

SOLVENCY RATIOS

These ratios show the ability of the business enterprise to survive and operate in the long run. They indicate the long-term stability and fitness for future trading of a firm. Some of the important ratios in this regard are given in the following paragraphs :

✓ (i) DEBT-EQUITY RATIO

This ratio expresses the relationship between total liabilities (also called external equities) and the owner's funds or equity (also called internal equities). It is calculated as :

$$\text{Debt - Equity Ratio} = \frac{\text{Total Debts (Outside Liabilities)}}{\text{Owner's Funds}}$$

or

$$\text{Debt - Equity Ratio} = \frac{\text{External Equities}}{\text{Internal Equities}}$$

Components : Total Debts (or outside liabilities) or external equities consist of short-term as well as long-term liabilities, e.g., creditors, bills payable, outstanding expenses, debentures and long-term loans (secured and unsecured). The owners' funds or internal equities consist of equity share capital *plus* reserves and surplus *plus* preference share capital *minus* fictitious assets. This ratio indicates the proportion of funds provided by the owners/ shareholders as against the outsiders. In other words, it is the ratio of the amount invested by outsiders to the amount invested by owners of the business firm.

It is necessary to clarify as to why the current liabilities are included in the total debts for calculating this ratio? The reasons are :

- (i) The fixed amount of current liabilities is always in use so that they are available on a long-term basis.
- (ii) Some current liabilities like bank overdraft or short-term bank credit, are available year after year on more or less a permanent basis and hence they automatically become part of the long-term debts.
- (iii) In the event of liquidation, the current liabilities like the long-term creditors have a prior claim on the assets of the business enterprise.
- (iv) The short-term creditors exert as much pressure on the management as do the long-term creditors.
- (v) The term debt does not make any distinction between short-term debt and long-term debt.

It is thus very clear that the non-inclusion of short-term liabilities in calculating debt-equity ratio would give incorrect or even misleading results.

However some authors do not agree with this view. They interpret the term debt as long term debts only. It is, therefore, suggested that the examiner must provide a clear hint to the students as to the meaning of the term debt. Otherwise, both the interpretations should be accepted. In no case the students are penalised.

Interpretation : A high debt-equity ratio shows the contribution of more funds by the outsiders than the owners and hence a larger claim on the assets of the firm. A low debt-equity ratio means smaller claims of the outsiders on the assets. **The debt-equity ratio indicates the margin of safety for the creditors.** For example if debt-equity ratio is 1 : 2, it means for every one rupee claim of outsiders, the business entity has two rupees of owners' capital. There is thus a safety margin of 50%.

The lower the debt-equity ratio, the higher the degree of protection available to creditors.

A higher debt-equity ratio means less investment by the owners and obviously a danger signal for the creditors.

It is also not good for the firm too. For example, the firm will have to bear a heavy burden of interest payments especially when the profits decline. Moreover the business entity will find it difficult to raise more loans in future.

However, the shareholders stand to gain from the high debt-equity ratio. The reasons are :

- (i) They can retain the control of the company with less contribution,
- (ii) The return on their investment will increase. The debt carries a fixed rate of return and if the firm is able to earn more than what is payable as interest on loan, the benefit will go to the owners. This is called **trading on equity.**

A low debt-equity ratio has the opposite results. The creditors have sufficient safety margin because of more funds provided by the owners. The business enterprise has less burden of interest payments and can raise more funds in future without much difficulty. However the shareholders are not entitled to the benefits of **trading on equity**.

