borrowed or invested.

Simple Interest

- Interest computed on the original investment/ principal only.

Illustration: Assume you borrow $5,000 for 2 years at a simple interest rate of 6% annually. Calculate the interest cost.

2 FULL YEARS

Interest = p x r x t

= $5,000 x .06 x 2

= $600

FV = 5000 + (5000 X .06 X 2) = $5600

Compound Interest

- Computes interest on
  - the **principal** and
  - any **interest earned**.
- ”Interest on interest as well.”
- Most business situations use compound interest.

Simple Interest vs compound Interest

Assume that you deposit €10,000 in Bank 1, where it will earn simple interest of 9% per year, and you deposit another €10,000 in Bank 2, where it will earn compound interest of 9% per year compounded annually. Also assume that in both cases you will not withdraw any cash until three years from the date of deposit.

	Bank 1				Bank 2		
	simple Interest calculation	Simple Interest	Accumulated Year End Balance		simple Interest calculation	Simple Interest	Accumulated Year End Balance
Year1	10,000 X 9%	€ 900	€ 10,900		10,000 X 9%	€ 900	€ 10,900
Year2	10,000 X 9%	€ 900	€ 11,800		10,900 X 9%	€ 981	€ 11,881
Year3	10,000 X 9%	€ 900	€ 12,700		11,881 X 9%	€ 1,069	€ 12,950.3
		€ 2,700		Difference		€ 2,950.3	
				250.3			

Simple Interest vs compound Interest

Simple Interest

- Interest computed on the original investment / principal only.
- Related to Annual Percentage Rate (APR)

Compound Interest

- Interest computed on the original investment /principal and also on earned interest (the later part is expressed as interest on interest)
- Related to Effective Annual Interest Rate (EAR)

Future Value Concepts

Future value of a single amount is the value at a future date of a given amount invested, assuming compound interest.

$$FV = p \times (1 + r)^t$$

FV = future value of a single amount

p = principal (or present value; the value today)

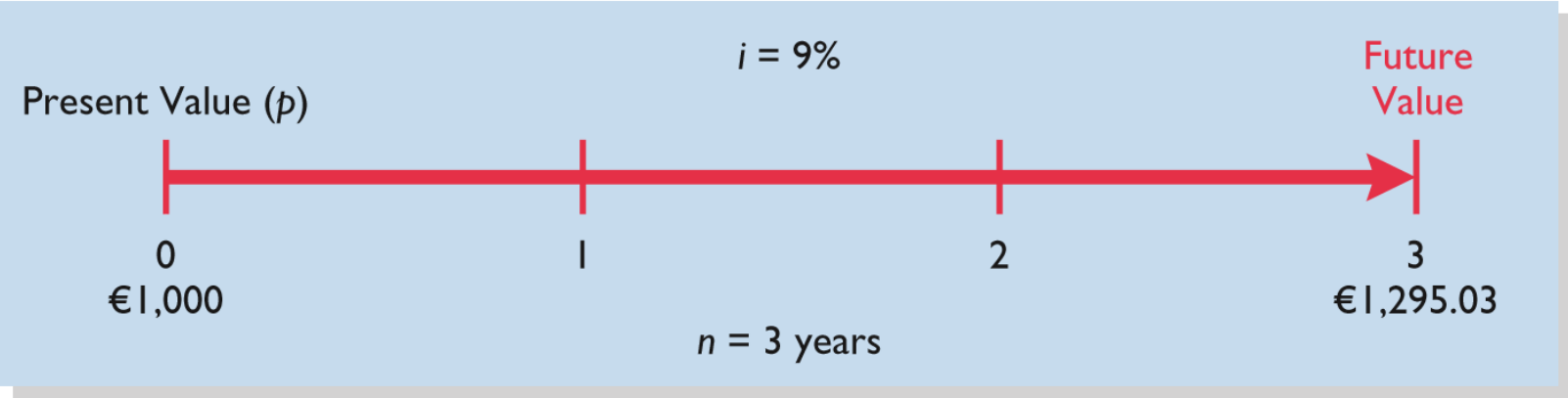
r = interest rate for one period

t = number of periods

Future Value of a Single Amount

Illustration: If you want a 9% rate of return, you would compute the future value of a €1,000 investment for three years as follows:

$$
\begin{aligned}
FV &= p \times (1 + i)^n \\
&= €1{,}000 \times (1 + .09)^3 \\
&= €1{,}000 \times 1.29503 \\
&= €1{,}295.03
\end{aligned}
$$



Present Value Concepts

Present Value Variables

The **present value** is the value now of a given amount to be paid or received in the future, assuming compound interest rate.

