

## Unit 3:

### Ratio Analysis

#### Meaning:

A ratio is a mathematical number calculated as a reference to relationship of two or more numbers and can be expressed as a fraction, proportion, percentage and a number of times. When the number is calculated by referring to two accounting numbers derived from the financial statements, it is termed as accounting ratio.

It needs to be observed that accounting ratios exhibit relationship, if any, between accounting numbers extracted from financial statements. Ratios are essentially derived numbers and their efficacy depends a great deal upon the basic numbers from which they are calculated.

Further, a ratio must be calculated using numbers which are meaningfully correlated.

#### Objectives of Ratio Analysis:

Ratio analysis is indispensable part of interpretation of results revealed by the financial statements. It provides users with crucial financial information and points out the areas which require investigation. Ratio analysis is a technique which involves regrouping of data by application of arithmetical relationships, though its interpretation is a complex matter. It requires a fine understanding of the way and the rules used for preparing financial statements. Once done effectively, it provides a lot of information which helps the analyst:

1. To know the areas of the business which need more attention;
2. To know about the potential areas which can be improved with the effort in the desired direction;
3. To provide a deeper analysis of the profitability, liquidity, solvency and efficiency levels in the business;
4. To provide information for making cross-sectional analysis by comparing the performance with the best industry standards; and
5. To provide information derived from financial statements useful for making projections and estimates for the future.

#### Importance (or Advantages) of Ratio Analysis:

1. **Helps to understand efficacy of decisions:** The ratio analysis helps you to understand whether the business firm has taken the right kind of operating, investing and financing decisions. It indicates how far they have helped in improving the performance.
2. **Simplify complex figures and establish relationships:** Ratios help in simplifying the complex accounting figures and bring out their relationships. They help summarise the financial information effectively and assess the managerial efficiency, firm's credit worthiness, earning capacity, etc.
3. **Helpful in comparative analysis:** The ratios are not be calculated for one year only. When many year figures are kept side by side, they help a great deal in exploring the trends visible in the business. The knowledge of trend helps in making projections about the business which is a very useful feature.

4. **Identification of problem areas:** Ratios help business in identifying the problem areas as well as the bright areas of the business. Problem areas would need more attention and bright areas will need polishing to have still better results.
5. **Enables SWOT analysis:** Ratios help a great deal in explaining the changes occurring in the business. The information of change helps the management a great deal in understanding the current threats and opportunities and allows business to do its own SWOT (Strength-Weakness-Opportunity-Threat) analysis.
6. **Various comparisons:** Ratios help comparisons with certain bench marks to assess as to whether firm's performance is better or otherwise. For this purpose, the profitability, liquidity, solvency, etc. of a business, may be compared: (i) over a number of accounting periods with itself (Intra-firm Comparison/Time Series Analysis), (ii) with other business enterprises (Inter-firm Comparison/Cross-sectional Analysis) and (iii) with standards set for that firm/industry (comparison with standard (or industry expectations)).

### **Limitations of Ratio Analysis:**

1. **Limitations of Accounting Data:** Accounting data give an unwarranted impression of precision and finality. In fact, accounting data "reflect a combination of recorded facts, accounting conventions and personal judgements which affect them materially. For example, profit of the business is not a precise and final figure. It is merely an opinion of the accountant based on application of accounting policies. The soundness of the judgement necessarily depends on the competence and integrity of those who make them and on their adherence to Generally Accepted Accounting Principles and Conventions". Thus, the financial statements may not reveal the true state of affairs of the enterprises and so the ratios will also not give the true picture.
2. **Ignores Price-level Changes:** The financial accounting is based on stable money measurement principle. It implicitly assumes that price level changes are either non-existent or minimal. But the truth is otherwise. We are normally living in inflationary economies where the power of money declines constantly. A change in the price-level makes analysis of financial statement of different accounting years meaningless because accounting records ignore changes in value of money.
3. **Ignore Qualitative Aspects:** Accounting provides information about quantitative (or monetary) aspects of business. But sometimes qualitative factors may surmount the quantitative aspects. The calculations derived from the ratio analysis under such circumstances may get distorted. For E.g., though credit may be granted to a customer on the basis of information regarding his financial position, yet the grant of credit ultimately depends on debtor's character, honesty, past record and his managerial ability.
4. **Variations in Accounting Practices:** There are differing accounting policies for valuation of inventory, calculation of depreciation, treatment of intangibles Assets definition of certain financial variables etc., available for various aspects of business transactions. These variations leave a big question mark on the cross-sectional analysis. As there are variations in accounting practices followed by different business enterprises, a valid comparison of their financial statements is not possible.
5. **Forecasting:** Forecasting of future trends based only on historical analysis is not feasible. Proper forecasting requires consideration of non-financial factors as well.
6. **Lack of ability to resolve problems:** Their role is essentially indicative and of whistle blowing and not providing a solution to the problem.