Illustration 2 (Debt-Equity Ratio)

From the following information, calculate the debt-equity ratio :

	₹		₹
Equity Share Capital	1,00,000	Securities Premium Account	15,000
Preference Share Capital	50,000	12% Debentures	1,25,000
General Reserves	40,000	Trade Creditors	40,000
Capital Reserves	10,000	Outstanding Expenses	5,000
Profit and Loss Account (Credit)	25,000	Provision for Tax	10,000

Solution

$$\text{Debt - Equity Ratio} = \frac{\text{Total Debts}}{\text{Owner's Funds}} = \frac{1,80,000}{2,40,000} = 0.75 : 1 \text{ or } 3 : 4 \text{ or } 75\%$$

Where, owners' Funds = $1,00,000 + 50,000 + 40,000 + 10,000 + 25,000 + 15,000 = 2,40,000$

Illustration 7

From the following balance sheet of ABC Co. Ltd. as on March 31, 2015. Calculate debt equity ratio:

ABC Co. Ltd.
Balance Sheet as at 31 March, 2017

Particulars	Note No.	Amount (Rs.)
I. Equity and Liabilities		
1. Shareholders' funds		
a) Share capital		12,00,000
b) Reserves and surplus		2,00,000
c) Money received against share warrants		1,00,000
2. Non-current Liabilities		
a) Long-term borrowings		4,00,000
b) Other long-term liabilities		40,000
c) Long-term provisions		60,000
3. Current Liabilities		
a) Short-term borrowings		2,00,000
b) Trade payables		1,00,000
c) Other current liabilities		50,000
d) Short-term provisions		1,50,000
		25,00,000
II. Assets		
1. Non-Current Assets		
a) Fixed assets		15,00,000
b) Non-current investments		2,00,000
c) Long-term loans and advances		1,00,000
2. Current Assets		
a) Current investments		1,50,000
b) Inventories		1,50,000
c) Trade receivables		1,00,000
d) Cash and cash equivalents		2,50,000
e) Short-term loans and advances		50,000
		25,00,000

Solution:

$$\begin{aligned}
 \text{Debt-Equity Ratio} &= \frac{\text{Debts}}{\text{Equity}} \\
 \text{Debt} &= \text{Long-term borrowings + Other long-term liabilities +} \\
 &\quad \text{Long-term provisions} \\
 &= \text{Rs. } 4,00,000 + \text{Rs. } 40,000 + \text{Rs. } 60,000 \\
 &= \text{Rs. } 5,00,000 \\
 \text{Equity} &= \text{Share capital + Reserves and surplus + Money received} \\
 &\quad \text{against share warrants}
 \end{aligned}$$

$$\begin{aligned} &= \text{Rs. } 12,00,000 + \text{Rs. } 2,00,000 + \text{Rs. } 1,00,000 \\ &= \text{Rs. } 15,00,000 \end{aligned}$$

Alternatively.

would depend upon the rate of return on the funds employed and the interest paid to outside liabilities.

(v) LONG-TERM DEBT-TOTAL FUNDS RATIO

This ratio is an extension of debt-equity ratio and provides similar information as the debt-equity ratio. In this ratio, the long-term debts are related to total capital of the firm and not merely to the shareholders' funds. The total capital or capital employed consists of shareholders' funds and the long-term debts (loan capital). It is computed as :

Long-term Debt to Total Capital Ratio =

$$\frac{\text{Long - term Debts}}{\text{Shareholders' Funds} + \text{Long - term Debts}}$$

Another approach for calculating the debt to total funds (total capital or capital employed) is to relate the total debts to the total assets of the firm. Total debt comprises long-term debts *plus* current liabilities.

Example : The following information is available from the accounts books of a company : Equity share capital ₹ 5,00,000; Preference share capital ₹ 1,00,000; Securities Premium Account ₹ 50,000; General Reserve ₹ 3,50,000; Preliminary Expenses ₹ 50,000; Profit and Loss Appropriation Account ₹ 4,10,000; 14% Debentures - ₹ 6,30,000. Calculate Long term debt to total funds ratio

$$= \frac{\text{Long - term Debts}}{\text{Total Funds}} = \frac{6,30,000}{19,90,000} = 0.32 : 1$$

(iii) INTEREST COVERAGE RATIO (DEBT-SERVICE RATIO)

This ratio, also known as "time-interest-earned ratio", establishes a relationship between profit before interest on long-term debts and taxes and the interest on long-term debts. It is generally expressed as 'number of times'. It is calculated as:

Interest Coverage Ratio =

$$\frac{\text{Profit Before Charging Interest on Long - term Debts and Income Tax}}{\text{Interest on Long - term Debts}}$$

The **objective** of this ratio is to measure the debt servicing capacity of a business firm in respect of fixed interest on the long-term debts, e.g., debentures, bonds, mortgage loans etc.. It shows whether the firm has sufficient income to pay interest on maturity dates.

