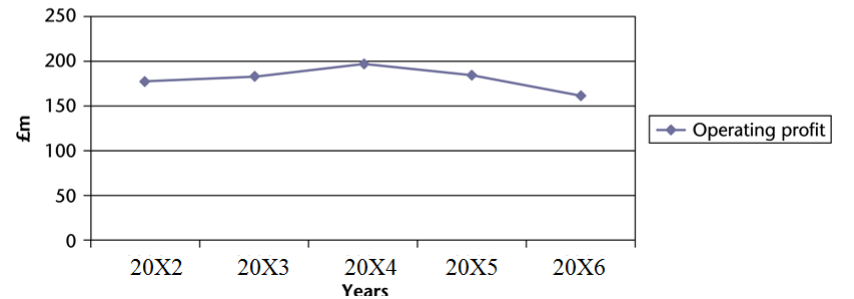


Table and graph of Devah’s operating profits showing changes from previous years

Year	20X2	20X3	20X4	20X5	20X6
Profit before tax (£m)	138	143	156	144	112
Add back interest (£m)	40	40	40	40	50
Operating profit/PBIT (£m)	178	183	196	184	162
Standardised profit (20X6 = 100)	110	113	121	114	100
Change on previous year (%)	n/a	2.7	7.1	(5.8)	(12.3)

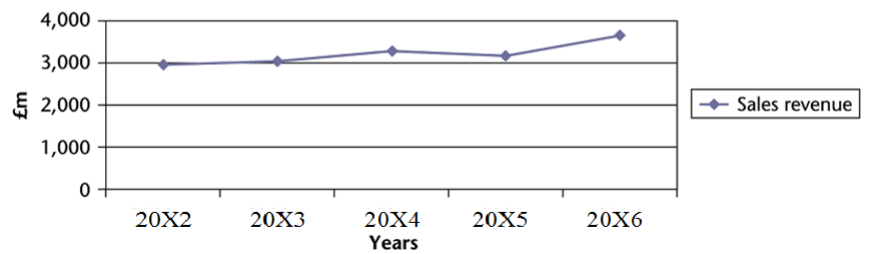


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Table and graph of Devah’s sales revenue showing changes from previous years

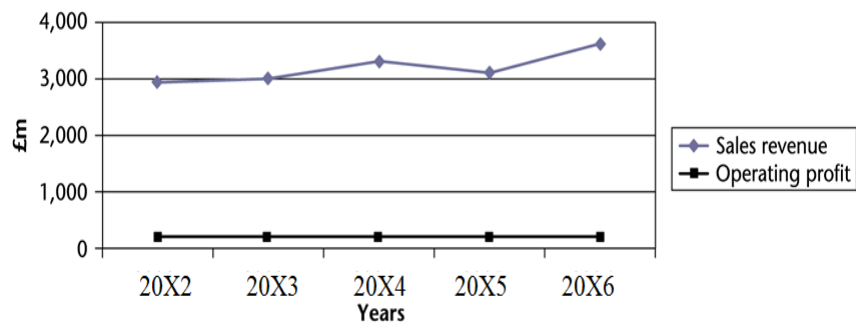
Year	20X2	20X3	20X4	20X5	20X6
Sales (£m)	2,945	3,017	3,291	3,136	3,646
Standardized sales (20X6 = 100)	81	83	90	86	100
Change on previous year (%)	n/a	2.5	8.4	(4.4)	16.3



