

ALLAMA IQBAL OPEN UNIVERSITY, ISLAMABAD

(Department of Commerce & Business Administration)

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Question 1: a. Define coupon rate and current yield, and explain how and why they differ in bond valuation. (10)
b. How does valuation of pure discount bonds differ from valuation of perpetual bonds? (10)

Answer:

a. Coupon Rate vs Current Yield

- **Coupon Rate:** The fixed annual interest rate stated on the bond contract, expressed as a percentage of face value (Par Value). Coupon Payment = Coupon Rate x Par Value.

- **Current Yield:** The annual coupon return expressed as a percentage of the bond's current market price. Current Yield = Annual Coupon Payment / Current Market Price.

Why They Differ in Bond Valuation:

Coupon rate remains constant throughout the bond's life. Current yield fluctuates dynamically with market price changes caused by prevailing market interest rates:

- **Trading at Par (Market Price = Par Value):** Current Yield equals Coupon Rate.
- **Trading at Discount (Market Price < Par Value):** Current Yield is HIGHER than Coupon Rate.
- **Trading at Premium (Market Price > Par Value):** Current Yield is LOWER than Coupon Rate.

b. Pure Discount Bonds vs Perpetual Bonds Valuation

- **Pure Discount Bonds (Zero-Coupon Bonds):** Pay no periodic coupon payments during maturity. Issued at a discount and redeemed at par. Value = Par Value / $(1 + r)^n$. Price depends heavily on time to maturity (n) and required yield (r).

- **Perpetual Bonds (Consols):** Provide periodic coupon payments indefinitely with no maturity date (n = infinity). Value = Annual Coupon Payment / r. Valuation is independent of maturity and depends solely on the required rate of return.

Question 2: Calculate the future value of annuity for each case in the accompanying table assuming that it is: a. An ordinary annuity, b. An annuity due. (20)

Cases: U (5,000, 7%, 6 yrs), V (2,500, 8%, 4 yrs), W (15,000, 11%, 5 yrs), X (10,000, 6%, 8 yrs), Y (8,000, 4%, 12 yrs), Z (12,000, 9%, 7 yrs)

Answer:

Formulas for Future Value of Annuity:

- Ordinary Annuity (FVOA): Payments occur at the END of each period.

$$FVOA = PMT * [(1 + r)^n - 1] / r$$

- Annuity Due (FVAD): Payments occur at the BEGINNING of each period.

$$FVAD = FVOA * (1 + r)$$

Case	PMT (Rs)	Rate (r)	Years (n)	FVOA (Ordinary)	FVAD (Annuity Due)
U	5,000	7%	6	Rs 35,766.45	Rs 38,270.11

V	2,500	8%	4	Rs 11,265.28	Rs 12,166.50
W	15,000	11%	5	Rs 93,417.02	Rs 103,692.89
X	10,000	6%	8	Rs 98,974.68	Rs 104,913.16
Y	8,000	4%	12	Rs 120,206.44	Rs 125,014.70
Z	12,000	9%	7	Rs 110,405.22	Rs 120,341.69

Detailed Calculation Notes:

- Case U: $FVOA = 5,000 * [(1.07)^6 - 1] / 0.07 = 5,000 * 7.153291 = \text{Rs } 35,766.45$. $FVAD = 35,766.45 * 1.07 = \text{Rs } 38,270.11$.
- Case W: $FVOA = 15,000 * [(1.11)^5 - 1] / 0.11 = 15,000 * 6.227801 = \text{Rs } 93,417.02$. $FVAD = 93,417.02 * 1.11 = \text{Rs } 103,692.89$.

Annuity Due is always higher than Ordinary Annuity by a factor of $(1 + r)$ because each payment earns one additional period of interest compounding.

- Question 3:** a. What is meant by a tax shield, and why do bonds provide a tax shield while preference shares do not? Explain your answer. (10)
- b. Explain the difference between the real cost of finance and the nominal cost of finance, and give an example of each. (10)

Answer:

a. Tax Shield Concept: Bonds vs Preference Shares

A Tax Shield refers to the reduction in corporate income tax liability resulting from tax-deductible financial expenses. Tax Shield Savings = Tax Deductible Expense x Corporate Tax Rate.

- **Bonds Provide a Tax Shield:** Interest paid to bondholders is treated as a financial operating expense deducted BEFORE taxable income ($EBIT - \text{Interest} = EBT$). This lowers taxable profit and saves taxes.
- **Preference Shares Do NOT Provide a Tax Shield:** Preference dividends are distributed from Net Income AFTER taxes (EAT). Dividends are profit distributions to equity owners, not deductible business expenses. Thus, preference capital receives no tax relief.

b. Real Cost vs Nominal Cost of Finance

- **Nominal Cost of Finance:** The stated contractual interest rate required by lenders without adjusting for inflation. Example: A commercial bank loan charging 12% per annum.
- **Real Cost of Finance:** The effective interest rate adjusted for inflation using Fisher's formula: $(1 + \text{Real Cost}) = (1 + \text{Nominal Rate}) / (1 + \text{Inflation Rate})$. Example: If nominal borrowing cost is 12% and annual inflation is 7%, Real Cost approx $12\% - 7\% = 5\%$.

