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CHAPTER 14

Financial Statement Analysis

14.1 INTRODUCTION

The financial statements of an enterprise present the raw data of its assets, liabilities, and equities in the balance sheet and its revenue and expenses in the income statement. Without subjecting these data to analysis, many fallacious conclusions might be drawn concerning the financial condition of the enterprise.

Financial statement analysis is undertaken by creditors, investors, and other financial statement users in order to determine the credit worthiness and earning potential of an entity. This chapter explores the various measuring instruments that can be used to evaluate the financial health of a business, including horizontal, vertical, and ratio analysis.

It is important for the analyst to examine trends in accounts and ratios over the years, and to make comparisons with other firms in the industry. The analyst must be reasonably sure that the data given in different years within an enterprise, or within the industry, are comparable. Conclusions drawn from comparing the inventory of a company using LIFO valuation with the inventory of a company using FIFO valuation might have little validity. Also, when two companies use different methods of depreciation, it will be difficult to compare their relative profitability and fixed asset balances.

14.2 HORIZONTAL ANALYSIS

Horizontal analysis looks at the trend in the accounts in dollar and percentage terms over the years. A $3-million profit year looks very good following a $1-million profit year, but much less desirable after a $4-million profit year. Horizontal analysis is usually shown in comparative financial statements (see Examples 1 and 2). In annual reports, companies often show comparative financial data for five years.

Horizontal analysis stresses the trends of the various accounts in the financial statements. It is then an easy matter to identify areas of wide divergence that require further analysis. In the income statement shown in Example 2, the large increase in sales returns and allowances coupled with the decrease in sales for the period 20X2–20X3 should cause concern. One might compare these results with those of competitors. The problem might be industry wide, or just within the company.

It is important to show both the dollar amount of change and the percentage of change because using either one alone might cause misleading conclusions. For example, because the increase of 100

percent in the interest expense from 20X1 to 20X2 resulted from a difference of only $1,000, no further analysis might be warranted. On the other hand, a large numerical change might result in only a small percentage change, indicating no cause for concern.

When horizontal analysis is used over many years, comparative financial statements might be too cumbersome. Another method of presenting horizontal analysis is by looking at trends relative to a base year. A year that is representative of the firm's activity is chosen as the base. Each account of the base year is assigned an index of 100. An index for an account in a succeeding year is found by dividing the account's amount by the base year amount and multiplying by 100. Referring to Example 1, if we let 20X1 be the base year in the balance sheet, Accounts Receivable would be given the index of 100. In 20X2, the index would be 150 (15/10 × 100), and in 20X3 it would be 200 (20/10 × 100). A *condensed* form of the balance sheet using *trend analysis* is shown in Example 3.

EXAMPLE 1

The Ratio Company
Comparative Balance Sheet
(In Thousands of Dollars)
December 31, 20X3, 20X2, and 20X1

				Increase or (Decrease)		Percentage of Increase or (Decrease)	
ASSETS	20X3	20X2	20X1	20X3–20X2	20X2–20X1	20X3–20X2	20X2–20X1
Current Assets							
Cash	$ 30.0	$ 35	$ 35	$(5.0)	—	(14.3%)	—
Accounts Receivable	20.0	15	10	5.0	$ 5	33.3	50.0%
Marketable Securities	20.0	15	5	5.0	10	33.3	200.0
Inventory	50.0	45	50	5.0	(5)	11.1	(10.0)
Total Current Assets	$120.0	$110	$100	$10.0	$10	9.1	10.0
Plant Assets	100.0	90	85	10.0	5	11.1	5.9
Total Assets	$220.0	$200	$185	$20.0	$15	10.0	8.1
LIABILITIES							
Current Liabilities	$ 55.4	$ 50	$ 52	$ 5.4	$(2)	10.8	(3.8)
Long-term Liabilities	80.0	75	70	5.0	5	6.7	7.1
Total Liabilities	$135.4	$125	$122	$10.4	$ 3	8.3	2.5
STOCKHOLDERS' EQUITY							
Common Stock, 4,500 shares $10 par value	$ 45.0	$ 45	$ 45	—	—	—	—
Retained Earnings	39.6	30	18	$ 9.6	$12	32.0	66.7
Total Stockholders' Equity	$ 84.6	$ 75	$ 63	$ 9.6	$12	12.8	19.0
Total Liabilities and Stockholders' Equity	$220.0	$200	$185	$20.0	$15	10.0	8.1