Components. The two components of this ratio are :

- (i) Profit before interest on long-term debts and tax and
- (ii) Interest on long-term debts.

This ratio uses the concept of net profit before tax because tax is calculated after deducting interest on long-term loans.

Interpretation : This ratio shows the number of times the interest is covered by profit before interest and taxes. This ratio is an indication of protection available to creditors for payment of interest on long term loans. A **high ratio** indicates enough safety for payments of interest even if the profits of a company might drop in the near future. For example an interest coverage ratio of 10 times would mean that even if the company's profit before interest and taxes were to fall to one-tenth or 10% of the present level, the company will still be in a position to pay the interest out of the profits. **From creditors' point of view,** the larger the interest coverage ratio, the greater is the ability of the firm to pay

fixed interest liability. But a very high ratio also means the lesser use of loan capital.

A low interest coverage ratio is a warning to the creditors that the firm is using more loan capital and may not be able to pay interest with certainty.

Example I

Net income as per Profit and Loss Account	5,40,000
Provision for tax	2,10,000
Interest on Debentures, and other long-term loans	1,50,000
Calculate interest coverage ratio.	

Answer

Profit before interest and tax is :

$$5,40,000 + 2,10,000 + 1,50,000 = ₹ 9,00,000$$

$$\text{Interest Coverage Ratio} = \frac{9,00,000}{1,50,000} = 6 \text{ times}$$

The firm has earned 6 times the fixed interest to be paid on long term debts, after meeting the usual business expenses. It means that the firm can pay interest out of profits without affecting other resources. Hence the firm is solvent.

Example II

Profit before interest but after tax is	10,20,000
Tax Provision	3,30,000
15% Debentures	15,00,000
Calculate the interest coverage ratio	

Answer

Profit before interest but after tax

Add : Provision for tax

₹

10,20,000

3,30,000

13,50,000

Interest on Debentures : 15% on ₹ 15,00,000

2,25,000

Interest Coverage Ratio

13,50,000

2,25,000 = 6 times

of interest by the company.

Example: PQR Ltd. has earned a net profit of ₹ 7,00,000 during the year 2016-17. It has paid an income tax of ₹ 2,20,000 and interest on debentures as ₹ 2,30,000.

The interest coverage ratio may be calculated as follows:

$$\text{Interest Coverage Ratio} = \frac{\text{EBIT}}{\text{Interest}}$$
$$= \frac{\text{Profits after Tax} + \text{Tax Paid} + \text{Interest Charged to Profit and Loss Account}}{\text{Interest}}$$
$$= (7,00,000 + 2,20,000 + 2,30,000)/2,30,000$$
$$= 11,50,000/2,30,000$$
$$= 5 \text{ times}$$

