FINANCIAL ACCOUNTING AND FINANCIAL STATEMENT ANALYSIS

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ANALYSIS OF MANAGEMENT PERFORMANCE

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1. Analysis of management performance

1.1 Why use financial ratios?

Ratio analysis is one of the most popular analytical tools used by financial analysts. While the computation of a ratio is quite simple, its interpretation is often a more complex process and therefore it is quite often that the role of ratios is misunderstood. To be meaningful, a ratio must refer to an economical underlying relation. This relation should be one of the starting points of an analysis, not an end point.

Understanding the underlying relation is extremely important because analysts are computing numerous ratios using a company's financial statements, but these ratios are not always defined in the same way. There are multiple differences in between the way analysts are computing even the most classic financial ratios (see for **instance the definitions** of ROA given in the next section). What is important is that analysts should make sure that the same definition is used when comparing different companies and that this definition is indeed capturing the underlying economic event.

While analysing the ratios, proper care should be taken for choosing the right ratios. Statistical techniques are available to separate similar ratios from dissimilar ratios. It is once again reiterated that these techniques should be used after bringing the financial statements on a same accounting policy basis.

Ratios should be interpreted with extreme care, because multiple factors may affect in the same time the numerator and the denominator. For instance, a ratio operating expenses to sales is important because there is a direct relation between operating expenses and sales. But if a company is trying to improve this ratio by reducing the advertising costs this is likely to lead in a decrease of sales affecting the company's future prospects.

In addition, a ratio is not important in its own; it becomes useful if interpreted in comparison with:

- Prior ratios;
- Predetermined standards (industry average for instance);
- Ratios of competitors.



Solomon Ngahu - Reg No. 49000007 The large number of ratios has prompted investors to synthesise them into a single figure. The Piotroski ratio is the best known and comprises nine simple measurements of a company's activity: www.r

Measurements of management efficiency over the operating cycle

- 1. Improving gross margin over the year (gross margin/total sales or $\Delta MARGIN$)
- 2. Improving assets turnover over the year (sales/total assets or $\Delta TURN$)
- 3. Improving current ratio (current assets/current liabilities) ($\Delta LIQUID$)
- 4. Operating cash flow higher than net profit before extraordinary charges (ACCRUAL)

Measurements of the profitability of capital

- 1. Positive return on assets ROA (profit before extraordinary items/total assets)
- 2. Improving return on assets ROA over the year (ΔROA)
- 3. Positive return on operating cash flow/total assets (CFO)

Measurements of financial risk

- 1. Improving long-term debt/total assets ratio ($\Delta LEVER$)
- 2. Number of equities stable or declining over the year (EQ_OFFER)

Recent studies¹ have shown that companies with a strong Piotroski score tend to perform well on the stock market. In particular, there is a strong relationship between the level of the ratio and the company's future profitability. This conclusion should be compared with fundamental analysis which tends to increase the weighting of companies with improving fundamentals compared with those with deteriorating fundamentals.

Piotroski scores for Novartis and Apple²:

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>
Novartis	5	5	2	4	6	4
Apple	7	5	5	6	5	5

Source: Bloomberg³.

Apple has consistently shown scores higher than 5 whereas Novartis has experienced two difficult years since 2010 which coincided with a change of management and the adoption of a new strategy.

Josef D. Piotroski, Value Investing: The Use of Historical Financial Statement Information to Separate Winners from Losers, University of Chicago, Selected papers 2002.

² A score of one point is attributed for each of the nine criteria fulfilled; 0 if the result is insufficient. The score is the sum of all these points

³ The figures used by Bloomberg are slightly different from ours. However, these differences are enough to modify the overall score. Our estimate of the Piotroski score for Novartis is 5 for the years 2012 and 2013. This does not alter the overall conclusions.

Experience shows that about twenty companies that present one or two significant accounting divergences from IFRS standards can be 'kept updated' by a sell-side analyst.

1.2.1 Measurement of management efficiency over the operating cycle

In general terms, the efficiency is measuring how well a system is performing by comparing the outputs with the inputs. Efficiency ratios may be expressed as turnovers (outputs divided by inputs) or as turnover periods (inputs divided by outputs multiplied with 365). Turnover ratios reflect the relative productivity of different categories of assets and all things being equal the higher the ratios are, the better. However, this generalization must be viewed with caution, as it might be counterproductive to decrease the inputs hoping to maximize the outputs. The investment in assets must be optimized, rather than minimized.

'Efficiency' can be expressed both in terms of margins compared to sales and in terms of the efficient use of working capital (with particular attention to the management of stocks, creditors and debtors).

1.2.1.1 Gross margin

The gross margin is a popular ratio used by analysts to assess the profitability of an enterprise. As opposed to the operating margin, the gross margin assesses the profitability excluding the fixed costs and it indicates the relationship between sales and the cost of goods sold:

$$GM = \frac{Sales - Cost of goods sold}{Sales}$$

A high gross profit margin indicates that a business can make a reasonable profit on sales, as long as it keeps overhead costs in control. This ratio should be used for comparing companies in the same industry as the ratio varies widely across different industries. For instance, the gross margin is low for a retail distribution company if compared to an enterprise whose principal activities are selling of luxury goods. Some analysts consider that the gross margin should be looked at as a constrained imposed to the company by the external economic environment. The gross margin cannot be completely under the control of the company as it is highly influenced by factors out of control of the enterprise such as clients, competition, suppliers etc.

Example:

The gross margin calculation is based on Novartis' 2013 figures. The figures shown are taken from the annual report. The restated figures come from the previous section.

Financial accounting and financial statement analysis

nting and financial statement analysis		Solomon N	lgahu - Reg No. 49000007
Mios USD	2012	2013	and
Published figures			250
Sales & Other revenues	57'561	58'831	no
Cost of goods sold	18'756	19'608	N.
Gross margin (GM)	67.4%	66.7%	10
Restated figures			2
Sales & Other revenues	57'505	58'831	
Cost of goods sold	15'658	16'673	
Gross margin (GM)	72.8%	71.7%	

Comments

The level of gross margin is very high. This illustrates the high added value of pharma/health activities compared with other economic sectors. However, this level fell by over 1 percent in 2013. The company must intensify its productivity efforts downstream of the profit and loss account, particularly in terms of production costs or fixed costs to rebuild its margins.

Differences between published and restated figures

The difference relates to lower variable expenses according to the explanations in the previous section.

1.2.1.2 Operating margin

In order to compare enterprises within the same industry, analysts need to look at the operating profit margin. This ratio, also known as the economic profit margin is expressed in percentage terms and tells us how many cents in average are earned on each unit of currency in which the sales are expressed.

$$OM = \frac{EBIT}{Sales}$$

The operating margin is a measure of the percentage of an enterprise's sales left over from the operating activity. Therefore, it is a good analytical tool used by analysts to compare enterprises from the same industry with similar operating cycles. Note that the financing policy has no effect on this ratio. A good operating margin is an indicator of the company's ability to pay interest and taxes and represents an indicator of the way the company controls its production the costs.

Example:

The operating margin calculation is based on Novartis' 2013 figures. The figures shown are taken from the annual report. The restated figures come from the previous section.

Mios USD	2012	2013
Published figures		
Sales & Other revenues	57'561	58'831
EBIT	11'193	10'910
Operating margin (OM)	19.4%	18.5%
Restated figures		
Sales & Other revenues	57'505	58'831
NOPAT	14'842	14'485
Operating margin after taxes (OM)	21.8%	20.9%

Comments

Here too, the operating margin is very high. It was subject to the same downward pressure as the gross margin. The adoption of a new strategy at the end of 2012 was aimed at reversing the erosion of this profitability due inter alia to patents expiring and competition from generics.

Differences between published and restated figures

The difference relates to lower variable and fixed expenses according to the explanations in the previous section. We consider taxes as an operating charge, and we calculate a margin after tax with the net operating profit after taxes (NOPAT). As the restated operating profit is higher than the published figure, it is to be expected that the NOPAT after tax will be higher than the published earnings before interest and taxes (EBIT).

Solomon Ngahu - Reg No. 49000009 cpt. con*i.2.1.3 Net margin* The net profit margin represents a common measure of profitability. This ratio is calculated bydividing the net profit on the total of sales: $<math display="block">NM = \frac{Net \text{ income}}{c_{c_1}}$ However, this ratio is mostly het profit

$$NM = \frac{Net income}{Sales}$$

net profit margin for different enterprises. Individual businesses' operating and financing arrangements vary so much that different entities are bound to have different levels of expenses, so that comparison of one with another may be biased. A low profit margin indicates a low margin of safety: higher risk that a decline in sales will erase profits and result in a net loss. Therefore this ratio is mostly used for time series analysis.

Example:

The net margin calculation is based on Novartis' 2013 figures. The published figures are taken from the annual report. The restated figures come from the previous section.

Mios USD	2012	2013
Published figures		
Sales & Other revenues	57'561	58'831
Net income	9'383	9'292
Net margin (NM)	16.1%	15.6%
Restated figures		
Sales & Other revenues	57'505	58'831
Net income	12'576	12'533
Net margin (NM)	21.7%	21.1%

Comments

As we can see, the net profit margin has slightly decreased in 2013 compared to 2012. We will see when we analyse the group's divisions that the company's three main divisions (Pharma, Alcon and Sandoz) have suffered an erosion of their profitability.

Differences between published and restated figures

From a legal point of view, only the 'Core' Net Income - Group Share (12,416) belongs to the owners of the company. Therefore, the NM - Group Share is 21.1 percent for 2013. In practice, we use consolidated profit, as the minority interests' at Novartis are extremely small.

1.2.1.4 Asset turnover

The asset turnover ratio indicates the general efficiency of the enterprise's use of its assets and it is measured as the annual sales generated by each monetary unit of assets:

$$AT = \frac{Sales}{Assets}$$

The asset turnover ratio indicates in financial terms the intensity with which enterprises use assets; for example, an improvement in the occupancy rate of airplanes will lead to an increase in the asset turnover ratio of an airline. In addition, this ratio is a function of the type of activity: capitalintensive economic sectors (as in cement factories, paper mills, airlines) will show lower asset turnover ratios than less capital intensive economic sectors (such as distribution or most service activities). Large variations between firms among the same economic sector may also be due to differences in fixed asset ownership: consider the typical case of two hotels, one being owner of the building and the other not. Therefore, it is often useful to compute the asset turnover ratio for subcategories of assets such as fixed-asset turnover, operating assets turnover etc. The next ratios focus on various analyses obtained by disaggregating the asset turnover.

ncial accounting and financial statement analysis		Solomon	Ngahu - Reg No. 49000007
Calculation of this ratio is based on Novartis' 2013 figur	es. The published fig	gures are ta	ken from the
annual report. The restated figures come from the previou	is section.	-	no
			N.
Mios USD	2012	2013	Sr.
Published figures			
Sales & Other revenues	57'561	58'831	
Total Liabilities & Equity	124'191	126'254	
Asset turnover (AT)	46.3%	46.6%	
Restated figures			
Sales & Other revenues	57'505	58'831	
Invested capital	102'941	104'733	
Asset turnover (AT)	55.9%	56.2%	

Comments

Asset turnover is low compared with other sectors. This is due to the nature of the product but also because of the high value of intangible assets on the balance sheet. When these assets are excluded, asset turnover is approximately 10 percent higher.

Differences between published and restated figures

The difference relates to taking the entire balance sheet into account in one case and capital invested in the other with working capital requirement and debt net of the respective assets/liabilities.

1.2.1.5 Inventory outstanding period

The inventory outstanding period represents the average time that inventories are available for sale and it is computed by dividing the inventories to the average daily cost of goods sold (cost of goods sold divided by 365):

$$IOP = \frac{Inventories}{Cost of goods sold} \cdot 365 days$$

Note that the cost of goods sold is used instead of sales as the inventories are reported at cost (and not at selling price). A long inventory outstanding period could mean that the enterprise's merchandise is hard to sell and therefore uncompetitive or that the company has a bad inventory management. Enterprises will try to keep the inventory outstanding period as short as possible because of finance, insurance, storage, and logistics costs. Different management tools (just in time deliveries, producing to order) are helping companies to reduce the inventory outstanding period without facing a stock out.

Example:

Calculation of this ratio is based on Novartis' 2013 figures. The published figures are taken from the annual report. The restated figures come from the previous section.

Mios USD	2012	2013
Published figures		2010
Inventories	6'744	7'267
Cost of goods sold	18'756	19'608
Inventories outstanding period (IOP)	131	135
Restated figures		
Inventories	6'744	7'267
Cost of goods sold	15'658	16'673
Inventories outstanding period (IOP)	157	159

Comments

Average storage time for semi-finished and finished products is 157 days. This figure is higher than in other sectors such as distribution.

ncial acc	ounting and financial statement analysis		Solomon N	Ngahu - Reg No. 4900000791.
Differen	ces between published and restated figures			ome
In its an	nual report, Novartis indicates the share of co	st of goods sold that	relates to	inventories
(USD 13	.7 trillion in 2013 and USD 12.9 billion in 201	2). On this basis, a m	ore precise	inventories
outstandi	ng period (IOP) can be recalculated.			NN.
				1 ² 2
	Mios USD	2012	2013	>
	Published figures			
	Inventories	6'744	7'267	
	Cost of goods sold	12'900	13'700	
	Inventories outstanding period (IOP)	191	194	
	Restated figures			
	Inventories	6'744	7'267	
	Cost of goods sold	9'802	10'765	
	Inventories outstanding period (IOP)	251	246	
	U			

Important is not the absolute level of the ratio but how much it changes. The aim behind these results is to capture the management's strategic intention in managing the capital invested.

1.2.1.6 Collection period

The collection period represents the average time that clients need to pay their debts and it is computed by dividing the receivables from clients to the average daily sales (sales divided by 365):

$$CP = \frac{\text{Receivables from clients}}{\text{Sales}} \cdot 365 \text{ days}$$

Receivables from clients represent an asset that is financed at a certain cost of capital. Therefore enterprises will try to minimize these costs by reducing the collection period or by offering cash discounts. However a too aggressive credit policy may harm the sales. As with all turnover ratios, an optimum level must be found. A long collection period has a major negative impact on the liquidity, profitability and on the risks that a company is facing (clients may not pay). A short collection period may force clients swift to competition. This ratio reflects the credit policy of the enterprise and it is heavily dependent on the economic sector.

Example:

Calculation of this ratio is based on Novartis' 2013 figures. The published figures are taken from the annual report. The restated figures come from the previous section.

Mios USD	2012	2013
Published figures		
Sales & Other revenues	57,561	58,831
Trade receivables	10,051	9,902
Collection period (CP)	64	61
Restated figures		
Sales & Other revenues	57,505	58,831
Trade receivables	10,051	9,902
Collection period (CP)	64	61

Comments

This period of credit for debtors is relatively short. This figure has improved compared with the previous year by an average of one day. Customers are paying slightly more quickly.

Solomon Ngahu - Reg No. 49000007 **1.2.1.7 Payables outstanding period** The payables outstanding period represents the average time that the enterprise needs to pay its suppliers and it is computed by dividing the accounts payable to the average daily purchases (purchases divided by 365): $POP = -\frac{Accounts partice}{POP}$

$$POP = \frac{Accounts payable}{Purchases} \cdot 365 \text{ days}$$

Sometimes analysts use the cost of goods sold at the denominator because the purchases are not always disclosed by enterprises. However, most of the times it is possible to compute the purchases given the beginning and final balance of inventories and the cost of goods sold based on the equation:

Initial balance + Purchases = Final balance + Cost of goods sold.

Receivables from clients and inventories are mostly financed by the accounts payable because they represent an interest free way of financing. The alternative would be to borrow money at higher costs in order to finance purchases and the production. This is why companies use trade credit whenever possible and try to delay the payment of suppliers. A long payables outstanding period can however harm the relation with the supplier if used excessively. A usual level for this ratio is 3 months, but it varies with industry.

Example:

Calculation of this ratio is based on Novartis' 2013 figures. The published figures are taken from the annual report. The restated figures come from the previous section.

Mios USD	2011	2012	2013
Published figures			
Trades payables		5'593	6'148
Inventories	5'930	6'744	7'267
Cost of goods sold		18'756	19'608
Purchases		19'570	20'131
Payables outstanding period (POP)		104	111
Restated figures			
Trades payables		5'593	6'148
Inventories	5'930	6'744	7'267
Cost of goods sold		15'658	16'673
Purchases		16'472	17'196
Payables outstanding period (POP)		124	130

Solution:

First we have to compute the purchases: Purchases for restated figures 2013= Final balance of inventories + Cost of goods sold – Initial balance of inventories = 7'267 + 16'673 - 6'744 = 17'196**Comments:**

Novartis has clearly extended its payment period in 2013 adding an average of six days which enables it to finance less of its working capital needs through debt.

These last three ratios can be easily put together in interpreting the efficiency of a company based on the formula:

Operating period to be financed =	Inventory outstanding period
	+ Collection period
	- Payables outstanding period

ncial accounting and financial state	ement ana	lysis	Solomon Ngahu - Reg No. 49000007
Example: For Novartis, the operating period to be Novartis has a need to finance almost 6 from the figure below for 2013 (restated	financed is 57 days for figures):	159 + 38 – its operatin	130 = 67. The positive sign means that g cycle. This can be easily undergood
	1180103)1		nn
	Assets	Liabilities	
Inventories outstanding period	159	130	Payable outstanding period
	+	+	
Collection period	61	90	Operating period to be financed
	=	=	
Cycle length	220	220	Cycle length

Some of this working capital requirement is financed by short-term provisions for deduction of income and restructuring (note 20 of the annual report)

1.2.2 Capital profitability ratios

Profitability analysis deals with the relative performance of profits with reference to some other measure (a benchmark). Investors are not only interested in aggregate profits but are also interested in profitability measures. It is essential for the investors to use these measures to compare the evolution of these ratios in time and with other similar enterprises. They need to use these measures to evaluate the performance of the enterprise in which they may have a stake. This is more relevant in the case of institutional investors such as mutual funds, banks, etc.

Profitability is important in the analysis but it can be subject to significant distortion due to accounting choices. The reasons are:

- 1. It is a simple instrument for measuring management quality and its past ability to create value for the company. There are huge differences between companies in terms of the profitability of capital. It is therefore important to be aware of these disparities.
- 2. Imagine handing your wealth over to a banker at the beginning of the year. At the end of the year, your question will be: 'How has my account performed?' He or she will reply by showing you its performance expressed in terms of a percentage of the initial capital while reminding you of the level of risk you were prepared to accept for your investments. Although on a different scale, the shareholder and the board of directors of a company are in an identical position vis-à-vis the company's management. They need a simple ratio to enable them to understand the performance in managing the capital invested over the year just ended.

But return on capital invested is only one of the components of the analysis. The reasons:

- Accounting does not take account of numerous components of the company in particular its intellectual capital represented by the value of its personnel.
- Capital invested varies according to the company's internal or external growth strategy. To take the example of a company that publishes profit for the year of CHF 100,000 and spends CHF 1,000,000 from the beginning of the following year to develop or acquire a new manufacturing process expecting a return on investment of 20 percent for the next four years.

- a. If it chooses internal development, the company posts the development costs to the profit and loss account. Its return on capital rises after an initial fall of 5 percent to 15 percent for four years⁴.
- b. If it buys a licence, it will also see an increase in return on capital but it will be more gradual and not as large.

The difference in profitability is due purely to the decision to develop internally or externally, which is not well understood by investors, as the free cash flows are identical.

nternal R&D - yearly expensed							
	0	1	2	3	4	5	6
FCF	100'000	-900'000	300'000	300'000	300'000	300'000	100'000
Capital	2'000'000	2'000'000	2'000'000	2'000'000	2'000'000	2'000'000	2'000'000
Return on capital	5%	-45%	15%	15%	15%	15%	5%
Acquired R&D	Acquired R&D						
	0	1	2	3	4	5	6
FCF	100'000	-900'000	300'000	300'000	300'000	300'000	100'000
Capital	2'000'000	3'000'000	2'750'000	2'500'000	2'250'000	2'000'000	2'000'000
Return on capital	5%	-30%	11%	12%	13%	15%	5%

- Some companies outsource whole swathes of their manufacturing process to reduce their capital needs. They concentrate on more profitable marketing and planning activities by delegating product manufacture to third parties. This outsourcing increases the profitability on capital considerably because it significantly reduces the need for capital. This phenomenon is one of the explanations for the increase in the profitability of US American and European companies over the past ten years. But it comes at the price of greater operating risk as the company depends on third parties for its production which one way or another will have an impact on its cost of capital. We will examine this point in the section on valuation.
- Finally, the balance sheet includes figures of different ages. Where there has been inflation over several years, the balance sheet values do not represent the replacement value of the products. The return on capital therefore tends to be overvalued economically.

To sum up, analysis of profitability produces essential information, but for an investor outside the company, it would be desirable to have access to ratios that reflect more closely the internal rates of return of companies' investments. The cash flow return on investment (CFROI) is a better tool than the return on capital employed (ROCE). The CFROI is more complicated to calculate, but it allows comparisons of historic ratios to be made. The final choice is a trade-off between cost and the availability of information. If we are dealing with companies with similar activities (in the same sector) and similar strategies, a comparison of ratios (even if imperfect like the ROCE) will already have produced useful conclusions.

⁴ We have taken two hypotheses: profit is distributed in the form of dividends to keep the amount of capital invested fixed and if licences are acquired, the asset is subject to straight-line amortisation over four years.

Solomon Ngahu - Reg No. 49000007 control of the sector o

$$ROA = \frac{Net income}{Assets}$$

Though some analysts use the assets on the balance sheet at year-end to compute the ROA, this does not accurately present the performance obtained on invested capital during the year. Indeed, this can produce distortions if there are significant changes during the year. For instance, if a company makes a significant investment towards the end of the year, this will be reflected in the assets at year-end. However, the earnings contribution will be minimal since the investment has only been made at year-end and has not yet had time to contribute fully to earnings. This would cause the ROA to appear lower than it probably should be. Analysts therefore typically use average assets (or equity for ROE) to compute the ratios to help minimize this effect and indeed, this approach should be preferred.

$$ROA = \frac{Net income}{Average assets}$$

In general terms and within the context of financial analysis, a rate of return is a relationship between an annual profit (or earnings) and the amount of capital used to generate this profit. This return simultaneously measures:

- the performance obtained on the invested capital; •
- the maximum remuneration that can be distributed.

The consequence of these two characteristics is that the numbers used to compute returns should respect a coherence principle: the profit should only include the components of the annual profit that are generated by the invested capital and from a distribution point of view, this profit should be used to remunerate all the components of the invested capital. A rate of return computed by dividing net income by the total assets should be therefore avoided as such a ratio is incoherent because the net income does not indicate the maximum remuneration of the total assets, but of the total equity only. A more coherent ROA should compare the value of the assets with the profit that can be used to remunerate the debts and equity as well as to pay the income tax:

$$ROA^* = \frac{EBIT}{Average assets}$$

where:

EBIT = earnings before interest expenses and income tax

Such a definition should be preferred as EBIT is independent of financial leverage as well as tax effect.

Therefore we will denote this definition as the <u>return on assets before tax and interest</u>. This return can be considered as the return before income tax if the company was entirely financed by equity. Therefore the ROA* is independent of the level of debt and is an indication of the ability of the company to generate profit, exclusively from an industrial and/or commercial point of view. In this sense, the ROA* plays a central role in financial analysis.

However, most of the financial databases leave out the state from the equation above (as it does not supply resources). Therefore the numerator becomes the net income recomputed as if the company would not borrow any funds. From the net income the interest expense is eliminated net of tax effects and therefore the formula becomes:

ROA **= $\frac{\text{Net income + Interest expense } \cdot (1 - \text{tax rate})}{\text{Average assets}}$

The ROA** is a good measure of the ability of the company to use its capital (assets) efficiently and it is referred to as the <u>return on assets after tax but before interest</u>. It is basically a measure of its operational efficiency. It does this by leaving aside the effect of the sources of financing, but it is taking into account the income tax.

The return on assets gives an indication of the capital intensity of the enterprise and helps the analyst to evaluate the performance of the individual enterprise on a comparable basis. It is a useful ratio for comparing competing companies in the same industry. As the number varies widely across different industries, it is not useful for comparisons between industries; companies that require large initial investments will generally have lower return on assets. Since the figure for total assets of the company depends on the carrying value of the assets, some caution is required for companies whose carrying value may not correspond to the actual market value. Return on assets is a common figure used for comparing performance of financial institutions (such as banks), because the majority of their assets will have a carrying value that is close to their actual market value.

Example:

These rat	ios are o	calculated	based of	on Novartis	2013	figures.	The published	l figures	are	taken	from	the
annual re	port. Th	e restated	figures	come from	the pre	evious se	ection.					

Mios USD	2012	2013
Published figures		
Total Liabilities & Equity	124'191	126'254
Net income	9'383	9'292
EBIT	11'193	10'910
Net interest expense	820	775
Actual tax rate	14.9%	14.2%
Restated figures		
Total Liabilities & Equity	102'941	104'733
Net income	12'576	12'533
EBIT	14'842	14'485
Net interest expense	691	619
Actual tax rate	15.7%	15.3%

Solution:

ounting and financial statement analysis			Solomon Ngahu - Reg No. 4900000	M
Published figures			, nº	
ROA (year-end assets) i.e after taxes	_	7.5%	7.3%	
ROA** (year-end assets) i.e after taxes before interest	1	8.0%	7.8%	
ROA * (year-end assets) i.e before interest and taxes		9.0%	8.6%	
Restated figures				
ROA (year-end assets) i.e after taxes		12.1%	11.9%	
ROA** (year-end assets) i.e after taxes before interest		12.8%	12.4%	
ROA * (year-end assets) i.e before interest and taxes		14.4%	13.8%	

Comments:

Novartis' figures show adequate profitability for the company's assets based on the published figures. It improves further if the figures for net working capital on the one hand and debt and cash on the other are offset against each other.

Profitability on capital excluding goodwill and other intangible assets can also be calculated to measure Novartis' 'pure' operating profitability compared with a company that has never had recourse to acquisitions.