EXAMPLE 2

The Ratio Company
Comparative Income Statement
(In Thousands of Dollars)
For the Years Ended December 31, 20X3, 20X2, and 20X1

				Increase or (Decrease)		Percentage of Increase or (Decrease)	
	20X3	20X2	20X1	20X3–20X2	20X2–20X1	20X3–20X2	20X2–20X1
Sales	$100.0	$110	$50	$(10.0)	$60	(9.1%)	120.0%
Sales Returns and Allowances	20.0	8	3	12.0	5	150.0	166.7
Net Sales	$ 80.0	$102	$47	$(22.0)	$55	(21.6)	117.0
Cost of Goods Sold	50.0	60	25	(10.0)	35	(16.7)	140.0
Gross Profit	$ 30.0	$ 42	$22	$(12.0)	$20	(28.6)	90.9
Operating Expenses							
Selling Expenses	$ 11.0	$ 13	$ 8	$ (2.0)	$ 5	(15.4)	62.5
General Expenses	4.0	7	4	(3.0)	3	(42.9)	75.0
Total Operating Expenses	$ 15.0	$ 20	$12	$ (5.0)	$ 8	(25.0)	66.7
Income from Operations	$ 15.0	$ 22	$10	$ (7.0)	$12	(31.8)	120.0
Nonoperating Income	3.0	0	1	3.0	(1)	—	(100.0)
Income before Interest Expense and Taxes	$ 18.0	$ 22	$11	$ (4.0)	$11	(18.2)	100.0
Interest Expense	2.0	2	1	—	1	—	100.0
Income before Taxes	$ 16.0	$ 20	$10	$ (4.0)	$10	(20.0)	100.0
Income Taxes (40% rate)	6.4	8	4	(1.6)	4	(20.0)	100.0
Net Income	9.6	12	6	(2.4)	6	(20.0)	100.0

EXAMPLE 3

The Ratio Company
Trend Analysis of the Balance Sheet
December 31, 20X3, 20X2, and 20X1

	20X3	20X2	20X1
ASSETS			
Current Assets	120.0	110.0	100
Plant Assets	117.6	105.9	100
Total Assets	118.9	108.1	100
LIABILITIES			
Current Liabilities	106.5	96.2	100
Long-term Liabilities	114.3	107.1	100
Total Liabilities	111.0	102.5	100
STOCKHOLDERS' EQUITY			
Common Stock	100.0	100.0	100
Retained Earnings	220.0	166.7	100
Total Stockholders' Equity	134.3	119.0	100
Total Liabilities and Stockholders' Equity	118.9	108.1	100

14.3 VERTICAL ANALYSIS

In *vertical analysis*, a significant item on a financial statement is used as a base value, and all other items on the financial statement are compared to it. In performing vertical analysis for the balance sheet, total assets is assigned 100 percent. Each asset account is expressed as a percentage of total assets. Total liabilities and stockholders' equity is also assigned 100 percent. Each liability and equity account is then expressed as a percentage of total liabilities and stockholders' equity. In the income statement, net sales is given the value of 100 and all other accounts are evaluated in comparison to net sales. The resulting figures are then given in a common size statement. The common size analysis of Ratio Company's income statement is shown in Example 4.