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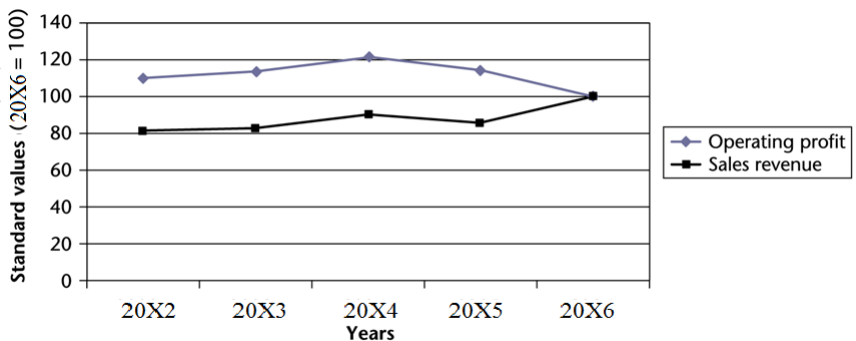
Devah’s operating profit and sales revenue



3

3

Devah’s operating profit and sales Revenue using standard values



4

4

Return on Capital Employed

- $\text{ROCE} = \frac{\text{operating profit}}{\text{total capital employed}}$
- $\text{ROCE} = \frac{\text{profit before interest and tax}}{\text{share capital} + \text{reserves} + \text{loan capital}}$
- *For Devah plc (20X5):*

$$\text{ROCE} = \frac{(144 + 40)}{600 + 224 + 400} = \frac{184}{1,224} = 15.0\%$$

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Calculate the ROCE ratio for Devah plc for 20X6 and comment on your findings.

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1: Answer

For Devah plc (20X6)

$$\begin{aligned}\text{ROCE} &= \frac{\text{profit before interest and tax}}{\text{share capital} + \text{reserves} + \text{loan capital}} \\ &= \frac{(112 + 50)}{700 + 238 + 500} = \frac{162}{1,438} = 11.3\%\end{aligned}$$

This shows that there has been a very sharp drop in the ROCE from 15.0% to 11.3%, a fall of about one-quarter. It is imperative for management to find out why this has occurred and, if possible, to correct this trend as soon as possible.

7

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Profit Margin

- **Profit margin** = $\frac{\text{operating profit (PBIT)}}{\text{sales revenue}}$

- *For Devah plc (20X5):*

$$\text{Profit margin} = \frac{184}{3,136} = 5.87\%$$

- This means that, on average, it makes £5.87 operating profit on every £100 of sales

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2

Calculate the profit margin for Devah plc for 20X6
and comment on your findings.

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2: Answer

For Devah plc (20X6)

$$\text{Profit margin} = \frac{162}{3,646} = 4.44\%$$

This shows that the profit margin has reduced by about a quarter, from 5.87% to 4.44%. This is a significant change and should be corrected if possible.

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Asset Utilization

- This ratio indicates how efficiently the assets of the business are being used to generate sales.
- Asset utilization = $\frac{\text{sales revenue}}{\text{net total assets}}$
- Capital utilization = $\frac{\text{sales revenue}}{\text{Total capital employed}}$ Same as asset utilization
- For Devah plc (20X5):
Asset utilization = $\frac{\text{sales revenue}}{\text{net total assets}} = \frac{3,136}{1,224} = 2.56 \text{ times}$
- The managers are using the assets to create 2.6 times their asset value in sales revenue.

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Calculate the Asset utilization ratio for Devah plc for 20X6 and comment on your findings.

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3: Answer

For Devah plc (20X6)

$$\text{Asset utilization} = \frac{\text{sales revenue}}{\text{net total assets}} = \frac{3,646}{1,438} = 2.54 \text{ times}$$

This shows that there has been no significant change in the utilization of assets (20X5 = 2.56 times).

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Relationship Between the Three Ratios

- $\frac{\text{operating profit}}{\text{total capital employed}} = \frac{\text{operating profit}}{\text{sales revenue}} \times \frac{\text{sales revenue}}{\text{total capital employed}}$
- $\frac{\text{operating profit}}{\text{total capital employed}} = \frac{\text{operating profit}}{\text{sales revenue}} \times \frac{\text{sales revenue}}{\text{net total assets}}$
- ROCE = profit margin × asset utilization
- *For Devah plc (20X5)*
 $15.03\% = 5.87\% \times 2.56 \text{ times}$

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Check that this relationship holds good for Devah plc for 20X6.