Restated figures		
ROA** (year-end assets) ex intangible assets	37.1%	35.1%

1.2.2.2 ROCE

The Return on Assets (ROA) measures returns on total assets, potentially also including nonproductive ones. However, investors are usually very interested in the returns a company produces on the capital it employs.

Return on Capital Employed does precisely that. It is a measure of capital efficiency, i.e. how well a firm uses its capital. It is defined in many different ways, but one common definition is shown below:

Return on Capital Employed = $\frac{\text{Net Operating Profit After Tax}}{\text{Net Operating Assets}}$

Where Net Operating Profit After Tax (NOPAT) is defined as:

NOPAT = EBIT $(1 - \tan \pi t)$

And net operating assets are calculated as follows:

	= net working capital + fixed assets = net operating assets
Net operating assets =	current assets - short-term liabilities

There are differences between the return on assets (ROA) and the return on capital employed ROCE:

- The intention of the two ratios is the same, i.e. to restore the balance sheet to a size that takes account of items that offset each other between assets and liabilities.
- -But one of the big differences with ROA is that ROCE focuses on operating assets and leaves out non-operating assets.

Solomon Ngahu - Reg No. 49000007 Another difference is that ROA** calculates the average of the last two years' balance sheets whereas ROCE takes account of the balance sheet at the beginning of the financial year (which is actually the balance sheet at the end of the previous financial year). An average ROCE will be closer to ROA**

Mios USD	2011	2012	2012
	2011	2012	2015
Published figures			
Total Liabilities & Equity	108'874	115'351	117'029
EBIT		11'193	10'910
Actual tax rate		14.9%	14.2%
RoCE		8.8%	8.1%
Restated figures			
Invested Capital (operating)	83'605	86'736	87'374
NOPAT		12'512	12'275
RoCE		15.0%	14.2%

Comments

For Novartis these figures are close to the ROA.

Differences between published and restated figures

We have excluded the Roche participation from capital invested as we consider it a non-operating asset.

1.2.2.3 Importance of marginal ROCE

The classic formula for estimating a company's long-term FCFF growth is:

 $G_{FCF} = ROCE \cdot Reinvestment rate$

A company with a return on capital employed (ROCE) of 5 percent and which has the opportunity of investing at the same rate in the future by reinvesting 80 percent of its net operating profit after taxes (NOPAT) will record an increase in its free cash flow to the firm (FCFF) of 4 percent. The higher either of these two variables is, the greater will be the rate of growth of the FCFF.

The formula mentions marginal ROCE, which means that it is the rate on new investments that is required, not the historic rate. Often, for reasons of simplicity, investors consider the ROCE for the previous year a good indicator of the return on new investments. This is not always the case. The ROCE of capital invested is the weighted average of the ROCE figures from the company's various historic investments. If the company's competitive position has deteriorated sharply in recent years, the average ROCE of capital invested will still bear the traces of the 'golden age', whereas the profitability of new investments is likely to be very close to the cost of capital.

The example below shows a growth in free cash flows of 4 percent over two years, achieved from a marginal profitability rate for the ROCE of 5 percent and a reinvestment rate of 80 percent. If the expected rate of return on new investments is taken as 12.5 percent of the company's historic ROCE, growth would be substantially overestimated in the anticipated rate of 10 percent $(12.5\% \cdot 80\%).$

Financial accounting and financial	statement analysi	S	Solor	non Ngahu - Reg No. 49000007	'n
	YO	Y1	Y2	Y3 OTT	
Invested Capital (year end)	800'000	880'000	963'200	1'049'728	
Capex gross		130'000	135'200	140'608	
- Depreciation		50'000	52'000	54080 N	
NOPAT		100'000	104'000	108'160	
- Capex net		80'000	83'200	86'528	
FCF		20'000	20'800	21'632	
ROCE		12.5%	11.8%	11.2%	
Marginal ROCE		5.0%	5.0%	5.0%	
Reinvestment rate		80%	80%	80%	
FCF growth		4.0%	4.0%	4.0%	

The overall impact of 'poor' investments over two years has only had a marginally adverse effect on the company's ROCE which is still 11.8 percent in Y2 and 11.2 percent in Y3. The reality is more dramatic as we shall see in the section dealing with valuations: if 5 percent is taken as the 'normal' rate of return on investments, the stock market value of the company would collapse. It is therefore essential for the analysis to detect changes in marginal profitability quickly.

1.2.2.4 Cash ROCE

To overcome the accounting drawbacks of ROCE and ROA, practitioners have proposed taking an approach linked to cash flow rather than profit and loss results. Cash ROCE is one of the proposed solutions:

	<u>2011</u>	<u>2012</u>	<u>2013</u>
A Property, Plant and Equipment (note 10)			
Cost	29'935	32'772	35'601
Net value used in Capital invested calculation	15'627	16'939	18'197
B Intangible and Goodwill (note 11)			
Value at cost	73'425	76'196	77'219
Net value used in Capital invested calculation	65'325	67'513	67'633
C R&D net	30'238	32'797	35'333
Adjustements to Capital Invested			
A PPE	14'308	15'833	17'404
B Intangible and Goodwill	8'100	8'683	9'586
C R&D	30'238	32'797	35'333
Total	52'646	57'313	62'323
Gross Capital invested adjusted	136'251	144'049	
Gross NOPAT		14255	14110
Cash RoCE		10.5%	9.8%
RoCE		15.0%	14.2%

Cash ROCE = (NOPAT + amortisation and non-cash charges) / (gross fixed assets + net working capital)

The adjustment for property, plant and equipment (PPE) (line A) is obtained by subtracting net values for industrial fixed assets from the gross values (32,772 and 16,939 in 2012). This difference represents accumulated depreciation.

The same process is applied for line B (intangible assets/goodwill: 76,196 gross in 2012, 67,513 net used for calculating the ROCE). Unlike for industrial assets, amortisation of intangible assets has already been included in the adjusted core results.

The adjustment made for research and development (32,797) has been added to line C. This figure is net, as the gross figures are not available.

The total adjustment (A+B+C) is 57,313 for 2012. This adjustment is added to the amount of operating capital invested. The return is calculated on the basis of the capital invested for the previous year.

Cash ROCE 2012 = (12,512 + 1,743) / (83,605 + 57,313) = 10.5%

Cash ROCE 2013 = (12,275 + 1,835) / (86,736+ 62,323) = 9.8%

The cash ROCE is about 4 percent lower than the ROCE. This is due to the reintroduction of historic values and the capitalisation of research and development.

1.2.2.5 CFROI

The Cash Flow Return on Investment (CFROI) model has been developed by a global consulting firm, HOLT Value Associates. HOLT's basic premise is that the stock market sets prices based on cash flows, not traditional accounting measures of corporate performance like reported earnings. The CFROI model is rooted in discounted cash flow principles (more cash is preferred to less, sooner is preferred to later, less uncertainty is preferred to more). It is supposed to be accurate because 1) it deals with inflation-adjusted figures and 2) it minimizes accounting distortions. This means that CFROIs are more comparable over time and across companies in different industries and different countries.

From a theoretical standpoint, CFROI is a cross-sectional return measure of a portfolio of ongoing projects. Each project a) has a life cycle, b) requires an initial outlay of depreciating assets (plant, goodwill) and non-depreciating assets (net working capital, land), c) generates cash flows over the life of the project and d) releases the non-depreciating assets at the end of the project.

Individual projects cannot be identified by outside investors. But financial statements do reveal the amount of total depreciating assets, total non-depreciating assets, and total cash flow. Consequently, it is possible to compute the CFROI without knowing the specific returns of all projects.

1. Depreciating assets

Depreciating assets can be defined as follows:

Inflation-adjusted gross plant

- + Capitalized value of operating leases
- + Goodwill
- = Depreciating assets

Gross plant assets must be adjusted for inflation. In other words, we should estimate the current value of these assets, and not simply use reported figures, which are usually a mix of different purchasing-power dollars.

Some operating assets are not mentioned in the balance sheet, because they are not owned but leased by the company:

Capitalized value =
$$\frac{\text{Annual rental expense}}{\text{Real debt rate}}$$

Solomon Ngahu - Reg No. 49000007 In HOLT's database, the amount of intangibles (goodwill) is included in assets for measuring CFROIs. This is basically a good decision, because the firm's capital suppliers paid for the goodwill. Unfortunately, accounting standards differ between companies which purchase intangible assets through acquisitions and companies which generate goodwill by increasing the value of their own intangible assets (for instance by training their staff). In the first case, goodwill is considered as an asset. In the second, it is not, and the CFROI may appear much higher than it really is.

Novartis:

- Value of gross industrial assets (35,601) less assets that cannot be depreciated, specifically land (954) and fixed assets under construction (3,639). The life of these assets is approximately 18 years (depreciation of 1,751, note 10 of the annual report). These amounts are adjusted by historic inflation rates. An average historic consumer price index (CPI) of 1.9 percent for the United States and 0.5 percent for Switzerland is used and split 50/50.
- Value of intangible assets is made up of gross goodwill (31,821), assets subject to amortisation (40,308) and those that have not been amortised (5,900). The estimated asset life using amortisation figures (2,976) is 13.5 years.
- Value of research and development: capitalised research and development expenses of USD 35,333 million were reincorporated in 2013.
- The total assets subject to amortisation amount to USD 151,663 million after these three adjustments.

2. Asset life

Asset life can be defined as follows:

Asset life = $\frac{\text{Adjusted grossplant}}{\text{Depreciation of grossplant}}$

The gross plant amount is the cost of all tangible fixed assets. However, land is excluded because there is no associated depreciation expense.

Novartis: total amortisation posted for these assets including amortisation of capitalised research and development expenses which was 1,751 million for property, plant and equipment (PPE), 2,976 million for intangible assets and 5,653 million for amortisation of capitalised research and development expenses. This produces an average life of 11 years.

3. Non-depreciating assets

Non-depreciating assets can be defined as follows:

- Net monetary assets
- + Current-dollar inventory
- + Current-dollar land
- = Non-depreciating assets

Net monetary assets (excluding inventories) are cash, short-term investments, receivables and other current assets, less current liabilities (accounts payable, income taxes payable, other current liabilities).

Inventory must be valued in current dollars, i.e. by using the FIFO (first-in, first-out) method.

As with plant, land is usually stated in historical dollars. This value should also be adjusted to take inflation into account.

Novartis: net working capital (USD 1,019 million), land and assets under construction (4,593 million) inventories (7,267 million) and other unspecified fixed assets (525) making a total of 13,404 million.

4. Gross cash flow Gross cash flow (the amount of cash flow resulting from the company's business operations, regardless of how they are financed) can be defined as follows (we have ignored the effects of pension and tax accounting): Net income + Depreciation & A:: + A::

- + Adjusted Interest Expense
- + Rental expense
- + Inflation adjustments
- + Minority interest
- = Current-dollar gross cash flow

Depreciation and amortization are added to net income because they are non-cash operating expenses.

Interest expense is added too, because it is viewed as a financing cost, not an operating cost.

Since in the depreciating assets calculation, leases were capitalized, rental expenses must be added to net income as well.

Inflation adjustments come from:

- the restatement of LIFO inventories to their FIFO value
- the adjustment of nominal interest revenues and expenses to real values

A minority owner is treated as a supplier of capital in the CFROI model. Therefore, minority interest is added back to net income.

Novartis: net profit (9,175) plus minority interests (117), interest payments after tax (619), depreciation of fixed assets (1,751) and amortisation of intangible assets (2,976). Expenses posted to research and development during the year are added. Gross cash flow amounts to USD 24,280 million.

Profitability calculation: the HOLT calculation applied to Novartis at the beginning of April 2014 has been taken as a comparison (the details of Holt's restatements are not known). Holt calculated average asset life as 12.2 years compared with 11 years according to our calculations.

	1	Year	AZEK	HOLT	
CFROI 2013			9.7%	10.3%	
	1	0	-165'067	-161'589	Gross capital
		1	24'280	22'963	Gross cash Flows
		2	24'280	22'963	
		3	24'280	22'963	
		4	24'280	22'963	
		5	24'280	22'963	
		6	24'280	22'963	
		7	24'280	22'963	
		8	24'280	22'963	
		9	24'280	22'963	
		10	24'280	22'963	
		11	37'684	22'963	
		12		46'019	Last cash flow + Non depreciating assets

The final profitability results are close with an internal rate of return (IRR) of 9.7 percent according to our figures and 10.3 percent according to Holt.

Solomon Ngahu - Reg No. 49000000 A 2013 profitability series has therefore been obtained for Novartis: an ROA** of 8.6 percent, an ROGE of 14.2 percent, a cash ROCE of 9.8 percent and a CFROI of 9.7 percent. The over-inflationary influence of ROCE with just one historic value in the balance sheet accounts can be clearly seen. The cash ROCE and the CFRQ hare, in the case of Novartis, very close as they are based on the same concept of not allowing historic figures to produce an undervaluation of capital needs. This is why gross figures excluding amortisation and depreciation were used in the calculations.

1.2.2.6 Return on equity (ROE)

The return on equity is viewed as one of the most important financial ratios. It measures the rate of return on the ownership interest and is obtained by comparing net profit after tax with the total equity of the company:

 $ROE = \frac{Net income}{Average equity}$

If a company has issued preferred stocks or many classes of equity, it becomes relevant to compute a return on common equity (only the common stocks are taken into account instead of total equity).

$$ROE = \frac{Net income - Preferred dividends}{Average common equity}$$

This will be more specifically the case in the USA where preferred shares are rather common. The numerator (net income minus preferred dividends) appears in most US income statements as net income available to shareholders.

The ROE measures from the owners' point of view a firm's efficiency at generating profits from its net assets (equity), and shows how well a company uses investments to generate earnings growth. However, the ROE as an earnings growth indicator is presumably irrelevant if the earnings are not reinvested. When firms pay dividends, earnings growth lowers. For example, if the dividend payout is 20%, the growth expected will be only 80% of the ROE rate.

Note that not all high-ROE companies make good investments. Some industries have high ROE because they require no assets, while other industries require a large infrastructure before they generate profit (compare for instance a service company to a production facility). One cannot conclude which is the best investment just based on the ROE. Generally, businesses that require large initial investments have high barriers to entry, which limit competition. But high-ROE firms with small initial investments (low assets bases) have lower barriers to entry. Thus, such firms face more business risk because competitors can replicate their success without having to obtain much outside funding. As with many financial ratios, ROE is best used to compare companies in the same industry.

As the ROA* is computed before tax, the return on equity may be computed before tax (but after the interest expense):

$$ROE^* = \frac{Earnings before income tax}{COE^*}$$

Average equity

From the point of view of institutional investors, the ROA and ROE are two of the most important tools. These ratios are essentially two variants of the most popular category of ratios, called Return on Investment (ROI). These ratios help the analyst to evaluate the performance of the individual enterprise on a comparable basis. The institutional investor is interested in getting the optimum returns on his investment. He is not concerned about size, product line, etc. of companies, but uses them as indicators towards return and risk. Thus, these ratios have their own utility.

ncial accour Example: Calculation	nting and financial statement analysis of this ratio is based on Novartis' 2013 figures	s. The published figur	Solomon Ne	gahu - Reg No. 49000000000000000000000000000000000000
annual repor	rt. The restated figures come from the previous	section.		NINC
	Mios USD	2012	2013	n ²
	Published figures			2
	Shareholders'equity	69'137	74'343	
	Net income	9'270	9'175	
	EBT	10'373	10'135	
	ROE (year-end assets) i.e after taxes	13.4%	12.3%	
	ROE* (year-end assets) i.e before taxes	15.0%	13.6%	
	Restated figures			
	Shareholders'equity	75'229	83'109	
	Net income	12'463	12'416	
	EBT	10'602	10'621	
	ROE (year-end assets) i.e after taxes	16.6%	14.9%	
	ROE* (year-end assets) i.e before taxes	14.1%	12.8%	

The return on equity is higher than the return on assets (see leverage).

1.2.2.7 Calculation of returns for cash-rich companies

Many companies have large amounts of cash on their balance sheets. This level of cash clearly reduces the profitability of assets and shareholders' equity. It is possible to evaluate the influence of this cash using the formula:

ROE ex cash = (net profit – interest income (1-t)) / (equity – cash)

Novartis: USD 83,109 million of shareholders' equity in 2013 for cash of USD 9,222 million which produced USD 62 million net of interest, i.e. a return of 0.7 percent. Profit is USD 12,416 million and the estimated rate of tax is 15.3 percent. The published ROE is 14.9 percent (taking the value at the end of year t).

ROE ex cash = (12,416 - 62 (1-0.153)) / (83,109 - 9,222) = 16.7%

Having a large amount of cash on the balance sheet has a negative impact on ROE of 1.8 percent. This deterioration is even greater given that short-term interest rates were particularly low in 2013. With a return on cash of 2.5 percent, the ex cash ROE is 16.5 percent. As long as the return on cash is less than the ROE, it will have a negative impact on profitability

Financial accou	unting and finance	ial statement ana	llysis	Solomon	Ngahu - Reg No. 490	0000 ⁰ 01.0m
1.2.2.8 Conclu	usions				on'	
Damodaran pu used to calcula	blishes a summate profitability.	ry table that cle	arly illustrates t	he difference be	etween the ratios	8
	Return on Invested	Return on Equity	Non-cash Return on Equity	Cash ROIC	CFROI]
Measured as	EBIT (1-t)/ (BV of Debt + BV of Equity – Cash)	Net Income/ BV of Equity	(Net Income – Interest Income(1- t))/ (BV of Equity – Cash)	(EBIT(1-t) + Depreciation)/ (Gross fixed assets + Non-cash WC)	IRR based upon operating cash flow and inflation adjusted capital	
Tries to measure	Nominal return earned on capital invested in operating assets	Nominal return on equity invested in all assets	Nominal return on equity invested in operating assets	Nominal return on capital invested in operating assets	Real return on capital invested in operating assets	
Compared to	Nominal cost of capital	Nominal cost of equity for the firm	Nominal cost of equity for operating assets of the firm	Nominal cost of capital	Real cost of capital	
Assumptions	 Level Earnings Depreciation reinvested in assets to maintain infinite life. Invested Capital measures capital invested in assets. 	 Level Earnings Depreciation invested in assets to maintain infinite life. Invested Equity measures equity invested in assets. 	 Level Earnings Depreciation invested in assets to maintain infinite life. Invested Equity measures equity invested in assets. 	 Level cash flows Perpetual asset life Gross capital measures capital invested in assets. 	 Level cash flows Finite asset life Gross capital measure real capital invested in assets. 	

1.3 Measurement of financial risk

So far, we have concentrated on the analysis of capital invested on the assets side of the balance sheet. We will now consider liabilities and in particular the cost of debt and the dangers this poses for the financing of short-term activities (liquidity ratios) and the long-term equilibrium of the balance sheet (solvency ratios). Contrary to the generally accepted view, most cases of bankruptcy are caused by the company's inability to meet its short-term cash needs and not simply because it has run out of shareholders' equity. This section concludes with different ways of measuring credit risk, particularly those used by the major ratings agencies.

1.3.1 Liquidity ratios

In the standard case of companies showing more or less acceptable annual returns, financial managers are faced with a classic return-liquidity dilemma: if they want to keep a lot of cash and assets that can be easily transformable into cash, the enterprises with high annual returns may encounter financing problems and the overall return of the company should suffer. In addition, there is a cost on the capital that is wasted. On the other hand, minimizing that cash and the assets that can be easily transformable into cash will increase the risk of cash shortage and, consequently, the risk of financial crisis or even bankruptcy. The implicit assumption in this reasoning is that the return on cash and short-term loans is lower than the return on the other assets. This assumption is not always satisfied, mainly when the level of short-term interest rates is high. In the context of financial analysis, it is very important to be aware of the "liquidity" dimension.

The term liquidity refers to the ability to meet short-term obligations. Normally this means the ability of the enterprise to pay the interest, principal instalments due, other dues such as accounts payable, accrued liabilities etc. For estimating this ability, analysts normally use liquidity ratios.

1.3.1.1 Current Ratio

The current ratio is calculated as the ratio of current assets to current liabilities:

$$CR = \frac{Current assets}{Current debts}$$

The current ratio is the most common of all liquidity ratios. It measures whether or not an enterprise has enough resources to pay its debts over the next 12 months by comparing a firm's current assets to its current liabilities. Generally this ratio should be around 2, but its level varies widely from industry to industry. A low current ratio signals that the enterprise may have problems in meeting its short-term obligations. A high current ratio may signal the fact that the company is not using efficiently its current assets. The current ratio is an indication of a firm's market liquidity and ability to meet short-term creditor's demands.

Example:

Calculation of this ratio is based on Novartis' 2013 figures. The published figures are taken from the annual report. The restated figures come from the previous section.

Mios USD	2012	2013
Published figures		
Current assets with cash ST	28'004	29'783
Current liabilities with debt ST	21'981	23'859
Current ratio (CR)	127%	125%
Restated figures		
Current assets (operating)	19'885	20'561
Current liabilities	18'106	19'542
Current ratio (CR)	110%	105%

Differences between published and restated figures:

- The current ratio of 105 percent in 2013 means that for every monetary unit Novartis owes, it has 1.05 units available in current assets. This ratio is lower if compared to the ideal ratio of 2.
- Should cash and short-term debt being taken into account or not? Yes, if we wish to highlight the company's ability to meet its short-term debt needs. No, if we want to highlight the improvement in the company's working capital structure (for example, low stock turnover offset by high debtor turnover), particularly in a long-term analysis.
- A proportion of cash is sometimes considered as operating cash, usually 1 to 2 percent of sales as current cash requirements depending on the sector.

1.3.1.2 Quick ratio

The quick ratio captures how many times the cash and items that may be converted into cash in the near future cover the short-term liabilities:

$QR = \frac{Current assets - Inventories}{Current debts}$

The numerator of the current ratio includes items such as inventory and other current assets. Though these items may be converted into cash within a year in the normal course of the business, they have to undergo a transformation before becoming cash. The quick ratio is a more conservative measure of short-term liquidity and includes only those current assets that presumably can be quickly converted to cash at close to their book values. This ratio indicates a firm's capacity to maintain operations as usual with current cash or near cash reserves in bad periods. As such, this ratio implies a liquidation approach and does not recognize the revolving nature of current assets and liabilities. In a conservative view, this ratio should be around 1, but this varies widely with industry.

ncial accounting and financial statement analysis		Solomon N	Ngahu - Reg No. 4900000
Example: Calculation of this ratio is based on Novartis' 2013 figure annual report. The restated figures come from the previous	es. The published fig section.	ures are tak	en from the original
Mios USD	2012	2013	2 ¹ ⁿ
Published figures			
Current assets with cash ST	28'004	29'783	
Inventories	6'744	7'267	
Current liabilities with debt ST	21'981	23'859	
Quick ratio (QR)	97%	94%	
Restated figures			
Current assets (operating)	19'885	20'561	
Inventories	6'744	7'267	
Current liabilities	18'106	19'542	
Quick ratio (QR)	73%	68%	

Differences between published and restated figures:

- The quick ratio tells us that for every monetary unit Novartis owes, it has in 2013 0.68 units available in current assets that can be quickly converted to cash. This ratio is sometimes called 'the acid test'.
- The remarks on whether or not to include cash when calculating the ratio are identical to those in the previous section.

1.3.1.3 Cash ratio

The cash ratio is taking into consideration only the cash and cash equivalents in measuring the liquidity of an enterprise:

Cash ratio (CAR) = Cash and cash equivalent ST / Current debt and liabilities

The cash ratio is a really conservative way of measuring the liquidity of an enterprise and gives an idea of what will happen if all the current liabilities are to be settled with the available cash and cash equivalents. A high ratio is not a good sign, as it denotes that the enterprise is not using properly its liquidities. However, the ratio is a pure balance sheet ratio and therefore it can be a distorted picture by what it is known as the year-end effect. The cash that a company has at the end of the year may be just a consequence of a temporal situation.

Example:

Calculation of this ratio is based on Novartis' 2013 figures. The published figures are taken from the annual report. The restated figures come from the previous section.

Mios USD	2012	2013
Published and restated figures		
Cash and equival., mark.securities	8'119	9'222
Current debt and liabilities	21'981	23'859
Cash ratio (CaR)	37%	39%

Comments:

These numbers mean that if Novartis had to settle its current liabilities today, it would manage to pay 35 percent in 2013. The cash ratio tells us that Novartis has a strong liquidity position.

1.3.2 Solvency ratios

Solomon Ngahu - Reg No. 49000007 di. com te long term Solvency is defined as the ability of the enterprise to meet its liabilities in the long term. While the short-term lenders look mainly at the firm's ability to meet their immediate obligations, long-term lenders look at both the profitability as well as cash flow. Additionally, the level of debt also affects investors' perception, as it is directly dependent on risk. Therefore, ratio measures of solvency relate components of capital structure to each other or their total.

1.3.2.1 Average interest rate

The average interest rate is calculated as follows:

 $i = \frac{\text{Interest expense}}{\text{Debts}}$

This average interest rate can be quite different from the actual rates observed on the financial markets for two reasons. First, the interest expenses are a function of loan contracts made in the past, some days before the end of the year, but also some years before for long-term bonds on other long-term debts. The marginal rates on the market can therefore be higher or lower than previous rates.

Second, the total debts include various items that do not support explicit interest expenses, such as the accounts payable and the provisions. In order to solve this problem, some analysts deduct from total debts the ones that do not support explicit interest expenses. Therefore, the average interest rate (on interest bearing debts) becomes:

 $i^* = \frac{\text{Interest expense}}{\text{Interest bearing debts}}$

The interest rate level and its change over time should be compared with the level of the return on assets and its evolution over time. It is the difference between these two rates that creates the positive or negative leverage effect. The logic behind this scenario is simple: as long as the return on assets is higher than the average interest rate, it is worth borrowing.

Example:

Calculation of this ratio is based on Novartis' 2013 figures. The published figures are taken from the annual report. The restated figures come from the previous section.