EXAMPLE 4

The Ratio Company
Income Statement and
Common Size Analysis
(In Thousands of Dollars)
For the Years Ended December 31, 20X3 and 20X2

	20X3		20X2	
	Amount	Percent	Amount	Percent
Sales	$100.00	125.0	$110.0	107.8
Sales Returns and Allowances	20.0	25.0	8.0	7.8
Net Sales	$ 80.0	100.0	$102.0	100.0
Cost of Goods Sold	50.0	62.5	60.0	58.8
Gross Profit	$ 30.0	37.5	$ 42.0	41.2
Operating Expenses				
Selling Expenses	$ 11.0	13.8	$ 13.0	12.7
General Expenses	4.0	5.0	7.0	6.9
Total Operating Expenses	$ 15.0	18.8	$ 20.0	19.6
Income from Operations	$ 15.0	18.8	$ 22.0	21.6
Nonoperating Income	3.0	3.8		
Income before Interest Expense and Taxes	$ 18.0	22.5	$ 22.0	21.6
Interest Expense	2.0	2.5	2.0	2.0
Income before Taxes	$ 16.0	20.0	$ 20.0	19.6
Income Taxes	6.4	8.0	8.0	7.8
Net Income	$ 9.6	12.0	$ 12.0	11.8

The common size analysis shown in Example 4 gives the percentage of each account to net sales. The analyst should compare these figures from year to year in order to identify areas requiring further attention.

Vertical analysis tends to exhibit the internal structure of the enterprise. It indicates the relative amount of each income statement account to revenue. It shows the mix of assets that produces the income and the mix of the sources of capital, whether provided by current or long-term liabilities, or by equity funding.

The vertical percentages of a company should be compared to its competitors or to industry percentages so that one may ascertain the firm's relative position.

As in horizontal analysis, vertical analysis is not the end of the process. The analyst must be prepared to probe deeper into the areas that either horizontal or vertical analysis, or both, indicates as being possible problem areas.

14.4 RATIO ANALYSIS

Horizontal and vertical analysis compares one figure to another within the same category. It is also essential to compare two figures applicable to different categories. This is accomplished through *ratio analysis*. There are many ratios that the analyst can use, depending upon what he or she considers as being important *relationships*. There is no point in computing ratios of unrelated items. For example, there is no interest in the ratio of sales returns and allowances to income taxes.

14.5 LIQUIDITY RATIOS

Liquidity is the company's ability to convert noncash assets into cash or to obtain cash in order to meet current liabilities. Liquidity applies to the short term, which is typically viewed as a time span of one year or less.

Liquidity is essential to the proper carrying out of business activity, particularly in times of adversity such as when the business is shut down by a strike. The firm would be required to satisfy current liabilities before current assets could be realized. In times of recession, operating losses may ensue. If liquidity is insufficient to cushion such losses, serious financial difficulty may be in store. Poor liquidity is analogous to a person having a fever in that both are a symptom of a fundamental problem.

Analyzing corporate liquidity is especially important to creditors. If a company has a poor liquidity position, it may lead to a delay in receiving interest and principal payments or even losses on the amounts due.

A description of various liquidity measures follows.

WORKING CAPITAL

Working capital is equal to current assets less current liabilities. It is a safety cushion to creditors. A greater balance is required when the entity has difficulty borrowing on short notice.

The Ratio Company had a working capital of $64,600 in 20X3 ($120,000 − $55,400) and $60,000 in 20X2. The increase in working capital is a favorable sign.

CURRENT RATIO

The current ratio is equal to current assets divided by current liabilities. It is used to measure the ability of an enterprise to meet its current liabilities out of current assets. The limitation of the ratio is that it may rise just prior to financial distress because of a company's desire to improve its cash position by, for example, selling fixed assets. Such dispositions, while resulting in a more favorable current ratio, will have a detrimental effect upon production capacity. Another limitation of the current ratio is that it will be excessively high when inventory is carried on the LIFO basis.

The Ratio Company's current ratio for 20X3 was 2.17 ($120,000/$55,400; see Example 1) and for 20X2 it was 2.2. The ratio has remained fairly constant over the years.

QUICK (ACID-TEST) RATIO

The quick ratio is a stringent test of liquidity. It is found by dividing the most liquid current assets (cash, marketable securities, and accounts receivable) by current liabilities. Inventory is not included in this ratio because it usually takes a long time to convert inventory into cash. Prepaid expenses are also not included because they are not convertible into cash, and as such are not capable of covering current liabilities.

The Ratio Company had a quick ratio of 1.3 in 20X2 and 1.26 in 20X3, computed as ($30,000 + $20,000 + $20,000) ÷ $55,400. The ratio has been fairly constant over the years.

