BUACCFUND 2021 – SESSION 5

AGENDA

- Basics of modern finance
  - Time value of money
  - Present values and discounting
- Cash flows
  - Perpetuity and annuity
- Financing the firm
  - Loans, bonds
  - Equity

NATURE OF INTEREST

- Payment for the use of money.
- Difference between amount borrowed or invested (**principal**) and amount repaid or collected.

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.

NATURE OF INTEREST

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

$$\text{Interest} = p \times r \times t$$
$$= \$5{,}000 \times .06 \times 2$$
$$= \$600$$

NATURE OF INTEREST

Compound Interest

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

ILLUSTRATION

Illustration: Assume that you deposit €1,000 in Bank Two, where it will earn simple interest of 9% per year, and you deposit another €1,000 in Citizens Bank, 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 Two

Simple Interest Calculation	Simple Interest	Accumulated Year-End Balance
Year 1 €1,000.00 × 9%	€ 90.00	€1,090.00
Year 2 €1,000.00 × 9%	90.00	€1,180.00
Year 3 €1,000.00 × 9%	90.00	€1,270.00
	€ 270.00	

€25.03
Difference

Citizens Bank

Compound Interest Calculation	Compound Interest	Accumulated Year-End Balance
Year 1 €1,000.00 × 9%	€ 90.00	€1,090.00
Year 2 €1,090.00 × 9%	98.10	€1,188.10
Year 3 €1,188.10 × 9%	106.93	€1,295.03
	€ 295.03	

Future Value Concepts

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

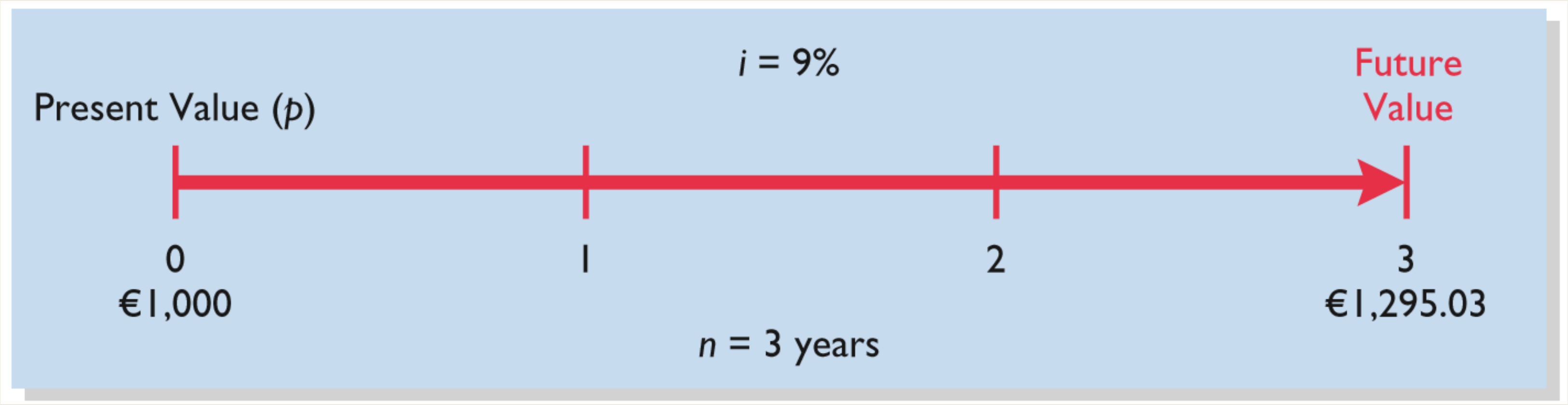
$$\boxed{FV = p \times (1+r)^t}$$

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:

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



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.

Present value variables:

1. Dollar amount to be received (future amount).
2. Length of time until amount is received (number of periods).
3. Interest rate (the discount rate).