Mios USD	2012	2013
Published figures		
Interest on interest bearing debt	655	664
Total debt	54'928	51'732
Average interest rate i on total debt	1.19%	1.28%
Restated figures		
Interest on interest bearing debt	655	664
Total debt	29'536	25'286
Average interest rate i on total debt	2.22%	2.63%

In order to calculate aggregate debt, all long-term and short-term liabilities that will have to be paid out of the formation of the parameters of the param

Mios USD	2012	2013
Published and restated figures		1.
Interest on interest bearing debt	655	664
Total interest bearing debt	19'726	18'018
Average interest rate i* on total interest-bearing dek	3.32%	3.69%

If long-term liabilities that do not give rise to regular payouts (provisions, pension funds) are excluded, we arrive at a more realistic calculation and an average rate i* of 3.69 percent. The average interest rate is lower than the return on assets, and therefore we have a positive leverage effect.

This assessment can also be made 'the other way round', i.e. derived from the information given in the notes to the balance sheet.

The average rate on long-term debt can be reconstituted in two ways:

- Novartis gives information on the average overall rate on debt of 3.3 percent which results in an estimated long-term interest charge of USD 371 million.
- The group also discloses details on the debt instruments issued. The total individual debt instruments mentioned in the notes is close to the overall amount on the balance sheet. A rule of three is applied while keeping the average calculated rate of 3.93 percent with individual debt instruments. A total charge of USD 413 million is obtained.

2'013	B/S	P&L		
Method #1 Total long term debt:	11'242	371	3.3%	Note 19 page 218 Novartis annual report
Method #2 Liabilities to bank & Others:	942	8	0.90%	Average interest rate
LT debt by maturity:				Note 19 page 218 Novartis annual report
2008/june 2015 3.625% CHF	896	32	3.63%	Average interest rate (given)
2010/april 2015 2.9% USD	1'996	58	2.90%	Average interest rate (given)
2009/june 2016 4.25% EUR	2'064	88	4.25%	Average interest rate (given)
2009/february 2019 5.125% USD	2'989	153	5.13%	Average interest rate (given)
2010/april 2020 4.4% USD	992	44	4.40%	Average interest rate (given)
2012/sept.2022 2.4% USD	1'484	36	2.40%	Average interest rate (given)
2012/sept.2042 3.7% USD	<u>488</u>	<u>18</u>	3.70%	Average interest rate (given)
Calculated amount:	10'909	429	3.93%	Average interest rate (calculated)
Estimated final amount	10'300	405	3.93%	Extrapolated
Total long term debt:	11'242	413		

For short-term debt, for reasons of balance sheet presentation, the end-of-year debt may not be representative of the effective average debt over the year. Novartis indicates its average annual debt and the average rates attached to that debt on page 159. For the portion of long-term debt repayable with a short maturity, the previous rate of 3.93 percent is used in the absence of other information. In total, our estimated interest on short-term debt is USD 228 million.

Mios USD	2'012	2'013		
Interest expense	655	664		
Interest paid (cash flow stat.)	594	609		
· · · ·				
2'013	B/S	P&L		
Method #1 Total short term debt (year-end)	5'945	137	2.30%	Note 21 page 224
Method #2 Interest bearing associates	1'658	17	1.00%	Average interest rate (given)
Other banks	1'485	56	3.77%	Average interest rate (given)
Commercial paper	1'935	25	1.30%	Average interest rate (given)
Current portion LT	3'319	130	3.93%	Average interest rate (calculated)
Fair value of derivative instr.	118			
ST debt average	8'515	228	2.68%	Page 159

The different calculations are summarised in the table below. The second method gives an amount of USD 641 million, which is very close to the profit and loss amount (USD 664 million). This means an average rate on debt of 3.73 percent, which is very similar to the estimates of i*.

2'013	Method #1	Method #2
	Simple	Detailed
Short term debt contribution	137	228
Long term debt contribution	<u>371</u>	<u>413</u>
Total interest expense estimate	508	641
Interest bearing debt	17'187	17'187
	2.95%	3.73%

1.3.2.2 Net debt

Net debt is fairly straightforward. It is defined as follows:

- Long-term debt
- + Short-term debt
- Cash and cash equivalents
- = Net debt

Net debt gives a quick indication of a company's financial strength and liquidity. It can also be an additional indication of a company's leverage since cash and cash equivalents could theoretically be used to repay debt. A company is net cash positive if its cash and cash equivalents are greater than its debt, implying a strong financial position.

Mios USD	2012	2013
Published figures		
Total debt	54'928	51'732
Cash and equival., mark.securities	8'119	9'222
Other long term financial assets	1'117	1'523
Net debt	45'692	40'987
Restated figures		
Total debt	29'536	25'286
Cash and equival., mark.securities	8'119	9'222
Other long term financial assets	1'117	1'523
Net debt	20'300	14'541

Comments

This calculation does not take into account the participation Novartis holds in Roche, which amounted to USD 8,588 million in 2012 and USD 8,982 million in 2013. We view this participation as strategic, and it is therefore a very different asset type from a portfolio of long-term debt instruments or equities.

Differences between published and restated figures

The calculation of net debt highlights more clearly the share of debt and the share of shareholders' equity in the medium term financing of the capital invested.

1.3.2.3 Capital structure ratio

The capital structure ratio (also called total debt ratio) measures the portion of debt in total capital (total assets) and it is computed as:

$$CS = \frac{Debts}{Assets}$$

It is a primary measure of the risk of a company and it refers to the way a company is financing its assets through a combination of equity and debt. The higher the percentage of liabilities, the more a company has to pay interest and debt reimbursement, the greater the likelihood of insolvency. In theory the Modigliani-Miller theorem suggests that, in a perfect market, the value of a firm is irrelevant to how that firm is financed. However, the markets are not perfect, and there are several reasons why the capital structure is important. Bankruptcy costs, agency costs, taxes, information asymmetry are just some of the reasons. Therefore the capital structure ratio is often used by analysts as a screening device: as long as the ratio is within certain limits, the analyses should focus on different aspects.

An issue is whether to use market value or book value of debt. Most of the authors in the financial literature prefer the use of market value, but clear indications about the market value of debt are often missing. Because the use of market value leads to certain difficulties in estimation, we prefer the use of the book value of debt (unless there are clear indications that the firm will trade in debt).

Example:

Calculation of this ratio is based on Novartis' 2013 figures. The published figures are taken from the annual report. The restated figures come from the previous section.

Mios USD	2012	2013
Published figures		
Net debt	45692	40987
Total Liabilities & Equity	124'191	126'254
Capital structure ratio (CS)	37%	32%
Restated figures		
Net debt	20'300	14'541
Invested capital	102'941	104'733
Capital structure ratio (CS)	20%	14%

Comments

The capital structure ratio does not change much from one year to another and shows that 14% of the assets are financed by external debt. This is largely lower than the standard industry average suggesting that Novartis is not indebted and therefore presents a lower risk.

1.3.2.4 Total debt to equity ratio

Another measure of the relation of debt to capital sources is the total debt to equity ratio which is computed as:

$$TDE = \frac{Debts}{Equity}$$

The total debt to equity ratio is just a version of the capital structure ratio and it directly compares the two sources of financing: external and internal. A small ratio of debt to equity is interpreted by analysts as no apparent concern and that the enterprise has alternative sources of financing available. This ratio is an important tool used by analysts in analysing the leverage of a company.

Example:

Calculation of this ratio is based on Novartis' 2013 figures. The published figures are taken from the annual report. The restated figures come from the previous section.

Mios USD	2012	2013
Published figures		
Total debt	54'928	51'732
Shareholders' equity	69'137	74'343
Total Debt/Equity ratio (Tot.DE)	79%	70%
Restated figures		
Total debt	29'536	25'286
Shareholders' equity	75'229	83'109
Total Debt/Equity ratio (Tot.DE)	39%	30%

ng and financial statement analysis		Solom	on Ngahu - Reg No. 49000007
Mios USD	2012	2013	and
Published figures			50
Total interest bearing debt	19'726	18'018	C.O.
Shareholders' equity	69'137	74'343	
Debt/Equity ratio (TDE)	29%	24%	Nr.
Restated figures			N
Total interest bearing debt	19'726	18'018	*
Shareholders' equity	75'229	83'109	
Debt/Equity ratio (TDE)	26%	22%	

Comments

Just as for the previous capital structure ratio, the implication of a violent external shock on potential solvency/credit worthiness is measured. (This is similar to bank stress tests or the value at risk for hedge funds.). It can be seen that an immediate repayment of interest-bearing debt would slash shareholders' equity by about a guarter. Available cash is not taken into account.

1.3.2.5 Long term debt to equity ratio

The long-term debt to equity ratio measures the relation between the noncurrent liabilities and the equity:

$$LTDE = \frac{Long term debts}{Equity}$$

When comparing the debt to the equity, we have to keep in mind that part of the debt is recurrent and within the normal operating cycle. The long-term debt to equity ratio restrains the analysis to the part of the debt that may be considered permanent: the external financing sources. Long-term liabilities generally represent the noncurrent liabilities plus the current portion of the noncurrent liabilities. Some analysts take into account only borrowings and bonds issued. A ratio lower than one indicates that the equity is higher than the long-term liabilities.

Example:

Calculation of this ratio is based on Novartis' 2013 figures. The published figures are taken from the annual report. The restated figures come from the previous section.

Mios USD	2012	2013
Published figures		
Total interest bearing debt	19'726	18'018
Other long term financial assets	1'117	1'523
Shareholders'equity	69'137	74'343
Long term debt/Equity ratio (LTDE)	27%	22%
Restated figures		
Total interest bearing debt	19'726	18'018
Other long term financial assets	1'117	1'523
Shareholders'equity	75'229	83'109
Long term debt/Equity ratio (LTDE)	25%	20%

Comments

The ratio is very low in absolute terms. Novartis reduced its long-term debt further last year, profiting from strong cash flows.

Differences between published and restated figures

As with the previous ratios, the difference in shareholders' equity originates from the reincorporation of amortisation of intangible assets. Available cash is not taken into account.

I.3.2.6 Interest coverage ratioThe interest coverage ratio deals with the ability of the enterprise to meet the interest obligation and it is computed as: $ICR = \frac{EBIT}{Interest expense}$ For the purpose of this ratio, ideally the interest expense. However, because the interest expense in the interest obligation in the interest obligation. given in the income statement, that is, the interest expense as per the accrual concept. Sometimes enterprises do not disclose the earnings before interest and tax. In this case, we take the operating earnings as EBIT.

The interest coverage ratio expresses the number of times the interest payment is covered by the earnings before interest and taxes. Sometimes analysts include the principal repayment also, and the ratio becomes the fixed charge coverage ratio. However, fixed charges have to be adjusted for tax effects.

Example:

Calculation of this ratio is based on Novartis' 2013 figures. The published figures are taken from the annual report. The restated figures come from the previous section.

Mios USD	2012	2013
Published figures		
Cash cost interest	594	609
EBIT	11'193	10'910
Interest coverage ratio (ICR)	18.8	17.9
Restated figures		
Cash cost interest	594	609
EBIT	14'842	14'485
Interest coverage ratio (ICR)	25.0	23.8

Comments:

Novartis' excellent financial health is reflected in this ratio. To be judged satisfactory, it should be between 5 and 7x, depending on the volatility of operating results. No account is taken of additional financial income of approximately USD 60 million in 2013 which is counterbalanced by the interest charge.

Differences between published and restated figures:

The cash cost interest figure is taken from the cash flow account.

1.3.2.7 Operating cash flow to cash interest cost

Another useful ratio used by lenders is operating cash flow to cash interest cost:

$$OCFCIC = \frac{Operating \ cash \ flow}{Cash \ interest \ cost}$$

While the interest coverage ratio measures the profitability in the eyes of the lenders, they will immediately worry if they are going to get their interest on time. Hence, the short term lenders will be interested to know if the firms is making enough profits and generating cash flows to meet at least the interest obligation. To this end, they use the data from the cash flow statement.

ncial accounting and financial statement analysis		Solomor	n Ngahu - Reg No. 49000007
Example: Calculation of this ratio is based on Novartis' 2013 figure annual report. The restated figures come from the previous	es. The published figu s section.	ires are ta	aken from the office
Mios USD	2012	2013	wh
Published figures	-		2
Operating cash flow	14'194	13'174	
Cash cost interest	594	609	
Operating cash flow to cash interest (OCFCIC)	23.9	21.6	
Restated figures			
Operating economic Cash Flow	14'711	14'870	
Cash cost interest	594	609	
Operating cash flow to cash interest (OCFCIC)	24.8	24.4	

Comments:

As we can see, lenders do not have to worry about the capacity of Novartis to pay its interest as the operating cash flow is covering more than 24.4 times the interest, which is slightly higher than the interest coverage ratio (23.8).

1.3.2.8 Operating cash flow to liabilities

Lenders that worry if the enterprise generates enough cash to pay back its liabilities will compute the operating cash flow to liabilities ratio:

$$OCFL = \frac{Operating \ cash \ flow}{Debts}$$

The operating cash flow to liabilities ratio is used in the regard that the long-term solvency depends on the cash flow generated by the enterprise. To this end, it is necessary to see if the operating cash flows are covering liabilities.

Example:

Calculation of this ratio is based on Novartis' 2013 figures. The published figures are taken from the annual report. The restated figures come from the previous section.

Mios USD	2012	2013
Published figures		
Operating cash flow	14'194	13'174
Long term debt	13'781	11'242
Other long term financial assets	1'117	1'523
Operating cash flow to liabilities (OCFL)	112%	136%
Restated figures		
Operating economic Cash Flow	14'711	14'870
Long term debt	13'781	11'242
Other long term financial assets	1'117	1'523
Operating cash flow to liabilities (OCFL)	116%	153%

Comments

Novartis is capable of repaying its debts (without dipping into its existing cash) in less than a year if the group decided to allocate all its operating cash flows to debt repayment. This shows the group's excellent financial solidity. Current financing items are excluded from this long-term calculation.

1.3.3 Credit risk*

The aim of this section is to identify bankruptcy risks for a particular enterprise on the basis of its financial statements. A business failure is an unfortunate circumstance. Although the majority of enterprises that fail do so within the first year or two of their life, other firms grow, mature and fail much later. There are two types of business failure:

- The first one is when an enterprise has negative or low returns. If the firm fails to earn a on on one return greater than its cost of capital, it can be viewed as having failed, and if the firm many operating losses, it will probably experience a decline in market value.
 A second type of failure is technical insolveneed.

Bankruptcy occurs when the enterprise cannot convert in cash some of its assets within a reasonable period and cover its liabilities. In this situation, a firm's liabilities exceed the market value of its assets, which means that the firm has negative equity.

To explain corporate bankruptcy, one can identify its major causes. Exogenous causes could be viewed as the economic environment of the enterprise. Global economic events such as recession or rise in the interest rates lead numerous firms to financial problems, and some may go bankrupt. But the major cause that accounts for more than half of business failure is mismanagement. Numerous specific managerial faults can cause the enterprise to fail. Overexpansion, poor financial actions, an ineffective sales force, and high production costs can all singly, or in combinations, cause the ultimate failure of the firm.

Assessing the risk of bankruptcy (also referred to as credit risk) represents a critical task for creditors and especially for financial institutions. Because debt payments are limited to contractual terms, the analytical focus of financial institutions is on the debt and interest paying ability of the enterprise. Therefore the accent will fall on solvency and liquidity ratios, while profitability and efficiency ratios are less important. However, these two groups of ratios are not completely independent. High profitability and efficiency ratios will make the debt less risky, although this will not increase the amount of cash paid to creditors. On the contrary, if an enterprise experiences problems with profitability and efficiency ratios, it might be unable to pay interest and debt, and therefore has a higher credit risk.

From the creditor's perspective, the credit risk represents the risk of loss due to the inability of the enterprise to fulfil its obligations. Based on the financial statements, analysts often have to assess the bankruptcy risk for a particular firm. This criterion has been and still is largely developed by banks in order to implement a binary strategy to grant or refuse a firm credit. The objective of these models is to discriminate the enterprises in two groups: the firms with a low risk of bankruptcy and those with a high risk.

E.I. Altman (1968) studied 33 firms who failed between 1946 and 1965 and 33 other firms nonfailed during the same period in the United Sates.

Altman is using 22 different ratios to discriminate between both groups, but finally found five relevant ratios to explain bankruptcy. He described these ratios as:

 X_1 Working capital/Total tangible assets

Ordinarily, a firm experiencing consistent operating losses will have shrinking current assets in relation to tangible assets. This ratio proved to be the most valuable among three liquidity ratios. The two other liquidity ratios tested were the current ratio and the quick ratio.

X_2 Retained earnings/Total tangible assets

Solomon Ngahu - Reg No. 49000007 di. off earnings and for 1 Retained earnings is the account that reports the total amount of reinvested earnings and/or losses of a firm over its entire life. The age of a firm is implicitly considered in this ratio. For example, a relatively young firm will probably show low retained earnings to total assets ratio because it had no time to build up its cumulative profits. Therefore, it may be argued that the young firm is somewhat discriminated against in this analysis, and its chance of being classified as bankrupt is relatively higher than that of an old firm. But, this is precisely the situation in real world. The incidence of failure is much higher in a firm's earlier years.

 X_3 Earnings before interest and tax/Total tangible assets

Since this ratio refers to profitability, it is particular appropriate for studies dealing with corporate failure. Furthermore, insolvency in a bankrupt sense occurs when the total liabilities exceed a fair valuation of a firm's assets with value determined by the profitability.

 X_4 Market value of equity/Book value of total liabilities

Equity is measured by the combined market value of all shares of stock, preferred or common, while liabilities include both current and long term. The measure shows how much the firm's assets can decline in value (measured by market value of equity plus debts) before the liabilities exceed the assets and the firm becomes insolvent. The ratio adds a market value dimension, and can be seen as the inverse of the debt to equity ratio that is often used as a measure of financial leverage.

X5 Sales/Total tangible assets

This is a standard financial ratio illustrating the sales generating ability of the firm's assets. In fact, based on the statistical significance measure, it would not have appeared at all. However, because of its unique relationship to other variables in the model, the asset turnover ratio ranks second in its contribution to the overall discriminating ability of the model. Still, there is a wide variation among industries, and a new model should be estimated without this variable.

Although the study may appear as obsolete, the most popular discriminant analyses used in our days are just versions of the Altman's model. The equation of the discriminant line obtained by Altman is:

$$Z = 1.2 \cdot X_1 + 1.4 \cdot X_2 + 3.3 \cdot X_3 + 0.6 \cdot X_4 + 1.0 \cdot X_5$$

With a critical Z-score at 2.675 applied to the sample, the model gave 95%, 72% and 30% of good classification for firms respectively 1, 2 and 5 years before bankruptcy. The score generally used in practice is as follows:

- less than 1.81: risk of future bankruptcy; •
- between 1.81 and 2.99: no clear conclusions; •
- greater than 2.99: very low risk of future bankruptcy.

The score's tendency should be monitored over several quarters.

Several studies have reworked Altman's study with similar results. Initially, Altman developed other versions:
Financial accounting and financial statement analysis



Solomon Ngahu - Reg No. 490000000 <u>-u. companies:</u> $-u./17x_1 + 0.847x_2 + 3.107x_3 + 0.42x_4 + 0.998x_5$ Grey area situated between 1.23 and 2.9 Difference from the base equation: the fourth variable does not take account either of market values but uses balance sheet values. <u>Double Prime Z-Score (service companies and emerging markets):</u> $Z'' = 6.56x_1 + 3.26x_2 + 6.72x_3 + 1.05x_4$ Grey area situated between 1.22 and 2.9 This version uses only the first for: y, Hillor

Finally, Hillgeist updated the Altman model and his equation becomes:

Hillgeist Z score = $3.85 + 1.13x_1 + 0.005x_2 + 0.269x_3 + 0.399x_4 - 0.033x_5$

The probability of default in one year is $1/(\exp(\text{Hillgeist Z score})+1)$. The Hillgeist Score of Novartis is between 5.04 and 5.42 for 2012 and 2013 respectively; this gives a probability of default in one year of 0.65 and 0.44 percent.

Therefore most of the credit scoring models used nowadays by credit rating agencies are just variations on a similar methodology. These popular analyses combine a set of financial ratios of firm performance. All these models used to predict bankruptcy appear very attractive since for practitioners the result in evaluating bankruptcy risk for a firm is straightforward. This attraction is the main reason explaining why numerous credit banks have developed their own models.

Nevertheless, financial institutions use it only as one criterion for decision, but never as a deciding element that could be substituted for the financial analyst's recommendation, and this for several reasons. Every "credit scoring" model is empirical since the discriminant functions are built on real data. Hence, data are historical and so is the function. When predicting bankruptcy, we are looking toward the future and this leads to uncertainty. The future will not be a simple reproduction or an extrapolation of past events. Thus, a ratio that used to be interesting 10 years ago may not make any sense today. Consequently, the model needs to be updated. It should be clear therefore that discriminant functions might be different from one sector of activity to another.

Statistical problems also arise: How many and what ratios must we consider first to determine the final best discriminant equation? It is always possible to obtain a sample composed of several pairs of failed and non-failed firms, both in the same activity? Hence, discriminant analysis must be a dynamic process that takes into consideration the most recent macro and microeconomic events influencing firms.

1.3.3.1 Rating agencies*

The "credit scoring" method is a popular analysis that uses different accounting ratios in order to accurately distinguish between enterprises with high and low risk of bankruptcy. In general, ratios measuring profitability, efficiency, solvency and liquidity prevail as the most significant indicators in predicting bankruptcy. This method is often used by popular credit rating agencies such as: Fitch Ratings (U.S.), Japan Credit Rating Agency (Japan), Moody's (U.S.), Standard & Poor's (U.S.), Capital Intelligence Ltd (Cyprus), etc.

Financial accounting and financial statement analysis

Solomon Ngahu - Reg No. 49000007 After the 2008 crisis, credit rating agencies decided to increase the transparency of their ratings award methods. Most agencies now give an overall opinion on the company's financial situation while insisting on the balance between cash flow released by the assets on the balance sheet and the use made of them on the liabilities side. Among the most widely used ratios is the debt / EBITDA ratio which, while ignoring the tax factor, represents an estimate of the number of years the company needs to reimburse its debts quickly.

As an example, and without going into detail over the methods of each agency, here are a few important S&P ratios for Novartis:

S&P report- May 2013

Corporate rating: AA_/Stable/A-1+

Business Risk: Excellent; Financial Risk: Modest; Liquidity: Strong

Upside scenario: Given Novartis's track record of returning excess cash to shareholders supported by its stated financial policy, we think a positive rating action is currently remote. However, such an action could be triggered if Novartis's achieved and sustained a fund from operations (FFO) of above 75%.

Downside scenario: We could take a negative rating action if Novartis consistently generated an FFO to net debt ratio lower than 50%. This could be the consequence of either a sizable debt-funded acquisition of more than USD 10 billion, or share repurchases as high as USD 6 billion with negative 5% revenue growth. However, we don't expect high merger and acquisition activity at this stage because we believe management is focusing on integrating the recent Alcon acquisition.

Base-Case scenario: Key metrics

	<u>2012A</u>	<u>2013E</u>	<u>2014E</u>
EBITDA margin	28.9%	29-30%	29-30%
Debt/EBITDA	1.2x	1.2x	1.1x
FFO/Debt	72.2%	75-80%	80-85%

1.3.3.2 Credit default swaps (CDS): mechanisms and how they can be useful for the investor*

CDS are another measure of financial risk, since they represent a form of insurance against the risk of default of the company. The investor pays an annual premium so that the investor can be reimbursed for the amount of capital lost if the company goes bankrupt while the CDS is held.

Theoretically, the holder of the Novartis two-year bond who buys a CDS with the same time horizon must generate a return on the overall portfolio equal to the risk-free market rate (represented by the interbank swap rate) because the portfolio is now insured.

The market data in February 2014 show similar results:

- The yield to maturity of the Novartis bond at 15 June 2016 is 0.52%
- The annual premium for the two-year CDS on Novartis senior debt was nine basis points. The nine basis points of the CDS represent the cost of insurance that investors are willing to pay each year to protect themselves against Novartis going bankrupt by 15 June 2016. The total cost over the term of the swap is therefore around 20 basis points (two years and four months from February 2014), or 9 + 9 + 3 = 21 basis points.
- The yield on the two-year swap rate in euros was 0.44 percent.
- This is very close to the theoretical equilibrium with $0.52\% 0.09\% \approx 0.44\%$.

- The spread of one to two basis points compared with the theoretical price is minimal. This is not always the case and this spread referred to as the 'base' can widen significantly during periods of stress, such as during the 2008 financial crisis, when effective arbitrage on the market becomes impossible.
- CDS contracts, like most swap contracts, are traded over the counter (OTC) and therefore carry a counterparty risk if the bank or financial institution with which the investor has taken out the CDS contract goes bankrupt itself during the lifetime of the contract.



1.4 Key sectorial ratios and metrics*

1.4.1 Introduction*

So far, in this module, we have covered a lot of ground and seen many different and sometimes complex issues, be it in terms of accounting or ratio analysis. All of this gives us a solid basis for understanding and analysing financial statements. This section tries to tie this all together for some of the major industry groups. After a brief overview of each industry and its characteristics, we point out some of the major accounting issues frequently found in that group. These are the ones that very often need further analysis and very often need to be compared to peers as accounting practices or assumptions might differ.

We then focus on some of the key ratios and other, sometimes non-GAAP, metrics that are useful in determining the health of a company. For each sector, we have mentioned a few companies that are the principal representatives of this.

