

CHAPTER 6

FUNDAMENTAL VALUATION CONCEPTS

6.1 Time Value of Money

Money has time value. A rupee is less valuable in the future than it is today. Time value of money could be studied under the following heads:

- Future value of a single cash flow
- Future value of an annuity
- Present value of a single cash flow
- Present value of an annuity

6.1.1 Future Value of a Single Cash Flow

For a given present value (PV) of money, future value of money (FV) after a period 't' for which compounding is done at an interest rate of 'r', is given by the equation

$$FV = PV (1+r)^t$$

This assumes that compounding is done at discrete intervals. However, in case of continuous compounding, the future value is determined using the formula

$$FV = PV * e^{rt}$$

where the compounding factor is calculated by taking natural logarithm (log to base).
e=2.71828

Example 1: Calculate the value 5 years hence of a deposit of ₹ 1,000 made today if the interest rate is 10%.

Solution: By discrete compounding

$$FV = 1,000 * (1+0.10)^5 = 1,000 * (1.1)^5 = 1,000 * 1.61051 = ₹ 1,610.51$$

By continuous compounding:

$$FV = 1,000 * e^{(0.10 * 5)} = 1,000 * 1.648721 = ₹ 1,648.72$$

Example 2: Find the value of ₹ 50,000 deposited for a period of 3 years at the end of the period when the interest is 10% and continuous compounding is done.

Solution: Future Value = $50,000 * e^{(0.01*10*3)} = ₹ 67,493.00$

The future value (FV) of the present sum (PV) after a period 't' for which compounding is done 'm' times a year at an interest rate of 'r', is given by the equation

$$FV = PV (1+(r/m))^{mt}$$

Example 3: How much does a deposit of ₹ 5,000 grow to at the end of 3 years, if the nominal rate of interest is 10% and compounding is done quarterly?

Solution: Future value = $5,000 * ((1 + 0.10/4)^{(4*3)}) = ₹ 6,724.45$

6.1.2 Future Value of an Annuity

The future value (FV) of a uniform cash flow (CF) made at the end of each period till the time of maturity 't' for which compounding is done at the rate 'r' is given by

$$\begin{aligned} FV &= CF*(1+r)^{t-1} + CF*(1+r)^{t-2} + \dots + CF*(1+r)^1 + CF \\ &= CF \left[\frac{(1+r)^t - 1}{r} \right] \end{aligned}$$

Example 4: Suppose, you deposit ₹ 1,000 annually in a bank for 5 years and your deposits earn a compound interest rate of 10 per cent, what will be value of this series of deposits (an annuity) at the end of 5 years? Assume that each deposit occurs at the end of the year.

Solution: Future value of this annuity is:

$$\begin{aligned} &= ₹ 1000*(1.10)^4 + ₹ 1000*(1.10)^3 + ₹ 1000*(1.10)^2 + ₹ 1000*(1.10) + ₹ 1000 \\ &= ₹ 1000*(1.4641) + ₹ 1000*(1.3310) + ₹ 1000*(1.2100) + ₹ 1000*(1.10) + ₹ 1000 \\ &= ₹ 6,105.00 \end{aligned}$$

In case of continuous compounding, the future value of annuity is determined using the formula $FV = CF * (e^{rt} - 1)/r$

6.1.3 Present Value of a Single Cash Flow

Present value of (PV) of the future sum (FV) to be received after a period 't' for which discounting is done at an interest rate of 'r', is given by the equation

In case of discrete discounting: $PV = FV / (1+r)^t$

Example 5: What is the present value of ₹ 1,000 payable 3 years hence, if the interest rate is 12 % p.a.

Solution: $PV = 1000 / (1.12)^3$ i.e. = ₹ 711.78

In case of continuous discounting: $PV = FV * e^{-rt}$

Example 6: What is the present value of ₹ 50,000 receivable after 3 years at a discount rate of 10% under continuous discounting?