Present Value of a Single Amount

Present Value (PV) = Future Value ÷ $(1 + r)^t$

FV = future value of an amount

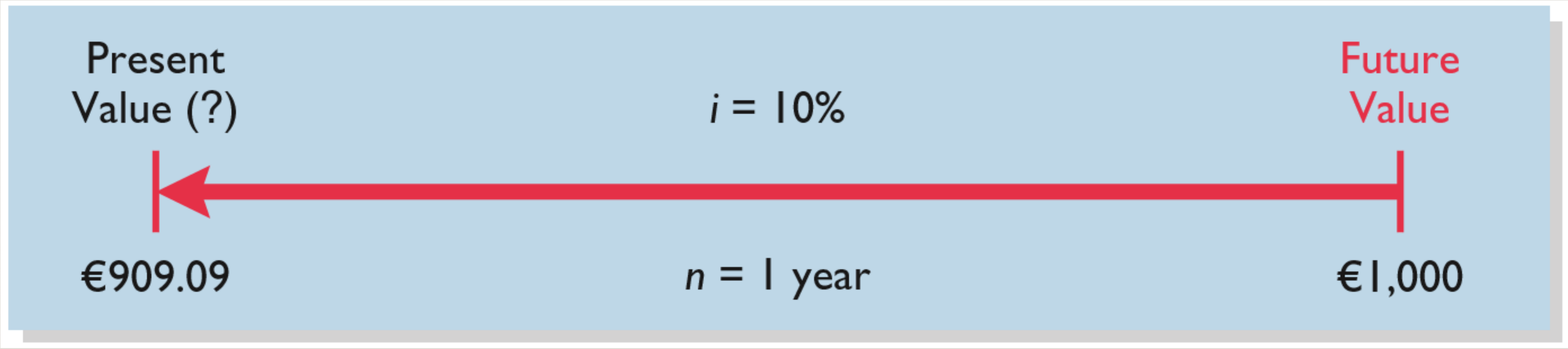
r= interest rate for one period

t= number of periods

Present Value of a Single Amount

Illustration: If you want a 10% rate of return, you would compute the present value of €1,000 for one year as follows:

$$
\begin{aligned}
PV &= \quad FV \quad \div (1 + i)^n \\
&= €1{,}000 \div (1 + .10)^1 \\
&= €1{,}000 \div 1.10 \\
&= €909.09
\end{aligned}
$$



Present Value of a Single Amount

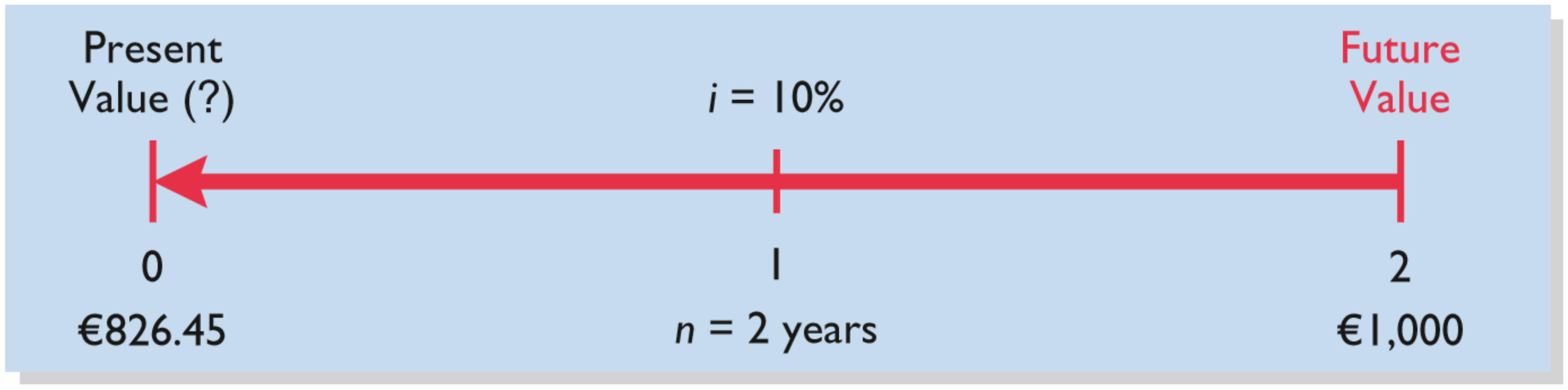


Illustration: If the single amount of €1,000 is to be received **in two years** and discounted at 10% [*PV* = €1,000 ÷ (1 + $.10^2$], its present value is €826.45 [($1,000 ÷ 1.21).

PRESENT VALUE OF A SINGLE AMOUNT - EXAMPLE

Example – ***Present Value***

You just bought a new computer for $3,000. The payment terms are 2 years same as cash. If you can earn 8% on your money, how much money should you set aside today in order to make the payment when due in two years?

$$PV = \frac{3000}{(1.08)^2} = \$2,572$$

Checking whether the result is right: calculate the future value of $ 2,572.

PRESENT VALUE OF MULTIPLE CASH FLOWS

- Present Values can be added together to evaluate multiple cash flows.

$$\boxed{PV = \frac{C_1}{(1+r)^1} + \frac{C_2}{(1+r)^2} + \ldots.}$$

$$\sum \frac{C_t}{(1+r)^t}$$

Perpetuities

Present Value of Perpetuity Formula

$$\boxed{PV = \frac{C}{r}}$$

C = cash payment/receipt

r = interest rate/discount rate

Perpetuity
A stream of level cash payments that never ends.