(You will probably need to use two decimal places to be sure the arithmetic is consistent.)

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4: Answer

For Devah plc (20X6)

ROCE = profit margin $\times$ asset utilization

11.3% = 4.44% $\times$ 2.54 times

This confirms the accuracy of the calculations and it also shows that the drastic fall in ROCE is almost entirely due to the fall in the profit margin.

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Further Interpretation

- (A) high profit margin $\times$ low asset utilization = mid-range ROCE

$$20\% \times 0.8 \text{ times} = 16\%$$

- (B) low profit margin $\times$ high asset utilization = mid-range ROCE

$$2.5\% \times 6.0 \text{ times} = 15\%$$

- Example (A) could be a business with relatively few premium-priced sales at the top end of the quality market whereas example (B) could be a 'pile-them-high-sell-them-cheap' business. These are **two well-known business strategies**.

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Gross Margin and Cost Control

- Decrease in Profit Margin may be due to increased costs.
- But which costs.....direct or indirect?
- Gross profit margin shows whether the direct costs are under control.
- $$\text{Gross margin} = \frac{\text{gross profit}}{\text{sales revenue}} = \frac{(\text{sales revenue} - \text{direct cost of sales})}{\text{sales revenue}}$$
- If gross margin decreases, corrective action may be possible.

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Gross Margin and Cost Control (Continued)

- If the gross margin is steady or improving, any decrease in profit margin will be due to an increase in overhead costs.

- Examine the ratio: $\frac{\text{overheads}}{\text{sales revenue}}$

(Note: total overheads should not include any interest costs.)

- For Devah plc (20X5):

$$\text{gross margin} = \frac{\text{gross profit}}{\text{sales revenue}} = \frac{1,068}{3,136} = 34.1\%$$

- $\frac{\text{overheads}}{\text{sales revenue}} = \frac{884}{3,136} = 28.2\%$

- Cost control is an important management task necessary to maintain and improve business performance.

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Question 2 shows the following profit margins:

$$20X5 = 5.87\%, \quad 20X6 = 4.44\%.$$

Explain this decline in performance by calculating the gross margin and overheads/revenue ratios for Devah plc for 20X6.

20

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5: Answer

For Devah plc

Profit margin	=	$\frac{20X6}{4.44\%}$	$\frac{20X5}{5.87\%}$
		(calculated in previous slides)	
Gross margin	=	$\frac{1,164}{3,646}$	= 31.93% 34.06%
$\frac{\text{overheads}}{\text{sales revenue}}$	=	$\frac{1,002}{3,646}$	= 27.48% 28.19%

This shows that the overheads are a smaller proportion of sales revenue in 20X6 than they were in 20X5 indicating that there has been an improvement in their control. However, **the gross margin has declined from 34% to 32%** indicating that there has been a disproportionate **increase in the direct cost of sales**. So management attention should be focused on direct costs rather than overheads.

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Working Capital Ratios

- Working capital = **Net current assets**
- Net Total Assets = Fixed assets (NBV) + **Net current assets**
= Total capital employed
- Reduction in working capital => Increase in ROCE
- **Control of working capital can lead to improved performance.**

22

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Stock Turnover Ratio

- Estimate of average amount of time period-end stock will be held.
- Stock turnover = $\frac{\text{year-end stock}}{\text{average daily cost of sales}}$
- Stock turnover = $\frac{\text{year-end stock}}{\text{annual cost of sales}/365}$
- Stock turnover = $\frac{\text{year-end stock} \times 365}{\text{annual cost of sales}}$
- *For Devah plc (20X5):*

$$\text{Stock turnover} = \frac{382}{2,068} \times 365 = 67 \text{ days}$$
- The shorter the better.

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Calculate the stock turnover ratio for Devah plc for 20X6 and comment on your findings.

