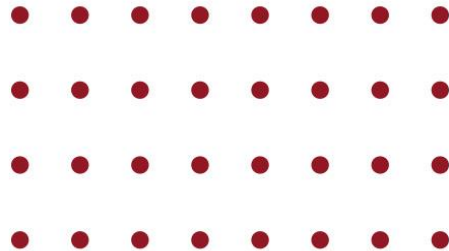Class 6

# UG3F14
# Corporate Finance

# Class 6 Topics and Content

- *Valuation: The Value of the Money in Time:*
*Time Value of Money TVM – Present Value, and Future Value of Cash Flows*

- ➢ TVM – Definition, Elements, and Formula
- ➢ The concept of TMV and PV, NPV, and Risk
- ➢ The importance of the TVM for Corporations – The Firm's Worth

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# Class 6

- ***Valuation: The Value of the Money in Time:*** a dollar today is worth more than a dollar tomorrow
  - The most important job of a financial manager is generating more cash flow to increase the business value
  - The business can increase more cash flows by buying assets that generate more cash than they cost or sell bonds and stocks and other financial instruments that raise more cash than they cost
  - ➢ Time Value of Money – TVM:
    - ✓ Time value of money **(TVM)** is a financial concept that states that money that is available at the present time is worth more than the same amount in the future, due to its potential earning capacity (can be invested and earn a return)
    - ✓ It is also referred as the Net Present Value **(NPV)** of the money

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# Class 6

- ***Valuation: The Value of the Money in Time:*** a dollar today is worth more than a dollar tomorrow
  - ➢ Time Value of Money – TVM:
    - ✓ Example 1:
    As a CFO, your business you invest €100,000 in a bank account that pays interest of *r=7%* a year. The value of the business investment will increase:
      - **Y1**= € 107,000 or 7%* €100,000
      By investing money in the bank, the business gave up the opportunity to spend € 100,000 today and earns the chance to spend € 107,000 next year

      - **Y2**= € 114,490 or 7%* €107,000
      If the investment committee of the firm, decided to invest your € 100,000 for t years, the investment will continue to grow at a 7% compound rate to:
      € 100,000* $(1.07)^t$

    For any interest rate r, the future value the business € 100,000 investment in the bank will be:
      Future Value of € 100,000 = € 100,000 * $(1+r)^t$

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# Class 6

- ***Valuation: The Value of the Money in Time:*** a dollar today is worth more than a dollar tomorrow
  - ➢ Time Value of Money – TVM:
    - ✓ Example Calculating Present Value:
      As a CFO, your business you want to know how much the business have to invest today in a bank account that pays interest of *r=7%* a year to receive € 114,490 at the end of the second year (the present value (PV) of the € 114,490 payoff?)

      - The Present value of a Future Payment or PV = Ct (1+r) ^ t
      - Present value or PV = € 114,490 / (11.072) ^ 2 = € *100,000 Today*

      - Discount Factor for the case studied (t=2 and r=7%): Measures the present value of 1€ received in Year t
      - DF2 = 1 / (1+i) or 1 / (1.07) ^ 2 = *0.8734*
      - Investors are willing to pay $.8734 today for delivery of $1 at the end of two years
      - Present value = DF2 * C2 = 0.8734 * € 114,900 = € 100,000

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# Class 6

- ***Valuation: The Value of the Money in Time:*** a dollar today is worth more than a dollar tomorrow
  - ➢ Time Value of Money – TVM:
    - ✓ Example 2: Company A Ltd wanted to know their net present value of cash flow if they invest $100,000 today, their initial investment in the project is $80,000 for the 3 years of time, and they are expecting the rate of return is 10 % yearly

      Calculate the NPV The Present value of a Future Payment or $PV = Ct (1+r)^t$
      - Present value or PV = € 114,490 / (11.072) ^ 2 = € *100,000 Today*
      - Discount Factor for the case studied (t=2 and r=7%): Measures the present value of 1€ received in Year t
      - DF2 = 1 / (1+i) or 1 / (1.07) ^ 2 = *0.8734*
      - Investors are willing to pay $.8734 today for delivery of $1 at the end of two years
      - Present value = DF2 * C2 = 0.8734 * € 114,900 = € 100,000

      The longer the business have to wait for the  money, the lower its present value

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# Class 6

- ***Valuation: The Value of the Money in Time:*** a dollar today is worth more than a dollar tomorrow
  - ➤ Time Value of Money – TVM:
    - ✓ Example 2 – Present Value of an investment opportunity:
    NapoPizza Ltd is contemplating construction of a warehouse. The total cost of buying the land and constructing the facility is € 370,000, and according to your real estate advisor, and due to warehouse space demand for that year, NapoPizza Ltd owners will be able to sell the fully built warehouse for € 420,000 in one year
      - The rate of interest on EU r* =5% per year
        - *discount rate or opportunity cost of capital
      - The present value of the warehouse is:
        PV = €420,000 / (1+0.05) ^ 1 = € *400,000 Today,* and also considered the market price
      - The business should go ahead with the project if the present value (PV) of the cash inflows is greater than the € 370,000

