

Financial Statement Analysis

Chapter 14 – Part II

Ratio Analysis

1. Compute and interpret financial ratios that managers use **to assess liquidity.**
2. Compute and interpret financial ratios that managers use **for asset management purposes.**
3. Compute and interpret financial ratios that managers use **for debt management purposes.**
4. Compute and interpret financial ratios that managers use **to assess profitability.**
5. Compute and interpret financial ratios that managers use **to assess market performance.**

Norton Balance Sheet – Part I

NORTON CORPORATION		
Balance Sheets		
December 31		
	This Year	Last Year
Assets		
Current assets:		
Cash	\$ 30,000	\$ 20,000
Accounts receivable, net	20,000	17,000
Inventory	12,000	10,000
Prepaid expenses	3,000	2,000
Total current assets	65,000	49,000
Property and equipment:		
Land	165,000	123,000
Buildings and equipment, net	116,390	128,000
Total property and equipment	281,390	251,000
Total assets	\$ 346,390	\$ 300,000

Norton Balance Sheet – Part 2

NORTON CORPORATION		
Balance Sheets		
December 31		
	This Year	Last Year
Liabilities and Stockholders' Equity		
Current liabilities:		
Accounts payable	\$ 39,000	\$ 40,000
Notes payable, short-term	3,000	2,000
Total current liabilities	42,000	42,000
Long-term liabilities:		
Notes payable, long-term	70,000	78,000
Total liabilities	112,000	120,000
Stockholders' equity:		
Common stock, \$1 par value	27,400	17,000
Additional paid-in capital	158,100	113,000
Total paid-in capital	185,500	130,000
Retained earnings	48,890	50,000
Total stockholders' equity	234,390	180,000
Total liabilities and stockholders' equity	\$ 346,390	\$ 300,000

Norton Income Statement

NORTON CORPORATION		
Income Statements		
For the Years Ended December 31		
	This Year	Last Year
Sales	\$ 494,000	\$ 450,000
Cost of goods sold	140,000	127,000
Gross margin	354,000	323,000
Operating expenses	270,000	249,000
Net operating income	84,000	74,000
Interest expense	7,300	8,000
Net income before taxes	76,700	66,000
Less income taxes (30%)	23,010	19,800
Net income	\$ 53,690	\$ 46,200

Learning Objective 2

Compute and interpret financial ratios that managers use to assess liquidity.

Liquidity refers to ***how quickly an asset can be converted to cash.***

Liquid assets can be converted to cash quickly, whereas ill-liquid assets cannot.

Ratio Analysis – Liquidity

The data and ratios that managers use to assess liquidity include:

- working capital,
- the current ratio,
- and the acid-test (quick) ratio.

The information shown for Norton Corporation will be used to calculate the aforementioned liquidity ratios.

NORTON CORPORATION	
This Year	
Cash	\$ 30,000
Accounts receivable, net	20,000
Total current assets	65,000
Total current liabilities	42,000

Working Capital – Part I

The excess of current assets over current liabilities is known as working capital.

Working capital is not free. It must be financed with long-term debt and equity.

Working Capital – Part 2

	December 31 This Year
Current assets	\$ 65,000
Current liabilities	(42,000)
Working capital	\$ 23,000

Current Ratio – Part I

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

The current ratio measures a company's short-term debt paying ability.

A declining ratio may be a sign of deteriorating financial condition, or it might result from eliminating obsolete inventories.

Current Ratio – Part 2

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

$$\text{Current Ratio} = \frac{\$65,000}{\$42,000} = 1.55$$

Acid-Test (Quick) Ratio

$$\text{Acid-Test Ratio} = \frac{\text{Quick Assets}}{\text{Current Liabilities}}$$

$$\text{Acid-Test Ratio} = \frac{\$50,000}{\$42,000} = 1.19$$

Quick assets include *Cash, Marketable Securities, Accounts Receivable, and current Notes Receivable.*

This ratio measures a company's ability to meet obligations without having to liquidate inventory.