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6: Answer

For Devah plc (20X6)

$$\text{Stock turnover} = \frac{530}{2,482} \times 365 = 78 \text{ days}$$

This shows that the management of stock has worsened over the year; stock days have increased from 67 to 78, a deterioration of 16%.

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Debtor Collection Period

- Only connected with credit sales (*cash sales not relevant*)
- Debtor collection period = $\frac{\text{year-end debtors}}{\text{average daily credit sales}}$
- Debtor collection period = $\frac{\text{year-end debtors}}{\text{annual credit sales}} \times 365$
- Estimate of how long it will take for year-end debtors to pay up.
- *For Devah plc (20X5):*
- Debtor collection period = $\frac{102}{3,136} \times 365 = 12 \text{ days}$
- **The shorter the better.**

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Calculate the debtor collection period for Devah plc for 20X6 and comment on your findings.

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7: Answer

For Devah plc (20X6)

$$\text{Debtor collection period} = \frac{156}{3,646} \times 365 = 16 \text{ days}$$

This shows that the management function of 'credit control' is being performed much less well than last year. Debtor days have increased by one-third, from 12 to 16.

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Creditor Payment Period

- Mirror image of debtor collection period
- Purchases on credit terms only (*cash purchases not relevant*)
- Creditor payment period* = $\frac{\text{year-end creditors}}{\text{average daily credit purchases}}$
- Creditor payment period = $\frac{\text{year-end creditors}}{\text{annual credit purchases}} \times 365$
- If purchases figure not known,
Purchases = cost of sales + closing stock – opening stock.

* Calculations in details.

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Creditor Payment Period (Continued)

- *For Devah plc (20X5):
assume stock at the start of 20X5 had a value of £290 million.*
- Purchases = cost of sales + closing stock – opening stock
- = 2,068 + 382 – 290 = 2,160
- Creditor payment period = $\frac{\text{year-end creditors}}{\text{average daily credit purchases}}$
- Creditor payment period = $\frac{242}{2,160} \times 365 = 41 \text{ days}$
- **The longer the better.**

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Calculate the creditor payment period for Devah plc for 20X6 and comment on your findings.

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8: Answer

For Devah plc (20X6)

$$\begin{aligned}\text{Purchases} &= \text{cost of sales} + \text{closing stock} - \text{opening stock} \\ &= 2,482 + 530 - 382 \\ &= 2,630 \\ \text{Creditor payment period} &= \frac{\text{year-end creditors}}{\text{average daily credit purchases}} \\ &= \frac{312}{2,630} \times 365 \\ &= 43 \text{ days}\end{aligned}$$

This shows a very slight improvement in creditor days, from 41 to 43.

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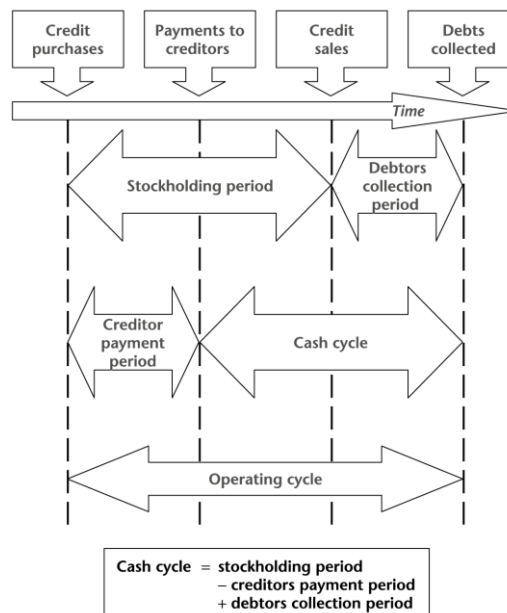
The Cash Cycle

- Cash cycle = (stock turnover – creditor payment period) + debtor collection period
- Term in brackets above = length of time money is tied up in stock
- For Devah plc (20X5):
 - = (67 days – 41 days) + 12 days
 - = 26 days + 12 days = 38 days
- The shorter the better. The longer the cycle, the more cash is needed by the business.
- Cash is often a scarce resource and must be managed efficiently.
- Most common cause for businesses ‘dying’ is insufficient cash.