			Industrials	Oil & Gas	Consumer	Healthcare	Technology	Banks	Utilities
P&L									
	Amounts	New licence revenues							
		Deferred revenues				-			
	Ratios	Same-store sales							
		Sales /square foot							
		Sales turnover							
		Book-to-bill				_			
		Gross margins							
		EBITDAR margin							
		EBITDA margin							
		Operating margins (EBIT)							
		R&D/ revenues							
		Efficiency ratio (cost/income)							
		Net interest margin							
		Interest coverage ratio					•		
Balance sheet									
	Amounts	Stock level at distributors							
	Ratios	Inventory outs.period				_			
		Inventory /square foot							
		Days of receivables outst.							_
		Non-performaing loans							
		Coverage loans							
		Net debt/EBITDA							
		Total debt/Capital			_				
		Tier 1 common ratio							
Cash flow									
	Amounts	FCF							
	Ratios								
Profitability									
	Ratios	RoA	r						
		RoCE							
		ROE]		
Physical ratios					r				
	Amounts	Oil production	ļ						
		Gas production	ļ						
		Barrel of Oil Equiv.	ļ						
	Ratios	Development cost/barrel	ļ						
		Reserve replacement ratio	l						

P&L

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P&L	omor	
New license revenue	Mainly used for software companies. Indication of whether a company is growing. A company will have an existing licensing base, but if it wants to grow, it will have to sell new licenses.	
Deferred revenues	Liability created when funds are received for services that have not yet been (fully) provided. Revenue will be recognized, and the deferred revenue liability eliminated, when the services are performed. This is becoming increasingly important to companies that do not sell licenses with an up-front fee but provide software as a service, using a monthly, annual or sometimes even multi-annual subscription fee. The liability will thus diminish over time as the revenues are recognized, going to zero prior to renewal. If the subscription is renewed, deferred revenues will increase again. Therefore, if deferred revenues trend downwards on a quarter-on-quarter basis, it might be a sign that the company is losing clients, i.e. that the clients are not renewing subscriptions.	
Same store sales (also called like-for-like)	Sales from stores open at least a year or more. Gives an indication of organic growth.	
Sales / square foot (meter)	Ratio of sales to square footage. Gives an indication of productivity. Note that different subsectors will use a variant of this. Hotels, for instance, will use RevPAR. i.e. revenue per available room, a measure of productivity and a function of occupancy and room rates.	
Sales turnover	This should be put into context with the margin. Food retailers have lower margins but much higher turnover than, say, luxury goods.	
Book-to-bill	The book-to-bill ratio measures the relationship between orders received (booked) and the amounts of products shipped and billed. It can be seen as an indicator of demand, with a book-to-bill of over 1 usually implying strong demand and less than one, weaker demand. However, since it does not include orders taken and filled during the same period, it is more meaningful for companies with orders encompassing several periods.	
Gross margins	Measure of profitability indicating how well a company can control input costs, notably raw material costs, and / or pass them on to customers. It is an indication of the pricing power of a company. A declining gross margin is usually a warning sign.	
EBITDAR margin	Analysts often also use EBITDAR which is earnings before interest, tax, depreciation, amortization and annual lease rentals.	
EBITDA margin	Eliminates the effect of financing and accounting decisions when comparing companies and industry benchmarks. Many managements target this ratio.	
Operating margin	Enables analysts to compare companies within the same industry.	
R&D / revenues	R&D is a significant item for healthcare companies, though more so for pharma companies than generics companies. R&D as a percentage of revenues does however say little about the efficiency of the research.	
Efficiency ratio	Also known as the cost/income ratio. It shows the percentage of revenues consumed by costs. The level will vary, with investment banking and asset management being on the high side, given the greater proportion of compensation costs.	
Net interest margin	Net interest income / average earning assets. NIM will be a function of the level and slope of interest rates, competitive pressure, business and funding mix.	
Coverage ratio	The coverage ratio, i.e. the ratio of loan loss reserves to non-performing loans, is also a measure of reserve adequacy and a key metric. It indicates how well a bank's capital and earnings are protected against future credit losses.	

Balance sheet

Stock levels at distributors If available, this can be an interesting metric to watch for companies that sell through distribution channels, such as pharmaceutical companies. A significant increase in stock levels at distributors might be a sign of channel stuffing or other

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Inventory outstanding	Indicates the average time that inventories are available for sale. Any build-up in	1
period	inventory that is not seasonal might mean future pressure on the gross margin.	1
Inventory / square foot (meter)	Another way to track the adequacy of inventory.	l
Collection period or days	Indicates the average time that clients need to pay their debts. An increase can be a	1
of receivables outstanding	warning sign.	1
Non-performing loans / loans	The non-performing loans / loans ratio is an important ratio to determine the quality of a bank's loan portfolio and potential future credit losses. It tracks the proportion of loans that are no longer performing relative to a bank's assets.	
Net debt / EBITDA	A measure of gearing	l
Tier 1 common ratio	The Tier 1 ratio is a measure of capital adequacy. The Tier 1 Common ratio is viewed as the highest form of loss absorbing capital, since it consists of equity less goodwill and intangibles.	

Cash flow

	Free cash flow is the amount available to the providers of capital (in the form of
	dividends, share buybacks and repayment of debt) or for investments in growth.
	Free cash flow generation can vary depending on the lifecycle of the company.
Free cash flow	Companies growing very fast might have big capex and working capital needs and
	so generate less Free Cash Flow, while mature companies can generate more,
	though sometimes this can be the reflection of fewer investment opportunities that
	could lead to future growth.

Profitability

Return on assets	Indicates how efficiently companies use their assets Indicates how efficiently companies use their assets. Note that with the financial crisis and the ensuing big provisioning needs, analysts turned to pre-tax-pre-provision earnings to assets to get a better feel for the underlying profitability at the bank.
Return on capital employed	Return on Capital Employed is a measure of capital efficiency, i.e. how well a firm uses its capital.
ROE	Indicates how efficiently companies use shareholder's equity. For financial institutions, an alternative measure, the Return on Tangible Equity is sometimes used.

Physical ratios

Unit of value production	
Oil	Barrel of oil = bbl
Gas	Thousand cubic feet of gas = MCF, a million = MMCF
Barrel of oil equivalent (BOE)	Based on heating value equivalency in British Thermal Units (BTU) of natural gas and oil. One barrel of oil has the same heating value as 6MCF of gas.
Finding and development costs ratio per BOE	Cost of adding and developing a barrel of new reserves to the point of production.
Reserve replacement ratio	Ratio of movement in reserves (revisions + reclassification + improved recovery + extensions + discoveries) to total production for the year. Indicated how well a company can replace production with new reserves.

1.4.2 Industrials*

The Industrials sector is heterogeneous and encompasses many different subsectors, for instance aerospace and defense, electrical equipment, construction and engineering, machinery, etc. There are short cycle and long cycle companies. This sector is usually rather global and certainly very capital intensive.

Main subsectors: 1. aerospace (EADS) and defense (Northrop); 2. electrical equipment (ABB), engineering (Technip), machinery (Bobst); 3. construction (Hochtief)

Accounting issues:

- Solomon Ngahu Reg No. 49000007 Long term construction contracts: There are two main methods: the percentage-of-completion method and the completed contract method. IFRS only allows the percentage of completion method for construction contracts whose outcome can be reliably estimated. Note that if a company recognizes revenues in excess of actual payments received, this will be reflected in the Receivables item on the balance sheet. This should be watched closely as a significant rise could indicate that revenues can drop in subsequent periods or that revenue is recognized somewhat aggressively.
- Joint contracts: Very often, sales contracts will include additional services, for instance maintenance. In this case, each component must be accounted for separately and recognized at its present value. There is some level of judgment associated with this and it is always useful to compare practices across companies.

Key ratios and metrics: EBITDA margin, Book-to-bill, ROE, Free cash flow, Net debt / EBITDA

1.4.3 Oil and Gas*

The oil and gas industry covers a variety of subsectors with different characteristics. Exploration and production (E&P) companies find hydrocarbon reserves, drill them and sell them. Indeed, contrary to most companies whose assets generate future benefits, oil and gas companies deplete their assets, i.e. their reserves. Companies must thus invest substantial amounts of capital to find new reserves. Oil services companies provide the E&Ps with the means and the tools to find, explore and extract oil and gas fields. These activities encompass seismic testing, engineering, rig construction, drilling and completion services. Refiners convert oil into usable products.

Main subsectors: 1. Exploration and production (Royal Dutch); 2. Oil services (Schlumberger); 3. Refiners (Neste Oil)

Accounting issues:

- Valuation and disclosure of reserves: reserves are very important as they will be a source of revenues in the future. IFRS has no specific requirements on the reporting of reserves yet, but the SEC has guidelines for companies listed in the USA. The SEC distinguishes between proven reserves (probability of recovery of 90 percent), probable reserves (between 50 and 90 percent) and possible reserves (between 10 and 50 percent). The Commission authorises the companies to evidence the first two categories (proven and probable). Note that these are non-GAAP numbers.
- Associates and joint-ventures: oil and gas companies very often make investments in companies or participate in joint ventures. There are different methods of consolidation

Key ratios and metrics: EBITDA margin, Return on capital employed, ROE, Free cash flow, Net debt / EBITDA, Unit of value production, Oil Gas Barrel of oil equivalent (BOE), Finding and development costs ratio per BOE, Reserve replacement ratio

1.4.4 Consumer*

Solomon Ngahu - Reg No. 49000007 di. Com Consumer Canason on 1997 Though the consumer sector comprises both Consumer Discretionary and Consumer Staples. we will look at both of them in this section. Consumer Discretionary is typically more cyclical and includes sub-sectors such as retailing, luxury goods, department stores, specialty retail, hotels, restaurants, etc. Consumer Staples is less cyclical and includes tobacco, food products, beverages, household and personal products, etc. In some instances, there might be a fair amount of seasonality (i.e. luxury goods around Christmas) which might distort quarterly numbers (inventory build-up, sales, etc.).

Consumer companies, especially hotels and retailers, can own significant amounts of real estate. However, some companies prefer to lease real estate. Differences in accounting treatment may imply distortions in comparability between different companies.

Main subsectors: 1. Discretionary: Food retail (Carrefour), Luxury goods (Richemont), Department Store (JC Penney), Specialty Retail (Home Depot), Hotels (Hilton), restaurants (Darden); 2. Staples: Tobacco (Altria), Food products (Nestlé), Beverages (Diageo), Households and personal products (Adecco)

Accounting issues:

- Real estate: if real estate is owned, it might be valued at cost less depreciation or at a revalued amount.
- Leases: leasing is a common method of off balance sheet financing. Finance leases transfer substantially all the risks and rewards associated with the ownership of an asset and are essentially an alternative to borrowing. Most companies capitalize finance leases and it is indeed compulsory under IFRS. If the transfer of risks and rewards condition is not met, then the lease is called an operating lease. Operating leases are not capitalized and lease rentals are treated as periodic payments and recognized as expenses.

Key ratios and metrics: Gross margins, Operating margin, EBITDA margin, EBITDAR margin, Return on capital employed, Inventory outstanding period, Sales turnover, Same store sales (also called like-for-like), Sales / square foot (meter), Inventory / square foot (meter)

1.4.5 Healthcare*

The healthcare industry encompasses sub-sectors such as pharma, medical technology, biotechnology, etc. Pharma and biotech companies spend significant amounts on R&D to discover new drugs which, if successful, will be protected by patents. When these patents expire, generics competition becomes intense. Finding new drugs to replace these is essential, but often difficult. R&D productivity has also been waning, leading companies to form alliances and acquire other companies.

Main subsectors: 1. Pharma (Novartis), Biotech (Amgen); 2. Medical technology (Fresenius Medical care)

Accounting issues:

R&D treatment: research costs will be expensed as incurred but development costs will be capitalized and amortised over their useful lives. The capitalized portion of R&D is usually very small relative to total R&D expense as the product has to be quite advanced to be classified as in development. Acquired R&D can be capitalized as an intangible asset and

Solomon Ngahu - Reg No. 490000000 amortised over its useful life. When comparing companies, one should look at the proportion of expensed versus capitalized costs as this can affect ROE and distort comparisons

- Associates and joint-ventures: pharma companies very often make investments in companies _ or participate in joint ventures. There are different methods of consolidation
- Business combinations: business combinations are frequent in this sector. This can be done via acquisition or merger. For acquisitions, only the purchase method is allowed and while there are two methods for mergers (purchase accounting and pooling of interests), IFRS only allows purchase accounting.

Key ratios and metrics: Operating margin, R&D / revenues, Stock levels at distributors, EBITDA margin, Return on assets, ROE, Free cash flow

1.4.6 Technology*

The technology sector encompasses a wide variety of different sub-sectors in different stages of maturity, from new, fast-growing companies to much more mature companies. Some sub-sectors, like semiconductors, are very cyclical, while others (typically, the software and services companies) will derive a large part of their revenues from licensing and service fees and will thus be more stable. Indeed, perhaps the best way to look at this sector is to divide it into hardware manufacturers and software and services companies. Hardware manufacturers will have much higher capital intensity and operating leverage and are usually more cyclical. R&D spend also tends to be higher, as the pressure on innovation can be quite intense. Hardware companies, because of their somewhat riskier profile, tend to have more conservative financial risk and leverage profiles.

1. Hardware: PC manufacturers (Lenovo), Semi-conductors Main subsectors: (ST Microelectronics), Consumer-related (Apple); 2. Software (SAP), Services companies (Accenture)

Accounting issues:

- Joint contracts: tech companies very often bundle a product with other services, for instance hardware and software or software license, or a maintenance contract or warranties. In this case, each component must be accounted for separately and recognized at its present value. There is some level of judgment associated with this and it is always useful to compare practices across companies.
- Research & development: Under IFRS, research costs will be expensed as incurred while development costs should be capitalized and amortised over their useful lives, if they meet the recognition criteria for intangible assets. Under US GAAP, all development costs must be expensed when incurred.
- Associates and joint-ventures: tech companies very often make investments in companies or participate in joint ventures. There are different methods of consolidation.
- Business combinations: business combinations are frequent in this sector as companies buy complementary or competing technology, expand geographically, etc. This can be done via acquisition or merger. For acquisitions, only the purchase method is allowed and while there are two methods for mergers (purchase accounting and pooling of interests), IFRS only allows purchase accounting.

Key ratios and metrics: New license revenue, Deferred revenues, EBITDA and EBITDA margins, Gross margin, ROCE, R&D / sales, Free cash flow, Book-to-bill, Inventory outstanding, Collection period or days of receivables outstanding

1.4.7 Banks*

Solomon Ngahu - Reg No. 49000007 di. com nvestment hangesonionist Banks have different activities such as retail banking, asset management, investment banking and wealth management. These will have different drivers. Retail and commercial backing will be driven by GDP growth and penetration rates while asset management will be much more sensitive to financial markets levels and sentiment. The riskiness of the activities will also be different. Credit risk will be much higher in commercial banking, while market risk will impact investment banks more. Capital needs will also vary depending on the type of activity with credit-related activities and trading activities requiring more capital than asset management. This will of course have an impact on ROEs.

Main subsectors: Retail & Commercial banking (Sydbank), Asset Management (Blackrock), Investment banking (Goldman Sachs), Wealth Management (Baer)

Accounting issues:

- Financial assets: financial assets can be held at amortised cost, at fair value through profit and loss and at fair value with changes in value reflected in Other Comprehensive Income (this is the Available for Sale category). The method chosen by a bank to classify these assets will have a significant impact on value adjustments and impairments of these assets.
- Loan loss provisions: IFRS uses the incurred loss method, whereby a bank can only _ recognize an impairment allowance where there is objective evidence of impairment as a result of one or more loss events that have occurred after initial recognition, and where these events have had an impact on the estimated future cash flows of the financial asset or portfolio of financial assets. However, local regulatory authorities have some say in the matter, so there are regional differences in provisioning. One should therefore look to the notes to the financial statements for further details.
- Level of equity capital: since the 2008 financial crisis, the regulator has sought to increase capital requirements so that banks no longer have recourse to public money in the event of another banking crisis. These requirements, summarised in the Basel III agreements, make provision for 'core' capital (minimum common equity capital ratio) and list the financial instruments that can be recognised as equity capital. These requirements significantly reduce the return on equity of banks at the peak of the cycle.

Key ratios and metrics: Efficiency ratio, Net interest margin, ROA, ROE, Non-performing loans / loans, Coverage ratio, Tier 1 common ratio

1.4.8 Utilities*

The utilities sector comprises electric, gas and water companies. Utilities can provide generation, transmission and distribution services. Energy trading activities consist in buying and selling in wholesale markets to match power supplies against customer demands. Utilities can be regulated or not. Regulated utilities are subject to price regulation, meaning that they will be allowed to earn a specific ROE based on their costs and capital structure. Margins tend to be more stable.

It is mostly a capital intensive industry, since infrastructure costs are so high, but since revenues tend to be very stable, utilities usually carry a lot of debt.

Main subsectors: 1. Electric (Electricité de Strasbourg); 2. Gas (Gas Natural); 3. Water (Pennon Water), 4. Renewable energy (ENEL Green Power). Other rankings: 1. Generation (EDF), 2. Transmission (National Grid), 3. Distribution services (GDF Suez) or 1. Trading (ex-Enron), 2. Waste management (same name), 3. Concession (Vinci)

Accounting issues:

- _
- _ restoration of the sites: the number of anticipated years and in particular the interest rates applied. If these rates are too high, an undervaluation of the reserves cannot be excluded.

Key ratios and metrics: EBITDA margin, ROE, Net debt / EBITDA, Return on capital employed, Free cash flow, Total debt to total capital, Interest coverage ratio

1.5 Sensitivity analyses*

The sensitivity of results to the variation in sales is a key aspect of the analysis. A management that decides to move towards technological activities at the expense of more traditional activities will increase its short-term growth but must expect greater earnings volatility. Sensitivity analyses seek to determine this risk.

There are several measures:

- measure of business risk (variation in sales during different economic phases)
- measure of operational risk (or measurement of the beta of the activity)
- measure of financial risk (or leverage)

A company's results can be significantly improved by reducing the proportion of its fixed costs, choosing a more cyclical activity or increasing its debt. All of these decisions will increase earnings volatility, but do not mean that the company's enterprise value will rise on the market. In other words, it increases the profitability of the asset, but the risk taken by equity providers also rises, with higher volatility and lower profits in the event of an economic slowdown. From the point of view of the strategic analysis, it is a zero sum game.

1.5.1 Operating income sensitivity*

1.5.1.1 Degree of operating leverage*

Operating income can be defined as sales less operating costs, which include all costs with the exception of interest paid and income taxes (and possibly other non-operating costs like exceptional losses incurred through the disposal of assets).

Operating leverage refers to the level of fixed costs as a percentage of operating costs. Variable costs are those that rise or fall along with the production level. Fixed costs are those the firm incurs regardless of its production level. Note that non-operating costs such as exceptional gains and losses (due, for instance, to asset disposals), interest paid and income taxes are not taken into account at this level of the analysis.

Operating leverage can be considered as an industry-specific factor, more than a company-specific one. Imagine you were an independent taxi driver. You could then not afford not to buy a car, or at least not to lease it. Your fixed costs - whatever your decision, to buy or to lease - would in any case be higher than the ones you would be faced with if you had chosen to become a writer.

Solomon Ngahu - Reg No. 49000007 The relationship between operating income growth and sales growth can be formalized as follows:

Operating income growth in $\% = DOL \cdot Sales$ growth in %

where DOL = Degree of Operating Leverage = $1 + \frac{\text{Fixed operating cost}}{2}$ Operating income

Mios USD	2011	2012	2013
Published figures			
Sales & Other revenues	59'375	57'561	58'831
Cost of goods sold	18'983	18'756	19'608
Fixed costs and Depreciation	29'394	27'612	28'313
EBIT	10'998	11'193	10'910
Degree Operating Leverage	3.673	3.467	3.595
Hypothesis: Sales growth: 2%			
Sales & Other revenues	60'563	58'712	60'008
Cost of goods sold	19'363	19'131	20'000
Fixed costs and Depreciation	29'394	27'612	28'313
EBIT	11'806	11'969	11'694
EBIT growth	7.35%	6.93%	7.19%

DOL 2013 = 1 + 28'313/10'190 = 1 + 2.595 = 3.595

Operating income growth = $3.595 \cdot 2.0\% = 7.19\%$

We can check that 7.19 percent / 2 percent is indeed equal to 3.595. DOL measures the growth multiple between the sales and operating income of Novartis. In the event of a 10 percent increase in sales, operating income would increase by 36 percent (gross margin and fixed costs remain stable).

The level of DOL varies significantly with the level of sales. It increases as the company's sales decline. Fixed costs do not change, so operating income is affected by a negative margin squeeze.

1.5.1.2 Currencies sensitivity*

Operating risk

Most companies – whatever the industry – do business in more than one currency. As orders, deliveries, and payments usually do not occur at the same time, firms are exposed to the exchange risk if they bill their products in foreign currencies.

Example:

Company X (reference currency = euro) gets an order from one of its American clients. The selling price of the product is EUR 10'000. At that time, the exchange rate of the U.S. dollar against the euro is just 1.00. So, Company X sets the price in dollars at USD 10'000. The delivery and billing is done one month later. Company X is glad because the dollar now trades at 1.05 against the euro, which means that the value of the sale in euros has increased to EUR 10'500. This is the figure that Company X captures in its accounting system. The payment is received after two months. Company X gets USD 10'000 and converts this amount into euros. Unfortunately, the dollar has slumped to 0.95. So, the bank credits Company X's account with only EUR 9'500. From an economic standpoint, Company X has lost EUR 500 (the difference between the price wanted, EUR 10'000, and the amount received, EUR 9'500). But from an accounting standpoint, it has lost more money, namely EUR 1'000 (the difference between the value of the bill, EUR 10'500, and the amount received, EUR 9'500). Those EUR 1'000 will appear as a loss in Company X's income statement.

This ratio is also equal to DOL = Gross margin/EBIT.

Conversion risk

Solomon Ngahu - Reg No. 49000007 di. om abroad. Once 1250000007 di. of the Many companies – whatever the industry – own assets (e.g. subsidiaries) abroad. Once twice or four times a year, they must draw up their balance sheets. Consequently, they must convert the value of all their foreign assets (which are not for sale, it must be emphasized) into their reference currency. Since exchange rates are not fixed, even though the local-currency value of these assets would be unchanged, their value translated into the reference currency changes with time.

Example:

Company Y (reference currency = euro) owns a subsidiary in the U.S. At the end of last year, the value of this subsidiary was USD 1 million. The U.S. dollar was 1.10 against the euro. Hence, the value of the subsidiary in euros was EUR 1.1 million. This is the figure that Company Y reported in its last annual report. One year later, nothing has changed as regards the U.S. subsidiary. Its value in local currency is still USD 1 million. But the dollar has plummeted against the euro. It now trades at 0.85. Therefore, the value of the subsidiary in euros is down to EUR 850'000. Has Company Y really lost EUR 250'000? From the operating standpoint no, because 1) the value of the subsidiary in local currency has not changed and 2) the subsidiary has not been sold, and will not be sold in the near future. Hence, those EUR 250'000 will not appear as a loss in the income statement. However, since the total asset value of Company Y (with its subsidiary) has come down, this amount will be deducted from the shareholders' equity.

As we have already highlighted, currency risk is not an industry-specific factor. There are local and multinational companies in all industries.

1.5.1.3 Break-even analysis*

1.5.1.3.1 Operational break-even point*

Break-even analysis is a simple but effective tool for predicting the effect of operating leverage on a firm. It tells the analyst the sensitivity of a firm's operating profit to changes in production levels. We will start with the simple case and move on to more complex cases.

In the simplest case, we take a single product manufacturing firm. Let us say that we can segregate the costs into two categories: those that are strictly variable with respect to production volume and fixed costs. We also assume the inventory to be zero. That is, we assume that we are able to sell whatever is produced. Let there be a single unit sales price. The break-even point is given by the volume of production at which the profit is zero. Putting it in a formula form we have:

Net profit =
$$Q \cdot (p - c_y) - FC$$

where:

- 0 volume of production/sales
- unit sales price р
- unit variable cost C_V
- FC fixed costs

$$0 = Q_{BEP} \cdot (p - c_v) - FC$$
$$Q_{BEP} = \frac{FC}{p - cv}$$
$$Q_{BEP} = \frac{FC}{P}$$

m

where:

Q_{BEP} break-even volume

m unit contribution margin = $p - c_v$

Otherwise stated, the break-even analysis is given by that volume of sales at which the fixed costs are just covered by the unit contribution margin.

Example:

Let us assume that Novartis only makes influenza pills, which it sells for one franc each (which of course is unrealistic, but greatly simplifies the calculations). Variable costs (cost of goods sold) represented 33.3 percent of sales in 2013, which means that we can calculate the volume required for Novartis to reach break-even point.

 $0 = Q_{BEP} \cdot (p - cv) - FC$

 $0 = Q_{BEP} \cdot (1 - 0.333) - 28,313$

 $Q_{BEP} = 28,313 / 0.66666667 = 42.467$ million influenza pills per year. This is 28 percent below the current sales level.

We can add the concept of <u>margin of safety</u> to this analysis. The management wants to know at what sales level it can expect not to be in negative territory in operational terms. The margin of safety was traditionally estimated at 10 to 20 percent. The 2008 crisis increased this margin, as Vernimmen points out. We take a pragmatic approach, by 'only' adding 5 percent to the operational break-even point for growth companies such as Novartis, which equates to sales of USD 44,590 million⁶. For highly cyclical or unprofitable companies such as companies in the paper industry, we apply a higher margin of safety (15 to 20 percent).

This is the first step in the break-even analysis. The break-even sales volume shows the minimum volume to be produced before profits can be expected.

Fixed costs typically consist of costs such as payments to executives, rent, etc. These do not vary with the volume of production. A particular problem is represented by some costs which do not vary directly with the volume of production, but vary with the number of batches. These costs are known as batch level costs or step costs. Typical examples of these costs are transportation costs. These costs will vary with every truck load. For the purpose of our analysis, such costs are split into two components. One component is the fixed portion and the other component will be the variable portion.

The second step of a break-even analysis is to take into account the profits that can be expected for a given volume of production. Analysts are often plotting graphically these situations. As we have seen, the profits can be computed by the formula:

⁶ This is still 24 percent below current sales levels. Novartis is therefore in a very comfortable position.

