

Ratio analysis

1. Introduction

1.1. Chapter overview

Ratios can be used to assess many aspects of a potential investment, from the reliability of dividend payments to the ability of a company to pay its short-term debts.

This chapter takes you through some of the most commonly used ratios.

You will cover both calculation and interpretation, giving you the basic tools for investment analysis and corporate comparisons.

1.2. Learning outcomes

On completion of this module, you will:

Investors' ratios

- 11.3.3 Explain the importance of the dividend yield and dividend cover in stock analysis
- 11.3.4 Calculate dividend yield and dividend cover
- 11.3.6 Distinguish between and evaluate the merits of relative valuation models and absolute valuation models and between historic and prospective measures of value
- 11.3.11 Explain what is meant by earnings per share, and diluted earnings per share
- 11.3.12 Calculate a basic earnings per share
- 11.3.16 Calculate price-earnings (both historic and prospective), price to book, price to sales, price to cash flow ratios for a company
- 11.3.13 Explain the rationale for the use of the following ratios in equity valuation: price-earnings, price to book, price to sales, price to cash flow, enterprise value (EV) to earnings before interest tax, depreciation and amortisation (EBITDA)
- 11.3.14 Explain the possible shortfalls of using price multiples in corporate valuation

Gearing and liquidity ratios

- 10.7.1 Distinguish between profitability, liquidity, and gearing ratios

Lenders' ratios

- 11.3.18 Define (financial) gearing and evaluate the effect on required equity returns and thus dividend valuations

Liquidity ratios

- 10.7.4 Define, calculate and interpret: operational gearing, financial gearing, the current ratio, the quick ratio (acid test)

Operating ratios

- 10.7.2 Define and calculate return on capital employed and equity
- 10.7.3 Explain how return on capital employed can be broken down into profit margin and asset turnover

2. Investors' ratios

2.1. Dividend yield

Rationale

Dividend yield gives an investor an indication of the dividend income return on a share. The ratio compares what an investor receives (net dividend) as a percentage of what they have to invest (market price).

By expressing the return on the investment in a share as a percentage, dividend yield facilitates the comparison of investing in a particular share with other shares or other types of investment.

Calculation

Net dividend per share is used in the calculation of dividend yield. Dividend information (for example, dividend paid by a company or dividend received by an investor) is generally **net** information.

$$\text{Dividend yield} = \frac{\text{Net dividend per share}}{\text{Market price per share}} \times 100\%$$

Example

For a company that has 60m ordinary shares in issue (that are currently trading at 35p each) and an income statement as illustrated, the dividend yield would be:

Income statement (excerpt)	
Profit after tax	£5.9m
Dividends	(£2.0m)
Retained Profits	£3.9m

A total dividend of £2.0m between 60m ordinary shares is a dividend per share of £0.033.

$$\text{Dividend yield} = \frac{\text{Dividend per share}}{\text{Market price per share}} \times 100\%$$

$$= \frac{£0.033}{£0.35} \times 100\%$$

$$= 9.43\%$$

Interpretation

Low yields may indicate a **high growth** company or an overvalued share price.

High yields may indicate a **low growth** company or a company underrated by the market.

This is because yields are inversely related to prices. People are prepared to pay high prices now for shares with good growth prospects, in anticipation of high future dividends. High prices equate to low yields.

2.2. Dividend cover

Rationale

Dividend cover looks at how many times a company could have paid out its dividends based on the profit for the year. It is an important measure of the safety of a dividend.

The more times a company could have paid out that level of dividend the stronger the dividend cover. This would make it less likely that a company will have to reduce dividends if profits fall.

A company can pay a dividend that is greater than the year's earnings (giving a dividend cover of less than one). It does this by drawing on profits within the profit and loss reserve in the balance sheet. This is referred to as an **uncovered dividend**.

