Chapter Nineteen

Financial Statement Analysis

Motivation

- In the previous chapter, equity valuation techniques take the firm's dividends and earnings prospects as inputs.
- Although the analyst is interested in economic earnings streams, only financial accounting data are readily available.
- What can we learn from a company's accounting data that can help us estimate the intrinsic value of its common stock?
- In this chapter, we show how investors can use financial data as inputs into stock valuation analysis.

The Major Financial Statements

- **Income Statement**
  - Financial statement showing a firm's revenues and expenses during a specified period
  - Operating income = operating revenues – operating expenses
  - Net income = EBIT – interests – taxes

    = (1 - tax rate)*(EBIT – interests)

Target's Income Statement

Table 19.1

Target's income statement for year ending January 2019

	$ Million	Percent of Revenue
Operating Revenues		
Net sales	$75,356	100.0%
Operating Expenses		
Cost of goods sold	$53,299	70.7%
Selling, general & admininstrative expenses	15,723	20.9
Depreciation	2,224	3.0
Total operating expenses	$71,246	94.5%
Operating income	$ 4,110	5.5
Other income	34	0.0
Earnings before interest and taxes	$ 4,144	5.5%
Interest expense	461	0.6
Taxable income	$ 3,683	4.9%
Taxes	746	1.0
Net income	$ 2,937	3.9%
Allocation of net income		
Dividends	$ 1,335	1.8%
Addition to retained earnings	$ 1,602	2.1%

Note: Sums subject to rounding error.

Source: Target *Annual Report*, year ending January 2019.

The Major Financial Statements

- **Income Statement**
- **Balance Sheet**
  - An accounting statement of a firm's financial position at a specified time
  - While the income statement provides a measure of profitability over a period of time, the balance sheet provides a "snapshot" of the financial condition of the firm at a particular moment.
  - Net worth = assets – liabilities, shareholders' or stockholders' equity

Target's Balance Sheet

Assets	$ Million	Percent of Total Assets	Liabilities and Shareholders' Equity	$ Million	Percent of Total Assets
Current assets			Current liabilities		
Cash and marketable securities	$ 1,556	3.8%	Debt due for repayment	1,218	2.9%
Receivables	1,257	3.0	Accounts payable	9,761	23.6
Inventories	9,497	23.0	Other current liabilities	4,035	9.8
Other current assets	209	0.5	Total current liabilities	$15,014	36.4%
Total current assets	$12,519	30.3%			
Fixed assets			Long-term debt	$12,227	29.6%
Tangible fixed assets			Other long-term liabilities	2,752	6.7
Property, plant, and equipment	$27,498	66.6%	Total liabilities	$29,993	72.6%
Other long-term assets	640	1.6			
Total tangible fixed assets	$28,138	68.1%	Shareholders' equity		
Intangible fixed assets			Common stock and other paid-in capital	$ 5,280	12.8%
Goodwill	$ 633	1.5%	Retained earnings	6,017	14.6%
Total fixed assets	$28,771	69.7%	Total shareholders' equity	$11,297	27.4%
Total assets	$41,290	100.0%	Total liabilities and shareholders' equity	$41,290	100.0%

Table 19.2

Target's balance sheet

Note: Column sums subject to rounding error.
Source: Target *Annual Report*, year ending January 2019.

Measuring Firm Performance

- Two broad responsibilities of a firm's financial managers
  1. Investment decisions
     - Pertain to the firm's *use* of capital: the business activities in which it is engaged
     - Concern is the profitability of those projects
  2. Financing decisions
     - Pertain to the firm's *sources* of capital

