

Calculating & Interpreting Financial Ratios August 2012



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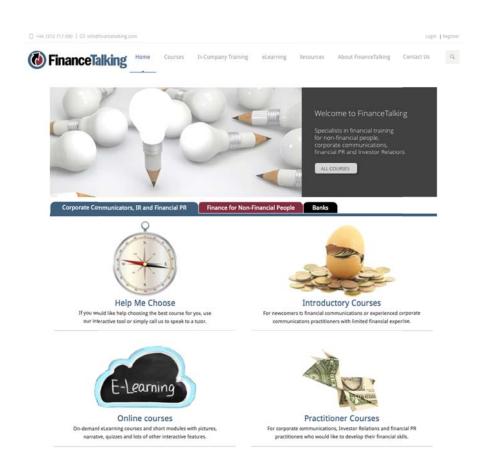
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### 1 Objective

The purpose of this paper is to explain how the most commonly used financial ratios are calculated and used. We cover the ratios used by management as internal and external performance measures (Key Performance Indicators, KPIs), ratios used by investors and analysts to understand performance and forecast and ratios used by rating agencies and debt investors to measure financial strength.

#### 2 Introduction to the Use of Financial Ratios

### 2.1 Why and How People Use Financial Ratios

People use financial ratios to help to interpret the numbers in the financial statements with the ultimate aim of getting a clearer picture of a company's financial performance and condition.

There are as many possible ratios as there are numbers in the accounts, but we will focus on those that are used most frequently.

Ratios for a single year, presented in isolation are not useful. To understand what the ratio is telling you, you need to compare it:

- Over a period of time
   This can offer insight into the company's trend.
- 2) Against other companies in the same industry
  This can offer a useful insight into relative performance.

The financial ratios that we are going to look at in this briefing paper are for non-financial companies only. Financial companies, such as banks and insurance companies use industry-specific ratios (see our briefing paper on Understanding Banks for more).



### 2.2 Problems With Using Financial Ratios

#### 2.2.1 Different Ratio Definitions

Ratios are not defined in law or by accounting standards. Indeed, different users may calculate ratios in different ways, adjusting them to make them more meaningful for a particular sector (see EBITDAR later on). Because ratios are not standardised, it is important to be sure that you are comparing ratios calculated in exactly the same way when comparing from company to company.

#### 2.2.2 Period Fnd Versus Period Information

Sometimes ratios use information from both the income statement (which shows performance over a year) and the balance sheet (which is a snapshot in time).

These ratios are likely to be distorted by:

- The period end figure not being representative of the period under review for example, an unusually large level of sales in the final month of the year might make the period end receivables figure look very high.
- The income statement figure is not representative for example if the company made any significant acquisitions or disposals during the period, the balance sheet will include both businesses, but the income statement will only include sales and costs from the date of acquisition.

#### 2.2.3 The Different Components of Ratios

Financial ratios are calculated using at least two numbers, a numerator (the top number) and a denominator (the bottom number). So when you are interpreting and comparing ratios, you should always remember to look at both sides of the ratio for answers as to why the relationship might have changed or look different from a competitor.



#### 2.3 Who Uses Which Ratios?

#### 2.3.1 Shareholders

Shareholders require a return on their investment that compensates them for the risk they are taking. They receive their return through a combination of dividends and increases in the share price – the total shareholder return (TSR). The task of the company's management is to grow the business, while making reasonable returns on the shareholders' capital (equity) – ie to create value for shareholders. Over the long-term, management must make a return on equity that beats the cost of equity (the return that the shareholders expect for the risk they're taking).

It therefore follows that the key ratio for shareholders is return on equity (ROE) and related ratios such as return on capital employed (ROCE) or return on invested capital (ROIC).

Going into more detail, shareholders may be interested in evaluating performance over time and comparing with peers using ratios that measure profitability and asset efficiency (see management below).

They will also be interested in evaluating financial risk, for which they will look at some of the ratios commonly used by ratings agencies (see below).

Finally, shareholders use relative valuation ratios to establish whether the shares are good value at the current price. We cover these ratios in our briefing paper on relative valuation.