Calculation

$$\text{Dividend cover} = \frac{\text{Earnings per share}}{\text{Net dividend per share}}$$

Example

The dividend cover for a company with a net dividend of 3.33p and an EPS of 6.83p / share would be:

$$\text{Dividend cover} = \frac{\text{EPS}}{\text{Net dividend per share}}$$

$$= \frac{6.83\text{p}}{3.33\text{p}}$$

$$= 2.05 \times$$

Dividend cover, like the p/e ratio, is a multiple.
This dividend cover is therefore '2.1 times'.

2.3. Payout ratio

Just like dividend cover the payout ratio is a measure of the sustainability of a company's dividend policy. It is a similar calculation with the only difference being a reversal of the numerator and denominator.

Calculation

- Payout ratio = Net dividend per share / earnings per share

Example

Using the figures from the previous example would give a payout ratio of 3.33p / 6.83p = 0.49p

Interpretation

The dividend cover is how many times we can cover this year's dividend with our yearly earnings, so a high number is better.

The payout ratio is what percentage of the yearly earnings are needed to pay this year's dividend, so a lower percentage is preferred.

2.4. Absolute vs. relative valuation techniques

As mentioned in the equity chapter, equity valuation is not an exact science, so there are many different valuation techniques used by analysts to obtain an appropriate valuation. Despite the variety of techniques used, they fall into one of two main categories:

- Absolute valuation techniques: based on discounting techniques, and used to estimate the value of equity as the present value of future equity returns to the investor
- Relative valuation techniques: estimate the value of equity as some measure of earnings power (e.g. profit) times an appropriate multiple. Other examples of earnings power might include sales, net assets ('book value') or cash flows

The narrative below explores absolute and relative valuation techniques in a little more detail.

2.5. Earnings per share (EPS)

Rationale

Earnings per share measures the profit available to ordinary shareholders, i.e. the profit that **could** have been paid as an ordinary dividend.

The profit available to ordinary shareholders is calculated after **all** other expenses and appropriations have been made by the company.

Calculation

$$\text{EPS} = \frac{\text{Profit available to ordinary shareholders}}{\text{Number of ordinary shares}}$$

Where:

Profit attributable to ordinary shareholders =

Profit after tax	X
Less: Preference dividends	(X)
Less: Minority interest	(X)
<u>Profit available to owners of the parent</u>	<u>X</u>

Example

ABC plc has 60m shares in issue with a nominal value of 50p each. Taking excerpts from the balance sheet and income statement, EPS is calculated as follows.

<u>Capital and Reserves</u>		£/m
Share capital a/c	Ordinary	30
	Preference	20
Share prem a/c		60
Reval Res		20
P & L Res		40
SHAREHOLDERS' FUNDS		170

Profit after tax		£5.5m
Min interest		(£0.4m)
Dividends	Pref	(£1.0m)
	Ord	(£2.0m)
Retained Profits		£2.1m

$$\begin{aligned}
 \text{EPS} &= \frac{\text{£4,100,000}}{60,000,000 \text{ shares}} \\
 &= \text{£0.0683/share} \\
 &= 6.83\text{p}
 \end{aligned}$$

Profit available to ordinary shareholders =
 Retained profit + Ordinary dividends = i.e.
 £2.1m + £2.0m = £4.1m

Number of ordinary shares = £30m /
 £0.5 per share = 60m shares

Diluted EPS

An extension of the basic EPS calculation is diluted EPS.

Diluted EPS is a worst case scenario calculation. It assumes that any **potentially dilutive** securities (securities in issue that could convert into ordinary shares) are converted into ordinary shares. EPS is re-calculated using the new, higher number of shares and any revenue generated from the process. If diluted EPS is lower it must be displayed in addition to EPS.

Potentially dilutive securities include:

- Directors' share options
- Warrants
- Convertible debt securities

Diluted EPS acts as a warning to existing ordinary shareholders. It indicates the level to which EPS will dip, if everything that could convert into ordinary share capital does convert.

EPS as a valuation technique

EPS in itself is an absolute measure, and so is not useful for intercompany comparisons. A better use is to analyse the trend in EPS over time, and use it as an indicator of growth.