Important Financial Questions

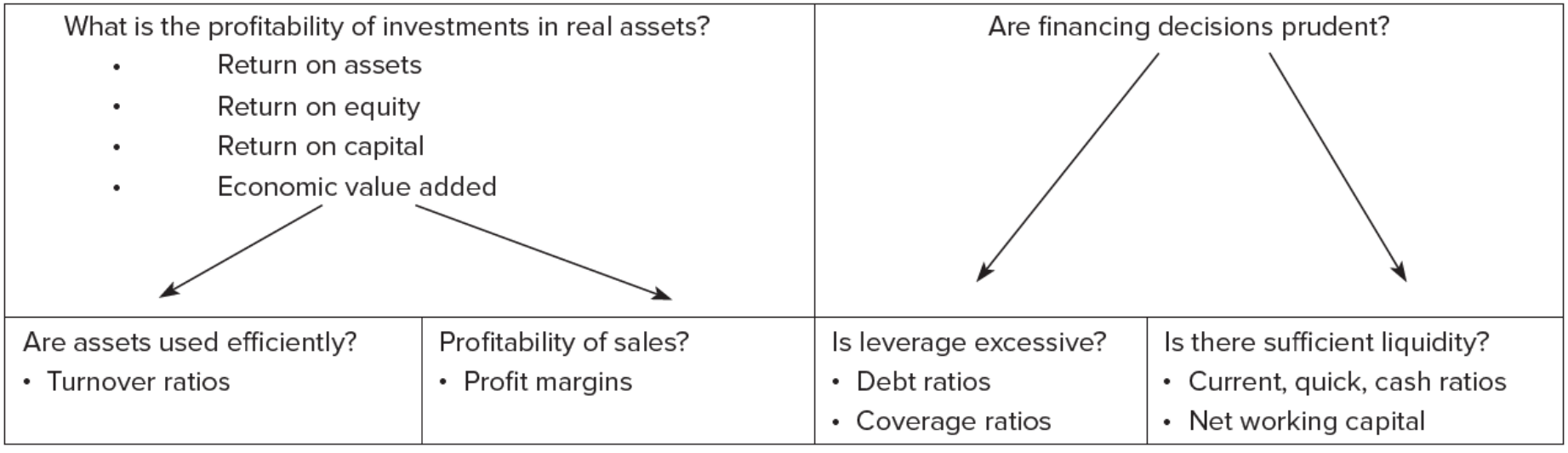

Figure 19.1 Important financial questions and some ratios that help answer them

Profitability Measures

- **Return on assets (ROA)** tells us the operating income per dollar deployed in the firm

$$ROA = \frac{EBIT}{Total\ Assets}$$

- **Return on capital (ROC)** measures earnings per dollar of long-term capital (i.e., shareholders' equity plus long-term debt) invested in the firm

$$ROC = \frac{EBIT}{Longterm\ Capital}$$

- **Return on equity (ROE)** focuses only on the profitability of equity investments

$$ROE = \frac{Net\ Income}{Shareholders'Equity}$$

Profitability Measures:
Financial Leverage and ROE (1 of 2)

- Leverage increases the risk of equityholder returns

$$\text{ROE} = (1-t) \times \left[\text{ROA} + (\text{ROA} - r) \times \frac{\text{Debt}}{\text{Equity}} \right]$$

- Where:
  - t = tax rate
  - r = interest rate

Profitability Measures:
Financial Leverage and ROE (2 of 2)

$$\text{ROE} = (1-t) \times \left[\text{ROA} + (\text{ROA} - r) \times \frac{\text{Debt}}{\text{Equity}} \right]$$

- No debt or ROA = r → ROE = ROA(1 - t)
- If ROA > r, the firm earns more than it pays out to creditors and the surplus earnings are available to the firm's equityholders, which increases ROE.
- If ROA < r, ROE will decline by an amount that depends on the debt-to-equity ratio

Impact of Financial Leverage on ROE

- Suppose Nodett is a firm that is all-equity financed and has total assets of $100 million. Assume its corporate tax rate is 40%.
- Somdett is another firm that has financed $40 million of its $100 million of assets with debt bearing an interest rate of 8%. It pays annual interest expenses of $3.2 million.

		Nodett		Somdett	
Scenario	EBIT ($ millions)	Net Profits ($ millions)	ROE (%)	Net Profits* ($ millions)	ROE† (%)
Bad year	5	3	3	1.08	1.8
Normal year	10	6	6	4.08	6.8
Good year	15	9	9	7.08	11.8

*Somdett's after-tax profits are given by .6(EBIT – $3.2 million).
†ROE = Net profit/Equity. Somdett's equity is only $60 million, so ROE = Net profit/60.

