



**RBI GRADE B
2018**

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Bond Valuations

1. **Coupon payments** = Coupon rate x Maturity Value

$$P = C \left[\frac{1 - \frac{1}{(1+i)^n}}{i} \right] + \frac{M}{(1+i)^n}$$

2. **Zero Coupon bond, P** = $\frac{M}{(1+i)^n}$

3. **Yield to maturity, YTM, i, IRR** = $\frac{C + \frac{f-p}{n}}{\frac{f+p}{2}}$

Where IRR = Internal Rate of Return

C= Coupon payments

f = Face value/Maturity Value of the bond

P = Price of the bond

n = Number of years to Maturity or Number of Payments

i = Interest rate or Required Yield

M= Value at maturity or Par Value

4. **Yield to call, YTC** =
$$\frac{\text{Coupon Interest Payment} + \frac{\text{Call Price} - \text{Market Value}}{\text{Number of years Until Call}}}{\frac{\text{Call Price} + \text{Market Value}}{2}}$$

5. **Holding period return, HPR** =
$$\frac{\text{Interest Income} + (\text{End of period value} - \text{Initial value})}{\text{Initial Value}}$$

6. **Annualised HPR** = $(\text{HPR})^{\frac{1}{\text{Years}}} - 1$

- When the interest rates falls bond price rise & Vice-versa
- When interest rate increases, yield increases & Vice-versa

7. **Bond price** $\propto \frac{1}{\text{Interest rate}}$

Prices of high coupon bonds are less sensitive to changes in interest rates than prices of low coupon bonds.

8. **Macaulay's duration** = $\sum_{t=1}^n \frac{(\text{PV})(\text{CF}_t) \times t}{\text{Market price of the bond}}$

Where,

$\text{PV} \times \text{CF}_t$ = Present value of the coupon at time t

Market price of the bond is also represented as B_0

9. **Number of bonds bought** = $\frac{\text{Cash}}{\text{Nominal Value} \times \text{Dirty price}}$

Dirty price is the price of a bond including the interest accrued

Ratios

Liquidity Ratios

10. **Current ratio** = $\frac{\text{Current Assets}}{\text{Current Liabilities}}$

Current Assets, CA → Current Investments, Inventories, Trade receivables

(debtors and bills receivables), Cash & Cash equivalents, Short term loans &

Other advances, Prepaid expenses, Advance tax & Accrued income.

Current liabilities, CL → Short term borrowing, Trade payables (Creditors & bills payables), Other current liabilities & Short term provisions.

11. **Quick ratio/Acid test ratio** = $\frac{\text{Quick Assets}}{\text{Current Liabilities}}$ (or) $\frac{\text{Cash} + \text{MS} + \text{AR}}{\text{CL}}$, where MS =

marketable securities and AR = Accounts Receivables

Quick Assets = CA – Inventories/Prepaid expenses, advance tax etc.

Solvency Ratios

12. **Debt equity ratio : Standard is 2:1**

$$\text{D/E ratio} = \frac{\text{Long term debt}}{\text{Shareholders funds}}$$

Shareholders funds (Equity) = Share capital + Reserves & Surplus + Money received against + Share warrants.

Share capital = Equity share capital + Preference share capital

Equity is also = Non-Current assets + WC - Noncurrent CL, WC = Working

Capital

Capital employed = Share capital + Reserves & Surplus + Long term debts

Debt = Long term borrowings + Other long term liabilities + Long term provisions

13. **Debt to capital employed ratio** =
$$\frac{\text{Long term debt}}{\text{Capital employed (or) Net assets}}$$

Or

$$\frac{\text{Long term debt}}{\text{Shareholders fund + Long term debt}}$$

Or

$$\frac{\text{Long term debt}}{\text{Net assets}}$$

Net assets = Total assets - Current liabilities

Capital employed = Shareholders fund + Long term borrowings

14. **Proprietary Ratio** =
$$\frac{\text{Shareholders funds}}{\text{Capital employed (or) Net assets}}$$