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The Operating and Cash Cycles



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Calculate the cash cycle for Devah plc for 20X6 and comment on your findings.

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9: Answer

For Devah plc (20X6)

Cash cycle = (stock turnover – creditor payment period) + debtor collection period

$$= (78 \text{ days} - 43 \text{ days}) + 16 \text{ days}$$

$$= 35 \text{ days} + 16 \text{ days}$$

$$= 51 \text{ days}$$

This shows that the cash cycle has increased by about one-third over the year, from 38 days to 51 days. This significant deterioration indicates inefficient management of working capital. It is important for this trend to be reversed as soon as possible.

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Liquidity Ratios

- Analysis of short-term assets and liabilities
- Adequate liquidity is essential for survival

$$\text{Current ratio} = \frac{\text{current assets}}{\text{current liabilities}}$$
- Usually expressed in the form 1.5:1.0
(i.e. £1.50 of current assets available to pay for every £1.00 of current liabilities)
- Liquid ratio = $\frac{\text{liquid assets}}{\text{current liabilities}} = \frac{\text{current assets} - \text{stock}}{\text{current liabilities}}$
- The liquid ratio (= acid test ratio) is a *sharper* measure of liquidity.

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Liquidity Ratios (Continued)

- No guarantee stock will be converted into sales.
- Sometimes, stockholding period similar to debtors collection period. So, stock can be 'liquid' e.g. grocery supermarkets.
- For Devah plc (20X5):

$$\text{Current ratio} = \frac{\text{current assets}}{\text{current liabilities}} = \frac{514}{360} = 1.4:1.0$$
- Liquid ratio = $\frac{\text{current assets} - \text{stock}}{\text{current liabilities}} = \frac{514 - 382}{360} = 0.4:1.0$

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Calculate the current and liquid ratios for Devah plc for 20X6 and comment on them.

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10: Answer

For Devah plc (20X6)

$$\text{Current ratio} = \frac{\text{current assets}}{\text{current liabilities}} = \frac{686}{428} = 1.6:1.0$$

$$\text{Liquid ratio} = \frac{\text{current assets} - \text{stock}}{\text{current liabilities}} = \frac{686 - 530}{428} = 0.4:1.0$$

This shows that although the current ratio has improved slightly compared to last year, the liquid ratio has not changed.

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Gearing and Capital Structure

- Where has the money to run the business come from?
- Three basic sources: shareholders, lenders and retained profits.
- Shareholders own profits, so only 2 sources: owners and non-owners.
- Non-owners are sometimes referred to as 'third parties'.
- Gearing ratio examines relationship between these 2 sources of funds.

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Gearing and Capital Structure (Continued)

- Gearing = $\frac{\text{funds from third parties}}{\text{total funds}}$
- = $\frac{\text{funds from third parties}}{\text{shareholder funds} + \text{funds from third parties}}$
- = $\frac{\text{loan capital}}{(\text{shareholder capital} + \text{reserves}) + \text{loan capital}}$
- A ratio of 75% means that 75% of funds come from 'outside' and 25% from 'inside' the company.
- The higher the percentage, the higher the gearing.

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Gearing and Capital Structure (Continued)

- *Alternative ratio:* Gearing = $\frac{\text{funds from third parties}}{\text{shareholder funds}}$

$$= \frac{\text{loan capital}}{\text{shareholder capital} + \text{reserves}}$$
- Direct comparison of the amounts provided by the two sources.
- Ratio of 3.0 means that third parties provide £3 of funds for every £1 provided by shareholders.
(Identical financial structure as in the 75% ratio shown on previous slide.)