Table 19.5

Impact of financial leverage on ROE

Profitability Measures:
Economic Value Added

- **Economic value added (EVA)** is the spread between ROC and opportunity cost of capital (k) multiplied by the capital invested in the firm
  - Measures the dollar value of the firm's return in excess of its opportunity cost
  - EVA is also referred to as **residual income**

- If ROA > k, value is added to the firm

Example 19.2 - Verizon

- Verizon, 2018
  - Cost of capital = 6%
  - ROC = 8.4%
  - Capital base = $176.6 billion

- Verizon's EVA =

  (0.084 - .06) × $176.6 billion = $4.24 billion

Ratio Analysis:
Decomposition of ROE (1 of 2)

- **DuPont system** is the decomposition of a firm's profitability measure into component ratios

$$ROE = \frac{Net\ profit}{Equity} = \underset{(1)}{\frac{Net\ profits}{Pretax\ profits}} \times \underset{(2)}{\frac{Pretax\ profits}{EBIT}} \times \underset{(3)}{\frac{EBIT}{Sales}} \times \underset{(4)}{\frac{Sales}{Assets}} \times \underset{(5)}{\frac{Assets}{Equity}}$$

- Factor 1 = *tax-burden ratio*
- Factor 2 = *interest-burden ratio*
- Factor 3 = **profit margin / return on sales**
- Factor 4 = **total asset turnover (ATO)**
- Factor 5 = **leverage ratio**

Ratio Decomposition Analysis for Nodett and Somdett

Table 19.4

Nodett's profitability over the business cycle

Scenario	Sales ($ millions)	EBIT ($ millions)	ROA (% per year)	Net Profit ($ millions)	ROE (% per year)
Bad year	80	5	5	3	3
Normal year	100	10	10	6	6
Good year	120	15	15	9	9

	ROE	(1) Net Profits/ Pretax Profits	(2) Pretax Profits/EBIT	(3) EBIT/Sales (Margin)	(4) Sales/Assets (Turnover)	(5) Assets/ Equity	(6) Compound Leverage Factor (2) × (5)
Bad year							
Nodett	0.030	0.6	1.000	0.0625	0.800	1.000	1.000
Somdett	0.018	0.6	0.360	0.0625	0.800	1.667	0.600
Normal year							
Nodett	0.060	0.6	1.000	0.1000	1.000	1.000	1.000
Somdett	0.068	0.6	0.680	0.1000	1.000	1.667	1.134
Good year							
Nodett	0.090	0.6	1.000	0.1250	1.200	1.000	1.000
Somdett	0.118	0.6	0.787	0.1250	1.200	1.667	1.311

Table 19.7

Ratio decomposition analysis for Nodett and Somdett

Ratio Analysis:
Decomposition of ROE (2 of 2)

- *ROE = tax burden* x *interest burden* x *margin* x *turnover* x *leverage*
- *ROA = margin* x *turnover*
- *Compound leverage factor = interest burden* x *leverage*
- *ROE = tax burden* x *ROA* x *compound leverage factor*