15. **Total assets to debt ratio** =
$$\frac{\text{Total Assets}}{\text{Long term debts}}$$

16. **Interest coverage ratio** =
$$\frac{\text{Net profit before interest \& taxes}}{\text{Interest on long term debts}}$$

17. **Times interest earned ratio** =
$$\frac{\text{EBIT}}{\text{Interest expenses}} \text{ (or) } \frac{\text{Net income}}{\text{Interest}},$$

EBIT - earnings before interest and taxes

$$18. \text{ **Capital gearing ratio** } = \frac{\text{Common stockholders equity}}{\text{Fixed cost bearing funds}}$$

Fixed cost bearing funds = Debentures + Preferential share capital + Other long term loans

Activity or turnover ratios

$$19. \text{ **Inventory turnover ratio** } = \frac{\text{Cost of revenue from operations}}{\text{Average inventory}}$$

Cost of revenues from operations = Inventory in the beginning + Net purchases + Wages + Carriage inwards – Inventory at the end.

$$\text{Average inventory} = \frac{\text{Opening} + \text{Closing Inventory}}{2}$$

Or Cost of revenue from operations = Revenue from operations – Gross profit

$$20. \text{ **Trade receivables turnover ratio** } = \frac{\text{Net credit revenue from operations}}{\text{Average trade receivables}}$$

$$21. \text{ **Trade payables turnover ratio** } = \frac{\text{Net credit purchase}}{\text{Average trade payables}}$$

Average trade payables = (Creditors + Bills Payables) At the beginning + (Creditors + Bills Payables) At the end

$$22. \text{ **Net assets (or) Capital employed turnover ratio** } = \frac{\text{Revenue from operations}}{\text{Capital employed}}$$

$$23. \text{ **Fixed assets turnover ratio** } = \frac{\text{Net revenue from operations}}{\text{Net fixed assets}}$$

$$24. \text{ **Working capital turnover ratio** } = \frac{\text{Net revenue from operations}}{\text{Working capital}}$$

Profitability Ratios

25. **Gross profit ratio/margin** = $\frac{\text{Gross profit}}{\text{Net revenue from operations / Sales}}$

$$\text{Gross profit} = \text{Sales} - \text{Cost of goods sold}$$

Or

$$\text{Gross profit} = \text{Revenue from operations} - \text{Net Revenue from operations}$$

$$\text{Net purchases} = \text{Cash purchases} + \text{Credit purchases} - \text{Return outwards}$$

$$\text{Cost of revenue from operations} = \text{Purchases} + [\text{Opening} - \text{Closing Inventory}] +$$

$$\text{Direct expenses}$$

26. **Operating ratio**

$$\frac{\text{Operating expenses}}{\text{Net sales}} = \frac{\text{Cost of revenue from operations} + \text{Operating expenses}}{\text{Net revenue from operations}}$$

27. **Operating profit rate** = $\frac{\text{Operating profit}}{\text{Revenue from operations}} \times 100$

28. **Net profit ratio or (PAT) or Profit after tax** = $\frac{\text{Net profit}}{\text{Revenue from operations}} \times 100$

29. **Return on capital employed/Investment** = $\frac{\text{PBIT}}{\text{Capital employed}} \times 100$

$$\text{Capital employed} = \text{Total net worth} + \text{OTL}$$

Or

$$\text{Capital employed} = \text{Fixed assets} + \text{Current assets} - \text{Current liabilities}$$

$$30. \text{ Return on shareholders fund/Equity} = \frac{\text{PAT}}{\text{Shareholders fund}} \times 100$$

$$31. \text{ EPS} = \frac{\text{Profit available to equity shareholders}}{\text{Number of equity shares}}$$

Profit available to equity shareholders = PAT - Preferential dividend on preferential shares

$$32. \text{ Book value per shares} = \frac{\text{Equity shareholders funds}}{\text{Number of equity shares}}$$

$$33. \text{ Dividend pay-out ratio} = \frac{\text{Dividends per share}}{\text{Earnings per share}}$$

$$34. \text{ Price earnings (P/E) ratio} = \frac{\text{Market price of the share}}{\text{Earnings per share}}$$