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- *For Devah plc (20X5):*
- Gearing = $\frac{\text{loan capital}}{\text{shareholder capital} + \text{reserves} + \text{loan capital}}$

$$= \frac{400}{600 + 224 + 400} = \frac{400}{1,224} = 32.7\%$$
- Using the same ratio, calculate the gearing ratio for Devah plc for 20X6 and comment on your answer.

44

44

11: Answer

For Devah plc (20X6)

$$\begin{aligned}\text{Gearing} &= \frac{\text{loan capital}}{\text{shareholder capital} + \text{reserves} + \text{loan capital}} \\ &= \frac{500}{700 + 238 + 500} = \frac{500}{1,438} = 35\%\end{aligned}$$

This shows that there has been a slight increase (of two percentage points) in gearing compared to the previous year.

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Gearing and Capital Structure (Continued)

- Gearing transforms inputs into higher or lower outputs.
- If a business gets half of its £2 million total funds from shareholders and half from bank (*£1 million debenture with interest at 10% a year*):
- Business achieves a return of **15%** a year on total capital employed.
- £1 million bank loan earns a return of £150,000 a year.
- £100,000 paid for interest to bank; other £50,000 to the shareholders.
- Shareholders' £1 million capital earns £150,000 and they also get £50,000 return on the loan capital.
- Shareholders' total return is £200,000 on £1 million = 20% return.
- In effect, their investment is **geared up to 20%**.

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Gearing and Capital Structure (Continued)

- Alternatively:
 - Business gets half of its £2 million total funds from shareholders and half from bank (*£1 million debenture with interest at 25% a year*).
 - Business achieves a return of **15%** a year on total capital employed.
 - Business earns £300,000 return ($15\% \times £2M$).
 - **The bank receives £250,000 interest a year.**
 - Shareholders' £1 million capital earns only £50,000.
 - Shareholders' total return is £50,000 on £1 million = 5% return.
 - In effect, their investment is **geared down to 5%**.

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Gearing and Capital Structure (Continued)

- Moderate gearing is seen as advantageous by shareholders but high gearing is seen as a risk.
- The higher the gearing – the greater the risk.
- But business was making positive operating profits.
- **Unless debt was reduced, profit would be insufficient to pay interest.**

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Interest Cover

- Interest cover = $\frac{\text{operating profit}}{\text{interest payable}} = \frac{\text{PBIT}}{\text{interest}}$
- Measures the number of times interest can be paid for by profits.
- Gives some idea of sensitivity/criticality of interest payments.
- Cover of 4 times much more comfortable than 1.5 times.

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For Devah plc (20X5):

$$\begin{aligned}\text{Interest cover} &= \frac{\text{PBIT}}{\text{Interest}} = \frac{\text{Profit before tax} + \text{Interest}}{\text{Interest}} \\ &= \frac{144 + 40}{40} = 4.6 \text{ times}\end{aligned}$$

Calculate the interest cover ratio for Devah plc for 20X6 and comment on your answer.

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12: Answer

For Devah plc (20X6)

$$\text{Interest cover} = \frac{\text{Profit before tax + interest}}{\text{Interest}} = \frac{112 + 50}{50} = 3.2 \text{ times}$$

Although this does not represent any imminent danger, the interest cover has reduced by about a quarter to 3.2 times (from 4.6 times). **Further borrowing will worsen this position.**

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Limitations of Ratio Analysis

- How accurate is the picture painted by ratio analysis?
- Effect of accounting conventions: e.g. if inflation is high, historic cost convention may distort amount of capital employed.
- Also, capital employed figure depends on choice of depreciation method and other accounting policies.
- Past performance is not always a good indicator of future performance due to rate of change in business environment.
- Ratios quantify *what* has happened, not *why*.
- Enron's accounts were certified correct by their auditors!
- *Ratios are only as good as the data they use.*

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