### Balance Sheet Ratios:

1. **Current Ratio** =  $\frac{\text{Current Assets}}{\text{Current Liabilities}}$

2. **Liquid Ratio** =  $\frac{\text{Quick (Liquid) Assets}}{\text{Quick (Liquid) Liabilities}}$

- **Liquid assets** are those which are readily converted into cash and will include cash/ bank balances, bills receivable, sundry debtors and short term investments. **Inventories and Prepaid Expenses are not included in liquid assets.**
- **Liquid Liabilities** includes all items of current liabilities except Bank Overdraft.

3. **Proprietary Ratio** =  $\frac{\text{Proprietors funds}}{\text{Total Assets}}$

- Proprietor fund = Share capital(Equity & Pref.) + Retained earnings (less loss if any) -Fictitious assets
- Total Assets = Fixed Assets + Current Assets-Fictitious assets

4. **Stock Working capital Ratio** =  $\frac{\text{Closing Stock}}{\text{Working Capital}}$

- Working Capital = Current assets – Current liabilities

5. **Capital Gearing Ratio** =  $\frac{\text{Fixed Interest \& Dividend Bearing Funds}}{\text{Equity Share holders fund}}$

- Equity Share holders fund= Equity Sh. Capital + Retained earnings (less loss if any) -Fictitious assets

6. **Debt Equity Ratio** =  $\frac{\text{Long Term Debt}}{\text{Proprietors Fund}}$

### Prob1:

<b>Liabilities</b>	<b>Rs.</b>	<b>Assets</b>	<b>Rs.</b>
Equity Share Capital	5,00,000	Land & Building	1,00,000
Preference share capital	2,00,000	Machinery	4,00,000
General Reserve	1,00,000	Furniture	50,000
Secured Loan	3,00,000	Inventory	3,00,000
Sundry Creditors	1,00,000	Sundry Debtors	3,00,000
		Cash/Bank Balance	50,000
	<b>12,00,000</b>		<b>12,00,000</b>

Calculate Following Ratios from the above balance sheet:

1. Current Ratio
2. Liquid Ratio

3. Proprietary Ratio
4. Stock Working capital Ratio
5. Capital Gearing Ratio
6. Debt Equity Ratio

**Solution:**

1. Current ratio	<p>= <b>Current assets/current liabilities</b></p> <p>Current assets = inventory (3,00,000)+ s.debtors(3,00,000) + cash balance(50,000) = 6,50,000</p> <p>Current liabilities = S.Creditors = 1,00,000</p> <p>= <b>6,50,000/1,00,000</b> = <b>6.5:1</b></p>
2. Liquid ratio	<p>= <b>liquid assets/liquid liabilities</b></p> <p>liquid assets = s.debtors(3,00,000) + cash balance(50,000) = 3,50,000</p> <p>liquid liabilities = S.Creditors = 1,00,000</p> <p>= <b>3,50,000/1,00,000</b> = <b>3.5:1</b></p>
3. Proprietary Ratio	<p>Proprietors fund / total assets</p> <p>Proprietor fund = Share capital(Equity &amp; Pref.) + Retained earnings (less loss if any) -Fictitious assets = 5,00,000 + 2,00,000 + 100,000 = 8,00,000</p> <p>Total Assets = Fixed Assets + Current Assets-Fictitious assets = 12,00,000</p> <p>= <b>800,000/12,00,000</b> = <b>0.66 : 1</b></p>
4. Stock Working capital Ratio	<p>= closing stock / working capital = <b>300,000 / 5,50,000</b> = <b>0.55:1</b></p> <p>Working capital (CA-CL= 6,50,000 – 1,00,000 = 5,50,000)</p>
5. Capital Gearing Ratio	<p>= <b>Fixed Interest &amp; Dividend Bearing Funds</b> <b>Equity Share holders fund</b></p> <p>Fixed Interest &amp; Dividend Bearing Funds = pref sh. (2,00,000) + secured loan (3,00,000) = 500,000</p> <p>Equity Share holders fund = Eq. Shares (5,00,000) + GR (100,000) = 600,000</p> <p>= <b>500,000 / 600,000</b> = <b>0.83 : 1</b></p>
6. Debt Equity Ratio	<p>=<b>Long Term Debt</b> <b>Proprietors Fund</b></p> <p>Long term debt = secured loan (300,000)</p> <p>= <b>3,00,000/8,00,000</b> = <b>0.38 : 1</b></p>