Norton Balance Sheet – Part I

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Balance Sheets		
December 31		
	This Year	Last Year
Assets		
Current assets:		
Cash	\$ 30,000	\$ 20,000
Accounts receivable, net	20,000	17,000
Inventory	12,000	10,000
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Total current assets	65,000	49,000
Property and equipment:		
Land	165,000	123,000
Buildings and equipment, net	116,390	128,000
Total property and equipment	281,390	251,000
Total assets	\$ 346,390	\$ 300,000

Learning Objective 3

Compute and interpret financial ratios that managers use for asset management purposes.

A company's assets are funded by lenders and stockholders, both of whom expect those assets to be deployed efficiently and effectively.

Ratio Analysis – Asset Management

Managers compute a variety of ratios for asset management purposes. The information shown for Norton Corporation will be used to calculate the asset management ratios.

Note: You may also use information provided in an earlier slide for these computations.

NORTON CORPORATION	
This Year	
Accounts receivable, net	
Beginning of year	17,000
End of year	20,000
Inventory	
Beginning of year	10,000
End of year	12,000
Total assets	
Beginning of year	300,000
End of year	346,390
Sales on account	494,000
Cost of goods sold	140,000

Norton Balance Sheet – Part I

NORTON CORPORATION		
Balance Sheets		
December 31		
	This Year	Last Year
Assets		
Current assets:		
Cash	\$ 30,000	\$ 20,000
Accounts receivable, net	20,000	17,000
Inventory	12,000	10,000
Prepaid expenses	3,000	2,000
Total current assets	65,000	49,000
Property and equipment:		
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Accounts Receivable Turnover

$$\text{Accounts Receivable Turnover} = \frac{\text{Sales on Account}}{\text{Average Accounts Receivable}}$$

$$\text{Accounts Receivable Turnover} = \frac{\$494,000}{(\$17,000 + \$20,000) \div 2} = 26.7 \text{ times}$$

This ratio measures how many times a company converts its receivables into cash each year.

Average Collection Period

$$\text{Average Collection Period} = \frac{365 \text{ Days}}{\text{Accounts Receivable Turnover}}$$

$$\text{Average Collection Period} = \frac{365 \text{ Days}}{26.7 \text{ Times}} = 13.67 \text{ days}$$

This ratio measures, on average, how many days it takes to collect an account receivable.

Inventory Turnover – Part I

$$\text{Inventory Turnover} = \frac{\text{Cost of Goods Sold}}{\text{Average Inventory}}$$

This ratio measures how many times a company's inventory has been sold and replaced during the year.

If a company's inventory turnover is less than its industry average, it either has excessive inventory or the wrong sorts of inventory.

Inventory Turnover – Part 2

Inventory turnover measures how many times a company's inventory has been sold and replaced during the year.

$$\text{Inventory Turnover} = \frac{\text{Cost of Goods Sold}}{\text{Average Inventory}}$$

$$\text{Inventory Turnover} = \frac{\$140,000}{(\$10,000 + \$12,000) \div 2} = 12.73 \text{ times}$$

Average Sale Period

$$\text{Average Sale Period} = \frac{365 \text{ Days}}{\text{Inventory Turnover}}$$

$$\text{Average Sale Period} = \frac{365 \text{ Days}}{12.73 \text{ Times}} = 28.67 \text{ days}$$

This ratio measures how many days, on average, it takes to sell the entire inventory.

Operating Cycle – Part I

$$\text{Average Sale Period} + \text{Average Collection Period} = \text{Operating Cycle}$$

This ratio measures the elapsed time from when inventory is received from suppliers to when cash is received from customers.

Operating Cycle – Part 2

$$\begin{array}{rclcl} \text{Average} & & \text{Average} & & \text{Operating} \\ \text{Sale Period} & + & \text{Collection Period} & = & \text{Cycle} \\ 28.67 \text{ days} & + & 13.67 \text{ days} & = & 42.34 \text{ days} \end{array}$$

This ratio measures the elapsed time from when inventory is received from suppliers to when cash is received from customers.

Total Asset Turnover – Part I

$$\text{Total Asset Turnover} = \frac{\text{Sales}}{\text{Average Total Assets}}$$

This ratio measures how efficiently a company's assets are being used to generate sales. This ratio expands beyond current assets to include noncurrent assets.