ACCOUNTS RECEIVABLE RATIOS

Accounts receivable ratios consist of the accounts receivable turnover and the collection period, which is the number of days the receivables are held. The *accounts receivable turnover* gives the number of times accounts receivable are collected during the year. The turnover is found by dividing net credit sales (if not available, then total sales) by the average accounts receivable. Average accounts receivable is typically found by adding the beginning accounts receivable to the ending accounts receivable and dividing by two. However, average accounts receivable may be computed more accurately on a monthly or quarterly basis, but this information is usually known only to management. Using data from the shortest period available will give the most accurate ratio. The higher the accounts receivable turnover, the better since this means the company is collecting quickly from customers. These funds can then be invested for a return. Ratio Company's average accounts receivable for 20X3 is $17,500 ($15,000 plus $20,000, divided by two) and the accounts receivable turnover is 4.57 times ($80,000/$17,500). For 20X2, the accounts receivable turnover is 8.16. The drop in the accounts receivable turnover ratio is significant, indicating a serious problem in collecting from customers. It implies that a careful analysis of the company's credit policy is required.

The *collection period*, or the number of days sales remain in accounts receivable, is found by dividing the accounts receivable turnover into 365 days. In 20X3, the Ratio Company's collection period was 79.9 days (365/4.57). This means that it took almost 80 days for a sale to be converted to cash. In 20X2, the collection period was 44.7 days. The materially higher collection period in 20X3 indicates a danger that customer balances may become uncollectible. Perhaps the company is now selling to highly marginal customers.

INVENTORY RATIOS

If a company is holding excess inventory, it means that funds are being tied up in inventory that could be invested elsewhere for a return. In addition, there will be high carrying costs to store the goods. The risk of obsolescence also exists. Two major ratios to look at are the inventory turnover and the number of days inventory is held.

Inventory turnover is computed by dividing the cost of goods sold by the average inventory. Average inventory is determined by adding the beginning and ending inventories and dividing by two. The inventory turnover for Ratio Company in 20X3 was 1.05 times ($50,000/$47,500) and in 20X2 it was 1.26 times.

The decline in the inventory turnover indicates the stocking of more goods. An attempt should be made to determine whether specific inventory categories are not selling well and the reasons therefor. However, a decline in the turnover rate would not cause concern if it was primarily due to the introduction of a new product line in which the advertising effects were not felt yet.

The number of days inventory is held is computed by dividing 365 days by the turnover rate. The result indicates the length of time needed to buy, sell, and replace inventory. For Ratio Company, the average age of inventory in 20X3 was 347.6 days (365/1.05) and in 20X2 it was 289.7 days. The increase in the holding period implies greater risk of obsolescence.

OPERATING CYCLE

The operating cycle of the business is the number of days it takes to convert inventory to cash. It is found by adding the collection period to the average age of inventory. In 20X3, it took Ratio Company 427.5 days (79.9 + 347.6) to convert the inventory into cash. In 20X2, the operating cycle was 334.4 days. The increase from 20X2 to 20X3 indicates an unfavorable trend since more money is being tied up in noncash assets.

A short operating cycle is desirable because cash is collected faster and the cash can then be invested for a return.

SUMMARY

A summary of the liquidity measures follows:

Working capital = Current assets − Current liabilities

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

$$\text{Quick (acid-test) ratio} = \frac{\text{Cash} + \text{Marketable securities} + \text{Accounts receivable}}{\text{Current liabilities}}$$

Accounts receivable

1. $\text{Accounts receivable turnover} = \dfrac{\text{Net credit sales}}{\text{Average accounts receivable}}$

2. $\text{Collection period} = \dfrac{365}{\text{Accounts receivable turnover}}$

Inventory

1. $\text{Inventory turnover} = \dfrac{\text{Cost of goods sold}}{\text{Average inventory}}$

2. $\text{Inventory age} = \dfrac{365}{\text{Inventory turnover}}$

Operating cycle = Number of days inventory is held + Number of days receivables are held

14.6 SOLVENCY RATIOS

Solvency is the entity's ability to meet its long-term obligations as they become due. The analysis concentrates on the long-term financial and operating structure of the business. The degree of long-term debt in the capital structure is also considered. Further, solvency is dependent upon profitability since in the long run a firm will not be able to meet its debts unless it is profitable.