One problem with EPS is that dividend payouts are dependent upon the availability of sufficient cash flows to meet them. EPS is based on profit (not cash) which may be distorted by accounting standards and policies, one-off purchases and write-offs. For this reason it is not indicative of a firm's ability to meet or maintain current dividend levels.

Care also needs to be taken when interpreting changes in EPS if share issues or buy-backs have taken place. EPS may rise (fall) due to a fall (rise) in the number of shares.

2.6. Price-earnings ratio (P/E ratio)

Rationale

Also known as the Earnings Multiple, the P/E ratio measures how highly investors value a company as a multiple of its earnings (or profit). It is calculated by dividing the market price by the EPS, or alternatively, by dividing the market capitalisation by profits available to ordinary shareholders. The prospective P/E is similar, however the earnings are increased by the stated growth rate.

Calculation

$$\text{P/E ratio} = \frac{\text{Market price per share}}{\text{Earnings per share}}$$

Example

For a company with an EPS of 6.83p per share and a share price of 35p, the price earnings ratio would be:

$$\begin{aligned} \text{P/E ratio} &= \frac{\text{Market price per share}}{\text{Earnings per share}} \\ &= \frac{35\text{p}}{6.83\text{p}} \\ &= 5.1\times \quad \longleftarrow \text{P/E ratios are expressed as multiples} \end{aligned}$$

Interpretation

The amount of profit a company earns determines the level of dividend it pays.

Consequently, investors pay more for shares if earnings are expected to rise **in the future**.

A company with a **high P/E ratio** relative to its sector average reflects that investors expect the company to achieve above average performance and growth. Careful market and company analysis is, however, still necessary to see if a high ratio is justified by future potential or not: it may also mean that a company is simply overvalued.

A company with a **low P/E ratio** relative to its sector average reflects the opposite, i.e. investors expect the company to achieve below average future growth in earnings.

Some investors will seek out value stocks that may have wrongly been attributed a low P/E by the market. The hope is that these undervalued stocks will one day increase in value when the market appreciates their true worth. Some low P/E stocks may therefore be undervalued by the market. Equally, some high P/E stocks may be said to be overvalued. This may eventually give rise to a market correction.

P/E can also be problematic for companies that experience cyclical earnings cycles. They may have relatively stable prices but P/E calculations at different points in the cycle will give highly variable results. P/E cannot be looked at in isolation.

2.7. The EBITDA multiple (EV/EBITDA)

As previously stated, the P/E ratio measures how highly investors value a company as a multiple of its earnings (or profit).

The main weakness of P/E is that it is based on accounting profit, which includes items derived using 'accounting estimates' or judgements. The best examples of such items are depreciation and amortisation. These measure the depletion in value of tangible and intangible assets, and their calculation incorporates an estimate of asset life and asset value at the end of the period of use.

The EV/EBITDA ratio uses earnings before interest, tax, depreciation and amortisation, and thus excludes the main two items that can be inconsistently calculated, or even manipulated, by accountants. It represents a more **comparable** measure of the earnings available to all providers of capital than net income (used in the calculation of P/E).

The EV/EBITDA ratio therefore compares the market value of capital from all providers with a measure of profit available to them, i.e. a more comparable measure of how highly investors value a company as a multiple of earnings.

EV/EBITDA is calculated as follows:

$$\frac{\text{EV}}{\text{EBITDA}} = \text{EV/EBITDA}$$

Where:

- EV = Enterprise Value = market value of debt + market value of equity
- EBITDA = Earnings before interest, tax, depreciation + amortisation

2.8. Price to book, price to sales and price to cash flow

P/E can be used to help decide whether a company is relatively over-/under-valued compared with a benchmark, but the ratio suffers from two potential problems:

- Loss making companies display negative P/E ratios which are not useful. They may also be due to the cyclical nature of the industry or the current state of the economy. Equity valuation should be based on long-term prospects
- P/E is based on accounting profit, which, as previously noted, may be distorted by accounting standards and policies, one-off purchases and write-offs, and international differences

As a result of these shortcomings, analysts may use the following alternative market multiples:

Price to book (P/B)

The book value of net assets is likely to be more stable than earnings, and is much less likely to become negative.