Norton Balance Sheet – Part I

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Total Asset Turnover – Part 2

$$\text{Total Asset Turnover} = \frac{\text{Sales}}{\text{Average Total Assets}}$$

$$\text{Total Asset Turnover} = \frac{\$494,000}{(\$300,000 + \$346,390) \div 2} = 1.53$$

Learning Objective 4

Compute and interpret financial ratios that managers use for debt management purposes.

Management need to evaluate their company's debt management choices from the vantage point of two stakeholders: long-term creditors and common stockholders.

Long-term creditors are concerned with a company's ability to repay its loans over the long-run.

Stockholders look at the debt from a financial leverage perspective.

Ratio Analysis – Debt Management

Managers compute a variety of ratios for debt management purposes. The information shown for Norton Corporation will be used to calculate its debt management ratios.

NORTON CORPORATION	
This Year	
Earnings before interest expense and income taxes	\$ 84,000
Interest expense	7,300
Stockholders' equity	
Beginning of year	180,000
End of year	234,390
Total liabilities	112,000

This is also referred to as net operating income.

Note: You may also use information provided in an earlier slide for these computations.

Norton Balance Sheet – Part 2

NORTON CORPORATION		
Balance Sheets		
December 31		
	This Year	Last Year
Liabilities and Stockholders' Equity		
Current liabilities:		
Accounts payable	\$ 39,000	\$ 40,000
Notes payable, short-term	3,000	2,000
Total current liabilities	42,000	42,000
Long-term liabilities:		
Notes payable, long-term	70,000	78,000
Total liabilities	112,000	120,000
Stockholders' equity:		
Common stock, \$1 par value	27,400	17,000
Additional paid-in capital	158,100	113,000
Total paid-in capital	185,500	130,000
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Norton Income Statement

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Times Interest Earned Ratio

$$\text{Times Interest Earned} = \frac{\text{Earnings before Interest Expense and Income Taxes}}{\text{Interest Expense}}$$

$$\text{Times Interest Earned} = \frac{\$84,000}{\$7,300} = 11.51 \text{ times}$$

This is the most common measure of a company's ability to provide protection for its long-term creditors. A ratio of less than 1.0 is inadequate.

Debt-to-Equity Ratio – Part I

$$\text{Debt-to-Equity Ratio} = \frac{\text{Total Liabilities}}{\text{Stockholders' Equity}}$$

This ratio indicates the relative proportions of debt to equity on a company's balance sheet.

Stockholders like a lot of debt if the company's rate of return on its assets exceeds the rate of return paid to creditors.

Creditors prefer less debt and more equity because equity represents a buffer of protection.

Norton Balance Sheet – Part 2

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Debt-to-Equity Ratio – Part 2

$$\text{Debt-to-Equity Ratio} = \frac{\text{Total Liabilities}}{\text{Stockholders' Equity}}$$

$$\text{Debt-to-Equity Ratio} = \frac{\$112,000}{\$234,390} = 0.48$$

The Equity Multiplier – Part I

$$\text{Equity Multiplier} = \frac{\text{Average Total Assets}}{\text{Average Stockholders' Equity}}$$

This ratio indicates the portion of a company's assets that are funded by equity. It focuses on average amounts maintained throughout the year rather than amounts at one point in time.

Norton Balance Sheet – Part I

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Total paid-in capital	185,500	130,000
Retained earnings	48,890	50,000
Total stockholders' equity	234,390	180,000
Total liabilities and stockholders' equity	\$ 346,390	\$ 300,000

The Equity Multiplier – Part 2

$$\text{Equity Multiplier} = \frac{\text{Average Total Assets}}{\text{Average Stockholders' Equity}}$$

$$\text{Equity Multiplier} = \frac{(\$300,000 + \$346,390) \div 2}{(\$180,000 + \$234,390) \div 2} = 1.56$$

This ratio indicates the portion of a company's assets that are funded by equity. It focuses on average amounts maintained throughout the year rather than amounts at one point in time.

Learning Objective 5

Compute and interpret financial ratios that managers use to assess profitability.

Managers pay close attention to the amount of profits that their companies earn. However, they tend to focus on ratios related to amounts of profit earned relative to: sales, total assets, or total stockholders' equity.