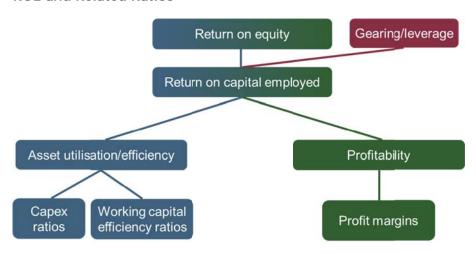
#### 2.3.2 Management

Management are ultimately running the company for the benefit of its owners (shareholders) and so should similarly want to ensure that the company is creating shareholder value by generating growth and ROE in excess of the cost of equity. However, management are also responsible for funding the business – ie for deciding on the appropriate mix of equity and debt. Management therefore are likely to break down ROE to its component parts, looking at leverage or gearing to assess the funding structure and ROCE to assess operating performance and make capital allocation decisions.



For management purposes, most ratios are calculated at the operating level – ie before interest and tax. The pre-tax return on capital can be broken down into subsidiary ratios that measure asset efficiency and profitability as shown in the diagram below.

#### **ROE** and Related Ratios



#### 2.3.3 Credit Rating Agencies

Credit rating agencies aim to make a recommendation as to the company's financial strength and ability to repay its loans and bonds (Moody's, Standard & Poors, Fitch etc) or its suppliers (Dunn & Bradstreet, Experian etc).



Bond rating agencies such as Standard & Poor's, Moody's Investor Service, and Fitch Ratings use qualitative as well as quantitative measures and they look at both the business risk and the financial risk in drawing their conclusions.

They routinely use the following ratios:

- Profitability
  - Return on capital
  - Operating profit margin
- Coverage
  - Interest cover
  - Fixed charge cover
- Capital structure
  - Gearing/Leverage
- Cash flow adequacy
  - Net debt/EBITDA
  - Funds from operations/Net debt
  - Cash interest cover

Companies such as Dunn & Bradstreet and Experian offer business credit scores to assess the credit worthiness as a potential supplier. They consider the following key financial ratios when looking at the financial risk:

- Profitability
  - Profit margin
- Financial Status
  - Acid test
  - Current ratio
  - Assets/net worth (equity)
- Asset Utilisation
  - Stock turnover
  - Collection period (days)



### 2.3.4 Equity Analysts

Analysts will look at financial information with a view to evaluating financial performance as per shareholders above. However, in addition to this, analysts need to forecast profits and cash flow forwards for several years, in order to value the shares. Of course, financial ratios are extremely useful here to establish a trend.

When forecasting profits, analysts will use:

- Gross profit margins
- EBITDA margins
- Operating profit margins
- Effective tax rate (ETR)

Analysts also use ratios that relate the income statement to the balance sheet to understand the business and for balance sheet and cash flow forecasting:

- Non-current asset turnover
- Working capital ratios (eg working capital/sales)

Analysts also look at financial strength ratios to evaluate financial risk:

- Net debt/EBITDA
- Net debt/equity
- Interest cover

As with shareholders, analysts also look at relative valuation ratios, which relate key value drivers to share price (see our briefing paper on relative valuation).



# 3 Calculating & Interpreting the Ratios

# 3.1 Return on Capital

Name	Calculation	Comment
Return on equity ROE	*Net profit = x 100 = x%  **Equity  *Profit attributable to shareholders  **Average, opening or closing equity will give different answers	ROE shows the return on shareholders' funds. To be creating value, ROE must be higher than the cost of equity. ROE significantly in excess of cost of equity (assuming cost of equity is approx. 10%, ROE of 20% would be very high) suggests that the company has little or no competition. Alternatively, high returns can be achieved by using lots of debt instead of equity (ie by excessive leverage, as happened with the banks pre-financial crisis).  ROE is sometimes called return on net assets (RONA).



