International Management Studies

Lecture 7

April 16, 2025

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I. Macro-Industry-Company Level Analysis

1. Trade war continues
2. Shifts in the global supply chain (Look for the industries which will take benefits from this kind of trade war)
3. In the micro level, which company will benefit the most in the trade war.

II. Time Value of Money (especially estimating the Present Value)

- Calculating the present value of future cash flows is very important in estimating the intrinsic values of various assets such as bond, stock, projects, real estate, and others.
- Here is the basic formula to calculate the present value.

$$PV = \frac{FV}{(1+r^{n})}$$

- Where PV=present value, FV=future value, r= discount rate, n =number of period

Formula to calculate present value of the annuity

$$PV_{Annuity} = \left(\frac{Annuity}{r}\right)\left(1 - \frac{1}{(1+r)^{t}}\right)$$

- PV = Present Value
- Annuity = Annuity Payment Per Period ($)
- t = Number of Periods
- r = Yield to Maturity (YTM)

$$PV = P \times \frac{1-(1+r)^{-n}}{r}$$

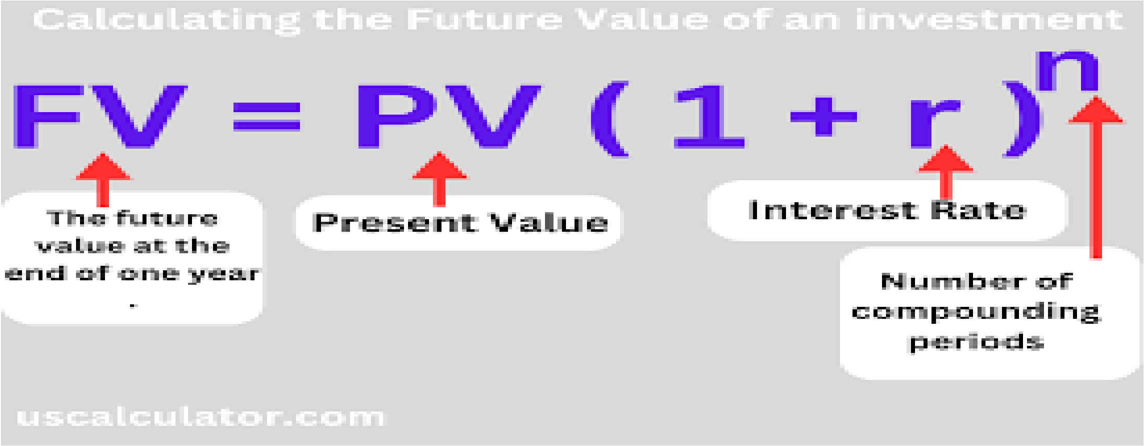
PV = present value of an ordinary annuity

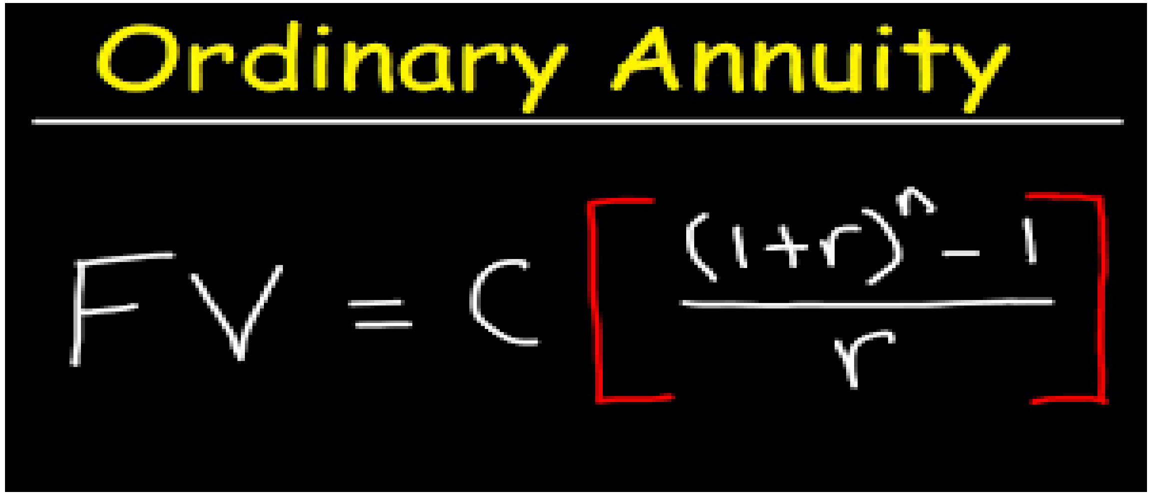
P = value of each payment

r = interest rate per period

n = number of periods

Calculating the future value





Calculate the present value of the following future cash flows

1. FV1 = $1,000, r = 10%
2. FV1 = $1,000, FV2 = $2,000, r = 10%
3. FV1 =$1,000, FV2 = $2,000, FV3 = $3,000, r = 10%
4. FV1 ~FV10 =$1,000 each year, r = 10%
5. FV1~FV30 = $1,000 each year, r = 10%
6. FV1~forever = $1,000 each year, r = 10%

1. FV1 = $1,000, r = 10%

This is a single cash flow received in 1 year.