Net Worth to Total Assets (Proprietary) Ratio

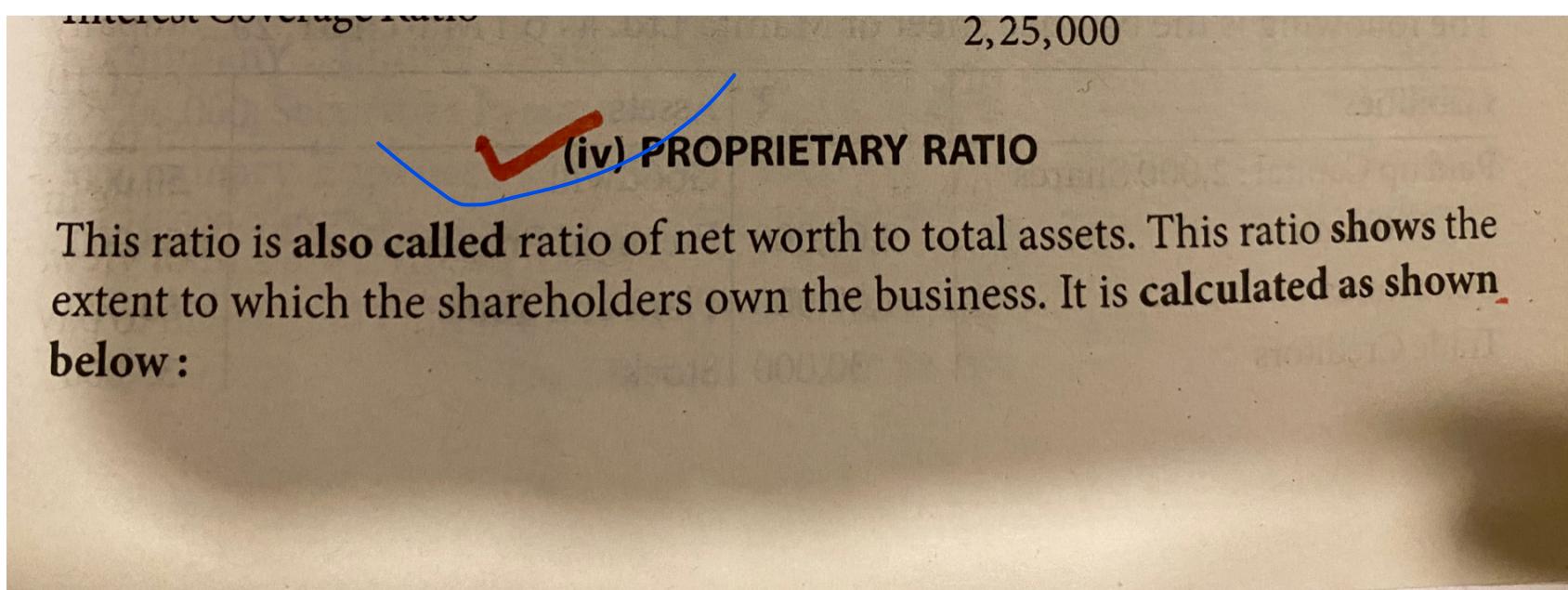
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1. Earnings:

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$$\text{Proprietary Ratio} = \frac{\text{Total Shareholders' Funds}}{\text{Total Assets}}$$

Components : Total shareholders' funds are comprised of the total amount of equity share capital and preference share capital *plus* the total amount of reserves and surplus. The total assets section includes total of current and fixed assets. The intangible assets (e.g., goodwill, patents etc.) should be included only if these assets have any realisable value. **The fictitious items in the assets side like preliminary expenses, debit balance of profit and loss account etc., must be deducted from the accumulated balance of the Reserves and Surplus Account or the capital.**

Uses of the ratio : The ratio is of particular importance to the investors because the presence of a high percentage of shareholders' funds (**including reserves and surplus**) indicates that there is relatively little danger of winding up or forced reorganisation in the event of default in payments to outside liabilities. Theoretically, then, the higher the proprietary ratio, the greater the long-run stability of the firm and consequently greater protection to creditors. **However greater long-run stability does not always result in maximum profits for shareholders over a period of time and does not itself show that the business is sound.**

Illustration 3

The following is the balance sheet of Mamta Ltd. as on March 31, 20...

Liabilities	₹	Assets	₹
Paid up Capital : 2,000 Shares of ₹ 100 each	2,00,000	Goodwill	50,000
Debentures	1,00,000	Freehold Property	1,50,000
Trade Creditors	30,000	Plant and Tools	83,000
		Stock	35,000

Ratio Analysis

12.15

Reserve Fund	50,000	Bills Receivable	4,500
Profit and Loss Account	20,000	Debtors	27,500
		Cash a Bank	50,000
	4,00,000		4,00,000

Calculate the proprietary ratio. It is assumed that goodwill has no realisable value.