Net profit =
$$Q \cdot (p - c_v) - FC$$

Net profit = $Q \cdot m - FC$

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Net profit = $Q \cdot (p - c)$	$_{v}) - FC$	Solution
Net profit = $\mathbf{Q} \cdot \mathbf{m}$ -	- FC	www.mas
Thus, an analyst can directly find out the impact of chang this analysis may take into account the income tax or the level of detail depends on the purpose of the analysis.	ge in volumes. Me e present value of	ore refined variations of future cash flows. The
Sales 2013	Op.profit	DOL
40'000	-1'645	n/c
42'467	0	n/c
43'000	355	80.67
58'831	10'910	3.60
70'000	18'356	2.54_

We can see that operating income grows monotonically with sales. Conversely, the DOL (degree of operational leverage) increases indefinitely as we approach the operational breakeven point.

1.5.1.3.2 Financial break-even point*

In the previous example, we calculated the volume of production that would generate zero operating income for the company. We could also calculate the volume of production that generates a zero net profit for the company.

For the 2013 published results of Novartis, this means adding net interest to the amount of fixed costs to be covered, or USD 775 million in interest. Factoring in taxes somewhat complicates the calculation, because some items are calculated after tax in the profit and loss account, such as minority interests and associates⁷. For an identical variable margin, we arrive at a financial breakeven point of 42,785 million pills. This figure is not all that far from the operational break-even point, and reflects the fact that Novartis has very limited leverage, as we will discuss in more detail below.

$$QBEP = \frac{(FC + i) \cdot (1 - t) + Minorities - Associates}{m \cdot (1 - t)}$$

1.5.1.3.3 Value creation break-even point*

Vernimmen⁸ mentions a third interesting break-even point: the value creation break-even point. Without encroaching on the section on EVA, we can calculate the level of activity that corresponds to a group net profit which takes into account the shareholder profitability requirement.

$$QBEP = \frac{(FC + i) \cdot (1 - t) + Minorities - Associates + Capital charge}{m \cdot (1 - t)}$$

⁷ If we consider Roche as a non-operating asset, it can be excluded from the calculation. We included it here because in the majority of situations, associates are treated as operating assets.

⁸ Pierre Vernimmen, 'Finance d'entreprise', Dalloz 2014, pages 229 et seq. This capital charge is of course purely financial and does not correspond to any profit and loss item or cash outflow.

Let us assume that the required rate of return for Novartis in 2013 is 10 percent. Taking into account a total equity Let us assume that the required rate of return for Novarus in 2015 is to percent. Taking into account a contract capital of USD 74,343 million, the annual capital charge is USD 7,434. The break-even point is therefore: $0 = Q_{BEP} \cdot (p - cv) - (FC+ Int.) \cdot (1 - t) - Minorities + Associates - Cap. charge$

$$0 = Q_{BEP} \cdot (p - cv) - (FC + Int.) \cdot (1 - t) - Minorities + Associates - Cap. charge$$

$$0 = Q_{BEP} \cdot (1 - 0.333) - 28,313 \cdot (1 - 0.1424) - 117 + 600 - 7,434$$

 $Q_{BEP} = ((28,313 + 775) \cdot (1 - 0.1424) + 117 - 600 + 7,434) / 0.66666667 \cdot (1 - 0.1424) = USD 55,787$

It is only from this sales level that the company starts to create value for shareholders. This approach was also used by Rappaport.

To sum up, below are the three break-even points of the company calculated based on published data.

	2012	2013
Break-even point (operational)	37'110	38'617
Break-even point (net income)	37'006	38'193
Break-even point (value creation)	49'268	51'877

The break-even points established based on recalculated figures would give different sales levels. These would be lower, since the COGS is lower in the 'core' approach of Novartis. There are fewer charges to cover, therefore fewer sales are needed to reach break-even point.

1.5.2 Financial leverage sensitivity*

One of the key questions that managers need to answer when discussing the strategy of the enterprise is the nature of the capital sources: debt or equity. Financing can widely range from permanent capital sources (like equity) to more risky short-term financing. Starting with Modigliani-Miller, the optimal capital structure has been extensively debated in corporate finance. As we have seen, analysts can easily understand the strategy of the enterprise in this area by computing and interpreting solvency ratios.

One basic financing decision facing financial managers of a firm is the target capital structure, i.e. the decision about which proportion of the capital of the firm should be borrowed funds and which proportion of the funds should be shareholder-provided equity funds. Obviously, the decision of the target capital structure will be based on the basic principle of the shareholder value maximisation. The optimal capital structure is that capital structure which maximises the value of the firm and the shareholder wealth.

The traditional view of the capital structure decision is to view it as a trade-off between the tax advantages of increasing debt financing and the costs of the increased risk of financial distress for a given investment plan. The costs of financial distress include legal and administrative costs of bankruptcy, as well as agency, moral hazard and contracting costs.

But additional factors are relevant to make the decision on the target leverage of a company. The optimal capital structure is a company-specific measure, which mainly depends on four factors: the specific risk, the tax situation, the asset types of the company, and the need for financial slack.

- Taxes: A company in a tax paying situation which increases its leverage reduces its incomposition of tax and increases the income tax paid by investors (as more interest is paid to debt hold and 19 If the company has large accumulated losses, an increase in leverage taxes, but increase personal taxes.
 Risk: With or with
- costs such as loss of customers, loss of key personnel, etc.). All things being equal, distress is more likely for firms with high business risk.
- Asset type: The costs of distress are likely to be greater for firms whose value depends on growth opportunities or intangible assets. These firms are more likely to forgo investment opportunities and, if default occurs, their assets may erode rapidly.
- Financial slack: In the long run, a company's value rests more on its capital investment and operating decisions than on financing decisions. Therefore, companies want to have enough financial slack to employ immediately the available capital when good investment opportunities arise. Financial slack is most valuable to firms that have large positive net present value investment opportunities. That is another reason why many companies usually prefer conservative capital structures.

1.5.2.1 Degree of financial leverage*

There are two major factors to be highlighted. The first is financial leverage, i.e. the interestbearing debt to equity ratio. The higher the ratio, the higher the sensitivity of earnings to GDP changes.

On published figures	2013	2014	Growth
Sales & Other income	58'831	60'008	2.0%
EBIT	10'910	11'694	7.2%
Interest expense on interest bearing debt	664	664	
EBT before financial income	10'246	11'030	7.7%
Degree Financial Leverage	1.065		1.065

For this calculation, interest expense does not change from one year to another. The forecasts for 2014 indicate a 2 percent increase in sales, as in the example of DOL and constant fixed costs.

The relationship between net income growth and operating income growth can be formalized as follows:

Income before taxes growth in $\% = DFL \cdot Operating income growth in \%$

As net income growth = Income before taxes growth, then:

Net income growth in $\% = DFL \cdot Operating income growth in \%$

where $DFL = Degree of Financial Leverage = 1 + \frac{Interest paid}{Income before taxes}$ ¹⁰

⁹ In addition, debt financing avoids double taxation of cash flows which arises from taxation at the company level and at the level of the equity holder. Dividends are in most countries subject to double taxation.

¹⁰ The ratio corresponds to the DFL = EBIT/EBT

As regards our example:

Net income growth = $1.0648 \cdot 7.19\% = 7.66\%$

We can see that financial leverage is indeed very low at Novartis.

1.5.2.2 The leverage effect*

For creditors, increased equity financing is preferred because it is a way of protection against losses. The percentage of equity financing in total financing is an important measure used by creditors for credit risk (which is directly linked to the interest rates). On the other hand, for investors in equity, debt represents a way of increasing the earnings (balanced by the risk of magnifying losses as well). Using debt as an attempt to increase returns to equity is known in finance as *financial leverage*.

We will substantially increase the leverage of Novartis to see what impact this might have on the various results and ratios of the group. Debt is now assumed to represent 40 percent of the balance sheet of Novartis.

We calculate the returns on capital and on equity based on the year-end balance sheet values.

We will also assume that the increased leverage has no impact here on the cost of borrowing. We will see that this is not the case in reality. The cost of debt rises quite significantly when borrowing increases.

From the example presented above, we can understand that financial leverage occurs when debt is invested in the company with the intent to earn a greater rate of return than the cost of interest. This effect occurs because interest payments are essentially fixed financing costs and as long as the enterprise can earn more on the funds than it pays in interest the inclusion of some level of debt is having a positive leverage effect. Another reason for the advantageous position of debt is the fact that interest is tax deductible and therefore the income tax paid by levered companies is lower.

However, it is important to notice that for equity holders leverage is interesting as long as the company is profitable. If things go bad, leverage is working both ways: losses are increased as well.

Mios USD	2013	2013 Lev.
Published figures		
Total Liabilities & Equity	126'254	126'254
Shareholders' equity	74'343	41'859
Total interest bearing debt	18'018	50'502
Other liabilities	33'893	33'893
Sales & Other revenues	58'831	58'831
EBIT	10'910	10'910
Interest paid on int.bearing debt	664	1'861
Financial income & others	-111	-111
Profit before taxes	10'135	8'938
Taxes	1'443	1'273
Non operating income after taxes	600	600
Minorities after taxes	-117	-117
Net income	9'175	8'148
ROE (year-end assets) i.e after taxes	12.3%	19.5%
ROE* (year-end assets) i.e before taxes	13.6%	21.4%

 Comments:

 Interest-bearing debt has been increased to 40 percent of the balance sheet. Other liabilities have on on the percent of the balance sheet. Other liabilities have on on the percent of the balance sheet. Other liabilities have on on the percent of the balance sheet. Other liabilities have on on the percent of the balance sheet. ROE rises sheet increased while interest income has remained stable. ROE rises sheet increase in borrowing.

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A company's optimal capital structure represents an important aspect that needs to be considered by analysts. From an income statement point of view, financial leverage determines the way the results from operations (EBIT) are divided between debt holders (in the form of interest payments) and equity holders. Solvency ratios should be put together with profitability ratios in order to understand the level and the trend of financial leverage.

The return on equity before tax (ROE*), the return on assets before tax and interest (ROA*), the average interest rate paid on interest-bearing debt (i*) and the total debt to equity ratios may be linked through the following formulae:

$$ROE* = ROA* + (ROA*-i*) \cdot TDE$$

Leverage effect before tax

The second part of the equation is referred to as the leverage effect before tax. Therefore, we can say that the return on equity before tax (ROE*) is the sum of return on assets before interest and tax (ROA*) plus the *leverage effect before tax*.

The equation above can be demonstrated by replacing the formulas:

 $\frac{\text{Earnings before tax}}{\text{Equity}} = \frac{\text{EBIT}}{\text{Assets}} + \left(\frac{\text{EBIT}}{\text{Assets}} - \frac{\text{Interest expense}}{\text{Debts}}\right) \cdot \frac{\text{Debts}}{\text{Equity}}$ $\frac{\text{EBIT}}{\text{Assets}} + \frac{\text{EBIT}}{\text{Assets}} \cdot \frac{\text{Debts}}{\text{Equity}} - \frac{\text{Interest expense}}{\text{Equity}}$ $EBIT \cdot Equity + EBIT \cdot Debts$ -Interest expense $\cdot Assets$ Assets · Equity $EBIT \cdot (Equity + Debts)$ -Interest expense \cdot Assets Assets · Equity $\frac{\text{Assets} \cdot (\text{EBIT-Interest expense})}{\text{Earnings before tax}} = \frac{\text{Earnings before tax}}{\text{Earnity}} = \text{ROE}^*$ Assets · Equity

It is important that analysts understand the underlying relations between these factors. Applying the formulae and keeping the interest rate constant, one can clearly see the effect of various levels of debt on the return on equity before tax (ROE*), for given levels of the ROA*. ROE* is a linear function of the degree of debt (as measured by the debt to equity ratio).

This formula works when a company's balance sheet only contains debt and equity. However, most of the time there are liabilities that do not pay interest. These liabilities are referred to as Non-Interest-Bearing Current Liabilities (NIBCLs). At Novartis they take the form of deferred tax liabilities and provisions and other non-current liabilities.

1. Option 1: these liabilities are included in the calculation of the interest rate paid on the debt. As they do not trigger any interest payment, they automatically reduce the average rate paid on the company. This is the calculation in the first table below. This approach is not particularly realistic, but it means that the formula can be applied as it is

	2013	2013 Lev.
1 ROA * (year-end assets) i.e before interest and taxes	8.55%	8.55%
i	1.28%	2.21%
ROA*-i	7.27%	6.35%
TDE (Including all liabilities)	69.8%	201.6%
2 Leverage contribution	5.08%	12.80%
1+2 ROE* (year-end assets) i.e before taxes	13.63%	21.35%

$ROE^* = ROA^* +$	+ (ROA* – i)·TDE
13.6% = 8.55% + (8)	$.55\% - 1.28\%) \cdot 69.8\%$

However, 1.28 percent does not represent the real rate paid by Novartis but a 'theoretical' i (different from the i* used in the previous calculations). Unfortunately the recalculated rate does not move synchronously with market rates.

2. Option 2: the basic formula is adjusted to include NIBCLs:

	2013	2013 Lev.
1 ROA * (year-end assets) i.e before interest and taxes	8.55%	8.55%
ROA*-i*	4.87%	4.87%
i*	3.69%	3.69%
TDE	24.2%	120.6%
2 Leverage contribution	1.18%	5.87%
3 Non-int.bearings liabil.(NIBLICS) contribution	3.90%	6.93%
1+2+3 ROE* (year-end assets) i.e before taxes	13.63%	21.35%

 $ROE^* = ROA^* + (ROA^* - i^*) \cdot TDE + ROA^* \cdot (NIBCLS/EQUITY)$ 13.63% = 8.55% + (8.55% - 3.69%) \cdot 69.8% + 8.55% \cdot (33,893/74,343)

Three sources of leverage are thus identified:

- operating profit before tax (8.55 percent)
- the financial leverage itself (1.18 percent)
- a third source of return, which is the company's ability to obtain finance without making regular interest payments (3.90 percent). The contribution of this third 'pole' is never negative if ROA > 0, so it does not interfere with the reasoning linked to leverage. That is not to say that these 'funds' are free, since the provisions are supposed to represent potential losses for the company. We will see in the calculation of the cost of capital in the financial markets that non-interest-bearing current liabilities (NIBCLs) are a rather special case, and are never treated entirely satisfactorily.

Considering the ROE*, we have the following situations:

- ROA* > i \rightarrow the higher the leverage ratio, the higher the ROE*
- ROA* < i \rightarrow the higher the leverage ratio, the lower the ROE*
- ROA* = i \rightarrow the leverage ratio does not have any effect on the ROE*

Novartis leveraged ROE* = $8.55\% + (8.55\% - 2.21\%) \cdot (84'395/41'859) = 8.55\% + 6.3\% \cdot 2.0 = 21.4\%$

Due to a higher debt ratio, "Novartis leveraged" exhibits a higher ROE*. In addition, a given change in ROA* will have a different impact on the two ROE*s. Assuming now that the sales & other income reach USD 66'911 million, all other things being equal, the ROA*will reach 12.8% and the new ROE*s will be as follows:

Novartis: $ROE^* = 12.8\% + (12.8\% - 1.28\%) \cdot (51'911/74'343) = 1283\% + 11.5\% \cdot 0.69 = 20.9\%$ Novartis leveraged ROE* = $12.8\% + (12.8\% - 2.21\%) \cdot (84'395/41'859) = 12.8\% + 10.6\% \cdot 2.01 = 34.2\%$

The calculation of 2.21 percent is obtained from an i* of 3.69 percent. We now take into account the total debt of USD 84,395 million - thus including the non-interest bearing portion. This reduces the interest rate calculated to 2.21 percent.

The increase in the ROE* is larger for "Novartis leveragaged" than for "Novartis":

 $\Delta\%$ of the ROE* = (20.9-13.6)/13.6 = 53% Novartis: Novartis leveraged $\Delta\%$ of the ROE* = (34.2-21.4)/21.4 = 60%

The difference between the two rates of change is fully explained by the degree of financial leverage that can be computed on the basis of the income statement before the increase in the EBIT. The degree of financial leverage is given by the formulae:

> EBIT Degree of financial leverage = Earnings before tax

Therefore we have:

 $\Delta\%$ of the ROE* = $\Delta\%$ of the ROA* \cdot Degree of financial leverage

The use of the degree of financial leverage is a very simple and powerful tool to have a first glance idea of the effect of a given change of the ROA* on the ROE*.

Example (continued):

	2013	2013 Lev.
Δ% ROA*	50%	50%
Degree Financial Leverage	1.06	1.21
Δ% ROE*	53%	60%

From this information, we know that, all other things being equal, a given change in the EBIT will have a larger impact on the earnings before taxes of "Novartis leveraged" than on "Novartis". Within our assumptions, we could have determined the variation of the ROE* by using the degrees of financial leverage and a 50% (12.8%/8.55%) increase in the ROA*:

 $\Delta\%$ of the ROE* = 50% · 1.06 = 53% Novartis: $\Delta\%$ of the ROE* = 50% \cdot 1.21 = 60% (rounding differences) Novartis leveraged:

We obtain the same results as above.

For the sake of simplicity, we have used the return on equity before tax (ROE*), but in real cases we may be required to conduct the analysis after tax. A simplistic solution is to compare the return on equity with a return on equity, as if the enterprise would not have borrowed (ROE^{UL}):

$$ROE^{UL} = \frac{\text{Net income} + \text{Interest expense} \cdot (1 - \tan rate)}{\text{Equity} + \text{Interest bearing debts}}$$

 ROE^{UL} represents the return on equity that the owners of the enterprise would have obtained if they would not have borrowed. Therefore, the equity is increased by the borrowings, while from the net income the interest expense is eliminated (net of tax effects). The difference between ROE and ROE^{UL} represents the financial leverage obtained by the owners of the enterprise through debts.

Solution:

Based on this data, the ROE^{UL} becomes:

On published figures	2012	2013	2013 Lev.
Shareholders'equity and Minorities	69'137	74'343	41'859
Group income	9'270	9'175	8'148
Interest paid	655	664	1'861
Interest bearing debt	19'726	18'018	50'502
Tax rate	14.9%	14.2%	14.2%
ROE ^{ul} (year-end assets)	11.06%	10.55%	10.55%
ROE (year-end assets)	13.41%	12.34%	19.47%

Novartis has a small positive leverage effect in 2012 and 2013. This means that the company is generating a greater rate of return than the cost of interest.

There is an important conclusion that we can draw from the above examples: when there is a high probability that (ROA* - i) might become negative, the level of debt should be reasonable. On the contrary, if that probability is close to zero, one can consider high levels of debt leading to a high degree of financial leverage. In other words, a comment on the level of debt should not only refer to the balance sheet, but also to the characteristics of the income statement.

The table below contains a comprehensive summary of leverage with two scenarios: an improvement and deterioration in the economic situation.

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RECESSIC On published	DN figures	STABLE ECONO On published fi	OMY gures				ECONOMIC BC On published fi	DOM gures
	2012		2012	2012	2012		2012	2012
2013	2013		2012	2013	2013		2013	2013
Today	Leverageu	Total interact bearing debt	10'726	10049	Eeveraged		Today	Leverageu
		Other liabilities	19720	20/002	30 502			
		Shareholders' aquity & Minerities	55 655 60'127	55 695	41'950			
		Total Palance Shoot	122'756	74 343	41 859			
451011			57'561	120 234	58'831		CC 011	CC 011
45 911	45 911	Salas & Other income	57 561	58 831	58 831		66 911	66 911
45 911	45 911	Variable easts	18/7501	10/000	10/608		22/201	22/201
14 998	15 302	Variable costs	18 / 50	19 608	19 608		22 301	22 301
28.313	28.313	Fixed costs and Depreciation	27612	28'313	28.313		28'313	28'313
2.600	2.296	EBII	11.193	10.910	10.910		16.297	16.297
664	1'861	Interest paid on int.bearing debt	655	664	1'861		664	1'861
1'936	435	EBT before financial income	10'538	10'246	9'049		15'633	14'436
-111	-111	Financial income & others	-165	-111	-111		-111	-111
260	46	Taxes	1'542	1'443	1'273		2'210	2'040
600	600	Non operating income after taxes	552	600	600		600	600
-117	-117	Minorities after taxes	-113	-117	-117		-117	-117
2'048	761	Group income (Novartis shareholders)	9'270	9'175	8'148		13'795	12'768
2.8%	1.8%	ROE (year-end assets)	13.41%	12.34%	19.47%		18.6%	30.5%
2.5%	0.8%	ROE* (year-end assets)	15.00%	13.63%	21.35%		20.9%	34.2%
2'013	2013 Lev.		2'012	2'013	2013 Lev.		2'013	2013 Lev.
11.89	13.33	Degree Operating Leverage	3.47	3.60	3.60		2.74	2.74
2'013	2013 Lev.			2'013	2013 Lev.		2'013	2013 Lev.
1.34	5.28	Degree Financial Leverage		1.06	1.21		1.04	1.13
2013	2013 Lev.			2013	2013 Lev.		2'013	2013 Lev.
2.0%	1.7%	1 ROA * (year-end assets) i.e before interest a	and taxes	8.6%	8.6%	1	12.8%	12.8%
1.3%	2.2%	i .		1.3%	2.2%		1.3%	2.2%
0.7%	-0.5%	ROA*-i		7.3%	6.3%		11.5%	10.6%
69.8%	201.6%	TDE (Including all liabilities)		69.8%	201.6%		69.8%	201.6%
0.5%	-1.0%	2 Leverage contribution		5.1%	12.8%	2	8.1%	21.4%
2.5%	0.8% 1+2	ROE* (year-end assets) i.e before taxes		13.6%	<mark>21.4%</mark>	1+2	20.9%	34.2%
				2013	2013 Lev.			
2.0%	1.7%	1 ROA * (year-end assets) i.e before interest a	and taxes	8.6%	8.6%	1	12.8%	12.8%
-1.7%	-2.0%	ROA*-i*		4.9%	4.9%		9.1%	9.1%
3.7%	3.7%	i*		3.7%	3.7%		3.7%	3.7%
24.2%	120.6%	TDE		24.2%	120.6%		24.2%	120.6%
-0.4%	-2.4%	2 Leverage contribution		1.2%	5.9%	2	2.2%	11.0%
2.1/0				=.=/0	2.270	-	=:=/0	
0,9%	1.4%	3 Non-int.bearings liabil.(NIBLICS) contribution	n	3.9%	6.9%	3	5.8%	10,4%

Sensitivity of results in case of higher leverage in different economic situations

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1.5.3 Net income sensitivity*

What is the sensitivity of net income to operating income growth?

Net income can be defined – when ignoring exceptional gains and losses – as operating income less interest paid, and less income taxes.

The level of indebtedness is, in principle, a company-specific decision. So we will address this issue in the section dedicated to balance-sheet factors (see previous chapter). Note, however, that the pressure exerted by the capital suppliers (the shareholders and the lenders) for optimising their risk/return leads – within a particular industry – to much more uniform debt-to-equity ratios than theory would suggest. It is a matter of profitability – some industries would never make enough money if they did not resort to high borrowing.

High indebtedness means higher risk for two reasons:

- The sensitivity of net income to GDP changes depends upon 1) the sensitivity of sales to GDP changes and 2) the proportion of total fixed costs (operating fixed costs and interest paid). So the higher the level of indebtedness, the higher the sensitivity of net income to GDP changes.
- Interest paid, a cost that reduces earnings, depends on 1) the level of indebtedness and 2) the level of interest rates. So the higher the level of indebtedness, the higher the sensitivity of net income to interest-rate changes.

Companies – or industries – with high debt-to-equity ratios are very vulnerable when the economy starts slowing down from its peak, while interest rates are still high. On the other hand, they achieve impressive earnings growth when the economy starts recovering from a trough, while interest rates are still low.

Do not forget that, in addition to the fundamental effect (increase or decrease of the cost of debt, along with interest-rate rises or drops), interest-rate changes impact company valuations. This second effect is even more important than the first from the investor's standpoint. A surge in interest rates would hit share prices much more because of the valuation effect than because of the fundamental effect.

Income taxes have nothing to do with the industry-related factors. Basically, the tax rate depends upon the mix of countries in which a specific company operates and the tax optimisation system that it uses.

In addition to GDP and interest rates, a third macro factor must be addressed, i.e. exchange rates. The major U.S. and European indices are dominated by multinationals, selling their products/services worldwide. Although these companies are international from an economic standpoint, they are still considered as American, British, German, French or Swiss depending on the location of their head office.

This would have no impact if all the countries around the world had adopted the same currency. Although the trend is very clear (there are fewer and fewer currencies in use, and it may be imagined that sooner or later, the major currency blocs – the dollar, the euro and the yen – will enter a common currency system), companies are still faced with exchange-rate risks.

Financia	l accounting and financial statement a	nalysis	Solor	mon Ngahu - Reg No. 49000007	om
1.5.3.1	Degree of leverage*			CON	
We could	d combine the degree of operating lev	erage and the degree of	of finar	ncial leverage into a	
single fa	ctor to assess the sensitivity of net in	come to sales changes	/I IIIIai	ierur ievenge into u	
single iu	etor, to assess the sensitivity of her m	conne to sures entanges.		N	
	On published figures	2013	2014	Growth	
	Sales & Other income	58'831	60'008	2.0%	
	Variable costs	19'608	20'000	2.0%	
	Fixed costs and Depreciation	28'313	28'313		
	EBIT	10'910	11'694	7.2%	
	Interest expense on interest bearing debt	664	664		
	EBT before financial income	10'246	11'030	7.7%	
	Degree Operating Leverage	3.595	3.421		
	Degree Financial Leverage	1.065	1.060		
	Degree Of Leverage	3.828	3.627		

The relationship between net income growth and sales growth can be formalized as follows:

Income before taxes growth in $\% = DL \cdot Sales$ growth in %

As net income growth = Income before taxes growth, then:

Net income growth in $\% = DL \cdot Sales$ growth in %

where

DL = Degree of Leverage = 1 + (Fixed costs + Interest expense) / EBT¹¹

As regards our example for 2013:

DL = (1 + (28'313+664))/10'246 = 1 + 2.83 = 3.83Net income growth = $3.83 \cdot 2\% = 7.7\%$

The second factor to be highlighted is working capital and cash flow. The company's solvency, i.e. its ability to pay back its short-term debt, must be assessed. Two ratios are widely used for assessing the risk of a cash squeeze:

 $Current ratio = \frac{Short-term assets}{Short-term debt}$

¹¹ This ratio is also equal to DL = Gross margin/EBT. It is equal to the product of DL Operating (Gross margin/EBIT) multiplied by DL Financial (EBIT/EBT).