Ratio Analysis – Profitability Ratios

The information shown for Norton Corporation will be used to calculate its profitability ratios.

Note: You may also use information provided in an earlier slide for these computations.

NORTON CORPORATION	
This Year	
Number of common shares outstanding	
Beginning of year	17,000
End of year	27,400
Tax rate	30%
Net income	\$ 53,690
Stockholders' equity	
Beginning of year	180,000
End of year	234,390
Dividends per share	2
Dec. 31 market price per share	20
Interest expense	7,300
Total assets	
Beginning of year	300,000
End of year	346,390

Gross Margin Percentage – Part I

$$\text{Gross Margin Percentage} = \frac{\text{Gross Margin}}{\text{Sales}}$$

This measure indicates how much of each sales dollar is left after deducting the cost of goods sold to cover expenses and provide a profit.

Norton Income Statement

NORTON CORPORATION		
Income Statements		
For the Years Ended December 31		
	This Year	Last Year
Sales	\$ 494,000	\$ 450,000
Cost of goods sold	140,000	127,000
Gross margin	354,000	323,000
Operating expenses	270,000	249,000
Net operating income	84,000	74,000
Interest expense	7,300	8,000
Net income before taxes	76,700	66,000
Less income taxes (30%)	23,010	19,800
Net income	\$ 53,690	\$ 46,200

Gross Margin Percentage – Part 2

$$\text{Gross Margin Percentage} = \frac{\text{Gross Margin}}{\text{Sales}}$$

$$\text{Gross Margin Percentage} = \frac{\$494,000 - \$140,000}{\$494,000} = 71.6\%$$

Net Profit Margin Percentage – Part I

$$\text{Net Profit Margin Percentage} = \frac{\text{Net Income}}{\text{Sales}}$$

In addition to cost of goods sold, this ratio also looks at how selling and administrative expenses, interest expense, and income tax expense influence performance.

Norton Income Statement

NORTON CORPORATION		
Income Statements		
For the Years Ended December 31		
	This Year	Last Year
Sales	\$ 494,000	\$ 450,000
Cost of goods sold	140,000	127,000
Gross margin	354,000	323,000
Operating expenses	270,000	249,000
Net operating income	84,000	74,000
Interest expense	7,300	8,000
Net income before taxes	76,700	66,000
Less income taxes (30%)	23,010	19,800
Net income	\$ 53,690	\$ 46,200

Net Profit Margin Percentage – Part 2

$$\text{Net Profit Margin Percentage} = \frac{\text{Net Income}}{\text{Sales}}$$

$$\text{Net Profit Margin Percentage} = \frac{\$53,690}{\$494,000} = 10.9\%$$

Return on Total Assets

$$\text{Return on Total Assets} = \frac{\text{Net Income} + [\text{Interest Expense} (1 - \text{Tax Rate})]}{\text{Average Total Assets}}$$

$$\text{Return on Total Assets} = \frac{\$53,690 + [\$7,300 \times (1 - .30)]}{(\$300,000 + \$346,390) \div 2} = 18.19\%$$

Adding interest expense back to net income enables the return on assets to be compared for companies with different amounts of debt or over time for a single company that has changed its mix of debt and equity.

Return on Equity

$$\text{Return on Equity} = \frac{\text{Net Income}}{\text{Average Stockholders' Equity}}$$

$$\text{Return on Equity} = \frac{\$53,690}{(\$180,000 + \$234,390) \div 2} = 25.91\%$$

This measure indicates how well the company used the owners' investments to earn income.

DuPont Formula

$$\text{Return on Equity} = \text{Net Profit Margin} \times \text{Total Asset Turnover} \times \text{Equity Multiplier}$$

The return on equity can also be computed using the DuPont Formula shown here.

Financial Leverage

Financial leverage results from the difference between the rate of return the company earns on investments in its own assets and the rate of return that the company must pay its creditors.

Return on investment in assets > Fixed rate of return on borrowed funds = Positive financial leverage

Return on investment in assets < Fixed rate of return on borrowed funds = Negative financial leverage

Concept Check 2

Which of the following statements is true?