Formula:

$$PV = \frac{FV}{(1+r)^t} = \frac{1{,}000}{(1+0.10)^1} = \frac{1{,}000}{1.10} \approx \$909.09$$

2. FV1 = $1,000, FV2 = $2,000, r = 10%

Two future cash flows.

Formula:

$$PV = \frac{1{,}000}{1.10} + \frac{2{,}000}{1.10^2} = 909.09 + 1{,}652.89 = \approx \$2{,}561.98$$

3. FV1 = $1,000, FV2 = $2,000, FV3 = $3,000, r = 10%

Formula:

$$PV = \frac{1{,}000}{1.10} + \frac{2{,}000}{1.10^2} + \frac{3{,}000}{1.10^3}$$

$$= 909.09 + 1{,}652.89 + 2{,}253.94 \approx \$4{,}815.92$$

4. FV1~FV10 = $1,000 each year, r = 10%

This is a 10-year **ordinary annuity**.

Formula:

$$PV = C \times \left(1 - \frac{1}{(1+r)^n}\right) \div r$$

$$= 1{,}000 \times \left(1 - \frac{1}{(1.10)^{10}}\right) \div 0.10 = 1{,}000 \times 6.1446 \approx \$6{,}144.57$$

5. FV1~FV30 = $1,000 each year, r = 10%

A 30-year annuity.

$$PV = 1{,}000 \times \left(1 - \frac{1}{(1.10)^{30}}\right) \div 0.10 = 1{,}000 \times 9.4269 \approx \$9{,}426.92$$

6. FV1~forever = $1,000 each year, r = 10%

This is a **perpetuity**.

Formula:

$$PV = \frac{C}{r} = \frac{1{,}000}{0.10} = \$10{,}000$$

III. Asset Valuation with " Time Value of Money"

1. Stock valuation

✅ [1] Simple Case: One-Period Dividend Discount Model (DDM)

Assumption:

- You will hold the stock for **one year**.
- You expect a **dividend (D1)** and a **price (P1)** after one year.
- Required return = **r**

🔹 Formula:

$$P_0 = \frac{D_1 + P_1}{1 + r}$$

🔹 Example:

- D1 = $2
- P1 = $100
- r = 10%

$$P_0 = \frac{2 + 100}{1.10} = \frac{102}{1.10} = 92.73$$

✅ [2] Multi-Period DDM (with finite horizon)

Assumption: You hold stock for **n years**, receive dividends D_1 to D_n, then sell the stock for $\mathbf{P_n}$.

- **Formula:**

$$P_0 = \sum_{t=1}^{n} \frac{D_t}{(1+r)^t} + \frac{P_n}{(1+r)^n}$$

- **Example (2 years):**

- D1 = $2, D2 = $2.5, P2 = $105
- r = 10%

$$P_0 = \frac{2}{1.10} + \frac{2.5}{1.10^2} + \frac{105}{1.10^2}$$

$$P_0 = 1.8182 + 2.0661 + 86.7769 \approx 90.66$$

✅ [3] Gordon Growth Model (Infinite Horizon DDM)

Assumption: Dividends grow at a **constant rate g**, forever.

- **r > g** must hold for this to work.

🔹 Formula:

$$P_0 = \frac{D_1}{r - g}$$

🔹 Example:

- D1 = $3
- g = 4%
- r = 10%

$$P_0 = \frac{3}{0.10 - 0.04} = \frac{3}{0.06} = 50$$

How to value the bond

✅ [1] Simple Case: Zero-Coupon Bond

Definition: A bond that pays **no interest** (coupon), only face value at maturity.

🔹 Formula:

$$PV = \frac{FV}{(1+r)^n}$$

- **FV**: face value (e.g., $1,000)
- **r**: required yield / market interest rate
- **n**: years to maturity

🔹 Example:

- FV = $1,000
- r = 5%
- n = 3 years

$$PV = \frac{1,000}{(1.05)^3} = \frac{1,000}{1.157625} \approx 863.84$$

✅ [2] Plain Vanilla Coupon Bond

Definition: A bond that pays **fixed annual coupons** and returns face value at maturity.