1.5.3.2 DuPont analysis: breakdown of profitability* As noted earlier, ratios should not be analysed separately. To be meaningful, ratios have to be put together and interpreted as a whole. In order to ascertain the area line to be performance of a company the analyst need to look at portfolios of ratios, as information from one ratio category may help in understanding another category. Integrating information from all sources may help in obtaining the overall picture of the enterprise. A popular tool used by analysts that puts together several ratios is the DuPont analysis (the name DuPont comes from the company where this tool has been developed¹²). The objective of this analysis is to understand the factors that are affecting an enterprise's return on equity. The decomposition of the return on equity may help analysts better understand the enterprise's performance compared to competitors and over time.

The return on equity is an important measure to summarize a firm's overall performance and it is used for analysis of current performance, but also for predicting future performance. The beauty of the return on equity ratio lies in its inherent ability to lend itself to decomposition. As we split the ratio into components we can get much helpful information and draw conclusions about the operational efficiency of the enterprise. Analysts have developed several models of decomposing the return on equity. Below we are going to present one of the most commonly used three stage decomposition.

As we have seen, the return on equity may be computed as the net income divided by equity. In a first stage, the assets are included in the equation:

$ROE = \frac{Net in}{Equation}$	uity
$\frac{\text{Net income}}{\text{Assets}}$	$\cdot \frac{\text{Assets}}{\text{Equity}}$
ROA	Leverage

In other words, the return on equity is a function of the return on assets and the leverage of the company. In order to increase the ROE managers may either increase the ROA or make a better use of leverage. Note that in this formulae leverage represents the total debts to equity ratio plus one (TDE+1). In the previous section we have analysed in detail the way leverage may boost the return on equity.

Example:

Based on the ratios computed for Novartis.

Solution:

	2012	2013
ROA	7.55%	7.27%
Leverage (1+Tot.DE)	1.78	1.70
ROE	13.41%	12.34%

(rounding differences)

¹² DuPont is historically used by managers of business units when examining ROA to aid them in their investment decisions. Financial decisions - and thus the choice of leverage and ROE - used to be the responsibility of the parent company. This analysis is in line with the shareholder value approach.

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In a second stage of the DuPont analysis, the return on assets is decomposed in a similar way by introducing into the equation the total sales of the enterprise. ROF - Net income

ROF -	Net income	Assets
KOL –	Assets	Equity
Net incom	me Sales	
Sales	Assets	
↑	\uparrow	$\qquad \qquad $
Net Marg	gin Asset Turno	ver Leverage

The first term of the equation above represents the net profit margin, a profitability ratio. The second term of the equation represents the asset turnover, an efficiency ratio. In other words, a company's return on assets depends on its profitability and efficiency.

Comparisons of net margins and asset turnovers are meaningful unless they are used in evaluating firms in the same industry. For instance, Richemont (a luxury brand) had a net profit margin of 29.61% in 2007 and an asset turnover of only 0.54 (the financial statements of Richemont can be found on www.richemont.com). Carrefour (a distribution brand – figures are presented below) had a net profit margin of 3.02% and an asset turnover of 1.58. The two companies cannot be compared directly as they do not belong to the same industry and have different commercial strategies. Richemont is hoping to make profits by selling at high prices (high net margin), while Carrefour is counting on its asset turnover.

Example:

Based on the ratios of Novartis

Solution:

	2012	2013	2013 Lev.
ROA	7.55%	7.27%	6.45%
Net margin	16.10%	15.60%	13.85%
Asset turnover	46.9%	46.6%	46.6%
Leverage (1+Tot.DE)	1.78	1.70	3.02
ROE	13.41%	12.34%	19.47%

(rounding differences)

We can see that leverage is by definition equal to the ROE/ROA ratio.

Finally, the third stage of the DuPont analysis is decomposing the net margin in the operating margin, interest burden and tax burden. This five factor decomposition of the return on equity is often used in empirical studies.

ROF -	Net income	è .	Sales	Assets
KOL –	Assets	_	Assets	Equity
	\downarrow			
Net income	EBT	EBIT		
EBT	EBIT	Sales		
$\qquad \qquad $	$\qquad \qquad $	$\qquad \qquad $	↑	ſ
Tax	Interest	Operating	Asset	Leverage
Burden	Burdern	Margin	turnover	

Solomon Ngahu - Reg No. 49000007 The return on equity is equal to five factors. The first and the second factors are the tax builden ratio and the interest-burden ratio, respectively. One has to be careful in interpreting these ratios: higher taxes will lower the tax burden ratio as well as higher interest expenses will lower the interest-burden ratio.

	2012	2013	2013 Lev.
ROA	7.55%	7.27%	6.45%
Net margin	16.10%	15.60%	13.85%
Operating margin	19.45%	18.54%	18.54%
Interest burden	92.67%	92.90%	81.92%
Tax burden	89.37%	90.53%	91.17%
Asset turnover	46.9%	46.6%	46.6%
Leverage (1+Tot.DE)	1.78	1.70	3.02
ROE	13.41%	12.34%	19.47%

The third and the fourth factors are the operating margin ratio and the asset turnover ratio. The product of these two factors obviously gives the return on assets before tax and interest (ROA*), which can be analysed in a similar manner to the return on assets (see above).

1.6 Quality of earnings as a measure of accounting risk*

1.6.1 Financial warnings signs*

Companies usually try to present themselves in the best light possible. Higher earnings usually mean higher stock prices and, very often, management compensation is tied to achieving key metrics, including meeting earnings targets. Compensation is also very often in the form of stock options or shares, so management has every incentive to wanting a high share price.

This is indeed a powerful motive to report good earnings. Most companies will do this the good old-fashioned way, but some will try to cut corners and use more aggressive accounting methods and, sometimes, even fraudulent ones. Analysts should keep this mind when researching a company and be somewhat skeptical when looking at financial statements. A good dose of common sense is also very helpful. If something looks to be good to be true, it might very well be the case. Even the best run company will run into one or the other quarter of declining earnings. These companies are not the ones one should be wary of but rather those companies that never report a down quarter. Who knows, maybe they might be smoothing earnings?

Sometimes, of course, it is the economic background that impacts a company. If most companies do acknowledge that fact, some will try to downplay a downtrend in earnings, for instance, by arguing that it is a temporary turn of events. Having a look at financial statements and what is happening there can give additional information on what really is going on.

In the following sections, we will look at tell-tale signs of trouble caused by changes in the economic environment and the way the company is managed as well as signs of potential aggressive accounting or earnings manipulation, notably aggressive revenue recognition.

Solomon Ngahu - Reg No. 49000007 ii. off Financial statements are not the only source of warning signs. There are also non-financial signs such as the sudden departure of key executives. We will list a few of these, but as ageneral rule, any unusual happenings or announcements should be examined closely. It is also interesting to note that very often it is the corporate culture of a firm that will determine if a company is more susceptible of earnings manipulation than its peers. For this reason, we will start by looking at the non-financial warning signs.

Finally, one of the most useful things an analyst can do, if he has the opportunity to do so, is to talk to management. What they say - or don't say - can be a valuable addition to what is said in the financial statements. Body language, signs of discomfort when asked questions, evasive answers are all clues to the diligent analyst. Indeed, some hedge funds are supposed to have hired CIA agents to help them in deception detection during conversations with executives and conference calls. Much in the same line, two Stanford researchers, David F. Larcker and Anastasia Zakolyukina, analysed conference calls using linguistic and psychological techniques to identify deceptive language. It does seem that certain speech patterns can imply a higher probability of deception. As interesting as this topic is, it is unfortunately well beyond the scope of this chapter.

1.6.2 Non-financial signs (change of accountants, sudden departure of CFO, delay in statements)*

Not all warning signs are to be found in the financial statements. Very often, the first indication that something is not right in a company comes from sudden and hard to explain changes in management, a delay in releasing earnings, a change in auditors, etc.

1.6.2.1 Corporate culture*

However, it must also be said that a look at corporate governance and a company's corporate culture can also be telling as to what one can expect. For instance, if the corporate culture is very aggressive, there might be considerable pressure on managers to achieve targets and this could be conducive to some manipulation of earnings.

1.6.2.2 Board of Directors*

If the Board of Directors is neither independent (i.e. a higher percentage of inside directors) nor very competent, there might not be sufficient checks and balances on executives. How many directors on the board of banks really understood what was happening during the crisis or even what effect on risk-taking compensation could have? The size of the board can also be a factor to consider. It appears that smaller boards do a better job of monitoring CEOs than bigger boards.

1.6.2.3 Presence of a controlling shareholder*

The presence of a controlling shareholder can potentially also be an indicator of an inclination to manage earnings, but will usually need to be associated with other factors, such as a board that is not dependent and other defective corporate governance mechanisms. Emerging markets appear to be somewhat more vulnerable in this respect.

Solomon Ngahu - Reg No. 49000007 China, for instance, is a country where corporate governance is rather weak. This, alongside with the presence of controlling shareholders, led to several dubious related-party transactions (not to mention cases of fraud and earnings manipulation) For instance, just looking at solar companies, JA Solar acquired in 2011 a wafer business that was 70% owned by the JA Solar chairman. Needless to say, the wafer business was also struggling at that time. Shortly thereafter, JA Solar's CFO resigned, though it may be that the two events are totally unrelated. In a previous solar downturn, another company, Yingli Green Energy, did pretty much the same, acquiring a polysilicon company from it chairman. These transactions have also been accompanied by allegations of aggressive accounting and disclosure problems.

In a way, China also managed to export its poor corporate governance to the United States, via the rather interesting phenomenon that it the reverse merger. Certain China-based companies opted to list on US equity markets via reverse mergers, whereby a private Chinese company acquires a shell company (typically a penny stock listed on the OTC), then makes a secondary offering, perhaps subsequently moving on to a listing on the American Stock Exchange or the Nasdaq. In itself, a reverse merger is not indicative of fraud. Many legitimate companies (for instance, KKR through an affiliate listed in Amsterdam) have decided to go this way, as it less costly and faster than an IPO and also less dependent on market conditions and appetite for IPOs. However, it has been a way to avoid the scrutiny and vetting process associated with a regular IPO, thus allowing perhaps more dubious companies to list on US exchanges. Unfortunately, many of these companies have been subject to allegations of fraud.

1.6.2.4 Auditors*

This also raises another point, that of the adequacy of auditors. Very often, it seems these Chinese companies used small US auditors. Given that their operations were in another country, namely China, it is highly unlikely that these small auditors were able to do their duty in a proper manner. Checking the auditor is not limited to Chinese companies but is also useful for other companies. The auditing firm should be reputable, of a size commensurate with the size of the company it is auditing (i.e. a small, local firm might not be able to fulfil its obligations adequately if its client is a huge, multinational company) and, preferably, have operations in the same country. For instance, Madoff's auditing firm was a relatively unknown, one-man firm whereas most other larger size hedge funds typically used one of the big, well-known auditing firms.

The sudden firing or resignation of a company's auditor is also a key warning sign, though unfortunately for investors, it often happens after a problem has been discovered. When a company fires an auditor it can be related amongst other to internal control weaknesses, audit scope expansion requests by the auditor (when an auditor seeks to do some more work on a problem he has uncovered), disagreements on accounting and opinion shopping (frequent changes in auditors might be a sign that the company is seeking a desired opinion).

More serious, however, is if the auditor resigns. That is usually the sign that something ominous is going on at the company and that there might be considerable litigation risk for the auditor. Markets usually react unfavourably to such announcements.

Example 1:

In June 2011, Life Partners Holdings, which operates in the secondary market for life insurance, saw its shares drop 16% when it disclosed that its auditor has resigned. Amongst the reasons for the resignation were possible material misstatements related to the company's revenue recognition policy.

On the other hand, however, it would appear that keeping the same auditor for a long period of time can induce complacency. Incoming auditors often appear to exercise tighter controls. www.r

1.6.2.5 Senior management turnover*

Unanticipated changes in management are also usually good indicators of potential problems. Of course, in some cases, the reasons for a sudden departure are completely valid (health problems, moving to another job) and in those instances, companies tend to provide detailed explanations. However, when no reasonable explanation is provided or if the reason is perhaps not entirely credible (spending more time with the family), one should be wary. The sudden resignation or firing of a CFO might mean that accounting irregularities (errors or even fraud) have been discovered.

The sudden resignation of an executive other than a CFO might mean key executives do not agree on certain important aspects of running the business, strategy, M&A or it might be a sign that there is a conflictive atmosphere that might make it hard for executives to do their job properly. In the latter case, it is likely that management changes will be more frequent than at peers.

Example 2:

On July 18 2011, insurance company Allstate saw its shares drop 5% on the announcement that one of its key executives, Joseph Lacher, would leave the company effective immediately. Joseph Lacher was President of Allstate Protection, Allstate's troubled homeowner and auto insurance business. Allstate had been losing market share in its auto business and its homeowner business was struggling. Mr. Lacher was a well-respected figure, hired in 2009 to turnaround this unit and was seen as a credible person to implement such a restructuring. His departure was thus seen that it might be more difficult for Allsate to return these activities to profitability.

1.6.2.6 Conclusion*

In conclusion, having a look at the company's background and corporate culture will typically yield a few indications as to whether this company is more at risk than others of potential earnings manipulation. However, even if the background is there, there usually needs to be some sort of trigger for the company to become more aggressive. A growing company that meets or beats earnings expectations will usually not need to resort to accounting tricks. It is when business deteriorates and profit growth becomes more challenging, that some companies will try to help numbers.

Solomon Ngahu - Reg No. 49000067 . . cuated warning signs* I.6.3.1 Revenue growing faster than peers* Markets typically like to see a company post stronger than expected sales and earnings growth and often reward this with good stock price performance. If in most cases, this is most likely warranted, as this implies the company is gaining market share or has introduced an incompoduct (i.e. Apple's iPhone, iPad, etc.), in some cases analysts need to be One such case could be if a company is growing reemingly without having a specific of stop be s to be found in the bants roducts - 1: products – lending. Thus, if a bank starts posting loan growth that is stronger than that of its peers in the same region (as different regions show different growth), it could be that it has loosened its credit underwriting standards and is attracting lower quality loans or that it has become more aggressive on pricing. Neither is very good for future profitability as in the first case, the bank will subsequently show higher loan losses in the future and as in the second, the net interest margin will likely be impacted.

This is not an instance of creative or fraudulent accounting but rather a very aggressive strategy followed by the company. It can, however, also have an impact on profitability.

When confronted with a company growing faster than its peers for no apparent reason, it sometimes worthwhile to go back in time and see if the company has a history of stronger growth in some quarters followed by disappointing revenue in the ensuing quarter. If this is the case, maybe the company is pulling forward revenues by booking them in advance. This would be an instance of improper revenue recognition

For instance, companies can offer distributors discounts or extended payment terms to attract sales towards year-end or quarter end. This can result in an above normal level of sales and is usually known as channel stuffing. If the distributor has too much product, he might not reorder for quite some time, thereby causing a drop in future sales, or he might be allowed to return the product. In itself, this is usually not illegal if undesirable, but in some cases, the sale is accompanied by illegal side letters specifically allowing the buyer to return the merchandise. In this case, the transaction does not really constitute a sale.

BOX Lantronix – an example of channel stuffing

In September 2006, Steven Cotton, the former CFO of Lantronix, a computer networking company, was charged by the SEC of financial fraud. Cotton artificially inflated reported revenue and earnings by deliberately sending excessive product to distributors and granting them undisclosed return rights and unusual extended payment terms.

This was not all. Lantronix also loaned funds to third parties who then bought the product from the distributors and later returned the product. Lantronix also shipped product that had not been ordered.

Through his actions, Cotton caused Lantronix to overstate its revenues by up to 21% and to understate its pre-tax losses by up to 98% for the second and third quarters of its fiscal year 2001, for its fiscal year 2001, and for the first quarter of its fiscal year 2002.

Needless to say, Cotton benefited financially from his fraud since, amongst others, his compensation was tied to his meeting certain corporate financial goals, including meeting analysts' revenues and earnings estimates.

Solomon Ngahu - Reg No. 49000007 ii. off So, how can one see if this is happening? As we mentioned in the beginning, revenues that are growing faster than peers for no apparent reason can be a warning sign. So can receivables that are growing faster than sales, which is what we will study in the next section.

1.6.3.2 Lengthening of receivables*

Receivables that grow faster than sales or a lengthening of days of sales outstanding can also be a warning sign. Note that when calculating days of sales outstanding, it is best to do so over several quarters or years and, if there is significant seasonality, it might be useful to calculate it on a trailing basis over several quarters.

Sometimes a lengthening of receivables reflects the economic environment. Maybe customers are taking more time to pay the company. This might be an indication that the customers' environment is deteriorating. Or else, maybe the company is facing sluggish sales and is trying to revive them by loosening its credit terms. This would mean that the company is bearing more of the financing cost. It might also mean that the company is selling to a new customer base that might not be as credit-worthy which implies that the company might have to book higher reserves for bad debts in the future.

Example: First Solar (USA)				
	Q3 2008	Q4 2008	Q1 2009	Q2 2009
Sales	348.7	433.7	418.0	526.0
Net income	99.3	132.8	164.6	180.6
Receivables	41.5	61.7	184.8	351.3
Sales growth Receivables	119%	116%	112%	97%
growth Receivables days	111% 11	240% 13	925% 40	603% 60

For instance, First Solar, a manufacturer of solar panels, saw its receivables jump from USD62m in Q4 2008 to USD165m in Q1 2009. In the meantime, sales fell from USD433.7m to USD418 m. Looking a bit closer at the notes in the financial statements, one can see that the company amended certain of its customers' long-term supply contracts to extend their payment terms from net 10 days to net 45 days in the first quarter of 2009.

Receivables growing faster than sales are, however, often also a sign of aggressive recognition, especially if the allowance for bad debts does not increase. An interesting ratio to look at is the allowance for bad debts / receivables. If this ratio decreases as receivables go up, it might be a sign that the company is under-reserving, thus boosting earnings.

1.6.3.3 Lengthening of payables*

Solomon Ngahu - Reg No. 49000007 di. off Lengthening of payables implies that the company is taking longer to pay its suppliers. This is not necessarily a bad thing, as it might mean that the company is using its working capital more efficiently. Comparing the company's days of payables outstanding with those of its peers will give a better idea of whether the company is in line or not. If the company has days of payables well below average and is trending towards the average, it will not be bad thing. One should however be aware that this improvement cannot continue indefinitely and that the benefit to cash flow from operations will stop eventually.

If, however, the company is in line with peers and is further lengthening it days of payables outstanding, it could be a sign of stress at the company, i.e. it might be facing difficulties paying its suppliers. Indeed, pushing days of payables outstanding can make life difficult for suppliers, potentially even leading to their bankruptcy.

It is also interesting to look at the relation between payables and inventories. Payables are typically linked to purchases of inventories, so one can assume that over time, they should move more or less in line. However, if there are any discrepancies, for instance if payables are unchanged or even decrease while inventories increase, one should take a closer look and seek explanations.

1.6.3.4 Inventory build-up*

When inventory grows faster than sales or when inventory days increase, it can be a sign of profitability deterioration in the future. It should certainly lead to outside investors asking further questions and determining why inventories have risen. In some cases, it is absolutely justified. If a retailer is planning on opening new stores, it will probably need to build up inventory in advance. This might be one explanation why inventory increases. On the other hand, it might be that the company has trouble moving the product. This could be due to a decline in demand or because the product does not correspond to what the market wants. In the short term, this can lead to inventory write-downs if the product is deemed obsolete (for instance, in the tech industry) or to downward pressure on the gross margin if the company has to reduce prices to sell the product (for instance, in the retail industry). In the longer term, depending on the reason for the product not selling, it might be an indication of some more fundamental problems at the company.

For instance, in its fiscal Q1 2011 results in October 2010, Coach reported sales growth of 20% year-on-year. Inventories, however, grew 36% year-on-year and 26% quarter-on-quarter. This could have been cause for concern if the product was not selling. However, during the conference call, management indicated that this was a planned inventory build up to support strong underlying business trends going into the very important Christmas holiday period. In addition, Coach was about to open a significant amount of new stores as well as a new distribution centre in Asia. Indeed, sales continued to grow at a fast clip the following quarter while the gross margin remained stable.

Looking at Coach's financial statements, one can see that the third quarter sees a rise in inventories, but that inventories drop sharply in Q4 when the majority of holiday sales are made.

Financial accounting and financial statement analysis

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Financial account	nting and	financial	statemen	t analysis	Solomon Ngahu - Reg No. 49000007					
								C	n.	
Coach – evolution	of sales, gr	oss margir	n and inve	ntories	and					
	/ 8	0			Calendar			25		
	Q1	Q2	Q3			Q2	Q3	n	Q1	
	2009	2009	2009	Q4 2009	Q1 2010	2010	2010	Q4 2010	2011	
Sales	739'939	777'744	761'437	1'065'005	830'669	950'525	911'669	1264'457	950'706	
Cost of goods										
sold	214'876	230'426	211'259	294'066	215'094	263'526	235'498	349'281	259'091	
Gross margin	525'063	547'318	550'178	770'939	615'575	686'999	676'171	915'176	691'615	
Inventories	357'670	326'148	337'545	269'200	306'673	363'285	458'920	367'410	391'442	
Sales growth					12%	22%	20%	19%	14%	
Inventory growth	n yoy				-14%	11%	36%	36%	28%	
Gross margin	71%	70%	72%	72%	74%	72%	74%	72%	73%	
-										
Inventory days	152	129	146	84	130	126	178	96	138	

Coach – evolution of sales, gross margin and inventories

Let us now look at another example, also in retailing. In this case, Talbots, a company selling women's apparel, is trying to reposition itself. Its customer- base is ageing and Talbots is trying to entice a younger customer to buy its clothes by revamping its assortment and refreshing its store base. It is having mixed success. In the first quarter of 2010, very tight control of inventories (-18% yoy) most likely led the company to miss some sales opportunities. It started increasing inventory thereafter but its product met with mixed success. At the end of Q3 2010, inventory days had risen to 98 while sales were slowing. Early Q4 2010, the company issued a profit warning, indicating that despite increased promotional activity (i.e. markdowns on its products), its sales were lower than expected.

					Calendar month	+ 1			
	Q1	Q2	Q3		Q1	Q2	Q3	Q4	Q1
	2009	2009	2009	Q4 2009	2010	2010	2010	2010	2011
Sales	306'175	304'641	308'891	315'925	320'661	300'742	299'099	292'558	301'310
Cost of goods									
sold	211'156	220'239	185'591	204'292	180'845	195'777	171'395	207'215	193'965
Gross margin	95'019	84'402	123'300	111'633	139'816	104'965	127'704	85'343	107'345
Inventories	190'749	145'494	165'892	142'696	156'661	130'344	184'699	158'040	177'134
Sales growth					5%	-1%	-3%	-7%	-6%
Inventory growth	yoy				-18%	-10%	11%	11%	13%
Gross margin	31%	28%	40%	35%	44%	35%	43%	29%	36%
Inventory days	82	60	82	64	79	61	98	70	83

Talbots – evolution of sales, gross margin and inventories

1.6.3.5 Gross margin*

In many cases, a decline in the gross margin can be a warning sign that things are getting more difficult for the company. The gross margin can decline for numerous reasons. First of all, a changing product mix can have an impact on the margin if the various products have different margins.

Solomon Ngahu - Reg No. 49000007 rackard (USA) 10Q March 2011 Total HP gross margin decreased by 0.6 percentage points for the three months ended January 37, 2010 as compared to the prior-year period. This decline was a result of strong growth in personal computer and printer hardware revenues that have lower gross margins, the effect of which was partially offset by cost imme-in services. Cost control can also be factor. This is perhaps ncreases to cuet. increases to customers, but in certain cases, notably if the consumer is price sensitive, if the input cost increased too rapidly or if the company does not have much pricing power, they might not be able to pass on the full increase (see example below). In general, though, peers should be feeling more or less the same pressure. If this is not the case, one should probably take a second look at the company and see what else might be going on.

Carters (USA) 10Q April 2011

Product costs can vary depending on the underlying cost of raw materials, such as cotton and polyester, and the level of labour and transportation costs. A substantial portion of the Company's products utilize cotton based fabrics, the cost of which has recently reached historically high levels. Additionally, labour costs have increased across Asia, particularly in China, where the Company currently sources more than 50% of its products. Furthermore, transportation costs to bring product to the United States have risen due to higher fuel costs and limited capacity in the marketplace. The Company purchases finished goods largely from foreign suppliers and pays its suppliers in U.S. currency. Consequently, the Company's product costs have been adversely impacted by the devaluation of the U.S. dollar relative to foreign currencies. These inflationary and currency risk factors have begun to result in higher costs of goods sold and inventory levels, and have adversely impacted our profitability and cash flows from operations. We expect that higher product costs will continue to adversely impact our profitability and cash flow through at least fiscal 2011.

The Company is subject to both inflationary and deflationary risks. With respect to inflation, the Company is experiencing, and expects to continue to experience for the foreseeable future, increases in the cost of its products, driven by increases in underlying component costs, such as cotton, polyester, labour rates, and transportation costs. The Company's product costs have also been adversely impacted by the devaluation of the U.S. dollar relative to foreign currencies. These inflationary and currency risk factors have begun to result in higher costs of goods sold and inventory levels. Although we plan to raise our selling prices on some of our products, we do not expect in the near term to be able to fully absorb these cost increases and our profitability will be adversely impacted.