# Class 6

- *Valuation: The Value of the Money in Time:* a dollar today is worth more than a dollar tomorrow
  - ➤ Time Value of Money – TVM:
    - ✓ Example 2 – **Net** Present Value of an investment opportunity:
    - NapoPizza Ltd warehouse is worth € 400,000 today, but the business invested € 370,000
      - • The net present value of the warehouse is (NPV) is € 30,000
        - NPV = PV  - Investment  or € 400,000 - € 370,000 = € 30,000
      - • The warehouse development is worth more than it costs making a net contribution to the business value and increased the owner's wealth
      - • The formula for calculating the NPV of a project is:
        - NPV = C0 + C1 / (1 + r) ^ t
        - C0 = Cash Flow today (cash outflow - negative number or  - € 370,000)

# Class 6

- ***Valuation: The Value of the Money in Time:*** a dollar today is worth more than a dollar tomorrow
    - ➤ Time Value of Money – TVM:
        - ✓ Example – PV with Multiple Cash Flows:
            - • Suppose a business wants to value a stream of cash flows extending over a number of years
            - • To calculate, the business should add all the present values of all the cash flows o The DCF formula

                PV = C1 / (1 + r) ^ 1 + C2 / (1 + r) ^ 2 + C3 / (1 + r) ^ 3…+ Ct / (1 + r) ^ t

$$PV = \sum_{t=0}^{n} \frac{FV_t}{(1+i)^t}$$

            - • NPV add the initial investment – negative number

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# Class 6

- ***Valuation: The Value of the Money in Time:*** a safe dollar is worth more than a risky dollar
    - ➢ Time Value of Money and Risk:
        - ✓ There is a percentage of uncertainty regarding the profitability of a project
        - ✓ Those future cash flows represent the best forecast, but they are not certain, and if the CF are uncertain, the calculation of NPV is wrong
        - ✓ Not all investments are equally risky, and investors could achieve those cash flows with certainty by buying €400,000 worth of government securities, so they would not buy NapoPizza LTD warehouse for that amount
        - ✓ The warehouse development is more risky than a government security but less risky than a start-up fintech venture

        Example 3: Investors believe the warehouse project is as risky as investment in the stock market and that stocks offer a 12% expected return (12% is the opportunity cost of capital – they are giving up by investing in the warehouse and not investing in equally risky securities
        - • Recalculating NPV with r = 12%
              420,000 / (1.12PV = € ) ^ 1 = € 375,000
              NPV= - € 370,000 + € 375,000 = € *5,000*

        - • The warehouse still makes a net contribution to value of the shareholders, but the increase in the wealth is smaller than in our first calculation (€ *5,000 vs € 30,000)* which assumed that the cash flows from the project were risk-free

# Class 6

- ***Valuation: The Value of the Money in Time:*** a safe dollar is worth more than a risky dollar
  - ➢ Time Value of Money and the Importance for Corporations – The Firm's worth:

    - ✓ Calculating a firm is worth is to calculate the present value of its future cash flows
      Example: *The ABC Kitchen Company is contemplating investing €1 million in four new stores in Boston. Carol R, the firm's chief financial officer (CFO), has estimated that the investments will pay out cash flows of € 200,000 per year for nine years and zero thereafter - The cash flows will occur at the end of each year and there will be no cash flow after year 9 – Mrs. R has determined that the prudent and appropiate discount rate for this investment is 15% - this is the rate of return that the firm can earn at comparable projects. Should the ABC Kitchen Company make the investments in the new stores?*
    - • The value of the firm is the sum of the present values of the individual net cash flows minus the investment
      NPV= - € 1,000,000 + € 200,000 / (1.10) ^ 9 = - € 1,000,000 + € 954,317 = − € *45,683*

      *The investment would not add value to the firm's worth therefore should not be taken*

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## Class 6

The objective of a firm is to maximize the wealth of its shareholders

The wealth of the shareholders is measured through the market value of their shares

The Market value of a firm's share is the present value of its future earnings, discounted at the rate of return expected by its shareholders

In future lessons, we will be covering cases with multiple cash flows

Cash flows are discounted for two simple reasons: because (1) a dollar today is worth more than a dollar tomorrow and (2) a safe dollar is worth more than a risky one

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