If book value is used in place of EPS in the P/E calculation, then the resultant ratio is price to book (P/B). The valuation methodology is the same: a higher P/B means that the market as a whole believes the company will use its assets more efficiently to create future value.

Price to sales (P/S)

Sales can be used to create an alternative market multiple, as sales are not negative and are less subject to accounting distortion. However, care needs to be taken as:

- Sales do not necessarily produce profits and cash for providers of capital
- Sales are generated by the use of both equity and debt capital, not equity alone

Thus, a more appropriate alternative may be enterprise value to sales (EV/S), where enterprise value is the value of the entire entity (market value of debt + market value of equity).

Price to cash flow (P/CF)

The final relative valuation ratio is price to cash flow (P/CF). Cash is totally unaffected by accounting policies and treatments, but it can still be negative. To get around this second problem, different definitions of cash flow can be used, such as operating cash flow and free cash flow.

2.9. Other measures of shareholder value

Residual Income Valuation Model

The residual income valuation model is an alternative model to the discounted cash flow method or the valuation method based on multiples in determining a company's value. It creates the company's value from two distinct parts:

- The first part is created from the book value of assets of the company
- The second part is the present value of the future 'Residual Incomes'. Residual income refers to the income part which is achieved above the expected return on equity

These values are added together to estimate the value of the company. This approach works well for shares with negative earnings, cash flows or that do not pay out dividends.

3. Gearing and liquidity ratios

3.1. Gearing (or Debt/Equity)

Rationale

Financial gearing quantifies the relationship between the proportion of capital which is debt financed and the proportion that is provided by shareholders.

If a company is financed solely by equity (or shares), then no interest need be paid before dividends are paid to shareholders. These dividend payments are discretionary. In good trading years shareholders can expect higher dividends than in poor trading years.

However, if a company takes on debt finance, or **gearing**, then the company must pay interest before it can pay dividends to shareholders. These payments are **fixed**. Even in poor trading years the same amount of interest has to be paid out. This will have an impact on the profit that is available to be paid out to the shareholders in the form of a dividend.

Highly geared companies can expect their earnings attributable to ordinary shareholders to experience a greater proportionate increase in good trading years than would lower geared companies. In poor trading years the highly geared company will experience a greater decrease.

Financial gearing, therefore, gives an indication of **risk** to ordinary shareholders. It also provides a measure of a company's ability to increase borrowing in order to take advantage of profitable projects. If gearing is low, then a company will have the capacity to borrow.

Calculation

- Debt/equity ratio = total long term debt / total equity

Long term debt = bonds, loans, overdrafts etc

Equity = book value of any ordinary shares, preferred stock and retained earnings

3.2. Liquidity ratios

Current and quick ratios

The ability of a company to pay its liabilities as they become due is an important aspect of risk. This ability to pay is known as **liquidity**. It can be assessed by using the **current** and **quick** ratios.

Current ratio

The current ratio puts current assets over current liabilities and gives an indication of whether assets which convert into cash within one year cover liabilities crystallising in the same period.

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

Quick ratio (acid test)

The quick ratio (or **acid test**) excludes inventory ('stock') from current assets. Stock is the least liquid current asset. Thus, the quick ratio gives a tighter measure of a company's ability to meet a sudden cash call.

$$\text{Quick ratio (acid test)} = \frac{\text{Current assets} - \text{stock}}{\text{Current liabilities}}$$

A current or quick ratio of more than one will indicate that a company has sufficient short-term assets to cover short-term liabilities. A company that has a quick ratio of less than one may need to raise new finance.

Therefore, in the absence of a good reason, we would normally expect current assets to exceed current liabilities.