Operating Profit Margin, and Asset Turnover for 45 Industries, 2018

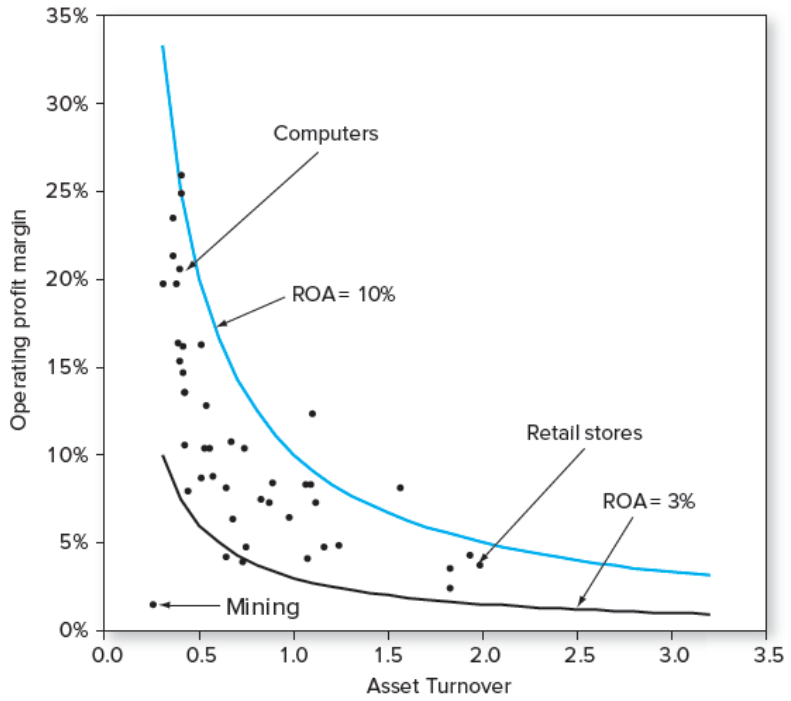

Figure 19.2 Operating profit margin and asset turnover for 45 Industries, 2018

Source: U.S. Census Bureau, *Quarterly Report for Manufacturing and Trade Corporations, Second Quarter 2018* (**www.census.gov/econ/qfr**). This is an updated version of a figure that first appeared in Thomas I. Selling and Clyde P. Stickney, "The Effects of Business Environments and Strategy on a Firm's Rate of Return on Assets," *Financial Analysts Journal*, January–February 1989, pp. 43–52.

Ratio Analysis
(1 of 3)

Turnover and Other Asset Utilization Ratios

- Fixed asset turnover = sales divided by fixed assets
- **Inventory turnover ratio** = ratio of cost of goods sold per dollar of average inventory
- **Average collection period** = ratio of accounts receivable to daily sales
  - Also called *days' receivables*

Liquidity Ratios

- **Current ratio** = current assets divided by current liabilities
- **Quick ratio** = (cash + marketable securities + receivables) divided by current liabilities
  - Also called the **acid test ratio**
- **Cash ratio** = (cash + marketable securities) divided by current liabilities

Ratio Analysis
(2 of 3)

- Market Price Ratios: Growth versus Value
  - **Market-book-value (P/B) ratio** equals the market price of a share of the firm's common stock divided by its *book value*
    - Book value is shareholders' equity per share
    - An interpretation of the market-book-value ratio is a measure of growth opportunities.
    - Recall from the previous chapter that the firm value can be viewed as the sum of assets in place and growth opportunities.
    - Firms with greater growth opportunities will tend to exhibit higher multiples of market price to book value.

Ratio Analysis
(3 of 3)

- Market Price Ratios: Growth versus Value
  - **Market-book-value (P/B) ratio** equals the market price of a share of the firm's common stock divided by its *book value*
    - Book value is shareholders' equity per share
  - **Price–earnings (P/E) ratio** is calculated as a stock's price divided by its earnings per share
    - Also referred to as the P/E multiple
    - Many analysts believe low-P/E stocks are more attractive than high-P/E stocks

Choosing a Benchmark

- To evaluate a firm's performance, you need a benchmark to which you can compare its ratios
  1. Compare the ratio for the same company in earlier years
  2. Compare ratios to those of other firms in the same industry
     - Note that cross-industry comparisons can be misleading

Summary of Key Financial Ratios
(1 of 2)

Leverage	
Interest burden	$\frac{\text{EBIT} - \text{Interest expense}}{\text{EBIT}}$
Interest coverage (times interest earned)	$\frac{\text{EBIT}}{\text{Interest expense}}$
Leverage	$\frac{\text{Assets}}{\text{Equity}} = 1 + \frac{\text{Debt}}{\text{Equity}}$
Compound leverage factor	Interest burden × Leverage
Asset utilization	
Total asset turnover	$\frac{\text{Sales}}{\text{Average total assets}}$
Fixed asset turnover	$\frac{\text{Sales}}{\text{Average fixed assets}}$
Inventory turnover	$\frac{\text{Cost of goods sold}}{\text{Average inventories}}$
Days sales in receivables	$\frac{\text{Average accounts receivable}}{\text{Annual sales}} \times 365$