**Prob 2:**

<b>Liabilities</b>	<b>Rs.</b>	<b>Assets</b>	<b>Rs.</b>
Equity Share Capital	2,00,000	Machinery	5,92,000
12% Preference share capital	3,60,000	Investment	2,24,000
General Reserve	1,40,000	Stock	2,02,000
16% debentures	2,40,000	Bills Receivable	40,000
Trade payable	2,44,000	S. Debtors	98,000
Bank overdraft	40,000	Cash and Bank	76,000
Provision for Income Tax	36,000	Profit & Loss A/c	28,000
	<b>12,60,000</b>		<b>12,60,000</b>

Calculate Following Ratios from the above balance sheet:

1. Current Ratio
2. Liquid Ratio
3. Proprietary Ratio
4. Capital Gearing Ratio
5. Debt Equity Ratio

**Solution:**

1. Current ratio	<p>= <b>Current assets/current liabilities</b></p> <p>Current assets = stock (2,02,000)+ BR (40,000)+ s.debtors(98000) + cash balance(76,000) = 4,16,000</p> <p>Current liabilities = trade payable (2,44,000) + Bank o/d(40,000) + provision for income tax (36,000) = 320,000</p> <p>= <b>4,16,000/3,20,000</b> = <b>1.3:1</b></p>
2. Liquid ratio	<p>= <b>liquid assets/liquid liabilities</b></p> <p>liquid assets = BR (40,000)+ s.debtors(98000) + cash balance(76,000) = 2,14,000</p> <p>liquid liabilities = trade payable (2,44,000) provision for income tax (36,000) = 2,80,000</p> <p>= <b>2,14,000/2,80,000</b> = <b>0.76:1</b></p>
3. Proprietary Ratio	<p>Proprietors fund / total assets</p> <p>Proprietor fund = Share capital(Equity &amp; Pref.) + Retained earnings (less loss if any) -Fictitious assets = 2,00,000 + 3,60,000 + 140,000-28,000 = 6,72,000</p> <p>Total Assets = Fixed Assets + Current Assets-Fictitious assets = 12,60,000 – 28,000 = 12,32,000</p> <p>= <b>6,72,000/12,32,000</b> = <b>0.55 : 1</b></p>
4. Capital Gearing Ratio	<p>= <b>Fixed Interest &amp; Dividend Bearing Funds</b> <b>Equity Share holders fund</b></p> <p>Fixed Interest &amp; Dividend Bearing Funds = pref sh. (3,60,000) + debentures (2,40,000) = 6,00,000</p> <p>Equity Share holders fund = Eq. Shares (2,00,000) + GR</p>

	(1,40,000) – profit & loss (28000) = 3,12,000 = <b>600,000 / 3,12,000</b> = <b>1.92 : 1</b>
5. Debt Equity Ratio	= <b>Long Term Debt</b> <b>Proprietors Fund</b>  Long term debt = debentures (2,40,000)  = <b>2,40,000/6,70,000</b> = <b>0.36 : 1</b>

**Practice problems:**

**Prob 3:**

<b>Liabilities</b>	<b>Rs.</b>	<b>Assets</b>	<b>Rs.</b>
Equity Share Capital	1,00,000	Furniture	2,96,000
10% Preference share capital	1,80,000	Trademarks	1,12,000
General Reserve	70,000	Stock	1,01,000
15% debentures	1,20,000	Bills Receivable	20,000
Trade payable	1,22,000	Trade Receivables	49,000
Bank overdraft	20,000	Cash and Bank	38,000
Provision for Tax	18,000	Profit & Loss A/c	14,000
	<b>6,30,000</b>		<b>6,30,000</b>

Calculate Following Ratios from the above balance sheet:

1. Current Ratio
2. Liquid Ratio
3. Proprietary Ratio
4. Capital Gearing Ratio
5. Debt Equity Ratio

**Prob 4:**

The Balance Sheet of Trident Limited as on 31-12-2017 was as follow:

<b>Liabilities</b>	<b>Rs.</b>	<b>Assets</b>	<b>Rs.</b>
Equity Share Capital	40,000	Plant & Machinery	24,000
Capital Reserve	8,000	Land & Building	40,000
Profit & Loss A/c	12,000	Furniture & Fixtures	16,000
7% Mortgage Loan	32,000	Stock	12,000
Creditors	16,000	Debtors	12,000
Bank overdraft	4,000	Investment (Short-term)	4,000
Provision for Income Tax	8,000	Cash at bank	12,000
	<b>1,20,000</b>		<b>1,20,000</b>

**You are required to Calculate Following Ratios:**

1. Current Ratio (1.43:1)
2. Liquid Ratio (1.17:1)
3. Proprietary Ratio (0.5: 1) or 50%
4. Capital Gearing Ratio (0.53: 1)
5. Debt Equity Ratio (0.53: 1) or 53%

**Prob 5:**

The Balance Sheet of omega Limited as on 31-12-2018 was as follow:

<b>Liabilities</b>	<b>Rs.</b>	<b>Assets</b>	<b>Rs.</b>
Equity Share Capital	20,00,000	Machinery	35,00,000
8% Pref. Share Capital	15,00,000	Patents & Trademarks	20,00,000
Reserves & Surplus	11,00,000	Stock	1,75,000
10% Debenture	10,00,000	Debtors	3,50,000
9% Secured Loan	5,00,000	Bills Receivables	50,000
Creditors	1,00,000	Cash at bank	2,25,000
Bank overdraft	1,50,000	Fictitious Assets	1,00,000
Bills Payable	45,000		
Outstanding Expenses	5,000		
	<b>64,00,000</b>		<b>64,00,000</b>

**You are required to Calculate Following Ratios:**

1. Current Ratio (2.67:1)
2. Liquid Ratio (4.17:1)
3. Proprietary Ratio (0.71: 1) or 71%)
4. Capital Gearing Ratio (1: 1)
5. Debt Equity Ratio (0.33: 1) or 33%)

**Prob 6:**

Following is the summarised Balance Sheet of Borkar tiles Ltd. as on 31-3-19.

<b>Liabilities</b>	<b>Rs.</b>	<b>Assets</b>	<b>Rs.</b>
Equity Shares of Rs. 10 Each	10,00,000	Fixed Assets	20,00,000
10% Pref. Shares of Rs. 100 each	4,00,000	Investments	2,00,000
Reserves and surplus	7,00,000	Closing Stock	2,00,000
15% Debentures	5,00,000	S. Debtors	4,60,000
Sundry Creditors	2,40,000	Bills Receivables	60,000
Bank Overdraft	1,60,000	Cash Balance	60,000
		Preliminary Expenses	20,000
	<b>30,00,000</b>		<b>30,00,000</b>

**You are required to Calculate Following Ratios:**

1. Current Ratio (1.95:1)
2. Liquid Ratio (2.42:1)
3. Proprietary Ratio (0.70: 1) or 70%)
4. Capital Gearing Ratio (0.54: 1)
5. Debt Equity Ratio (0.24: 1) or 24%)

## INCOME STATEMENT RATIOS:

1. **Gross Profit Ratio** =  $\frac{\text{Gross Profit} \times 100}{\text{Net Sales}}$

**Purpose:** Indicates the efficiency of production and trading operations .

2. **Operating Ratio** =  $\frac{\text{Cost of Goods Sold} + \text{Operating Expenses} \times 100}{\text{Net Sales}}$

**Purpose:** index of managerial ability to control operating expenses.

3. **Expenses Ratio** =  $\frac{\text{Operating Expenses} \times 100}{\text{Net Sales}}$

(Expenditure may be cost of production or Cost of sales, administrative or Selling or distribution expenses or any other Element of Group)

**Purpose:** Indicates the direction in which economies ought to be effected.

4. **Net Operating Profit Ratio** =  $\frac{\text{Operating Profit} \times 100}{\text{Net Sales}}$

**Purpose:** Index of Operating Efficiency.

5. **Net Profit Ratio** =  $\frac{\text{Net Profit After Tax} \times 100}{\text{Net Sales}}$

**Purpose:** Indicates Net Margin on sales.

### Prob. 1:

Following is the Income Statement of Urja Auto. Ltd. For the year ended 31<sup>st</sup> Dec 2019. You are required to calculate: 1) Gross Profit Ratio; 2) Operating Ratio; 3) Net operating Profit Ratio and 4) Net Profit Ratio.