Solution: Present Value = $50,000 / (exp^{(0.01*10*3)}) = ₹ 37,041.00$

6.1.4. Present Value of an Annuity

The present value of annuity is the sum of the present values of all the cash inflows/outflows.

Present value of an annuity (in case of discrete discounting)

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

Present value of an annuity (in case of continuous discounting)

$$PV_a = FV_a * (1 - e^{-rt})/r$$

6.2 Understanding Financial Statements

Accounting is a system of collecting, summarizing, analyzing and reporting in monetary terms, financial status of an organization. The end product of the financial accounting is the financial statements consisting of **Balance Sheet and Profit & Loss Account**.

As the name suggests, balance sheet provides information about financial position of a firm at a particular point of time. On the other hand, Profit & Loss Account of a firm portrays as a flow statement, the results of operations over a specified period of time (usually accounting year, April-March). The Balance Sheet contains information pertaining to firm's assets, liabilities and shareholders' equity whereas Profit & Loss Account summarizes the revenue items, the expense items and the difference between the two (net income) for an accounting period.

Mere statistics/data presented in the different financial statements do not reveal the true picture of a financial position of a firm. Properly analyzed and interpreted financial statements can provide valuable insights into a firm's performance. To extract the information from the financial statements, a number of tools are used to analyse these statements. The popular tools are:

- Comparative Financial Statements,
- Common sized Statements, and
- Ratio Analysis.

6.2.1 Comparative Financial Statements

This involves putting statements for two periods/organizations in a comparative form and indicating differences between them in terms of rupees and percentages.

Example 7: Financial statement of XYZ Ltd. for the years 2000 and 2001 are compared as under:

Particulars	Amount (in ₹ Lakh)		Increase/Decrease	
	2000	2001	in amount	in %
Equity Share Capital	15.00	15.00	-	-

Debentures	9.00	6.00	(-) 3.00	(-) 33.33
Current Liabilities	10.00	10.50	(+) 0.50	(+) 5.00
Land and Building	13.00	13.00	-	-
Investments	8.00	10.00	(+) 2.00	(+) 25.00
Current Assets	13.00	8.50	(-) 4.50	(-) 34.62

6.2.2 Common Size Statements

This involves putting statements for two years/organizations in a comparative form, where the items appear in percentage to total, rather than in absolute rupee form. This indicates relative importance of each item in the total and significant changes in the composition of the items.

Example 8: Common size statement of ABC Ltd. for the years 2000 and 2001 is as under:

Particulars	Amount (in ₹ Lakh)		Increase/Decrease	
	2000	2001	2000	2001
Equity Share Capital	15.00	15.00	23.62	16.17
Debentures	9.00	6.00	14.17	6.47
Current Liabilities	10.00	10.50	15.75	11.32
Land and Building	13.00	13.00	20.47	14.02
Investments	8.00	10.00	12.60	10.78
Current Assets	13.00	8.50	13.39	41.23
Total	63.50	92.74	100.00	100.00

6.2.3 Ratio Analysis

A ratio is a numerical relationship between two numbers (in financial statements) in terms of proportion, rate or percentage. The popular ratios are discussed in the following paragraphs:

- (i) **Return for Shareholders:** A common (equity) shareholder has only a residual claim on profits and assets of a firm, i.e., only after claims of creditors and preference shareholders are fully met, the equity shareholders receive a distribution of profits or assets on liquidation. A measure of his well being is

reflected by return on equity. There are several measures to calculate return on shareholders' equity:

- a) **Earnings Per Share (EPS):** EPS measures the profit available to the equity shareholders on a per share basis, that is, the amount that they can get on every share held. It is calculated by dividing the profit available to the shareholders by number of outstanding shares. The profit available to the ordinary shareholders is net profit after taxes and preference dividend.

$$EPS = \text{Net profit after tax} / \text{number of ordinary shares outstanding}$$