RATIO OF STOCKHOLDERS' EQUITY TO TOTAL LIABILITIES

Stockholders' equity compared to total liabilities is a significant measure of solvency since a high degree of debt in the capital structure may make it difficult for the company to meet interest charges and principal at maturity. Further, with a high debt position comes the risk of running out of cash under conditions of adversity. Also, excessive debt will result in less financial flexibility in the sense that it will be difficult to obtain funds during tight money markets. For Ratio Company the ratio was 0.62 in 20X3 ($84,600/$135,400) and 0.6 in 20X2. The ratio remained fairly constant. A desired ratio depends on many variables, including the ratios of other companies in the industry, the access for further debt financing, and the stability of earnings.

RATIO OF STOCKHOLDERS' EQUITY TO LONG-TERM LIABILITIES

Another indicator of solvency is the ratio of stockholders' equity to long-term liabilities. The 20X3 ratio for Ratio Company was 1.06 ($84,600/$80,000). In 20X2, it was 1.0. The slight improvement in the ratio is primarily due to the greater percentage increase in stockholders' equity than in long-term debt.

RATIO OF PLANT ASSETS TO LONG-TERM LIABILITIES

The ratio of plant assets to long-term liabilities reflects the degree to which plant assets are financed by long-term creditors. A low ratio indicates that creditors have a significant claim on the firm's assets. The ratio also gives an indication of the extent to which additional long-term borrowing is possible. The ratio for our company was 1.25 in 20X3 ($100,000/$80,000) and 1.2 in 20X2. Therefore, there was improved coverage of long-term debt in 20X3.

INTEREST COVERAGE RATIO

The interest coverage ratio (number of times interest is earned) reflects the number of times before-tax earnings cover interest expense. This is found by dividing income before interest and taxes by the interest expense. It is a safety margin indicator in the sense that it shows how much of a decline in earnings a company can absorb. In 20X3, interest of Ratio Company was covered 9 times ($18,000/$2,000), while in 20X2 it was covered 11 times. The decline in the coverage is a negative indicator since less earnings are available to meet interest charges.

14.7 PROFITABILITY RATIOS

An indication of good financial health is the company's ability to earn a satisfactory profit and return on investment. Investors will be reluctant to associate themselves with an entity that has poor earning potential since the market price of stock and dividend potential will be adversely affected. Creditors will shy away from companies with deficient profitability since the amounts owed to them may not be paid.

Some major ratios that measure operating results are summarized below.

PROFIT MARGIN

The ratio of net income to net sales is termed the profit margin. It indicates the profitability generated from revenue and hence is an important operating performance measure. In 20X3 the ratio for our company was 0.12 ($9,600/$80,000) and in 20X2 it was 0.12. The profit margin was constant, indicating that the earning power of the business remained static.

RETURN ON INVESTMENT

Return on investment is a key measure because it looks at the earnings achieved by the investment made in the business. Basically, two ratios evaluate the return on investment. One is the return on total assets and the other is the return on owners' equity.

The return on total assets indicates the efficiency with which management has used its available resources to generate income. It is found by dividing the sum of the net income and the interest expense adjusted for the tax rate by the average total assets. In 20X3, the return on total assets for Ratio Company was 0.05 {$9,600 + $2,000 (0.6) ÷ [($220,000 + $200,000)/2]}. In 20X2, the return was 0.07. The productivity of assets in deriving income deteriorated in 20X3.

The return on owners' equity measures the return applicable to stockholders after the deduction of interest payments to creditors. It is found by dividing the net income by the average stockholders' equity. In 20X3, Ratio Company's return on owners' equity was 0.12 {$9,600 ÷ [($84,600 + $75,000)/2} and in 20X2 it was 0.17. There has been a significant drop in the return earned by the owners of the business.