Interpretation of the formula

Perpetuities

<u>*Example - Perpetuity*</u>

In order to create an endowment, which pays \$100,000 per year forever, how much money must be set aside today if the rate of interest is 10%?

$$PV = \frac{100{,}000}{0.10} = \$1{,}000{,}000$$

Problems:

- How does PV of perpetuity change if the interest rate changes?

Present Value of an Annuity

Annuity: Level stream of cash flows at regular intervals with a finite maturity.

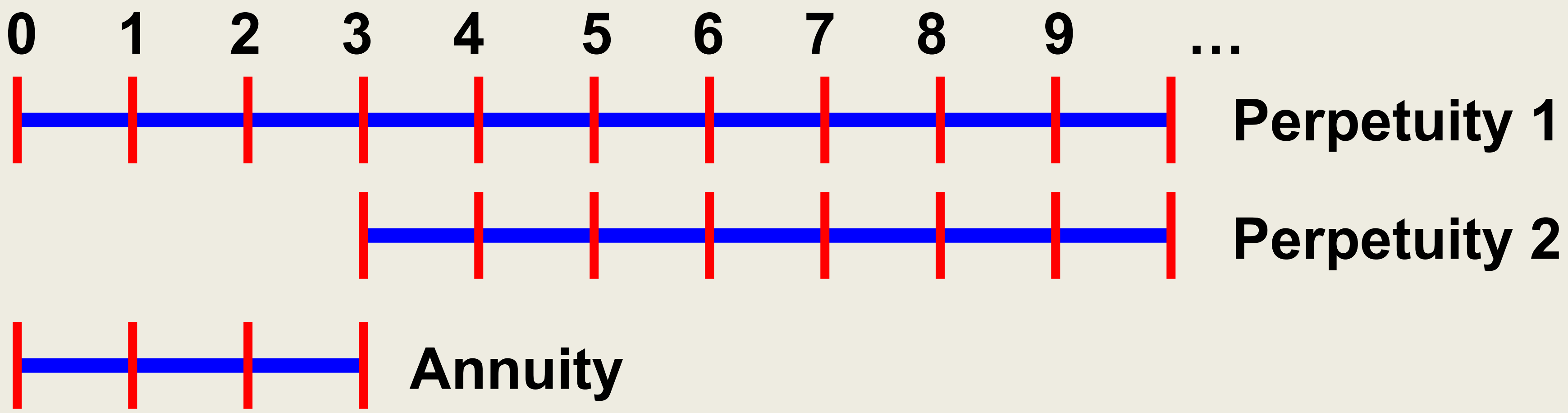
PV of an Annuity: The value now of a series of future receipts or payments, discounted assuming compound interest.

Necessary to know the:

1. Discount rate → r
2. Number of payments (receipts) → t
3. Amount of the periodic payments or receipts. → C

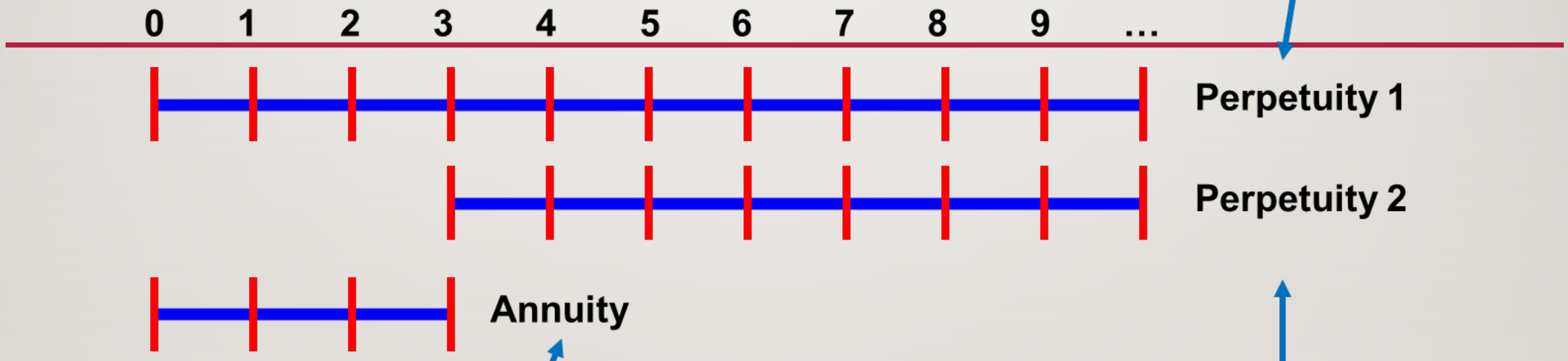
ANNUITY

- An annuity (for instance, receiving 1 dollar for 3 years) can be viewed as the difference between two perpetuities: one that starts immediately, and one that starts in 3 years