$$\boldsymbol{PV = FV/(1 + r)^t}$$

PV = Present value of a single amount

FV = Future value

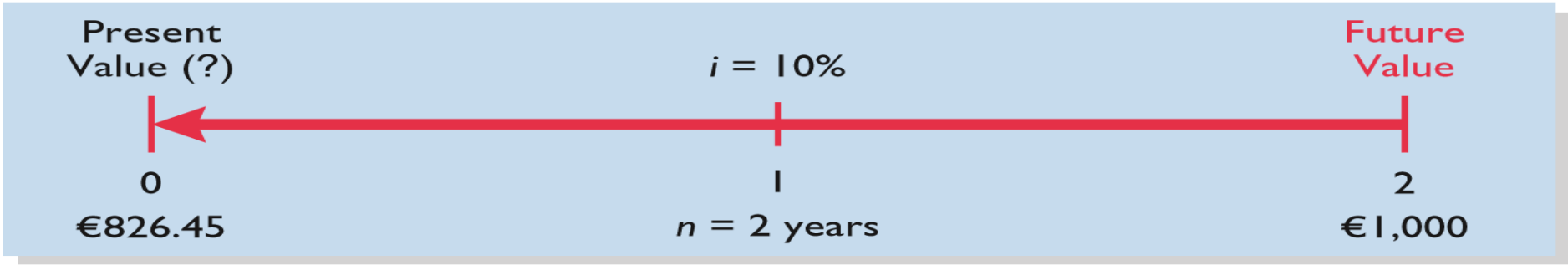
r = interest rate for one period

t = number of periods

Present Value of a Single Amount

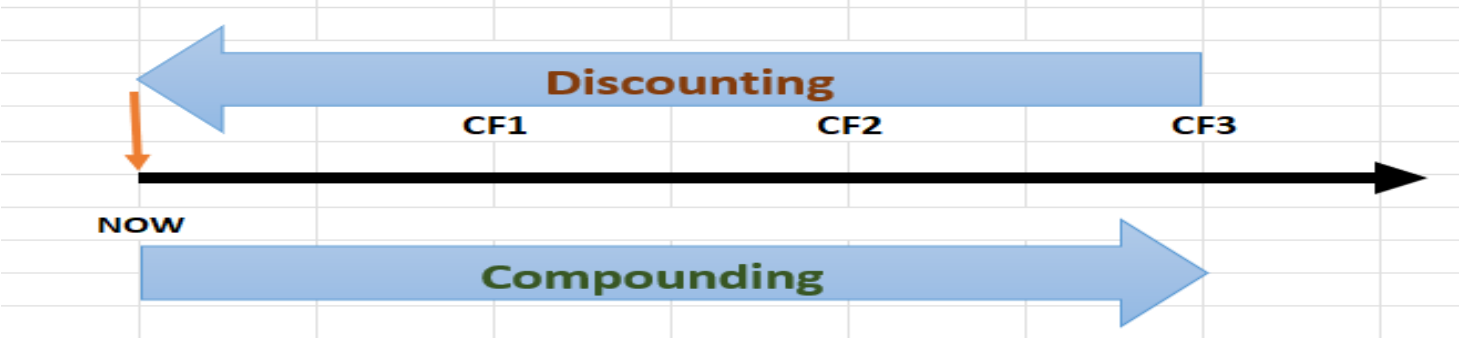
What is present value of €1,000 received in two years at 10% interest rate?

$$PV = 1000/(1 + 10\%)^2$$
$$= €826.45$$



Future value vs. Present value

- Future Value: the value of a cash flow that is moved forward in time,you must compound it
- Present Value: the value of a cost or benefit computed in terms of cash today, you must discount it.



Effective Interest Rates

In connection with simple interest and compound interest we have to distinguish two types of interest rate: effective annual interest rate and annual percentage rate.

Effective Annual Interest Rate - Interest rate that is annualized using compound interest.

$$EAR = \left(1 + \frac{APR}{number\ of\ periods}\right)^{number\ of\ periods} - 1$$

Annual Percentage Rate - Interest rate that is annualized using simple interest.

Effective Interest Rates

*Example – **EAR & APR***

Given a APR of 12% for an interest rate paid monthly, what is the Effective Annual Rate(EAR)? What is the monthly Percentage Rate (APR)?

- EAR= $\left(1+\frac{0.12}{12}\right)^{12}-1=0.1268=12.68\%$

- Monthly rate = APR/number of compounding periods
  = 0.12 / 12 = 0.1 = 1%

EAR is generally higher than APR. If there is no compounding within one year, EAR equals APR.

Inflation

Inflation - Rate at which prices as a whole are increasing.

Nominal Interest Rate - Rate at which money invested grows.

Real Interest Rate - Rate at which the purchasing power of an investment increases.

Real interest rate shows what the real value of an investment is including the inflation effect.

Inflation

$$1 + \text{real interest rate} = \frac{1+\text{nominal interest rate}}{1+\text{inflation rate}}$$

With positive inflation, real interest rate is always less than nominal interest rate. If there is no inflation, the two rates are equal – money does not lose its value.

Inflation

Example

If you make a deposit for one year, it earns the interest rate of 5.0% and the inflation rate is 2.2%, what is the real interest rate?

$$1 + \text{real interest rate} = \frac{1+.050}{1+.022}$$

$$1 + \text{real interest rate} = 1.027$$

$$\text{real interest rate} = .027 \text{ or } 2.7\%$$