RATIO OF NET SALES TO AVERAGE TOTAL ASSETS

This ratio is helpful in appraising a company's ability to efficiently utilize its asset base in generating revenue. The ratio for our company in 20X3 was 0.38 ($80,000/$210,000) and in 20X2 it was 0.53 ($102,000/$192,500). The company's utilization of assets significantly declined. Perhaps the assets are getting older and should be replaced, or inadequate repairs are being made.

EARNINGS PER SHARE

Earnings per share indicates what the earnings are for each common share held. When preferred stock is included in the capital structure, net income must be reduced by the preferred dividends to determine the amount applicable to common stock. When preferred stock does not exist, as is the case with the Ratio Company, earnings per share is equal to net income divided by common shares outstanding. Earnings per share is a useful indicator of the operating performance of the company, as well as of the dividends that may be expected. In 20X3, earnings per share for Ratio Company was \$2.13 (\$9,600/4,500 shares). In 20X2, it was \$2.67. The decline in earnings per share should be of concern to investors.

All of the aforementioned profitability ratios have declined for Ratio Company in 20X3 relative to 20X2. This is a very negative sign.

PRICE/EARNINGS RATIO

Some ratios appraise the enterprise's relationship with its stockholders. The often quoted P/E ratio, or price/earnings ratio, is equal to the market price per share of stock divided by the earnings per share. A high P/E ratio is good because it indicates that the investing public considers the company in a favorable light.

EXAMPLE 5 Let us assume that the market price per share of Ratio Company's stock was \$20 on December 31, 20X3, and \$22 on December 31, 20X2. Therefore, the P/E ratio in 20X3 was 9.39 (\$20/\$2.13) and the ratio in 20X2 was 8.24 (\$22/\$2.67). The decline in the P/E multiple indicates that the stock market had a lower opinion of the company in 20X3, possibly due to the company's declining profitability.

DIVIDEND RATIOS

Many stockholders are primarily interested in receiving dividends. The dividend yield of a stock is the dividends per share divided by the market price per share. Another ratio is the dividend payout, which is equal to the dividends per share divided by the earnings per share. A decline in dividends will cause concern on the part of stockholders.

14.8 SUMMARY

Financial statement analysis is an attempt to work with the reported financial figures in order to ascertain the entity's financial strengths and weaknesses.

Most analysts tend to favor certain ratios. They may leave out some of those mentioned and include some that were not discussed here. The perspective of the analyst as investor, stockholder, or creditor is the deciding factor for which ratios to include in the analysis of an enterprise.

Once a ratio is computed, it is then compared to related ratios of the company, ratios of previous years, and ratios of competitors. The comparisons aid in showing trends over a period of time, and in showing the ability of an enterprise to compete with others in the industry. These comparisons do not mark the end of the analysis, but rather indicate areas needing further attention.

Summary

(1) Horizontal analysis compares an account to _____.

(2) In a common size income statement, _____ is given the value of 100.

(3) _____ is the ability of a company to meet its current liabilities out of current assets.

(4) The current ratio is equal to _____ divided by _____.

(5) _____ is included in computing the current ratio but not the quick ratio.

(6) The accounts receivable turnover is equal to _____ divided by _____.

(7) The number of days for inventory sold on credit to convert to cash is found by adding the _____ to the _____.

(8) The ratio of _____ to long-term liabilities looks at the degree of debt in the capital structure.

(9) The number of times interest is earned is equal to _____ divided by _____.

(10) Return on owner's equity is found by dividing _____ by _____.

(11) The price/earnings ratio is equal to the _____ per share divided by the _____ per share.

(12) Two measures that are of interest to stockholders in evaluating the dividend policy of the firm are the dividend _____ and the dividend _____ ratios.

(13) When the comparison of ratios indicates a significant change in financial position, the analyst should _____.

Answers: (1) the same account of a prior year; (2) net sales; (3) Liquidity; (4) current assets, current liabilities; (5) Inventory; (6) net credit sales, average accounts receivable; (7) collection period, average age of inventory; (8) stockholders' equity; (9) income before interest and taxes, interest expense; (10) net income, average stockholders' equity; (11) market price, earnings; (12) yield, payout; (13) investigate further