- b) **Dividend Yield:** Dividend Yield is closely related to EPS. While the EPS is based on book value per share, the yield is expressed in terms of the market value per share. The dividend yield is calculated by dividing the cash dividends per share (DPS) by the market value per share, (not price actually paid by investors)

$$\text{Dividend yield} = \text{Dividend per share} / \text{Market Price per share} * 100$$

- c) **Price to Earnings Ratio:** The P/E ratio reflects the price currently being paid by the market for each rupee of currently reported EPS. It measures investors' expectations and market appraisal of the performance of a firm. It is defined as:

$$\text{Price to Earnings Ratio} = \text{Market Price of share} / \text{EPS}$$

- d) **Return on Equity:** It reflects the rate of return which a firm is able to generate on equity. This is calculated as:

$$\text{Return on Equity} = \text{Net income after tax} / \text{Equity}$$

Where

$$\text{Equity} = \text{Equity Share Capital} + \text{Reserves and Surplus}$$

- e) **Debt to Equity Ratio:** The Debt to Equity Ratio is the ratio of debt (liabilities) to the share capital plus reserves and surplus (Networth). It is also known as Financial Leverage Ratio. It is defined as:

$$\text{Debt to Equity Ratio} = \text{Debt} / \text{Equity}$$

Higher ratio implies greater financial risk (on account of interest payment). Therefore, for a newly set up firms equity finance is preferred to debt finance.

- (ii) **Ratios for Short-term Creditors:** A short-term creditor is interested in near term prospects of having his dues paid in time. He looks at the following ratios:

- a) **Current Ratio:** It is the most popularly used ratio to judge liquidity of a firm.



It is defined as the ratio between current assets and current liabilities i.e.

$$\text{Current Ratio} = \text{Current Assets} / \text{Current Liabilities}$$

Current Assets include cash, debtors, marketable securities, bills receivable, inventories, loans and advances, and prepaid expenses, while Current Liabilities include loans and advances (taken), creditors, bills payable, accrued expenses and provisions.

It measures a firm's ability to meet short term obligations. The higher the current ratio, the more is the firm's ability to meet current obligations, and greater is the safety of funds of short term creditors.

A current ratio of 1.5:1 implies that for every one rupee of current liability, current assets of one-and-half rupees are available to meet the obligation.

- b) Acid-Test Ratio (Quick Ratio):** Though higher current ratio implies the greater short term solvency of the firm, the break-up of the current assets is very important to assess the liquidity of a firm. A firm with a large proportion of current assets in the form of cash and accounts receivable is more liquid than a firm with a high proportion of inventories even though two firms might have the same ratio. A more rigorous way to ascertain a firm's liquidity is found out by acid-test/quick ratio. Inventory and prepaid expenses are excluded from the current assets, leaving only the more liquid assets to be divided by current liabilities. It is found by:

$$\text{Acid-Test Ratio} = \frac{\text{Current Assets} - (\text{Inventory} + \text{Prepaid Expenses})}{\text{Current Liabilities}}$$

(iii) Ratios for Efficiency

More popularly known as activity ratios or asset management ratios which help measure how efficiently the assets are employed by a firm under consideration. Some of the important turnover ratios are:

- a) Inventory Turnover Ratio:** It measures how many times a firm's inventory has been sold during a year. It is found by:

$$\text{Inventory Turnover Ratio} = \frac{\text{Cost of Goods Sold}}{\text{Inventory}}$$

Where, Cost of Goods Sold means Sales minus gross profit and 'Inventory' implies stock of goods at the end of the year. This ratio reflects the efficiency of inventory management. The higher the ratio, the more efficient the inventory management (i.e. how quickly/fast the inventory is sold. A high ratio is considered good from the view point of liquidity and vice versa.