Value of a 3 years annuity

A regular perpetuity = 1/r



The difference between the two

$$\frac{1}{r} - \frac{1}{r \times (1+r)^3}$$

A regular perpetuity that starts in 3 years = a regular perpetuity received in year 3 needs to be discounted =

$$\frac{1}{r} \times \frac{1}{(1+r)^3} = \frac{1}{r \times (1+r)^3}$$

Present Value of an Annuity

Present Value of Annuity Formula

$$PV = C \times \left[\frac{1}{r} - \frac{1}{r(1+r)^t} \right]$$

C = periodic cash payment/receipt

r = discount rate (interest rate)

t = Number of periodic payments or receipts

Present Value of an Annuity

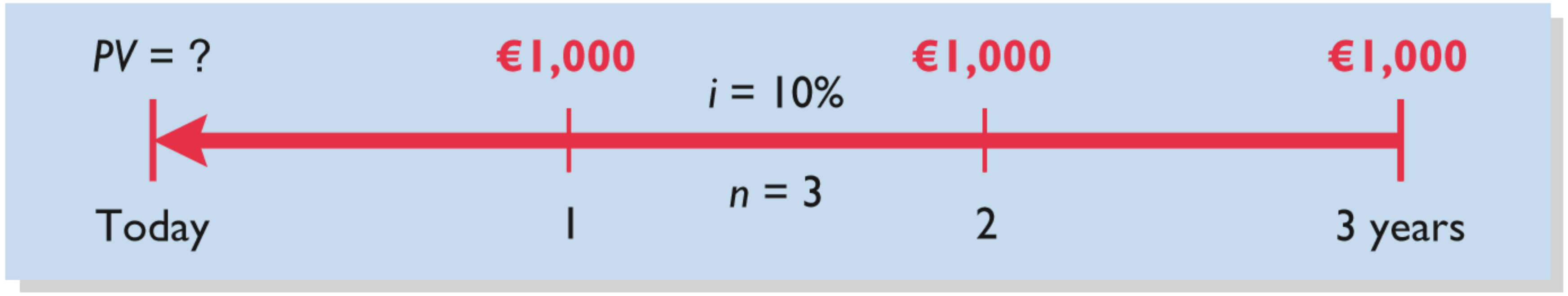


Illustration: Assume that you will receive €1,000 cash annually for three years at a time when the discount rate is 10%. Calculate the present value in this situation.

$$PV = 1000 \times \left[\frac{1}{0.1} - \frac{1}{0.1(1+0.1)^3} \right] = €2{,}486.85$$

FINANCING THE FIRM

Assets that are invested *(bought and kept for more than a year)*	**Own financing**
	Debt that needs to be repaid in the long term (>1 year)
Assets that are ‚current' *(bought and sold within a year)*	Debt that needs to be repaid in the short term (<1 year)
	Trade loans

OWN FINANCING

- Share capital *(paid-in by the owners in cash)*
- Reserve from the previous years' profit *(profit that was not paid out to the owners in the form of dividends in the past and is now at the disposal of the company)*
- Profit from this year *(profit that could still be paid out in dividends in the coming months)*

LONG TERM FINANCING FROM THE EXTERNAL SOURCES

- Investment loans *(mostly from banks and other financial institutions)*

  Project financing

  Long-term loans

- Leasing
- Selling bonds to the public *(like a loan, but from investors in general, not from a bank)*

SHORT-TERM FINANCING

- Loans from your bank on your bank account *(‚overdrafts')*
- Loans to finance your current production
- Loans that serve to finance the execution of a contract
- Loans that are backed by some valuable assets *(usually bonds or similar assets, the bank can take those assets in case the company doesn't repay its loan)*

TRADE LOANS

Financing that comes from the fact that the company receives a deadline to pay its invoices from its suppliers

3 ways to pay for an invoice:

- Pay on the due date *(usually pay the full price)*
- Pay after the due date *(usually pay more than the full price, because you have to pay interests)*
- Pay earlier than the due date *(usually pay less than the full price, because you can discuss with the supplier to have a discount)*

Advantages:

Automatically available // Flexible (varies with your activity level) // Stable conditions