- a. Negative financial leverage is when the fixed return to a company's creditors and preferred stockholders is greater than the return on total assets.
- b. Positive financial leverage is when the fixed return to a company's creditors and preferred stockholders is greater than the return on total assets.
- c. Financial leverage is the expression of several years' financial data in percentage form in terms of a base year.

Concept Check 2a

Which of the following statements is true?

- a.** Negative financial leverage is when the fixed return to a company's creditors and preferred stockholders is greater than the return on total assets.
- b. Positive financial leverage is when the fixed return to a company's creditors and preferred stockholders is greater than the return on total assets.
- c. Financial leverage is the expression of several years' financial data in percentage form in terms of a base year.

Learning Objective 6

Compute and interpret financial ratios that managers use to assess market performance.

Common stockholders use these main ratios to assess a company's performance, given that they are those who own the company and managers need measures to make them judge their performance.

Ratio Analysis – Market Performance

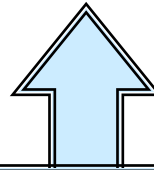
The information shown for Norton Corporation will be used to calculate its profitability ratios.

NORTON CORPORATION	
This Year	
Number of common shares outstanding	
Beginning of year	17,000
End of year	27,400
Stockholders' equity	234,390
Dividends per share	2
Dec. 31 market price per share	20

Note: You may also use information provided in an earlier slide for these computations.

Earnings Per Share – Part I

$$\text{Earnings per Share} = \frac{\text{Net Income}}{\text{Average Number of Common Shares Outstanding}}$$



Whenever a ratio divides an income statement balance by a balance sheet balance, the average for the year is used in the denominator.

Earnings form the basis for dividend payments and future increases in the value of shares of stock.

Earnings Per Share – Part 2

$$\text{Earnings per Share} = \frac{\text{Net Income}}{\text{Average Number of Common Shares Outstanding}}$$

$$\text{Earnings per Share} = \frac{\$53,690}{(\$17,000 + \$27,400) \div 2} = \$2.42$$

This measure indicates how much income was earned for each share of common stock outstanding.

Price-Earnings Ratio

$$\text{Price-Earnings Ratio} = \frac{\text{Market Price Per Share}}{\text{Earnings Per Share}}$$

$$\text{Price-Earnings Ratio} = \frac{\$20.00}{\$2.42} = 8.26 \text{ times}$$

A higher price-earnings ratio means that investors are willing to pay a premium for a company's stock because of optimistic future growth prospects.

Dividend Payout Ratio – Part I

$$\text{Dividend Payout Ratio} = \frac{\text{Dividends Per Share}}{\text{Earnings Per Share}}$$

$$\text{Dividend Payout Ratio} = \frac{\$2.00}{\$2.42} = 82.6\%$$

This ratio gauges the portion of current earnings being paid out in dividends. Investors seeking dividends (market price growth) would like this ratio to be large (small).

Dividend Yield Ratio – Part 2

$$\text{Dividend Yield Ratio} = \frac{\text{Dividends Per Share}}{\text{Market Price Per Share}}$$

$$\text{Dividend Yield Ratio} = \frac{\$2.00}{\$20.00} = 10.00\%$$

This ratio identifies the return, in terms of cash dividends, on the current market price of the stock.

Book Value Per Share – Part I

$$\text{Book Value per Share} = \frac{\text{Common Stockholders' Equity}}{\text{Number of Common Shares Outstanding}}$$

$$\text{Book Value per Share} = \frac{\$234,390}{27,400} = \$8.55$$

This ratio measures the amount that would be distributed to holders of each share of common stock if all assets were sold at their balance sheet carrying amounts after all creditors were paid off.

Book Value Per Share – Part 2

$$\text{Book Value per Share} = \frac{\text{Common Stockholders' Equity}}{\text{Number of Common Shares Outstanding}}$$

$$\text{Book Value per Share} = \frac{\$234,390}{27,400} = \$8.55$$

Notice that the book value per share of \$8.55 **does not equal** the market value per share of \$20. This is because the market price reflects expectations about future earnings and dividends, whereas the book value per share is based on historical cost.