Name	Calculation	Comment
Post-tax return on capital employed Post-tax ROCE	*Operating profit - tax (at ETR) x 100 = x%  **Equity + net debt  *Operating profit after tax is also known as NOPAT (net operating profit after tax) and NOPLAT (net operating profits less adjusted tax). The tax is a notional amount based on the effective tax rate because the actual tax will have been affected by interest receivable and payable. Profit is usually adjusted to exclude unusual/one-off items.  **Capital employed or assets employed = equity (net worth) + net debt (loans) = non-current assets + net working capital - non-current liabilities not used for funding.	Post-tax ROCE should be higher than a company's weighted average cost of capital (WACC) for a company to be creating value. As with ROE, a company with a very high ROCE is likely to be one with little competition. Competition tends to push returns down towards the weighted average cost of capital over time. In very competitive industries returns may be pushed below the cost of capital, usually triggering industry consolidation.  ROCE will look high for a company that  1. Outsources manufacturing 2. Leases its assets on operating leases which do not appear on the balance sheet (eg many retailers) 3. Invests through the income statement rather than the balance sheet, in things like marketing, advertising and research and development (eg pharmaceuticals, FMCG) 4. Has written off lots of goodwill or other assets via impairment charges.
		Under-investment can make the ratio look as though it is improving. Similarly, high initial investment may lower the ratio temporarily.
		Variations on ROCE are return on average capital employed (ROACE) and return on invested capital (ROIC) below and return on assets (ROA).



Name	Calculation	Comment
Pre-tax return on capital employed	*Operating profit x 100 = x%  **Equity + net debt	ROCE (before tax) is used as a performance measure. ROCE should be as high as possible (see comments for post-tax
Pre-tax ROCE	*Profit before interest and tax, adjusted to exclude unusual/one-off items	ROCE above).
	**Capital employed or assets employed = equity (net worth) + net debt (loans)	
	<ul><li>= non-current assets + net working capital</li><li>-non-current liabilities not used for funding</li></ul>	
Return on invested capital	*Operating profit x 100 = x% **Equity + net debt	ROIC (before or after tax) is used to get a better feel for the return on the capital that has been invested by lenders and
ROIC	*Operating profit (before or after tax) will be adjusted to exclude the profit effect of the capital employed adjustments above – eg operating lease costs will be added back.	shareholders. Adjustments are made to the equity and to the profit to add back items that have been written off under accounting rules, but which represent use of investors' capital.
	**Capital employed or assets employed are adjusted for any or all of the following:	
	<ol> <li>Add back goodwill previously written off</li> <li>Write back other intangible amortisation</li> <li>Capitalise operating leased assets</li> </ol>	
	Capitalise R&D	



Name	Calculation	Comment
Cash Flow Return on Investment	<u>Cash flow before interest &amp; tax</u> x100 = x% *Market value of capital employed	CFROI is a further refinement of ROIC and is an increasingly popular measure with analysts. It removes the subjectivity of
(CFROI)	*Total assets + accumulated depreciation & amortisation + an inflation adjustment + capitalised operating rentals + capitalised research & development (R&D) - non-debt related current liabilities	the income statement by converting profits into cash flows, a measure that more closely approximates a company's underlying economics. CFROI is more complex to calculate than ROIC since it is harder to derive the capital employed figure.
	related current habilities	CFROI is an approximation of the average real internal rate of return earned by a company on all its operating assets. Since the measure is inflation-adjusted, it can be used to compare companies across time.
		A variation on CFROI Is CROCE (cash flow return on capital employed).



# 3.2 Profitability Ratios

Name	Calculation	Comment
Gross profit margin	*Gross profit x 100 = x% Revenue  *Reported profit (as shown in the income statement) or on an underlying basis,	Gross profit margin shows how much profit a company generates on average from \$/£100 of revenue after taking into account the direct costs associated with that revenue. GM should be as high as possible.
	excluding one-off/unusual items	Gross margins are useful for comparing year on year but are not always useful for industry comparisons as there is often significant variation in the make up of the cost of sales (which is deducted from revenue in arriving at gross profit).
Operating profit (EBIT) margin	*Operating profit x 100 = x% Revenue	Operating margin shows how much profit a company makes on average from \$/£100 of revenue after all operating costs.
	*Reported profit (as shown in the income statement) or on an underlying basis, excluding one-off/unusual items	Again, the ratio should be as high as possible.  You tend to find high margins in low volume businesses (eg luxury goods) and low margins in high volume businesses (eg supermarkets). Similarly, margins tend to be higher where there is significant perceived added value (eg health and beauty products) and low where little value is added (eg supermarkets, which simply put the product on the shelf). Margins will be high in businesses with little competition and will tend to be squeezed in industries where competition is intense.
		Margins can be calculated at segment level (either by business or by geographical market). This will usually give a better insight into profitability than the overall margin.