- b) Average Collection Period:** Average collection period represents the

number of days taken to collect an account. It is defined as:

$$\text{Average Collection Period} = \text{Average Accounts Receivable} / \text{Average Daily Credit Sales}$$

- c) **Fixed Assets Turnover Ratio:** This ratio is used to measure the efficiency with which fixed assets are employed. A high ratio indicates an efficient use of fixed assets. Generally this ratio is high when the fixed assets are old and substantially depreciated.

$$\text{Fixed Assets Turnover Ratio} = \text{Net Sales} / \text{Average Net Fixed Assets}$$

- d) **Gross Profit Ratio:** It is defined as ratio between gross profit to net sales i.e.

$$\text{Gross Profit Ratio} = \text{Gross Profit} / \text{Net Sales}$$

Where, Gross Profit is defined as the difference between net sales and the cost of the goods sold.

- e) **Net Profit Ratio:** It is defined as ratio between net profit to net sales i.e.

$$\text{Net Profit Ratio} = \text{Net Profit} / \text{Net Sales}$$

This ratio shows the profits left for shareholders as a percentage of net sales. It measures the overall efficiency of production, administration, selling, financing, pricing and tax management.

Example 9: from the following Balance Sheet and Profit & Loss Account of XYZ Co. Ltd., calculate the relevant ratios:

Balance Sheet of XYZ Co. Ltd as on March 31, 2000

(₹ in Crore)

Liabilities	Amount	Assets		Amount
Share Capital (1,00,00,000 equity shares of ₹10 each)	10.00	Fixed Assets (net)	0.20	34.00
Reserves & Surplus	15.20	Current Assets:	11.80	23.40
Secured Loans	14.30	Cash & Bank	10.60	
Unsecured Loans	16.90	Debtors Inventories	0.80	
Current Liabilities & Provisions	10.50	Pre-paid expenses	10.50	
		Investments		

Total	67.90	Total		67.90
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Profit and Loss Account of XYZ Co. Ltd for the year ending March 31, 2000

(₹ in Crore)

Particulars	Amount	Particulars		Amount
Opening Stock	8.00	Sales (net) Closing Stock		70.10
Purchases Wages and Salaries Other Mfg. Expenses Gross Profit	44.70 6.80 6.30 14.90			10.60
Total	80.70	Total		80.70
Administrative and Personnel Expenses Selling and Distribution Expenses Depreciation Interest Net Profit	1.20 1.80 3.00 2.10 6.80	Gross Profit		14.90
Total	14.90	Total		14.90
Income Tax Equity Dividend Retained Earning	3.50 2.00 1.30	Net Profit		6.80
Total	6.80	Total		6.80

Market price per equity share - ₹ 20.00

Ratios for XYZ Limited are computed as under:

EPS = Net profit after tax/number of ordinary shares outstanding
= 3.30/1.00 = ₹ 3.30 per share

Dividend yield = Dividend per share/Market Value per share * 100
= 2.00/20.00 * 100 = 10.00%

Price to Earning Ratio	= Market Price of Share/EPS. = $20.00/3.30 = ₹ 6.06$
Return on Equity	= Net income after tax/Equity = $3.30/(10.00+15.20) * 100 = 13.09\%$
Debt to Equity Ratio	= Debt/ Equity = $(14.30+16.90)/(10.00+15.20) = 1.24$
Current Ratio	= Current Assets / Current Liabilities = $23.40/10.50 = 2.29$
Quick Ratio	= Quick Assets / Current Liabilities = $(0.20+11.80)/10.50 = 12.00/10.50 = 1.14$
Inventory Turnover Ratio	= Cost of goods sold/Inventory = $55.20/10.60 = 5.20$
Average Collection period	= Receivables / Average Sales per day = $11.80/70.1 * 1/360 = 61 \text{ days Fixed}$
Assets Turnover ratio	= Net Sales / Fixed Assets = $70.10/34.00 = 2.06$
Gross Profit Ratio	= Gross Profit/Net Sales = $14.90/70.10 * 100 = 21\%$
Net Profit Ratio	= Net Profit / Net Sales = $6.80/70.10 * 100 = 9.70 \%$