Ratio	Formula	Significance
Liquidity:		
Working capital	Current assets – Current liabilities	Measures the company's ability to repay current liabilities using only current assets
Current ratio	Current assets ÷ Current liabilities	Test of short-term debt-paying ability
Acid-test ratio	(Cash + Marketable securities + Accounts receivable + Short-term notes receivable) ÷ Current liabilities	Test of short-term debt-paying ability without having to rely on inventory
Asset Management:		
Accounts receivable turnover	Sales on account ÷ Average accounts receivable balance	Measures how many times a company's accounts receivable have been turned into cash during the year
Average collection period	365 days ÷ Accounts receivable turnover	Measures the average number of days taken to collect an account receivable
Inventory turnover	Cost of goods sold ÷ Average inventory balance	Measures how many times a company's inventory has been sold during the year
Average sale period	365 days ÷ Inventory turnover	Measures the average number of days taken to sell the inventory one time
Operating cycle	Average sale period + Average collection period	Measures the elapsed time from when inventory is received from suppliers to when cash is received from customers
Total asset turnover	Sales ÷ Average total assets	Measures how efficiently assets are being used to generate sales
Debt Management:		
Times interest earned ratio	Earnings before interest expense and income taxes ÷ Interest expense	Measures the company's ability to make interest payments
Debt-to-equity ratio	Total liabilities ÷ Stockholders' equity	Measures the amount of assets being provided by creditors for each dollar of assets being provided by the stockholders
Equity multiplier	Average total assets ÷ Average stockholders' equity	Measures the portion of a company's assets funded by equity
Profitability:		
Gross margin percentage	Gross margin ÷ Sales	Measures profitability before selling and administrative expenses
Net profit margin percentage	Net income ÷ Sales	A broad measure of profitability
Return on total assets	{Net income + [Interest expense × (1 – Tax rate)]} ÷ Average total assets	Measures how well assets have been employed by management
Return on equity	Net income ÷ Average stockholders' equity	When compared to the return on total assets, measures the extent to which financial leverage is working for or against common stockholders
Market Performance:		
Earnings per share	Net income ÷ Average number of common shares outstanding	Affects the market price per share, as reflected in the price-earnings ratio
Price-earnings ratio	Market price per share ÷ Earnings per share	An index of whether a stock is relatively cheap or relatively expensive in relation to current earnings
Dividend payout ratio	Dividends per share ÷ Earnings per share	An index showing whether a company pays out most of its earnings in dividends or reinvests the earnings internally
Dividend yield ratio	Dividends per share ÷ Market price per share	Shows the return in terms of cash dividends being provided by a stock
Book value per share	Total stockholders' equity ÷ Number of common shares outstanding	Measures the amount that would be distributed to common stockholders if all assets were sold at their balance sheet carrying amounts and if all creditors were paid off

Published Sources That Provide Comparative Ratio Data (1 of 2)

Sources of Financial Ratios

Source	Content
<i>Almanac of Business and Industrial Financial Ratios</i> , Aspen Publishers; published annually	An exhaustive source that contains common-size income statements and financial ratios by industry and by the size of companies within each industry.
<i>AMA Annual Statement Studies</i> , Risk Management Association: published annually	A widely used publication that contains common-size statements and financial ratios on individual companies; the companies are arranged by industry.
<i>EDGAR</i> , Securities and Exchange Commission; website that is continually updated; www.sec.gov	An exhaustive Internet database that contains reports filed by companies with the SEC; these reports can be downloaded
<i>Hoover's Online</i> , Hoovers, Inc.; website that is continually updated; www.hoovers.com	A site that provides capsule profiles for 10,000 U.S. companies with links to company websites, annual reports, stock charts, news articles, and industry information.

Published Sources That Provide Comparative Ratio Data (2 of 2)

Source	Content
<i>Industry Norms & Key Business Ratios</i> , Dun & Bradstreet; published annually	Fourteen commonly used financial ratios are computed for over 800 major industry groupings
<i>Mergent Industrial Manual and Mergent Bank and Finance Manual</i> ; published annually	An exhaustive source that contains financial ratios on all companies listed on the New York Stock Exchange, the American Stock Exchange, and regional American exchanges.
<i>Standard & Poor's Industry Survey</i> , Standard & Poor's; published annually	Various statistics, including some financial ratios, are given by industry and for leading companies within each industry grouping.