Break even analysis or Cost volume profit analysis

$$35. \text{ BEP} = \frac{\text{Total fixed cost}}{\text{Selling price per unit} - \text{Variable price per unit}}$$

Or

$$\frac{\text{TFC}}{\text{P} - \text{V}}$$

BEP in sales value = BEP x SP/Unit

$$36. \text{ Number of units to be sold to break even} = \frac{\text{Total fixed cost}}{\text{Unit contribution margin}}$$

$$37. \text{ BEP} = \frac{\text{Fixed cost} \times \text{Sales}}{\text{Sales} - \text{Variable cost}}$$

$$38. \text{ Margin of Safety (MoS)} = \text{Current O/P} - \text{Break even O/P}$$

$$39. \text{ MoS \%} = \frac{\text{MoS}}{\text{Current output}} \times 100$$

Or

$$= \frac{\text{Profit}}{\text{P / V ratio}}$$

Breakeven is only possible when firm's prices are higher than its variable costs per unit

$$\text{Contribution margin} = \text{SP/Unit} - \text{VC/Unit}$$

$$40. \text{ Profit - Volume ratio} = \frac{\text{Contribution}}{\text{Sales}}$$

Or

$$= \frac{\text{Fixed expenses} + \text{Profit}}{\text{Sales}}$$

Or

$$= \frac{\text{Sales} - \text{Variable cost}}{\text{Cost}}$$

$$\text{Contribution} = \text{Fixed cost} \pm \text{Profit/Loss}$$

$$41. \text{ Break even sales} = \frac{\text{Fixed costs}}{\text{P / V Ratio}}$$

$$42. \text{ Desired sales} = \frac{\text{Fixed cost} + \text{Desired cost}}{\text{P / V Ratio}}$$

$$43. \text{ MoS} = \text{Actual sales in units} - \text{BEP volume in units}$$

$$44. \text{ MoS \%} = \frac{\text{MoS}}{\text{Actual sales in units}}$$

$$45. \text{ Degree of Operating Leverage (DOL) } = \frac{\text{Contribution margin}}{\text{Profit before tax}}$$

$$46. \text{ Operating profit margin } = \frac{\text{EBIT}}{\text{Sales}}$$

$$47. \text{ Return on Assets, ROA } = \frac{\text{EBIT}}{\text{Total assets}}$$

$$48. \text{ Return on Equity, ROE } = \frac{\text{Net profit}}{\text{Equity}}$$

$$49. \text{ Debt Service coverage ratio, DSCR } = \frac{\text{Operating Income}}{\text{Total Debt Service Costs}}$$

Or

$$\text{DSCR} = \frac{\text{PAT} + \text{Annual Interest} + \text{Lease Rental} + \text{Non-cash expenses}}{\text{Installment (Annual Interest + Principal Repayment) + Lease Rental}}$$

Non-cash expenses → Writing off preliminary expenses, Pre-operating expenses,

Depreciation, Amortization, Provision for doubtful debts, Deferment of expenses

like advertising, Promotions

$$50. \text{ Du point analysis to assess ROE } =$$

$$\frac{\text{Net income}}{\text{Total equity}} = \frac{\text{Net income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Average total assets}} \times \frac{\text{Average total assets}}{\text{Equity}}$$

$$51. \text{ Altaman Z score } = 1.2A + 1.4B + 3.3C + 0.6D + 1E$$

$$A = \frac{\text{WC}}{\text{TA}}$$

$$B = \frac{\text{RE}}{\text{TA}}$$

$$C = \frac{EBIT}{TA}$$

$$D = \frac{\text{Marketing value of equity}}{\text{Book debt}}$$

$$E = \frac{\text{Sales}}{TA}$$

Where, WC = Working Capital, TA = Total Assets, RE = Retained earnings.