🔹 Formula:

$$PV = \sum_{t=1}^{n} \frac{C}{(1+r)^t} + \frac{FV}{(1+r)^n}$$

- **C**: annual coupon = FV × coupon rate
- **FV**: face value (usually $1,000)
- **r**: market rate
- **n**: years

🔹 Example:

- FV = $1,000
- Coupon rate = 6% → C = $60/year
- r = 5%
- n = 3 years

$$PV = \frac{60}{1.05} + \frac{60}{1.05^2} + \frac{60}{1.05^3} + \frac{1,000}{1.05^3}$$

$= 57.14 + 54.42 + 51.8$ [illegible] $863.84 = \approx 1,027.23$

How to value a project

✅ [1] Simple Case: Single Cash Flow in the Future

You invest today to get **one known payoff in the future**.

🔹 **Formula:**

$$\text{NPV} = \frac{CF_1}{(1+r)^1} - C_0$$

- CF_1: cash inflow in year 1
- C_0: initial investment (cash outflow at t=0)
- r: required rate of return (discount rate)

🔹 **Example:**

- Initial cost $C_0 = 800$
- Return in one year $CF_1 = 1,000$
- $r = 10\%$

$$NPV = \frac{1,000}{1.10} - 800 = 909.09 - 800 = +109.09$$

→ ✅ **Accept the project** (NPV > 0)

✅ [2] Multiple Cash Flows (Conventional Project)

You invest today and receive returns for several years.

- **Formula:**

$$NPV = \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t} - C_0$$

- **Example:**

- C_0 = 1,000
- CF_1 = 300, CF_2 = 400, CF_3 = 500
- r = 10%

$$NPV = \frac{300}{1.10} + \frac{400}{(1.10)^2} + \frac{500}{(1.10)^3} - 1,000$$

$$= 272.73 + 330.58 + 375.66 - 1,000 = -21.03$$

→ ❌ **Reject** the project (NPV < 0)

✅ [3] Include Terminal Value or Salvage Value

Final cash inflow includes **asset resale value or terminal cash flows**.

🔹 **Formula:**

$$NPV = \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t} + \frac{TV}{(1+r)^n} - C_0$$

🔹 **Example:**

Same as above, but project ends with $200 resale value in Year 3.

$$NPV = 272.73 + 330.58 + \frac{(500+200)}{(1.10)^3} - 1,000 = 272.73 + 330.58 + 476.52 - 1,000 = +79.83$$

→ ✅ Accept the project.

How to value a real estate

✅ [1] Simple Case: Single Future Sale Value

You buy a property today and plan to sell it in the future. No rental income.

🔹 Formula:

$$\mathrm{PV} = \frac{\text{Expected Sale Price}}{(1+r)^n}$$

- **r** = required return or discount rate
- **n** = number of years until sale

🔹 Example:

- Buy now (what's it worth today?)
- Sell in 5 years for $500,000
- Required return = 8%

$$PV = \frac{500,000}{(1.08)^5} = \frac{500,000}{1.4693} \approx 340,136$$

→ The max you'd pay today is **$340,136**.

✅ [2] Rental Income Property (Fixed Income)

Now assume you earn **annual rental income (R)**, and sell at the end.

$$PV = \sum_{t=1}^{n} \frac{R}{(1+r)^t} + \frac{P_n}{(1+r)^n}$$

- R: net rental income per year
- P_n: sale price in year n

🔹 Example:

- Net rent: $30,000 per year
- Hold for 5 years, sell at $400,000
- r = 10%

$$PV = \sum_{t=1}^{5} \frac{30,000}{(1.10)^t} + \frac{400,000}{(1.10)^5} = 113,719 + 248,686 \approx 362,405$$

→ Property is worth **$362,405** today.

✅ [3] Real Estate as a Perpetual Income Stream (Capitalization Method)

If a property generates **constant net income forever**, use the **perpetuity formula**:

$$PV = \frac{\text{Net Operating Income (NOI)}}{r}$$

- NOI = gross rent − expenses
- r = cap rate (or required rate of return)

🔹 Example:

- NOI = $50,000/year
- r = 5%

$$PV = \frac{50,000}{0.05} = 1,000,000$$

→ You'd pay **$1 million** for a 5% return.

✅ [4] Growing Rental Income (Gordon Growth Model)

Rent increases at a **constant growth rate g** each year.

$$PV = \frac{NOI_1}{r - g}$$

- NOI_1 = net income next year
- $g < r$

🔹 Example:

- NOI_1 = $52,000
- g = 2%
- r = 6%

$$PV = \frac{52,000}{0.06 - 0.02} = \frac{52,000}{0.04} = 1,300,000$$

→ Higher valuation due to growth.

IV. Mid-term Exam

1. Global economy (analyze the economic effects of the recent happenings such as trade war and AI developments)
2. Analyze the prospect of an industry
3. What are the merits of top-down approach in the fundamental approach ?
4. Analyze the prospect of a company or stock
5. Time value of money
6. Cases of evaluating assets with "time value of money"