Name	Calculation	Comment
EBITDA margin	*EBITDA x 100 = x% Revenue  *Usually on an underlying basis, excluding one-off/unusual items	EBITDA margin is similar to the operating profit margin but it removes the non-cash costs of depreciation and amortisation, which can be subjective and may differ between different companies.
	one on anasau toms	A variation is EBITDAR margin (earnings before interest, tax, depreciation, amortisation and rent) which is used to evaluate companies in sectors which rely heavily on leased assets, such as retail.
EBITA margin	*EBITA x 100 = x% Revenue	EBITA margin is similar to the operating profit margin but it removes the non-cash costs of amortisation.
	*Usually on an underlying basis, excluding one-off/unusual items	EBITA can be as a useful measure to be used as a replacement for, or in conjunction with, EBITDA where companies have high levels of intangible-based amortisation, which may not be considered a real business expense.
Cost ratios	Operating costs x 100 = x% Revenue	Cost ratios can be calculated for each separately disclosed cost line. They show what percentage of revenue is taken by each cost. Variable costs will tend to take the same proportion each year, whereas fixed costs will decrease as a proportion of revenue as volume grows (conversely, they will increase as a proportion if volume falls).
		Sometimes increases in cost ratios are seen as positive – generally if the cost is regarded as an investment – eg research and development or marketing.
Effective tax rate (ETR)	<u>Tax (per income statement)</u> x 100 = x% Profit before tax	Tax as a proportion of profit before tax shows the effective rate of tax the group is paying. This should be similar to the country tax rate. For multi-national companies, the ETR will vary according to the tax rates in the company's countries of operation.



# 3.3 Asset Utilisation/Efficiency Ratios

### 3.3.1 Non-current Assets

Name	Calculation	Comment
Asset turnover	Revenue = x times Assets employed	This shows how many \$/£'s worth of revenue is generated by \$/£1 of assets. It is an overall efficiency ratio and can be explained using the ratios below.
Non-current asset turnover	Revenue = x times Non-current assets	This ratio measures capital intensity. It shows how many \$/£'s worth of revenue is generated by \$/£1 of non-current assets (fixed or capital assets). A low ratio (below 5) is indicative of a very capital-intensive business. Service businesses on the other hand, will have a very high ratio (above 20).
		As with ROCE, the ratio will look high if a company out sources manufacturing or has lots of assets on operating leases (which are not on the balance sheet). Underinvestment can make the ratio look as though it is improving. Similarly, high investment may lower the ratio temporarily.
Capex/depreciation	<u>Capital expenditure</u> = x times Depreciation	This ratio shows how fast the company is investing (capital expenditure or capex) versus how fast the assets are wearing out (depreciation can be considered a proxy for this).
		A company which is spending less than 1x depreciation on new investment is unlikely to be replacing its assets faster than the rate at which it is wearing them out, whilst a company spending 2x depreciation is likely to be investing for growth.