Summary of Key Financial Ratios
(2 of 2)

Liquidity	
Current ratio	$\frac{\text{Current assets}}{\text{Current liabilities}}$
Quick ratio	$\frac{\text{Cash + Marketable securities + Receivables}}{\text{Current liabilities}}$
Cash ratio	$\frac{\text{Cash + Marketable securities}}{\text{Current liabilities}}$
Profitability	
Return on assets	$\frac{\text{EBIT}}{\text{Average total assets}}$
Return on equity	$\frac{\text{Net income}}{\text{Average stockholders' equity}}$
Return on sales (profit margin)	$\frac{\text{EBIT}}{\text{Sales}}$
Market price	
Market-to-book	$\frac{\text{Price per share}}{\text{Book value per share}}$
Price–earnings ratio	$\frac{\text{Price per share}}{\text{Earnings per share}}$
Earnings yield	$\frac{\text{Earnings per share}}{\text{Price per share}}$

Summary

- Profitability measures
  - $$ROA = \frac{EBIT}{Total\ Assets}$$

    $$ROC = \frac{EBIT}{Long-term\ Capital}$$

    $$ROE = \frac{Net\ Income}{Shareholders'Equity}$$
  - Leverage increases the risk of equityholder returns

    $$\text{ROE} = (1-t) \times \left[\text{ROA} + (\text{ROA} - r) \times \frac{\text{Debt}}{\text{Equity}} \right]$$
  - Economic value added

    $$EVA = (ROC - cost\ of\ capital) \times Capital$$

Summary

- Profitability measures (cont'd)
  - Suppose that Chicken Express, Inc. has an ROA of 7% and pays a 6% coupon on its debt. Chicken Express has a capital structure that is 70% equity and 30% debt. Relative to a firm that is 100% equity-financed, Chicken Express's net profit will be _____, and its ROE will be _____. Assume EBITs of the two firms are equivalent.
    a) lower; lower
    b) higher; higher
    c) higher; lower
    d) lower; higher
    e) It is impossible to predict.

Summary

- Ratio analysis
  - Dupont system

$$ROE = \frac{Net\ profit}{Equity} = \underset{(1)}{\frac{Net\ profits}{Pretax\ profits}} \times \underset{(2)}{\frac{Pretax\ profits}{EBIT}} \times \underset{(3)}{\frac{EBIT}{Sales}} \times \underset{(4)}{\frac{Sales}{Assets}} \times \underset{(5)}{\frac{Assets}{Equity}}$$

  - *ROE = tax burden* x *interest burden* x *margin* x *turnover* x *leverage*
  - *ROA = margin* x *turnover*
  - *Compound leverage factor = interest burden* x *leverage*
  - *ROE = tax burden* x *ROA* x *compound leverage factor*
  - Summary of key financial ratios

Exercise

Income Statement	2017	
Sales	$5,500,000	
Cost of goods sold	2,850,000	
Depreciation	280,000	
Selling and administrative expenses	1,500,000	
EBIT	$ 870,000	
Interest expense	130,000	
Taxable income	$ 740,000	
Taxes	330,000	
Net income	$ 410,000	
Balance Sheet, Year-End	**2017**	**2016**
Assets		
Cash	$ 50,000	$ 40,000
Accounts receivable	660,000	690,000
Inventory	490,000	480,000
Total current assets	$1,200,000	$1,210,000
Fixed assets	3,100,000	2,800,000
Total assets	$4,300,000	$4,010,000
Liabilities and shareholders' equity		
Accounts payable	$ 340,000	$ 450,000
Short-term debt	480,000	550,000
Total current liabilities	$ 820,000	$1,000,000
Long-term bonds	2,520,000	2,200,000
Total liabilities	$3,340,000	$3,200,000
Common stock	$ 310,000	$ 310,000
Retained earnings	650,000	500,000
Total shareholders' equity	$ 960,000	$ 810,000
Total liabilities and shareholders' equity	$4,300,000	$4,010,000

Calculate:

(a) Asset turnover ratio
(b) Interest coverage ratio
(c) Operating profit margin
(d) Return on equity
(e) Return on assets
(f) Return on capital