Particulars	Rs.
Sales	20,00,000
Less: Cost of goods Sold	12,00,000
Gross Profit	8,00,000
Less: Operating Expenses	4,80,000
Operating Profit	3,20,000
Add: Non –operating income	48,000
	3,68,000
Less: Non –operating Expenses	16,000
Profit before Tax	3,52,000
Less: Tax @ 30%	1,05,600
<b>Net Profit After Tax</b>	<b>2,46,400</b>



**Solution:** (Hint: only needs to replace available figures with respective formula to arrive at answer)

1. Gross Profit Ratio =  $800000/20,00,000 \times 100 = 40\%$
2. Operating ratio =  $\frac{12,00,000 + 4,80,000}{20,00,000} \times 100 = 84\%$
3. Net operating profit Ratio =  $3,20,000/20,00,000 \times 100 = 16\%$
4. Net profit ratio =  $2,46,400/20,00,000 \times 100 = 12.3\%$

**Prob. 2:**

The following Trading and Profit and Loss Account of Tiptop Ltd. for the year 31-3-2019 is given below:

Particulars	Rs.	Particulars	Rs.
To opening stock	76,250	By Sales	5,00,000
To purchases	3,15,250	By Closing stock	98,500
To Carriage inward	2,000		
To wages	5,000		
To Gross profit c/f	2,00,000		
	<b>5,98,500</b>		<b>5,98,500</b>
To Administrative exp.	1,01,000	By Gross profit b/d	2,00,000
To Selling & dist. Exp.	12,000	By interest on securities	1,500
To non operating exp.	2,000	By dividend on shares	3,750
To financial exp.	7,000	By profit on sale of shares	750
To net profit c/d	84,000		
	<b>2,06,000</b>		<b>2,06,000</b>

Calculate: Gross profit ratio, Expense ratio, operating ratio, net operating profit ratio & net profit ratio.

**Solution:**

1. Gross profit ratio =  $2,00,000/500,000 \times 100 = 40\%$
2. Expense ratio =  $\frac{\text{operating exp.}}{\text{net sales}} \times 100$   
 $\frac{1,13,000+5,00,000}{5,00,000} \times 100 = 22.60\%$
3. Operating ratio =  $\frac{\text{cost of goods sold} + \text{operating Exp}}{\text{net sales}} \times 100$   
 $\frac{3,00,000 + 1,13,000}{5,00,000} \times 100$

(Cost of Goods sold = Op. stock + purchases + carriage inward + wages – Closing Stock)

4. Operating profit ratio =  $\frac{\text{operating profit}}{\text{net sales}} \times 100$   
 $\frac{87,000}{5,00,000} \times 100 = 17.40\%$   
 (Operating profit = sales – (cost of goods sold + operating exp.)
5. Net profit ratio =  $\frac{\text{Net profit}}{\text{net sales}} \times 100$   
 $\frac{84,000}{5,00,000} \times 100 = 16.8\%$

**Practice problems:****Prob. 3:**

Following is the Income Statement of Durv Pvt. Ltd. For the year ended 31<sup>st</sup> March 2017.

<b>Particulars</b>	<b>Rs.</b>
Net Sales	12,00,000
Less: Cost of goods Sold	7,00,000
Gross Profit	5,00,000
Less: Operating Expenses	2,00,000
Operating Profit	3,00,000
Add: Non –operating income	45,000
	3,45,000
Less: Non –operating Expenses	25,000
Profit before Tax	3,20,000
<b>Tax Rate is 40%</b>	

**Calculate:** 1) Gross Profit Ratio; 2) Operating Ratio; 3) Net operating Profit Ratio and 4) Net Profit Ratio.

**Prob. 4:**

From the following information for the year ended 31<sup>st</sup> Dec 2018, You are required to calculate: 1) Gross Profit Ratio; 2) Operating Ratio; 3) Net operating Profit Ratio and 4) Net Profit Ratio.

Total Sales- Rs. 5,00,000/-

Sales Return- Rs. 50,000/-

Gross Profit – 40% of Net Sales.

Cost of goods sold – Rs. ??

Operating Expenses – Rs.60,000/-

Non-operating Income – Rs. 21,000/-

Tax Rate is 50%

Hint: first prepare income statement and then calculate ratios.