Book debt is also called as total liabilities.

Score below 1.8 means the company is headed for bankruptcy.

$$52. \text{ ROE} = \frac{\text{Net profit}}{\text{Sales}} \times \frac{\text{Sales}}{TA} \times \frac{1}{(1 - \text{Debt asset ratio})}$$

$$53. \text{ Dividend yield} = \frac{\text{Dividend / share}}{\text{Market Price}} \times 100$$

$$54. \text{ Capital equity ratio} = \text{Capital Equity Ratio} = \frac{\text{Capital Equity (or) Net Assets}}{\text{Net Worth}}$$

$$55. \text{ Book Value} = \frac{\text{Equity + Reserves}}{\text{Equity}} \times 100$$

$$56. \text{ Debtors velocity or Debt collection period} = \frac{\text{Average book debts}}{\text{Sales}} \times 12$$

$$57. \text{ Creditors velocity or creditors payment period} = \frac{\text{Average Creditors}}{\text{Purchases}} \times 12$$

$$58. \text{ Proprietary ratio} = \frac{\text{TNW}}{\text{Tangible Assets}}$$

Or

$$= \frac{\text{Proprietor's fund}}{\text{Total Assets}}$$

Proprietor's fund = Equity share capital + Preference Share capital + Revenue and Surplus.

59. **Value of no par Share** = $\frac{\text{The real net worth}}{\text{Total no of shares}}$

When the shares are having no face value it is said to be no par.

60. **Modigliani and Miller Approach**

$$\text{Value of the firm} = \frac{\text{EBIT}}{k_0} (1 - t),$$

Where, k_0 = Overall cost of capital, t = Tax Rate, EBIT = Earnings before Interest and taxes

61. **Debt issued at par** = $K_d = (1 - t) R$

Where, K_d = Cost of debt capital, t = Tax rate and R = Debenture interest rate

This means debt is issued at the face value of the debt.

62. **Debt Issued at Premium or Discount**

$$K_d = \frac{I}{N_p} (1 - t)$$

Where, K_d = Cost of debt capital, I = Annual interest payable, N_p = Net proceeds of debenture and t = Tax rate

63. **Financial Leverage** = $\frac{\text{Operating Profit / EBIT}}{\text{PBT}}$

PBT = Profit before Tax

64. **Degree of financial leverage** = $\frac{\text{Percentage change in taxable Income}}{\text{Percentage change in EBIT}}$

65. **Combined Leverage** = $OL \times FL = \frac{C}{PBT}$

$OL = \text{Operating Leverage} = \frac{C}{OP}$, $FL = \text{Financial Leverage} = \frac{OP}{PBT}$

Where C = contribution, OP = EBIT = Operating profit, PBT = Profit before tax

66. **Working Capital Leverage** = $\frac{\text{Percentage change in ROI}}{\text{Percentage change in WC}}$

Or = $\frac{CA}{TA \pm DCA}$

Where, CA = Current Assets, TA = Total Assets and DCA = Changes in the level of Current Assets

67. **Payback Period** = $\frac{\text{Initial Investment}}{\text{Annual Cash inflows}}$

68. **Economic Order quantity** = $EOQ = \sqrt{\frac{2ab}{c}}$

Where, a = annual usage of inventories/annual consumption, b = buying cost/ordering cost per order, c = carrying cost per unit

EOQ is that inventory level that minimizes the total of ordering of carrying cost.

69. **Capital Asset Pricing Model** = $\bar{R} = R_f + \beta \times (\bar{R}_m - R_f)$

Where \bar{R} = Expected return on a security, R_f = risk-free rate, $(\bar{R}_m - R_f)$ Expected

Difference between return on market and risk free rate, β = Beta of the security.

70. **Gap Analysis** = $\Delta \text{Profit} = \text{Gap} \times \Delta i$

It measures the sensitivity of bank's profits to changes in market interest rates.

i = Interest rates difference.

Gap = amount of rate sensitive assets – rate sensitive liabilities.

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