# 3.3.2 Working Capital Ratios

Name	Calculation	Comment
Inventory turnover	Revenue = x times Inventory	Inventory turnover shows how many times inventories are turning over per year. The ratio overstates the case because inventories are in the accounts at cost, whereas revenue includes the profit (see alternative calculations below). An average manufacturing business might have inventory turnover of 6 times (ie stock is moving on average 6 times a year or every 2 months). Heavy manufacturing will be slower and food retail would be much higher.
		The ratio should be as high as possible as this minimises the investment in inventories. However, it should not be so high that the company is in danger of running out of product and is therefore unable to meet customer demand.
Receivables turnover	Revenue = x times Receivables	Receivables turnover shows how many times customer balances are being collected per year. A ratio of 6 times suggests 60 days payment terms, a ratio of 12 times would suggest that receivables are being collected once a month etc. Below 6 times would generally be considered slow and might suggest bad debt problems.
Payables turnover	Revenue = x times Payables	Accounts payable turnover shows how many times supplier balances are being paid per year. This ratio generally overstates the case because trade payable are usually in respect of cost of sales, whereas revenue includes the profit (see alternative calculations below). It would be more efficient to pay suppliers more slowly as the company has free use of supplier funds in the meantime.



Name	Calculation	Comment
Payables/receivables+inventory	Payables = x% Receivables + inventories	This ratio shows how what proportion of the current asset are financed by suppliers. The higher the proportion the better, as supplier money is generally interest-free (if these items are not financed by payables, then they must be financed by equity or debt which is clearly more expensive).



# 3.3.3 Alternative Working Capital Ratios 1

Name	Calculation	Comment
Inventory turnover	Inventory x 100 = x% Revenue	These ratios are a variation on those we have detailed above. They show the same thing, but the ratio is upside down. You would hope that inventories and receivables would be as low a percentage of revenue as possible. It would be more efficient for payables to be a higher percentage of revenue. These calculations are useful because they allow you to calculate an overall working capital ratio (see below).
Receivables turnover	Receivables x 100 = x% Revenue	
Payables turnover	<u>Payables</u> x 100 = x% Revenue	
Total working capital ratio	(Inventory + receivables - payables) x 100 Revenue	The overall working capital ratio tells you how much additional working capital you would need for every additional \$/£100 of sales. If the ratio is higher than the operating profit margin, sales growth is likely to create a requirement for more cash.

### 3.3.4 Alternative Working Capital Ratios 2

Name	Calculation	Comment
Inventory turnover	Inventory x 365 = x days Revenue	Some people find it easier to understand these ratios in terms of the number of days' worth of  — inventory/receivables outstanding at the year-end.
Receivables turnover	Receivables x 365 = x days Revenue	inventory/receivables existanting at the year end.
Payables turnover	<u>Payables</u> x 365 = x days Revenue	



# 3.3.5 Alternative Working Capital Ratios 3

Name	Calculation	Comment
Inventory turnover	<u>Inventory</u> x 365 = x days Cost of sales	These ratios are more realistic because they compare inventories and payables with cost of sales rather than revenue (which includes the profit). They can be used for comparing a company's results from one year to the next. However, the ratios which use revenue are better for comparing different companies because they will not be distorted by different cost allocations between cost of sales and other operating costs.
Receivables turnover	Receivables x 365 = x days Revenue	
Payables turnover	<u>Payables</u> x 365 = x days Cost of sales	
		(Note: it would never be consistent to compare accounts receivable to cost of sales, as receivables represent amounts of revenue owed by customers).

### 3.3.6 Alternative Working Capital Ratios 4

Name	Calculation
Inventory turnover	Inventory x 100 = x% Cost of sales
Receivables turnover	Receivables x 100 = x% Revenue
Payables turnover	<u>Payables</u> x 100 = x% Cost of sales



# 3.4 Measuring Liquidity

Name	Calculation	Comment
Current ratio	<u>Current assets</u> Current liabilities	This is a broad indicator of a company's short-term financial position.
		A ratio of more than 1 indicates a surplus of current assets over current liabilities. A high figure (more than 2) is not necessarily a good thing - it may be due to excessive stock and receivables or it may indicate that the directors are sitting on a pile of cash which is not being used efficiently.
		The ratio varies enormously from industry to industry so is most useful to compare one company over time.
Acid test	<u>Current assets – inventories</u> Current liabilities	This is a refinement of the current ratio, taking out inventories on the basis that they may not be so easily convertible into cash as the other current assets.