Solution

$$\text{Proprietary Ratio} = \frac{\text{Total Shareholders' Funds}}{\text{Total Assets}} \times 100$$

$$= \frac{2,00,000 + 50,000 + 20,000}{4,00,000 - 50,000} \times 100$$

$$= \frac{2,70,000}{3,50,000} \times 100 = 77.14\%$$

at long-term solvency too. A healthy proprietary ratio indicates less risk of default on firm's part.

$$\text{Proprietary Ratio} = \frac{\text{Total Shareholders Fund}}{\text{Total Assets}} \times 100$$

Example: Calculate Proprietary Ratio from the following information

	₹
Equity Share Capital	5,00,000
Debentures	2,50,000

Reserves and Surplus	1,65,000
Total Non Current Assets	7,00,000
Total Current Assets	3,50,000
Cash at Bank	50,000

Solution

$$\begin{aligned}\text{Proprietary Ratio} &= \frac{\text{Total Shareholders Funds}}{\text{Total Assets}} \\ &= \frac{(5,00,000 + 1,65,000)}{7,00,000 + 3,50,000} \\ &= 63.33\%\end{aligned}$$

Note: Cash at Bank is a part of total current assets.

DEBT ANALYSIS OR INVESTOR ANALYSIS

(ii) CAPITAL GEARING (LEVERAGE) RATIO

The term '**capital gearing**' expresses the relationship between the equity capital and fixed interest/dividend bearing securities of a business enterprise. **Gearing ratio**, therefore, discloses the relationship between the **equity share capital on the one hand and the fixed dividend capital (Preference shares) and fixed interest loan capital (e.g., Bonds, Debentures) on the other**. The business enterprise is said to be **highly geared** when the capital carrying a fixed rate of dividend and interest is in greater proportion than equity capital. But if the equity capital is more than the fixed dividend and interest bearing capital (*e.g.*, **preference share capital, debentures, bonds, etc.**), the capital structure is said to be **low geared**. Gearing is **neutral** when equity capital and fixed interest and dividend capital is equal resulting in ratio of 1 : 1. Capital structure refers to the total funds invested in the business by equity shareholders and holders of fixed dividend and interest securities. It also includes the reserves and surplus.

(Leverage) Ratio is initially expressed as:

(ii) $\frac{\text{Preference Share Capital} + \text{Debentures} + \text{Bonds}}{\text{Equity Share Capital} + \text{Reserves and Surplus}}$

~~DEBT-COVERAGE RATIO (DEBT-SERVICE RATIO)~~

earnings and hence dividends to the shareholders.

7.4.3 DuPont Analysis - Decomposing Firm's Earning Power

DuPont Analysis decomposes ROE (Return On Equity) into three part viz- Profit margin, Asset turnover and Equity multiplier.

$$\text{ROE} = (\text{Profit margin}) \times (\text{Asset turnover}) \times (\text{Equity multiplier}) \dots \dots \dots (7.1)$$

$$\text{Net Profit/Equity Capital} = (\text{Net profit}/\text{Sales}) \times (\text{Sales}/\text{Assets}) \times (\text{Assets}/\text{Equity})$$

- ◆ Profitability (as measured by net profit margin)
- ◆ Asset Use efficiency (as measured by asset turnover)
- ◆ Financial leverage (as measured by equity multiplier)

The DuPont analysis breaks down Return on Equity (that is, the returns that equity investors receive from the firm) into three distinct elements. This analysis enables the analyst to understand the source of superior (or inferior) return by comparison with companies in similar industries (or between industries).

Return on Equity can also be measured as follows:

$\text{ROE} = \text{Return on Assets} \times \text{Financial Leverage (Income Statement)} \times \text{Financial leverage (balance sheet)}$

ROE=PAT/Net worth= (EBIT/Net Assets) × (PAT/EBIT) × (Net Assets/Net Worth)

Further ROA can be subdivided into operating profit margin and asset turnover.

Hence, extended DuPont Analysis states that :

$$\text{ROE} = \text{PAT}/\text{Net worth} = (\text{EBIT}/\text{sales}) \times (\text{Sales}/\text{Net Assets}) \times (\text{PAT}/\text{EBIT}) \times (\text{Net Assets}/\text{Net Worth}) \dots \quad (7.2)$$

- (d) **Comparative analysis** - Studying the shareholding pattern for a single period is unlikely to tell you much. It is important to compare holding patterns with those of the previous periods to identify major changes, if any.