In recent years, the Company has also experienced deflationary pressure on its selling prices, in part driven by intense price competition in the young children's apparel industry. In this environment there is a risk that customers will not accept our price increases. If the Company is unable to effectively raise selling prices to help offset higher production costs, the adverse effect on our profitability may be even greater than anticipated.

Cutting price to maintain market share will also cause the gross margin to decline. Indeed, if a product is no longer as competitive, a company might try to cut price in order to maintain its market share. In this case, it is worthwhile to take a closer look and see if this could be temporary (a competitor has come out with a new product before the company has been able to launch its own version) or more structural (the company's product is no longer relevant in the market place).

Competitive pressure can also lead to declining gross margins. When in general, demand is slack across the industry, companies might become more aggressive in their pricing. This was the case, for instance, in the retailing industry post the Lehman bankruptcy. Faced with a complete drop in demand and relatively high inventory, retailers slashed prices to clear inventory. The arrival of lower cost producers can also force companies to lower prices to remain competitive.
Hewlett Packard (USA)

Solomon Ngahu - Reg No. 49000007 di. 'ay competitive, while in whie' We may have to continue to lower the prices of many of our products and services to stay competitive, while at the same time trying to maintain or improve revenue and gross margin. The markets in which we do business, particularly the personal computer and printing markets, are highly competitive, and we encounter aggressive price competition for all of our products and services from numerous companies globally. Over the past several years, price competition in the market for personal computers, printers and related products has been particularly intense as competitors have aggressively cut prices and lowered their product margins for these products. In addition, competitors in some of the markets in which we compete with a greater presence in lower-cost jurisdictions may be able to offer lower prices than we are able to offer. Our results of operations and financial condition may be adversely affected by these and other industry-wide pricing pressures.

1.6.3.6 Cash flow from operations is lower than net income over a certain period of time*

Operating cash flow or cash flow from operations is a key measure of performance. Contrary to net income which is derived from accrual-based accounting (i.e. where revenues can be recognized before actually collected and expenses recognized before being actually paid), operating cash flow is based on cash amounts paid and received. It measures the ability of a firm to honour financial obligations and to make capital investments.

There is some flexibility in classifying items between cash flow from operations and cash flow from investing and even cash flows from financing. Given the focus investors have on operating cash flow, a company might try to classify some items (for instance, capitalized software costs in the investing section) to make operating cash flow look better. Once again, it is prudent to compare one company's practices with those of its peers. If it is doing things differently, one should take a closer look.

One thing, however, to watch for is if operating cash flow is not following the same trend as net income (for instance, positive or growing earnings and decreasing or negative operating cash flow). This could imply that some revenues are being overstated or some expenses understated. A useful ratio to evaluate this is comparing operating cash flow to net income.

Operating cash flow to net income =
$$\frac{\text{Operating cash flow}}{\text{Net income}}$$

If this ratio is below one over a certain period of time, it might be an indication of earnings manipulation.

1.6.4 Beneish M Score*

The Beneish ratio examines whether a company has manipulated its results or not. This ratio has identified guilty companies in more than three-quarters of cases in an 'out-of-sample' statistical test.

			h.com
Financ	ial accounting and financial	statement analysis s	olomon Ngahu - Reg No. 4900000
M-S	core = -4.84 + 0.92*DSRI +	0.528*GMI + 0.404*AQI + 0.892*S	GI + 0.115*DEPI
	0.172*SG	AI + 4.679*TATA – 0.327*LVGI	mas
Factor	Name	Formula	Basis N
DSRI	Days' Sales in Receivables Index	Receivables / Total Sales	This Year / Last Year
GMI	Gross Margin Index	Gross Profit / Total Sales	Last Year / This Year
AQI	Asset Quality Index	(Non-Current Assets - PP&E) / Total Asset	s This Year / Last Year
SGI	Sales Growth Index	Total Sales	This Year / Last Year
DEPI	Depreciation Index	Depreciation / (Depreciation + Net PP&E)	Last Year / This Year
SGAI	SG&A Expense Index	SG&A / Revenues	This Year / Last Year
TATA	Total Accruals to Total Assets	(Working Capital – Cash) – Depreciation	This Year / Last Year
LVGI	Leverage Index	Total Debt / Total Assets	This Year / Last Year

Beneish discovered that firms that scored more than 2.22 were most likely to have manipulated their accounts¹³.

Some financial information providers, such as Starmine, also have an indicator linked to the quality of the accounts (the amount of accruals, earnings-FCFE, working capital management).

1.7 Analysis of the business environment*

1.7.1 A vision of the company beyond figures*



The analysis of the business environment occurs after the calculation of ratios and the sensitivity analysis phase. We leave figures behind to embark on an analysis of the world surrounding the company.

Economic liberalism often results in fierce competition over products. While the profitability of a product allows a company to create value, there will always be a competitor who is trying to produce it at a lower cost to capture its margins. Apart from a handful of cases, such as Coca Cola and General Electric, there are very few companies who manage to maintain strong profitability for long. It has been observed that excessive profits tend to disappear in the medium term, according to the theory of competition.

¹³ For more details: Beneish's paper: *The Detection of Earnings Manipulation, 1999*

Solomon Ngahu - Reg No. 49000000 The analysis of the business environment gives us a better understanding of the concept of sustainability of earnings. A company cannot grow sustainably in an economy of deep recession, in a sector in heavy decline, in an uncertain economic and legal environment or in a country whose public accounts are in a mess. Conversely, a company that does not seek to reinvest continuously in the future, which does not nurture its employees or build a good relationship with the local authorities will have little chance of developing sustainably and without problems over the long term. The study of the environment adds colour and perspective to a hitherto essentially numerical analysis.

1.7.2 Qualitative analysis of the industry*

1.7.2.1 Industry long term life cycle*

Understanding industry cycles is key to building an equity portfolio. The life cycle (or longterm cycle) can be distinguished from the business cycle (or short-term cycle).

The first is very similar to a product life cycle. Like Bodie, Kane and Marcus, and other authors, we can highlight four successive stages in any industry life cycle:



Start-up stage

The first stage is characterized by the emergence of a new product, technology and/or business model. Internet-related services, such as on-line investment research dedicated to individuals, are typical examples. It is very difficult to predict which firms will survive and potentially become industry leaders. Selecting the right stocks is not an easy task, to say the least. Therefore, individual investors, and also most investment professionals, are strongly advised to play the industry through mutual funds managed by true experts.

Consolidation stage

The second stage is characterized by the appearance of industry leaders. The mobile phone sector is a quite obvious example. The product has become established. Sales and earnings growth – although higher than average – are easier to forecast. Hence, selecting stocks is less risky, and well-informed investors may start buying individual stocks. But those who do not have enough time to closely monitor their investments should stick to mutual funds.

Maturity stage

Solomon Ngahu - Reg No. 49000007 di. orn The third stage is characterized by greater price competition. TV sets are in this stage. The product has reached its full potential for use by consumers, and it has become more or less standardized. Profit margins are gradually coming under pressure and cost-cutting programs may already be necessary. Companies are much more exposed to the business cycle (see below). Selecting individual stocks can nevertheless be quite safe (if the industry – such as food & drinks – is not cyclical and the maturity stage is due to last for a long time). But it can also be much riskier (if the industry – such as car makers – is cyclical, and/or if the product – such as video cassettes – is about to be replaced by a new one).

Decline stage

The fourth stage is, after lower-than-average growth, characterized by shrinking sales. This is often due to the obsolescence of the product. Selecting individual stocks here - as in the startup phase, ironically – is a difficult task. The focus should be on turnaround situations and asset plays. Once again, individual investors and most investment professionals would be wise to play such industries through mutual funds managed by true specialists, instead of trying to do the job themselves.

Peter Lynch uses another – although related – industry classification system. He divides firms into the following six groups:

Slow growers

Large and aging companies that will grow only slightly faster than the broad economy. This category corresponds to the beginning of the maturity stage described above.

Stalwarts

Large, well-known firms like Coca-Cola. They grow faster than the slow growers, but are not in the very rapid growth start-up phase. This category corresponds to the end of the consolidation stage described above.

Fast Growers

Small and aggressive new firms with annual growth rates in the neighbourhood of 20% to 25%. This category corresponds to both the start-up stage and the beginning of the consolidation stage described above.

Cyclicals

These are firms with sales and profits that regularly expand and contract along with the business cycle. This category does not correspond to any of the stages described above, because it refers to the short-term cycle, i.e. the business cycle, not to the long-term cycle, i.e. the life cycle. In fact, cyclical firms can be either in the start-up stage (digital books), in the consolidation stage (mobile phones), in the maturity stage (TV sets) or in the decline stage (turntables).

Turnarounds

Solomon Ngahu - Reg No. 49000007 di com These are firms that are in bankruptcy or soon might be. That can be due to a continuous sales drop, i.e. the company is in the decline stage. But it may also be the result of a cash squeeze, and in this case, the company could be in any of the stages described above. We might, for instance, be faced with a start-up that was not able to raise new funds because of troubled stock markets. In other words, this category does not strictly correspond to any of the stages described above.

Asset plays

These are firms that have valuable assets not currently reflected in the market prices of their stocks. Like cyclicals, this category does not correspond to any particular life-cycle stage. You may find asset plays – usually companies with sizable tangible assets, for instance real estate – in all four stages.

As regards industry classifications, we would suggest that you forget about special situations like turnarounds and asset plays, which are stock-specific, and not industry-specific concepts.

As we have already said, the slow-grower, the stalwart and the fast-grower categories can be viewed as life-cycle stages.

The cyclical companies category, for its part, refers to the business cycle, not to the life cycle. So does another category, that of the so-called "defensive" firms. These companies are not - or less – affected by economic downturns, and they do not benefit – or benefit less – from economic recoveries. The following table provides examples for both the life cycle and the business cycle:

	Defensive	Cyclicals
Start-up	Health-promoting nutrients	Digital books
Consolidation	Diet food	Mobile phones
Maturity	Washing powder	TV sets
Decline	High-tar cigarettes	Turntables

1.7.2.2 Strenghts and weaknesses of the industry*

1.7.2.2.1 Characteristics of the products and services*

Which life-cycle stages are the products/services in?

Start-up-stage industries usually exhibit the highest sales growth. But they are faced with losses and negative cash flows. As we highlighted earlier, those industries are much riskier than average.

Consolidation-stage industries usually exhibit the highest earnings growth. Those industries are less risky than start-up-stage industries, since the products/services have become established.

Maturity-stage industries usually exhibit low sales and earnings growth, but they generate a lot of cash. Those industries are normally the least risky of the four life-cycle categories, provided that 1) competition within the industry is not too intense (slow industry growth contributes to competition) and 2) they are not near the decline stage yet.

Solomon Ngahu - Reg No. 49000007 Decline-stage industries exhibit – by definition – a decrease in sales and/or profits. The may still be cash cows, but this cannot last for long unless, for whatever reason, they enter arevival phase (which happens sometimes). They are riskier than maturity-stage industries, and sometimes even riskier than start-ups (for instance, when most companies of the industry are close to bankruptcy).

To what extent do the products/services fulfil basic needs?

Industries corresponding to basic need are usually less sensitive to changing market conditions, i.e. to the business cycle. In other words, they are less risky. Note that this factor has nothing to do with profitability and/or long-term earnings prospects. Cyclical industries may be just as profitable, and grow just as fast as defensive ones.

How uniform are the products/services?

Industries selling very uniform products/services are usually riskier than the ones providing relatively complementary ones. If something goes wrong in the first case - say, for instance, volumes are under pressure because the industry is faced with an economic downturn - all the companies in the industry are affected in the same way. In addition, as competition is often higher in the uniform industries, margins may be under pressure.

How transportable are the products/services?

As competition from abroad is potentially higher, industries selling easily-transportable products/services are usually riskier than average. Internet services, for instance, are much more exposed to international competition than voluminous, heavy, and/or perishable goods. In addition, because of competition, margins may be under pressure.

To what extent can the products/services be legally protected?

Industries that can protect their products – and/or their production processes – through patents are usually less risky and more profitable than the ones that cannot. Trademarks and copyrights are also useful protections. Generally speaking, physical goods can be protected better than services.

How intense is the pressure from substitute products/services?

Industries facing competition from firms in related industries are usually less profitable than average. The availability of substitutes limits the price that can be charged to customers. Furthermore, those industries are riskier because their clients may - more or less easily - switch from their products/services to the ones offered by the related industries.

In addition to existing substitutes, potential substitutes must also be addressed. What about new products/services that may emerge and threaten the industry? This factor is obviously most important in technology-related industries.

1.7.2.2.2 Characteristics of the clients*

What is the bargaining power of clients?

Industries with a large number of small clients are usually less risky than ones with a small number of large clients. As they do not face price concessions demanded by their buyers, they are also more profitable.

Solomon Ngahu - Reg No. 49000007 11. 10 are +1-Both the end users (who are the final buyers) and the intermediaries (who are the actual clients) should be considered. If there are only a few intermediaries distributing the products/services, the industry may well be under pressure, in spite of the large number of end users.

In other words, the distribution channels of the products/services should be carefully analysed. Industries that sell their output in different countries with different types of distribution are usually less risky than average. That does not mean that they are more profitable, because a larger number of markets and/or types of distribution implies higher costs.

Last but not least, the bargaining power of clients also depends upon the intensity of competition within the industry.

How loyal are the clients?

As keeping existing clients is often more profitable than trying to attract new ones, industries that benefit from strong client loyalty usually achieve higher profits with less risk.

1.7.2.2.3 Characteristics of the suppliers*

What is the bargaining power of suppliers?

Industries with a large number of small suppliers are usually less risky than ones with a small number of large suppliers. As they can impose price concession to the suppliers, they are also more profitable.

More generally, the degree of rivalry between suppliers should be assessed. Intense competition benefits the industry, through lower purchasing prices.

How loval are the suppliers?

As keeping existing suppliers is often more profitable than regularly switching from one to another, industries that benefit from strong supplier loyalty usually achieve higher profits with less risk.

It might be argued that this factor is much less important than client loyalty. That may be right for growth industries that need to finance their expansion. But note that the management of production tools - plant, computers, furniture etc. - has become a true challenge for most industries, probably as important as product innovation and client satisfaction. Here, products, clients and logistics are the three keys. And since the above production tools are quite often provided by suppliers (and not built by the industry itself), securing their loyalty – for instance by treating them as partners and not simply as providers – may well prove very helpful in the long run.

1.7.2.2.4 Characteristics of the labour force*

What is the bargaining power of workers?

Industries where the labour market is highly unionized are usually considered as riskier and less profitable than others, because labour unions can engage in collective bargaining to increase the wages paid to workers. In other words, a significant share of the potential profits can be captured by the workforce at the expense of the shareholders.

However, it should be acknowledged that industries (or countries) where labour unions hardly exist can, at the end of the day, prove riskier and less profitable than average because workers, being treated as nonentities, suffer from a lack of motivation. This could even lead, in some cases, to substantial social unrest.

Another important element is the phase of the business cycle. How tight is the labour market? This also determines the bargaining power of workers.

How loyal are the employees?

As keeping existing employees is often more profitable than hiring new ones, industries that benefit from strong employee loyalty usually achieve higher profits with less risk.

1.7.2.2.5 Characteristics of shareholders (and of other capital suppliers)*

How loyal are the shareholders?

Keeping existing shareholders is also more profitable and less risky than trying to attract new ones. Shareholder "volatility" tends to increase the cost of capital, which is really bad news for growth industries that need to finance their expansion.

But it is also negative for more mature industries, even though they do not need to raise new funds. As you know, any increase in the return required by the shareholders translates into lower stock prices. Therefore, stock-option plans prove less effective, and company managements and employees must be compensated by higher wages, which decrease reported profits.

1.7.2.2.6 Characteristics of the environment*

What are the side-effects of the business on the environment?

Industries selling products that can be dangerous to human and/or animal health are obviously riskier than average. The ones that potentially or actually pollute the air, the ground and/or the water are also under pressure. In the long run, those industries may also prove less profitable, because they will be required to pay for the risk to the environment.

Industries operating in regulated markets are usually riskier as well. Because they have been protected for a long time, they may be hit hard when the markets get liberalized. These industries are often more profitable than average, but their returns are likely to prove unsustainable.

explanations about cash flows at different stages of the life cycle of a firm are given in the following paragraphs.

Figure 1-1 shows cash flow as a function of business development stages. There is no scale on either axis, as the length of the various stages largely depends on the nature of the firm's activity as well as on factors which are more or less under the control of its management, such as the time-span of research, production and marketing decisions, etc. Most new businesses do not generate positive and sufficient cash flows immediately. One must understand the impact of growth on financial needs: the operating cash flow of a business might be quite good as a result of its high profitability, but insufficient to support its growth.

From an investment point of view it is important to see the return potential, and the risk associated with investments, at the various business development stages. Risks are often very high during the initial stages, and the risk premium is not always in proportion to the level of risk. This is true regardless of the form of the investments such as loans, bonds or shares. We must, furthermore, be aware of agency problems, especially conflicts of interests between managing shareholders, who are often the founders of the business, and shareholders whose interests are purely financial.



Figure 1-1: The cash flow "S" curve of business activity

Stage 1: Research and development stage

Solomon Ngahu - Reg No. 49000007 di. Com based on an Massim At this stage one person, or a small group of people begins a business based on an idea. The finance comes from the founders themselves, and sometimes from their families and friends. The rate of failure is very high, which makes rational investment decisions almost impossible at this stage. The most important criterion for such 'seed' financing is the quality of the founders of the business - their past performances elsewhere, competence, and their ability fully to motivate their employees, etc.

Stage 2: start-up stage

At this stage, the product is ready to be sold, but most of what has to happen next is still on the drawing board. The firm needs money to finance production. There may be doubts on how the product will work in real life and on how potential customers will accept it. With a good business plan, the firm might get money from a venture capital firm: this possibility seems easier in the United States than in many other countries. This first-stage financing through venture capital is a difficult process, with the reduction or curtailment of risk as its main task. The objective is often reached by having recourse to investment funds that specialise in specific industrial sectors. Such funds take an active role in the management of the firms in which they invest. In addition, some investment funds create a portfolio consisting of shares in a wide spread of specialised venture capital investment funds. If these "funds of funds" are well managed, the risk-return figures can become acceptable. For the founders, the problem is to maintain a large stake in the business while placing a sufficiently high value on its potential development. They become frustrated if they feel they have had to give too much away to their new shareholders. The most important thing at this stage is to find solutions that maintain the rights of the founders - stock options for example - and minimise possible conflicts of interests.

Stage 3: Early growth stage

By this stage production problems are solved and the product is well accepted. The firm may enjoy positive operating cash flows, but the finance required to cover investments in fixed assets, and the working capital required for inventories and customer receivables, may be substantial. The risks are still too high for standard bank loans and, in addition, there is a need for equity funds. The solution is again to obtain money from venture capitalists. If the growth of the business is fast, the founders are forced to accept a high dilution of their stake in the firm. From a purely financial point of view, the total return on their shares might be very high anyway for many reasons: the size of the firm is increasing, its financial situation is improving, and these good results are demonstrable to the banks and the public.

Stage 4: Accelerating growth

The firm is successful and its annual financial results are excellent. Its operating cash flow is, however, insufficient to cover the financing needs arising from its growth and new developments. The past results may allow the firm to go for an IPO (Initial Public Offering). Going public will give a broader base for future financing. The role of venture capitalists is, furthermore, soon over: they are ready to cash in their capital gains in order to invest all over again in firms still at stages 2 or 3. The alternative to going public is to sell a large stake in the firm - or all of it - to a larger company.

Stage 5: Sustained growth and maturity

Solomon Ngahu - Reg No. 49000007 di. offi nal financing fram During this stage the business has a reasonable rate of growth and internal financing can cover most of its financing needs. Being known and profitable, the firm can obtain external funds from the financial markets through classic financial transactions such as bank loans, the issue of bonds, and equity capital increases, etc. At some point the level of operating cash required might, particularly if the firm is very profitable, be larger than the level of finance required for fixed assets renewal and a more modest growth. At this stage managers often justify diversification and growth through mergers and acquisitions. A leverage buy-out may also be an appealing prospect for them personally. At this point one can only hope that the company will not reach what we could call stage 6, namely the decline and disappearance stage.

1.7.3.2 Strengths and weaknesses of the company (SWOT analysis)*

Forecasting companies' future results is a challenge, to say the least. So much so that many investment professionals have given up the idea of making earnings or cash flow estimates beyond the current year, or possibly the next year.

Is it easier to make forecasts in some industries than others? Definitely yes. In fact, this issue is closely related to the industry characteristics described above.

Characteristics of the products/services

- Forecasting the results of maturity-stage companies is easier than predicting the ones of start-ups or declining firms.
- Forecasting the results of defensive companies (those which sell products/services fulfilling basic needs) is easier than predicting the ones of cyclicals.
- Predicting the results of companies active in a uniform industry is more difficult than forecasting those of the ones selling more differentiated products/services.
- Predicting the results of companies offering easily-transportable products/services is more difficult than forecasting the ones of firms less exposed to international competition.
- Forecasting the results of companies that can protect their products/services through patents is easier than predicting the ones of firms that cannot.
- Predicting the results of companies that face competition from substitute products/services is more difficult than forecasting the ones of firms that do not.

Characteristics of the clients

- Forecasting the results of companies with a large number of small clients is easier than predicting the ones of firms with a small number of large clients.
- Forecasting the results of companies that benefit from client loyalty is easier than predicting the ones of firms that suffer from high client turnover.

Characteristics of the suppliers

- Forecasting the results of companies with a large number of small suppliers is easier than predicting the ones of firms with a small number of large suppliers.
- Forecasting the results of companies that benefit from supplier loyalty is easier than predicting the ones of firms suffering from high supplier turnover.

Characteristics of the labour force

- Solomon Ngahu Reg No. 49000007 di. com • Predicting the results of companies in highly unionized industries is, in the short fun at least, more difficult than forecasting the ones of firms in less unionized industries.
- Forecasting the results of companies that benefit from employee loyalty is easier than predicting the ones of firms suffering from high employee turnover.

Characteristics of the shareholders (and of other capital suppliers)

• Forecasting the results of companies that benefit from shareholder loyalty is easier than predicting the ones of firms suffering from high shareholder turnover.

Note that shareholder loyalty depends a lot upon all the other company characteristics mentioned above. Moral of the story? "The riskier the company, the less loyal the shareholders. And the less loyal the shareholders, the riskier the company". It sometimes becomes a true vicious circle.

What about specific companies within the industry? Not surprisingly, their results tend to evolve in the same way, at the same time. All car makers benefit from an improvement in consumer confidence. All investment brokers get hit when investor sentiment turns negative.

The more uniform the products/services offered by the companies in the industry, the more similar their earnings and cash flow growth. And conversely. Drug companies, for instance, may achieve quite distinct results, because their products are not identical. Which means that a better knowledge of company-specific fundamentals can add value. Furthermore, understanding individual firms' characteristics is even more important if they are in the startup phase, like most biotech companies. This is mainly because their current portfolio of products is not diversified, which means that the impact of new drug development is spectacular.

Last but not least, we should not forget, as regards specific companies, the degree of risk arising from regulations, anti-trust laws, protectionism, litigation, fair competition issues, political instability and specific environmental and social aspects in order to assess both the growth potential and the risk of a specific industry, we might go through the following checklist, and answer the questions as precisely as possible. Note that these same questions may also be useful for analysing a specific company.