# 3.5 Measuring Financial Strength

Name	Calculation	Comment
Equity to total assets	Equity (net worth) x 100 = x% Total assets	There are numerous ways of looking at financial strength. This ratio shows what proportion of the assets is financed by equity (the most flexible, but most expensive form of funding). The higher the ratio, the less risky the situation.
Net leverage/gearing	Net debt (loans - cash) x 100 = x% Equity or Net debt (loans - cash) x 100 = x% Net debt + equity	Leverage/gearing can be calculated gross or net of cash. The most common ratio in the UK is net debt divided by equity. In the US, it is more common to calculate net debt divided by net debt + equity. The ratios show the debt (money borrowed) as a percentage of equity (shareholder funding) or as percentage of total capital. The higher the ratio, the riskier the situation.
		We tend to think of leverage/gearing as high when it reaches or exceeds 100% (on the basis of net debt/equity) and low when it is under 50%. However, the ratio matters far less than the company's ability to pay the interest - see interest cover below.
		Note that the definition of debt is all interest-bearing liabilities including loans, overdrafts, finance leases and many analysts would also include pension liabilities (as it is effectively money borrowed from the firm's pension scheme).
Net debt/EBITDA	Net debt (loans - cash) = x times *EBITDA	A further way of evaluating leverage, commonly used in the Private Equity industry, by credit ratings agencies and increasingly by analysts is net debt to EBITDA. It shows how many years' cash flow would be required to pay down debt.
	*Earnings before interest, tax, depreciation & amortisation adjusted to exclude unusual/one-off items	



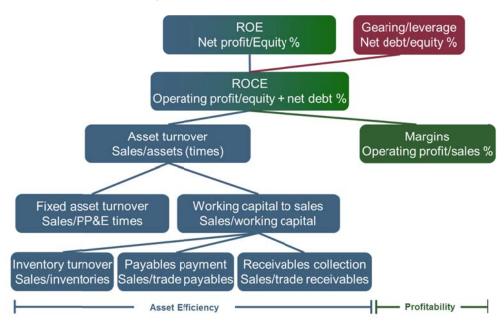
Name	Calculation	Comment
Interest cover	*Earnings before interest & tax = x times Net interest payable  or  *EBITDA = x times Net interest payable  *These profit measures can also be adjusted to exclude unusual/one-off items	Interest cover is like a safety feature. Like leverage/gearing, it can be calculated on a net basis (using interest payable net of interest receivable) or a gross basis. It shows how many times over a company could afford its interest payable.  The comfort level will depend on the variability of profits, but interest cover of more than 5 times is usually acceptable and even lower cover could be appropriate where profits are very stable. The issue to consider is whether there would be a problem if interest rates increased or profits decreased.
		Interest cover could also be calculated using operating cash flow as the numerator.
Fixed charge coverage	<u>EBIT + fixed charges (eg rent)</u> = x times Fixed charges + interest	This ratio gives an indication of whether the company has enough profit to meet its contractual obligations.



# 4 Summary

The diagram below shows how the key ratios fit together. At the top, remember that ROE should exceed the cost of equity for a company to be creating value. Alternatively, post-tax ROCE should exceed the weighted average cost of capital. The ratios below that show how the company performance can be assessed in greater detail in term of asset utilisation efficiency and profitability.

#### How the Ratios Fit Together





This is not the whole story though, in addition to these, there are a number of ratios that help you gauge a company's financial strength and liquidity. The table below summarises which ratio you can use.

**Quick Financial Analysis - Which Ratios?** 

#### Income Statement Balance sheet Capex efficiency Revenue growth Are the non-current Are revenues ratios growing, declining or assets being used Gross profit efficiently? static? margin · Is the working capital Working capital · Is the company more efficiency ratios · Operating profit under control? or less profitable margin than it used to be? · Are the timing of Current ratio Cost ratios current assets and · Is the company more Quick ratio (acid or less proftable (costs/revenue) current liabilities the test) same? than its competitors? Leverage/ Does the company · Return on capital Is the company gearing ratios employed have the appropriate making sufficient funding structure? profit using its (ROCE) assets? Equity to total · What is the assets ratio company's financial strength?

#### 5. Where to Go For More Information

Understanding & Communicating Shareholder Value, FinanceTalking Briefing Paper, March 2012

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