ILLUSTRATION 7.1

The relevant financial data for an automobile company Sree Automobiles Ltd. as on March end 20X1, 20X2 and 20X3 is given below. Calculate various ratios to perform company analysis.

**SREE AUTOMOBILES LTD.
P&L A/C FOR THE YEAR ENDING ON 31ST MARCH**

(in ₹ Lakhs)

	Particulars	20X1	20X2	20X3
A	Net Sales	2000	2800	3500
B	Less: Cost of Goods Sold	1800	2500	3000
C	Gross profit (A-B)	200	300	500
	Less: Administrative & Selling expenses	30	100	160
D	Operating income	170	200	340
	Add: other incomes	40	60	120
E	EBIT (earnings before Interest and taxes)	210	260	460
	Less: Interest	100	140	240
F	Profit Before Tax (PBT)	110	120	200
	Less: Provision for Tax	44	48	80
G	Profit after Tax (PAT)	66	72	120
H	Dividend distributed	30	50	80
I	Retained Earnings	36	22	40

**BALANCE SHEET
(AS ON MARCH END)**

(in ₹ Lakhs)

	Particulars	20X1	20X2	20X3
A	Net Worth			
	Share Capital	400	400	400
	Reserve	500	550	600
	Net Worth	900	950	1000
B	Borrowings			

(in ₹ Lakhs)

Particulars	20X1	20X2	20X3
Long term Debentures	-	-	600
Long term debt	150	120	200
Total Borrowings	150	120	800
C Capital Employed (A + B)	1050	1070	1800
D Fixed Assets			
Gross Block	600	800	900
Less : Depreciation	150	200	250
Net block	450	600	650
Other non-current assets	50	20	50
Net Fixed Assets	500	620	700
E Current Assets			
Inventories	450	800	1200
Debtors	250	300	500
Cash & Bank	10	100	50
Others	90	50	50
Current Assets	800	1250	1800
F Less: Current Liabilities			
Creditors	50	200	350
Provision and others	200	600	350
Current Liabilities	250	800	700
G Net Current assets or working capital	550	450	1100
H Net Assets(D+G)	1050	1070	1800

The market price per share is ₹ 20, 22.5 and 25 respectively in year 20X1, 20X2 and 20X3. Face value of share is ₹ 10 each.

SOLUTION:

			$1.05/1.05=0.455$	$1.25/1.8=0.694$	$2/3=0.67$
Three step DuPont Analysis of profit earning capability of firm over the three years is as follows:					
	Particulars	Dimension	20X1	20X2	20X3
A	Profit margin =Net profit/Net sales	Profitability	$66/2000=0.033$ Or 3.33%	$72/2800=0.026$ Or 2.6%	$120/3500=0.034$ Or 3.4%
B	Asset turnover ratio =Net sales/Net Assets	Asset Use efficiency	$2000/1050=1.91$	$2800/[(1050+1070)/2]=2.64$	$3500/[(1070+1800)/2]=2.44$
C	Equity multiplier =Net Assets/Net worth	Financial leverage	$1050/900=1.17$	$1060/950=1.12$	$1435/1000=1.44$
D	$\text{ROE} = \frac{\text{PAT}}{\text{Net worth}} \times 100$	Owners' return	$66/900=7.33\%$	$72/950=7.58\%$	$120/1000=12\%$

ROE = (Profit margin)×(Asset turnover)×(Equity multiplier)

Net Profit/Equity Capital = (Net profit/Sales)×(Sales/Assets)×(Assets/Equity)

For 20X3, ROE= 12% It can be analysed from the following sub-components

$\text{ROE} = \text{Profit margin (A)} \times \text{Asset turnover (B)} \times \text{Equity multiplier (C)}$
 $= 3.4\% \times 2.44 \times 1.435$
 $= 11.9$ or 12% ROE (row D)

Interpretation

The ROE of the firm remained constant from 20X1 to 20X2 despite of a severe decline in net profit margin from 3.33% to 2.6%. It can majorly be attributed to a better asset use efficiency reflected in an improvement in asset turnover ratio from 1.904 to 2.64. The firm generated more sales in 20X2 from its more or less same asset base. The firm witnessed a minor loss of financial leverage from 1.17 in 20X1 to 1.12 in 20X2 due to discharging of debt of ₹ 30 lakhs. Therefore, the positive effect of asset use efficiency was nullified by a poor profit margin resulting in meager increase in ROE to 7.58% in 20X2 from 7.33% in 20X1.