1.8 Novartis case study

Financial ratios of Novartis

Published figures	2011	2012	2013
1. Operating risk			
Gross margin (GM)	68.0%	67.4%	66.7%
Operating margin (OM)	18.5%	19.4%	18.5%
Net margin (NM)	15.3%	16.1%	15.6%
Asset turnover (AT)	50.5%	46.3%	46.6%
Asset turnover excluding intangibles (AT ex.int.)	106.8%	91.7%	87.3%
Inventories outstanding period (IOP)	114	131	135
Collection period (CP)	63	64	61
Payables outstanding period (POP)		104	111
Purchases		19,570	20,131
Period to be financed by debt		90.7	85.2
2 Canital profitability			
Actual tax rate	14.9%	14.9%	14.2%
ROA (average assets) i.e after taxes		7.7%	7.3%
ROA (vear-end assets) i.e after taxes	7.8%	7.5%	7.3%
ROA * (average assets) i.e before interest and taxes		9.3%	8.7%
ROA * (year-end assets) i.e before interest and taxes	9.4%	9.0%	8.6%
ROA** (average assets) i.e after taxes before interest		8.2%	7.9%
ROA** (year-end assets) i.e after taxes before interest	8.3%	8.0%	7.8%
ROA** (average assets) ex intangible assets		16.8%	15.1%
ROA** (year-end assets) ex intangible assets	17.5%	15.9%	14.6%
RoCE		8.8%	8.1%
ROE (average assets) i.e after taxes		13.74%	12.79%
ROE (year-end assets) i.e after taxes	13.84%	13.41%	12.34%
ROE* (average assets) i.e before taxes		15.37%	14.13%
ROE* (year-end assets) i.e before taxes	15.56%	15.00%	13.63%
3. Financial risk			
Current assets with cash ST	24,084	28,004	29,783
Current assets with cash ST Current liabilities with debt ST	24,084 21,442	28,004 21,981	29,783 23,859
Current assets with cash ST Current liabilities with debt ST Current ratio (CR)	24,084 21,442 112%	28,004 21,981 127%	29,783 23,859 125%
Current assets with cash ST Current liabilities with debt ST Current ratio (CR) Quick ratio (QR)	24,084 21,442 112% 85%	28,004 21,981 127% 97%	29,783 23,859 125% 94%
Current assets with cash ST Current liabilities with debt ST Current ratio (CR) Quick ratio (QR) Current debt and liabilities	24,084 21,442 112% 85% 21,442	28,004 21,981 127% 97% 21,981	29,783 23,859 125% 94% 23,859
Current assets with cash ST Current liabilities with debt ST Current ratio (CR) Quick ratio (QR) Current debt and liabilities Cash ratio (CaR)	24,084 21,442 112% 85% 21,442 22%	28,004 21,981 127% 97% 21,981 34%	29,783 23,859 125% 94% 23,859 35%
Current assets with cash ST Current liabilities with debt ST Current ratio (CR) Quick ratio (QR) Current debt and liabilities Cash ratio (CaR) Total debt	24,084 21,442 112% 85% 21,442 22% 51,556	28,004 21,981 127% 97% 21,981 34% 54,928	29,783 23,859 125% 94% 23,859 35% 51,732
Current assets with cash ST Current liabilities with debt ST Current ratio (CR) Quick ratio (QR) Current debt and liabilities Cash ratio (CaR) Total debt Total interest bearing debt	24,084 21,442 112% 85% 21,442 22% 51,556 20,229	28,004 21,981 127% 97% 21,981 34% 54,928 19,726	29,783 23,859 125% 94% 23,859 35% 51,732 18,018
Current assets with cash ST Current liabilities with debt ST Current ratio (CR) Quick ratio (QR) Current debt and liabilities Cash ratio (CaR) Total debt Total interest bearing debt Net debt	24,084 21,442 112% 85% 21,442 22% 51,556 20,229 45,505	28,004 21,981 127% 97% 21,981 34% 54,928 19,726 45,692	29,783 23,859 125% 94% 23,859 35% 51,732 18,018 40,987
Current assets with cash ST Current liabilities with debt ST Current ratio (CR) Quick ratio (QR) Current debt and liabilities Cash ratio (CaR) Total debt Total interest bearing debt Net debt Net interest-bearing debt	24,084 21,442 112% 85% 21,442 22% 51,556 20,229 45,505 14,178	28,004 21,981 127% 97% 21,981 34% 54,928 19,726 45,692 10,490	29,783 23,859 125% 94% 23,859 35% 51,732 18,018 40,987 7,273
Current assets with cash ST Current liabilities with debt ST Current ratio (CR) Quick ratio (QR) Current debt and liabilities Cash ratio (CaR) Total idebt Total interest bearing debt Net debt Net interest-bearing debt Average interest rate i on total debt	24,084 21,442 112% 85% 21,442 22% 51,556 20,229 45,505 14,178 1.36%	28,004 21,981 127% 97% 21,981 34% 54,928 19,726 45,692 10,490 1.19%	29,783 23,859 125% 94% 23,859 35% 51,732 18,018 40,987 7,273 1.28%
Current assets with cash ST Current liabilities with debt ST Current ratio (CR) Quick ratio (QR) Current debt and liabilities Cash ratio (CaR) Total debt Total interest bearing debt Net debt Net interest-bearing debt Average interest rate i on total debt Average interest rate i* on total interest-bearing debt	24,084 21,442 112% 85% 21,442 22% 51,556 20,229 45,505 14,178 1.36% 3.46%	28,004 21,981 127% 97% 21,981 34% 54,928 19,726 45,692 10,490 1.19% 3.32%	29,783 23,859 125% 94% 23,859 35% 51,732 18,018 40,987 7,273 1.28% 3.69%
Current assets with cash ST Current liabilities with debt ST Current ratio (CR) Quick ratio (QR) Current debt and liabilities Cash ratio (CaR) Total debt Total interest bearing debt Net debt Net debt Net interest-bearing debt Average interest rate i on total debt Average interest rate i* on total interest-bearing debt Average interest rate i on net debt	24,084 21,442 112% 85% 21,442 22% 51,556 20,229 45,505 14,178 1.36% 3.46% 1.67%	28,004 21,981 127% 97% 21,981 34% 54,928 19,726 45,692 10,490 1.19% 3.32% 1.23%	29,783 23,859 125% 94% 23,859 35% 51,732 18,018 40,987 7,273 1.28% 3.69% 1.47%
Current assets with cash ST Current liabilities with debt ST Current ratio (CR) Quick ratio (QR) Current debt and liabilities Cash ratio (CaR) Total interest bearing debt Net debt Net interest bearing debt Average interest rate i on total debt Average interest rate i* on total interest-bearing debt Average interest rate i* on net debt Average interest rate i* on net interest-bearing debt	24,084 21,442 112% 85% 21,442 22% 51,556 20,229 45,505 14,178 1.36% 3.46% 1.67% 5.35%	28,004 21,981 127% 97% 21,981 34% 54,928 19,726 45,692 10,490 1.19% 3.32% 1.23% 5.37%	29,783 23,859 94% 23,859 35% 51,732 18,018 40,987 7,273 1.28% 3.69% 1.47% 8.28%
Current assets with cash ST Current liabilities with debt ST Current liabilities with debt ST Current ratio (CR) Quick ratio (QR) Current debt and liabilities Cash ratio (CaR) Total interest bearing debt Net debt Net interest bearing debt Average interest rate i on total debt Average interest rate i* on total interest-bearing debt Average interest rate i* on net debt Average interest rate i* on net interest-bearing debt Capital structure ratio (CS)	24,084 21,442 112% 85% 21,442 22% 51,556 20,229 45,505 14,178 1.36% 3.46% 5.35% 38.7%	28,004 21,981 127% 97% 21,981 34% 54,928 19,726 45,692 10,490 1.19% 3.32% 1.23% 5.37% 36.8%	29,783 23,859 125% 94% 23,859 35% 51,732 18,018 40,987 7,273 1.28% 3.69% 1.47% 8.28% 32.5%
Current assets with cash ST Current liabilities with debt ST Current ratio (CR) Quick ratio (QR) Current debt and liabilities Cash ratio (CaR) Total interest bearing debt Net debt Net interest bearing debt Average interest rate i on total debt Average interest rate i* on total interest-bearing debt Average interest rate i* on net interest-bearing debt Capital structure ratio (CS) Debt/Equity ratio (TDE)	24,084 21,442 112% 85% 21,442 22% 51,556 20,229 45,505 14,178 1.36% 3.46% 1.67% 5.35% 38.7% 30.7%	28,004 21,981 127% 97% 21,981 34% 54,928 19,726 45,692 10,490 1.19% 3.32% 1.23% 5.37% 36.8% 28.5%	29,783 23,859 125% 94% 23,859 35% 51,732 18,018 40,987 7,273 1.28% 3.69% 1.47% 8.28% 32.5% 24.2%
Current assets with cash ST Current liabilities with debt ST Current ratio (CR) Quick ratio (QR) Current debt and liabilities Cash ratio (CaR) Total debt Total interest bearing debt Net interest-bearing debt Average interest rate i on total debt Average interest rate i* on total interest-bearing debt Average interest rate i* on net interest-bearing debt Average interest rate i* on net interest-bearing debt Capital structure ratio (CS) Debt/Equity ratio (TDE) Total Debt/Equity ratio (Tot.DE)	24,084 21,442 112% 85% 21,442 22% 51,556 20,229 45,505 14,178 1.36% 3.46% 1.67% 5.35% 38.7% 30.7% 78.3%	28,004 21,981 127% 97% 21,981 34% 54,928 19,726 45,692 10,490 1.19% 3.32% 1.23% 5.37% 36.8% 28.5% 79.4%	29,783 23,859 125% 94% 23,859 35% 51,732 18,018 40,987 7,273 1.28% 3.69% 1.47% 8.28% 32,5% 24,2% 69,6%
Current assets with cash ST Current liabilities with debt ST Current ratio (CR) Quick ratio (QR) Current debt and liabilities Cash ratio (CaR) Total debt Total interest bearing debt Net debt Net debt Average interest rate i on total debt Average interest rate i* on total interest-bearing debt Average interest rate i on net debt Average interest rate i* on net interest-bearing debt Capital structure ratio (CS) Debt/Equity ratio (TDE) Total Debt/Equity ratio (LTDE) Long term debt/Equity ratio (LTDE)	24,084 21,442 112% 85% 21,442 22% 51,556 20,229 45,505 14,178 1.36% 3.46% 1.67% 5.35% 38.7% 30.7% 78.3% 29.2%	28,004 21,981 127% 97% 21,981 34% 54,928 19,726 45,692 10,490 1.19% 3.32% 1.23% 5.37% 36.8% 28.5% 79.4% 26.9%	29,783 23,859 125% 94% 23,859 35% 51,732 18,018 40,987 7,273 1.28% 3.69% 1.47% 8.28% 32.5% 24.2% 69.6% 22.2%
Current assets with cash ST Current liabilities with debt ST Current ratio (CR) Quick ratio (QR) Current debt and liabilities Cash ratio (CaR) Total debt Total debt Total interest bearing debt Net debt Net debt Net interest-bearing debt Average interest rate i on total debt Average interest rate i on net debt Average interest rate i on net interest-bearing debt Capital structure ratio (CS) Debt/Equity ratio (TDE) Total Debt/Equity ratio (LTDE) Interest coverage ratio (LCR)	24,084 21,442 112% 85% 21,442 22% 51,556 20,229 45,505 14,178 1.36% 3.46% 1.67% 5.35% 38.7% 30.7% 78.3% 29.2% 17.2	28,004 21,981 127% 97% 21,981 34% 54,928 19,726 45,692 10,490 1.19% 1.23% 5.37% 36.8% 28.5% 79.4% 26.9% 18.8	29,783 23,859 125% 94% 23,859 35% 51,732 18,018 40,987 7,273 1.28% 3.69% 1.47% 8.28% 32.5% 24.2% 69.6% 22.2% 17.9
Current assets with cash ST Current liabilities with debt ST Current ratio (CR) Quick ratio (QR) Current debt and liabilities Cash ratio (CAR) Total debt Total interest bearing debt Net debt Net interest-bearing debt Average interest rate i on total debt Average interest rate i on total debt Average interest rate i on net debt Average interest rate i on net debt Capital structure ratio (CS) Debt/Equity ratio (TDE) Interest coverage ratio (ICR) Operating cash flow to cash interest (OCFCIC)	24,084 21,442 112% 85% 21,442 22% 51,556 20,229 45,505 14,178 1.36% 3.46% 1.67% 5.35% 38.7% 30.7% 78.3% 29.2% 17.2 22.4	28,004 21,981 127% 97% 21,981 34% 54,928 19,726 45,692 10,490 1.19% 3.32% 1.23% 5.37% 36.8% 28.5% 79.4% 26.9% 18.8 23.9	29,783 23,859 125% 94% 23,859 35% 51,732 18,018 40,987 7,273 1.28% 3.69% 1.47% 8.28% 32.5% 24.2% 69.6% 22.2% 1.7.9 21.6
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Current assets with cash ST Current liabilities with debt ST Current ratio (CR) Quick ratio (QR) Current debt and liabilities Cash ratio (CaR) Total debt Total interest bearing debt Net interest-bearing debt Average interest rate i on total debt Average interest rate i * on total interest-bearing debt Average interest rate i * on total interest-bearing debt Average interest rate i * on net interest-bearing debt Capital structure ratio (CS) Debt/Equity ratio (TDE) Total Debt/Equity ratio (ICR) Long term debt/Equity ratio (LTDE) Interest coverage ratio (ICR) Operating cash flow to liabilities (OCFL) Operating cash flow to income	24,084 21,442 112% 85% 21,442 22% 51,556 20,229 45,505 14,178 1.36% 3.46% 1.67% 3.46% 5.35% 38.7% 30.7% 78.3% 29.2% 17.2 22.4 111% 157%	28,004 21,981 127% 97% 21,981 34% 54,928 19,726 45,692 10,490 1.19% 3.32% 1.23% 5.37% 36.8% 28.5% 79.4% 26.9% 18.8 23.9 112% 153%	29,783 23,859 125% 94% 23,859 35% 51,732 18,018 40,987 7,273 1.28% 3.69% 1.47% 8.28% 32.5% 24.2% 69.6% 22.2% 17.9 21.6 136% 144%
Current assets with cash ST Current liabilities with debt ST Current ratio (CR) Quick ratio (QR) Current debt and liabilities Cash ratio (CaR) Total debt Total interest bearing debt Net idebt Net interest-bearing debt Average interest rate i on total debt Average interest rate i on not debt Average interest rate i* on net interest-bearing debt Average interest rate i* on net interest-bearing debt Average interest rate i* on net interest-bearing debt Capital structure ratio (CS) Debt/Equity ratio (TDE) Total Debt/Equity ratio (IDE) Interest coverage ratio (ICR) Operating cash flow to liabilities (OCFL) Operating cash flow to income Operating cash flow to Total assets	24,084 21,442 112% 85% 21,442 22% 51,556 20,229 45,505 14,178 1.36% 3.46% 1.67% 5.35% 38.7% 30.7% 78.3% 29.2% 17.2 22.4 111% 157% 12.2%	28,004 21,981 127% 97% 21,981 34% 54,928 19,726 45,692 10,490 1.19% 3.32% 1.23% 5.37% 36.8% 28.5% 79.4% 26.9% 18.8 23.9 112% 113% 11.4%	29,783 23,859 125% 94% 23,859 35% 51,732 18,018 40,987 7,273 1.28% 3.69% 1.47% 8.28% 32.5% 24.2% 69,6% 22.2% 17.9 21.6 136% 144%
Current assets with cash ST Current liabilities with debt ST Current ratio (CR) Quick ratio (QR) Current debt and liabilities Cash ratio (CaR) Total debt Total interest bearing debt Net debt Net debt Average interest rate i * on total debt Average interest rate i * on total interest-bearing debt Average interest rate i * on net interest-bearing debt Average interest rate i * on net debt Average interest rate i * on net interest-bearing debt Capital structure ratio (CS) Debt/Equity ratio (TDE) Total Debt/Equity ratio (TDE) Long term debt/Equity ratio (LTDE) Interest coverage ratio (ICR) Operating cash flow to cash interest (OCFCIC) Operating cash flow to Total assets Change in share capital	24,084 21,442 112% 85% 21,442 22% 51,556 20,229 45,505 14,178 1.36% 3.66% 1.67% 5.35% 38.7% 30.7% 78.3% 29.2% 17.2 22.4 111% 157% 12.2%	28,004 21,981 127% 97% 21,981 34% 54,928 19,726 45,692 10,490 1.19% 3.32% 1.23% 5.37% 36.8% 28.5% 79.4% 26.9% 18.8 23.9 112% 153% 11.4% 0.6%	29,783 23,859 125% 94% 23,859 35% 51,732 18,018 40,987 7,273 1.28% 3.69% 1.47% 8.28% 32.5% 24.2% 69,6% 22,2% 17.9 21.6 136% 144% 10.4%
Current assets with cash ST Current liabilities with debt ST Current ratio (CR) Quick ratio (QR) Current debt and liabilities Cash ratio (CaR) Total debt Total interest bearing debt Net debt Net interest-bearing debt Average interest rate i on total debt Average interest rate i* on total interest-bearing debt Average interest rate i on net debt Average interest rate i on net debt Average interest rate i on net interest-bearing debt Capital structure ratio (CS) Debt/Equity ratio (TDE) Total Debt/Equity ratio (LTDE) Long term debt/Equity ratio (LTDE) Interest coverage ratio (ICR) Operating cash flow to cash interest (OCFCIC) Operating cash flow to Total assets Change in share capital	24,084 21,442 112% 85% 21,442 22% 51,556 20,229 45,505 14,178 1.36% 3.46% 1.67% 5.35% 38.7% 30.7% 78.3% 29.2% 17.2 22.4 111% 157% 12.2%	28,004 21,981 127% 97% 21,981 34% 54,928 19,726 45,692 10,490 1.19% 3.32% 1.23% 5.37% 36.8% 28.5% 79.4% 26.9% 18.8 23.9 112% 15.3%	29,783 23,859 125% 94% 23,859 35% 51,732 18,018 40,987 7,273 1.28% 3.69% 1.47% 8.28% 24.2% 69.6% 22.2% 17.9 21.6 136% 144% 10.4%

Fixed assets life (PPE net/ Depreciation)

18.5%	Operating margin after taxes (OM)	22.4%	21.8%	20.9%
15.6%	Net margin (NM)	22.5%	21.7%	21.1%
46.6%	Asset turnover (AT)	60.7%	55.9%	56.2%
87.3%	Asset turnover excluding intangibles (AT ex.int.)	181.6%	162.3%	158.6%
135	Inventories outstanding period (IOP)	138	157	159
61	Collection period (CP)	63	64	61
111	Payables outstanding period (POP)		124	130
20.131	Purchases		16.472	17.196
85.2	Period to be financed by debt		97	90
	-			
	2. Capital profitability			
14.2%	Actual tax rate	16.1%	15.7%	15.3%
7.3%	ROA (average assets) i.e after taxes		12.4%	12.0%
7.3%	ROA (year-end assets) i.e after taxes	13.6%	12.1%	11.9%
8.7%	ROA * (average assets) i.e before interest and taxe	2S	14.8%	13.9%
8.6%	ROA * (year-end assets) i.e before interest and 1	16.2%	14.4%	13.8%
7.9%	ROA** (average assets) i.e after taxes before inter	est	13.1%	12.6%
7.8%	ROA** (year-end assets) i.e after taxes before ir	14.3%	12.8%	12.4%
15.1%	ROA** (average assets) ex intangible assets		38.6%	35.9%
14.6%	ROA** (year-end assets) ex intangible assets	42.7%	37.1%	35.1%
8.1%	RoCE		15.0%	14.2%
12.79%	ROE (average assets) i.e after taxes		17.3%	15.7%
12.34%	ROE (year-end assets) i.e after taxes	19.3%	16.6%	14.9%
14.13%	ROE* (average assets) i.e before taxes		20.6%	18.7%
13.63%	ROE* (year-end assets) i.e before taxes	23.2%	19.8%	17.8%
	· · ·			
	3. Financial risk			
29,783	Current assets (operating)	19,009	19,885	20,561
23,859	Current liabilities	16,774	18,106	19,542
125%	Current ratio (CR)	113%	110%	105%
94%	Quick ratio (QR)	78%	73%	68%
23,859	Current debt and liabilities	23,148	24,051	26,318
35%	Cash ratio (CaR)	22%	34%	35%
51,732	Total debt	28,021	29,536	25,286
	Total interest bearing debt	20.229	19.726	18.018
10.987	Net debt	21.970	20.300	14.541
7.273	Net interest-bearing debt	14,178	10.490	7.273
1 28%	Average interest rate i on total debt	2 49%	2 22%	2 63%
3 69%	Average interest rate i* on total interest-bearin	3 46%	3 32%	3 69%
1 47%	Average interest rate i on net debt	3.45%	2 77%	4 14%
9 29%	Average interest rate i* on net debt	5.25%	5 27%	9 29%
0.2070	Average interest on cash	-0.08%	1.00%	0.20%
22 50/	Capital structure ratio (CS)	-0.38%	10 7%	12.0%
32.5%		22.4%	19.7%	13.9%
24.2%	Debt/Equity ratio (TDE)	29.2%	26.2%	21.7%
09.0%	Total Debt/Equity ratio (Tot.DE)	40.5%	39.3%	30.4%
22.2%	Long term debt/Equity ratio (LIDE)	27.8%	24.7%	19.8%
17.9	Interest coverage ratio (ICR)	24.9	25.0	23.8
21.6	Operating cash flow to cash interest (OCFCIC)		24.8	24.4
136%	Operating cash flow to liabilities (OCFL)		116%	153%
144%	Operating cash flow to income		118%	120%
10.4%	Operating cash fllow to Invested Capital		14.3%	14.2%
0.2%	Change in share capital		-1.5%	0.0%
	4. Inputs for value drivers			
9.92	Fixed assets life (PPE net/ Depreciation)	7.30	9.72	9.92

Adjusted figures 1. Operating risk Gross margin (GM)

Solomor	າ Ngahu	I - Reg N	o. 490000	adi.com
	2011	2012	2013	
	73.7%	72.8%	71.7%	
	22.4%	21.8%	20.9%	

7.30	9.72	9.92
	175%	169%
	5.3%	5.3%
gible)	5.5%	5.3%
3.8%	3.1%	1.7%
	48.4%	49.1%
	7.30 gible) 3.8%	9.72 175% 5.3% gible) 5.5% 3.8% 3.1% 48.4%

7.30

9.72

Comments:

Solomon Ngahu - Reg No. 49000007 di. om sections. Here was Comments on the various ratios have already been made in previous sections. Here we will examine only whether the trend is favourable from one year to the next. For example, an improvement in the return on equity is favourable, whereas an increase in the product storage time is unfavourable. We can calculate an overall score for each main type of ratio (operational, profitability, financial)¹⁴.

	Publishe	Published figures		d figures
	<u>2012</u>	2013	<u>2012</u>	<u>2013</u>
Overall score	3	-15	5	-17
Operational ratios	-3	-3	-7	-3
Profitability ratios	2	-12	2	-12
Financial ratios	4	0	8	2

The overall score of Novartis declined in 2013, mainly due to profitability ratios. Financial ratios improved, although there was a definite 'slowdown' compared with 2012.

What conclusions can we draw from this 'relative' analysis, where the variation is more important than the level of the ratio? We will see in the evaluation section that the market tends to rally or decline in response to a given situation. For example, the market 'knows' that Novartis is a good company, but what matters to investors is the analysis of the dynamics of this fundamental state.

Piotroski score

Published figures	2011	2012	2013	2012	2013
Gross margin (GM)	68.0%	67.4%	66.7%	0	0
Asset turnover (AT)	50.5%	46.3%	46.6%	0	1
ROA (year-end assets) i.e after taxes	7.8%	7.5%	7.3%	1	1
Current ratio (CR)	112%	127%	125%	1	0
Capital structure ratio (CS)	38.7%	36.8%	32.5%	1	1
Operating cash flow to income	157%	153%	144%	1	1
Operating cash fllow to Total assets	12.2%	11.4%	10.4%	1	1
Change in share capital		0.6%	0.2%	0	0
Total Piotroski Ratio				5	5

Novartis has good fundamentals. The score remained stable between 2012 and 2013¹⁵.

¹⁴ For each ratio, we will assign a score of 1 if there has been a favourable change and -1 if there has been an unfavourable change.

¹⁵ The table notes are the notes for each of the nine criteria used by Piotroski.

Altman Z-score and Hillegeist score

ccounting and financial statement analysis	Solomo	n Ngahu -
	2012	2013
Tangible assets according to Z-Score	62'770	67'387
Working capital according to Z-Score	3'953	4174
Total liabilities according to Z-Score	54'928	51'782
X1 Working capital / Tangible Assets	6.3%	6.2%
X2 Retained earnings / Tangible assets	109%	109%
X3 EBIT / Tangible assets	17.8%	16.2%
X4 Market value / Book value liabilities	277%	376%
X4 bis Shareholders' equity / BV liabilities	126%	144%
X5 Sales / Tangible assets	92%	87%
Altman Z-Score	4.76	5.26
Altman Double Prime Z-Score	6.47	6.55
Hillegeist Score	5.04	5.42
Defaut probability at 1 year	0.65%	0.44%

The default probability for Novartis is extremely low.

Beneish model

	2012	2013	Ratio	8 factors	5 factors
DSRI Days'Sales in Receivables Index	17.46%	16.83%	1.037	0.92	0.823
GMI Gross margin Index	67.42%	66.67%	0.989	0.528	0.906
AQI Asset Quality Index	57.88%	55.55%	1.042	0.404	0.593
SGI Sales Growth Index	57'561	58'831	0.978	0.892	0.717
DEPI Depreciation Index	9.33%	9.16%	0.982	0.115	0.107
SGAI SG&A Expense Index	5.10%	5.20%	0.981	-0.172	
TATA Total Accruals to Total Assets	-4.0%		-4.0%	4.679	
LVGI Leverage Index	30.46%	29.75%	1.024	-0.327	
				-2.65	-2.89

Novartis scores less than the average of -2.2 required by the Beneish model¹⁶.

Qualitative analysis of the Novartis environment

	INDUSTRY: Pharmaceuticals	5	COMPANY Novartis	
<u>Life cycle:</u>	"Consolidation" Maturity / Defer "Stalwarts"	nsive New markets in emerging markets	Sustained growth and	f maturity
Characteristics/Forecasts:	(Favourable =1;	Unfavourable = 5)	(Easy to forecast=1; l	Jnpredictable = 5)
1. Products/Services	2	Earnings growth confortable but declining High cash generation Potential liabilities from regulation/trials	1	Defensive company, products differentiated (important pipe-line) Products protected by licences, good pipe-line Sandoz is a leader in the generics
2. Clients	2	Large number of clients Client loyalty for patent protected products	2	Huge number of countries covered Health organisations are important too (largest = 10% sales) Client loyalty increased by important marketing efforts
3. Suppliers	1	A lot of suppliers (chemical companies)	1	Large number of small suppliers Important value-added makes suppliers less important
4. Employees	1	Unions not very strong (a few exceptions Sanofi)	2	High productive personal Restructuring sometimes difficult to accept in Switzerland
5. Shareholders	3	Not specific loyalty as huge companies High dividend makes shares attractive for pension	2	Family-owned a few generations ago, more institutionnalized Good communication and transparency policy
	10			7
Average	1.8	=	1.6	
Factor weighting	Industry is relati	vely homogeneous, therefore it has more weight than the	company factor	
Final note for Novartis:	,	1.7 (Excellent=1; Bad = 5)		

¹⁶ Each score is the sum of different ratios multiplied by the factors of the model. There are two variants of the Beneish model, one with eight factors, the other with five.

Conclusions¹⁷

Financial a	accounting and financial statem	ient analysis Solomon Ngahu - Reg No. 4900000
Conclusio	ns ¹⁷	25000
1. Analysis of	key figures 2012-2013	2. Qualitative analysis 2012-2013
Ratios: Sensitivity:	Level <u>Trend</u> High ¹ Worsening Low ²	Level MM Industry: High ¹ Company: High ² Quality of statements: Worsening
1: Piotroski scor	e: 6 (stable)	1: Score 1.8 of 5 in the strengths/weaknesses analysis of the industry
2: Low sensitivity	y of operational results	2: Score 1.6 of 5 in the strengths/weaknesses analysis of the company
2: Low rate sensi	itivity of financial results	

¹⁷ These conclusions relate to the figures published in 2013. Investors have therefore incorporated them into the analyses of the market prices of Novartis for the years 2012-2013.