Example

Using the following excerpt from a company's balance sheet, its current and quick ratios may be calculated:

<u>CURRENT ASSETS</u>	
Stock	£4.0m
Debtors	£1.0m
Cash	£2.5m
	<hr/>
	£7.5m
<u>CURRENT LIABILITIES</u>	
Bills due within 1 year	£2.0m

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

$$= \frac{£7.5\text{m}}{£2.0\text{m}}$$

$$= 3.8 \times$$

$$\text{Quick ratio} = \frac{\text{Current assets} - \text{stock}}{\text{Current liabilities}}$$

$$= \frac{£7.5\text{m} - £4.0\text{m}}{£2.0\text{m}}$$

$$= 1.8 \times$$

3.3. Operational gearing

Operational gearing examines the sensitivity of profits to sales revenue.

More precisely, it is the percentage change in trading profits which results from a one percent change in sales revenue.

The value of operational gearing depends on the relationship between fixed costs, variable costs and profit.

$$\text{Operational gearing} = \frac{(\text{sales revenue} - \text{variable costs})}{\text{trading profits}}$$

Example

Operational gearing = (Sales revenue - Variable costs) : Trading profit

Consider the following two companies:

	Company X	Company Y
	£m	£m
Sales	200	200
Fixed costs	(40)	(120)
Variable costs	(120)	(40)
Trading profit	<u>40</u>	<u>40</u>

X operational gearing = $(200 - 120) : 40 = 2 : 1$

Y operational gearing = $(200 - 40) : 40 = 4 : 1$

Now increase sales by 10%

	Company X	Company Y
	£m	£m
Sales	220	220
Fixed costs	(40)	(120)
Variable costs	(132)	(44)
Trading profit	<u>48</u>	<u>56</u>
Change in profit	+20%	+40%

Only variable costs increase with sales. As a result, the company with the highest operational gearing (Company Y) will see profits increase disproportionately as sales increase. Equally profit will fall at a greater rate if sales decrease.

This means that relative to Company X, the results of the more highly geared company (Company Y) will be more volatile.

4. Operating ratios

4.1. Return on capital employed (ROCE)

ROCE is a measure of profitability relative to size.

ROCE compares profit with the assets available to generate profit (or **capital employed**), and gives an indication of how well a company is generating profit from its asset base.

ROCE calculation

$$\text{Return on capital employed (ROCE)} = \frac{\text{PBIT}}{\text{Capital employed}} \times 100$$

Where:

- Capital employed = share capital + reserves + long term borrowing
- PBIT = Profit **before** interest and tax

The calculation of ROCE is based on profit **before** interest and tax (trading profit).

When using ratios to compare different companies, or the same company over time, it is important to make the ratios as comparable as possible. By using PBIT, there is no distortion from differences/changes in financing structure and/or tax planning.

ROCE example

Profit after tax for a company is £200k, after charging corporation tax of £30k and interest of £50k. If capital employed is £1m, ROCE will be:

$$\begin{aligned} \text{ROCE} &= \frac{\text{PBIT}}{\text{Capital employed}} \\ &= \frac{\text{£200K} + \text{£30k} + \text{£50k}}{\text{£1m}} \\ &= \frac{\text{£280k}}{\text{£1m}} = 28\% \end{aligned}$$

4.2. Operating profit margin and asset turnover

Operating profit margin

Operating profit margin looks at how efficient a company is at turning their sales (turnover) in to profit, once all costs are considered.

The formula is:

$$\text{Operating profit margin} = \frac{\text{Operating profit}}{\text{Sales}}$$

The result is expressed as a percentage. The higher the percentage the more efficient the company is. However, different sectors have different averages for profit margin. For example, a manufacturing company may have profit margins of between 8% and 10%, whereas retail companies would typically have lower margins.

Asset turnover

Asset turnover is similar to ROCE. However, it looks at the total sales generated by the capital employed, rather than the profit.

The formula is:

$$\text{Asset turnover} = \frac{\text{Sales}}{\text{Capital employed}}$$

Return on capital employed

The two ratios can be combined to create ROCE:

- **Operating profit margin x Asset turnover = ROCE**

5. Ratio analysis: summary

5.1. Key concepts

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- 11.3.3 Explain the importance of the dividend yield and dividend cover in stock analysis
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Operating ratios

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- 10.7.3 Explain how return on capital employed can be broken down into profit margin and asset turnover

Now you have finished this chapter you should attempt the chapter questions.