However, the profitability of firm improved in 20x3 to an ROE of 12%. This increase can be attributed to a better profit margin of 3.4% and a greater leverage factor of 1.435. Increase in financial leverage can be traced to an increased debt of ₹ 800 lakhs. Firm has issued debentures of ₹ 600 lakhs and raised more long term debt of ₹ 80 lakhs. These two factors - improved margin and financial leverage - have generated an ROE of 12% for the shareholders despite a lower asset turnover ratio.

ILLUSTRATION 7.2

From the following excerpts from the financial statements of two firms, calculate:

1. Operating margin
2. Return on assets
3. Return on equity

Comment on the profitability of the two firms. Why is ROE of firm B just marginally higher than firm A despite of having a thundering high ROA? Use DuPont analysis.

Particulars	FIRM A	FIRM B
Revenue	2710	4895
Operating income	190	380
Depreciation	15	45
Interest	15	0
Pre-tax income	160	335
Income tax	65	185
Net income after tax	95	150
Fixed assets	205	350
Total assets	1225	1455
Working capital	615	785
Debt	80	0
Equity share capital	795	1100

SOLUTION:

$$\text{EBIT} = \text{Operating Income} - \text{Depreciation}$$

$$\text{Net Assets} = \text{Fixed Assets} + \text{Working Capital}$$

Particulars	FIRM A	FIRM B
Operating margin = EBIT/Net sales	$(190-15)/(205+615) = 175/820 = 21.34\%$	$(380-45)/(350+785) = 335/1135 = 29.52\%$
ROA = EBIT/Net assets	$(190-15)/(205+615) = 175/820 = 21.34\%$	$(380-45)/(350+785) = 335/1135 = 29.52\%$
ROE = $\frac{\text{PAT}}{\text{Net worth}} \times 100$	$95/795 = 12.03\%$	$150/1100 = 13.56\%$

In real life, the concern of equity is defined in such a way through the use of expensive shares which have their total share capital divided among various shareholders.

(i) No

When a company has a year after it has been incorporated, it can issue shares in such a way that the year following its incorporation, it will have a large number of shareholders.

inability to capitalize on the market value of its assets due to its capital structure.

Four step DuPont analysis (Extended DuPont analysis) is used in the following table to decompose the ROE and get deeper insights in this comparison of two firms.

	Particulars	Dimension	FIRM A	FIRM B
A	Profit margin =EBIT/Net sales	Profitability	$(190-15)/2710 = 6.46\%$	$(380-45)/4895 = 6.84\%$
B	Asset turnover ratio =Net sales/Net Assets	Asset Use efficiency	$2710/820 = 3.305$	$4895/1135 = 4.313$
C	ROA =A×B	Profit on assets	$6.46 \times 3.305 = 21.35\%$	$6.84 \times 4.313 = 29.5\%$
D	Degree of financial leverage = PAT/EBIT	Financial leverage	$95/175 = 0.543$	$150/335 = 0.448$
E	Equity multiplier =Net Assets/Net worth	Financial leverage	$820/795 = 1.031$	$1135/1100 = 1.032$
F	$\text{ROE} = \frac{\text{PAT}}{\text{Net worth}} \times 100 \quad (\text{A} \times \text{B} \times \text{D} \times \text{E})$	Owners' return	11.95%	13.64%

Minor decimal place variations are due to rounding off errors.

Interpretation:

Firm B has performed better than firm A on the performance parameters like asset use efficiency, profit margins and thus enjoyed a superior return on assets. However, it was beaten by firm A on the financing aspect, i.e. optimal capital structure decisions.