- Question 4:** What are the different methods for valuing ordinary shares, and which type of investor is likely to prefer each method? Explain your answer clearly. (20)

Answer:

Methods for Valuing Ordinary Shares & Investor Preferences

- **1. Dividend Discount Model (DDM) / Gordon Growth Model:** Values a share based on the present value of expected future cash dividends: $P_0 = D_1 / (r - g)$. Preferred by Income-Seeking / Value Investors looking for steady cash dividend returns from stable, mature dividend-paying blue-chip firms.
- **2. Price-to-Earnings (P/E) Multiple Method:** Values a stock by multiplying Earnings Per Share (EPS) by an industry baseline P/E ratio: $P_0 = \text{EPS} \times \text{P/E}$. Preferred by Growth Investors & Retail Traders evaluating young or high-growth tech companies that reinvest earnings rather than paying dividends.
- **3. Free Cash Flow to Equity (FCFE) Model:** Values equity based on cash left after operating expenses, capital expenditures, and debt payments: PV of FCFE. Preferred by Institutional Investors, Financial Analysts, & Private Equity Firms

analyzing cash generation independent of dividend policies.

- 4. Book Value / Asset-Based Valuation: Values a share based on net accounting equity per share: (Total Assets - Total Liabilities) / Shares. Preferred by Value / Distress Investors assessing liquidation margin of safety and undervalued balance sheets.

Question 5: Haidar Textile Mills Ltd. is considering three projects (Cost of Finance = 9%):

Project X (Cost 120M), Project Y (Cost 1000M), Project Z (Cost 850M).

Calculate: a. Payback Period (PBP), b. Net Present Value (NPV), c. Profitability Index (PI), d. Final Recommendation. (20)

Answer:

Capital Budgeting Analysis Summary Table (r = 9%)

Metric / Indicator	Project X	Project Y	Project Z
Initial Capital Cost	Rs 120 Million	Rs 1,000 Million	Rs 850 Million
Payback Period (PBP)	1.07 Years	2.61 Years	4.29 Years
PV of Cash Inflows	Rs 977.01 Million	Rs 2,523.12 Million	Rs 1,855.21 Million
Net Present Value (NPV)	Rs 857.01 Million	Rs 1,523.12 Million	Rs 1,005.21 Million
Profitability Index (PI)	8.14	2.52	2.18

Detailed Calculation Breakdown

- Project X (Cost 120M): PBP: Year 1 inflow = 110M. Unrecovered = 10M. $PBP = 1 + (10/140) = 1.07$ years. Sum of PV inflows = 977.01M. $NPV = 977.01 - 120 = \text{Rs } 857.01 \text{ Million}$. $PI = 977.01 / 120 = 8.14$.

- Project Y (Cost 1000M): PBP: Cum $Y_1 + Y_2 = 780\text{M}$. Unrecovered = 220M. $PBP = 2 + (220/360) = 2.61$ years. Sum of PV inflows = 2,523.12M. $NPV = 2,523.12 - 1000 = \text{Rs } 1,523.12 \text{ Million}$. $PI = 2,523.12 / 1000 = 2.52$.

- Project Z (Cost 850M): PBP: Cum $Y_1..Y_4 = 760\text{M}$. Unrecovered = 90M. $PBP = 4 + (90/310) = 4.29$ years. Sum of PV inflows = 1,855.21M. $NPV = 1,855.21 - 850 = \text{Rs } 1,005.21 \text{ Million}$. $PI = 1,855.21 / 850 = 2.18$.

d. Strategic Selection Recommendation

- Primary Recommendation (Unconstrained Capital & Mutually Exclusive): Select Project Y. It delivers the maximum absolute Net Present Value (Rs 1,523.12 Million), generating the highest total incremental wealth for shareholders.

- Capital Efficiency / Rationing Perspective: If capital is constrained, Project X is extraordinarily efficient, yielding a Profitability Index of 8.14 (Rs 8.14 of PV per Rupee spent) and recovering capital in just 1.07 years.

- Combination Portfolio (Budget Limit Rs 1,000 Million): Combining Project X (Cost 120M) + Project Z (Cost 850M) requires Rs 970 Million capital and yields a combined NPV of Rs 1,862.22 Million ($857.01 + 1005.21$), which outperforms Project Y alone (NPV 1,523.12M).