Valuation Principles and Practices

WEB CHAPTER 19
Analysis of Financial Statements

WEB CHAPTER 20
An Introduction to Security Valuation
Early in the textbook, you learned about the purpose of investing, the importance of appropriate asset allocation, and the numerous investment instruments available on a global basis. In your earlier corporate finance classes, you would have reviewed the major developments in investment theory as they relate to efficient capital markets, portfolio theory, capital asset pricing, and multi-factor valuation models. Therefore, at this point you are in a position to consider the theory and practice of estimating the value of various securities, which is the heart of investing and leads to the construction of a portfolio that is consistent with your risk-return objectives. You will recall that the investment decision is based on a comparison of an asset’s intrinsic value and its market price.

The main source of information regarding a stock or bond is the corporation’s financial statements. Web Chapter 19 considers what financial statements are available and what information they provide, followed by a discussion of the financial ratios used to answer several important questions about a firm’s liquidity, its operating performance, its risk profile, and its growth potential. Web Chapter 20 considers the basic principles of valuation and applies those principles to the valuation of bonds, preferred stock, and common stock. Because it is recognized that the valuation of common stock is the most challenging task, we present two general approaches to equity valuation and several techniques for each of these approaches. We conclude this chapter by reviewing the basic factors that influence the two critical variables that determine the intrinsic value of an asset irrespective of the valuation model: (1) the required return for an investment, and (2) the estimated growth rate of earnings, dividends, and cash flows for the investment.

These two chapters, although much of a review, provide you with the tools and the theoretical understanding to apply the valuation models to the range of entities included in the top-down approach—the aggregate market, alternative industries, and individual companies and stocks.
After you read this chapter, you should be able to answer the following questions:

1. What are the main financial statements provided by firms and what specific information does each of them contain?
2. Why do we use financial ratios to examine the performance of a firm, and why is it important to examine performance relative to the economy and to a firm’s industry?
3. What are the main categories for financial ratios and what questions are answered by the ratios in these categories?
4. How can DuPont system analysis help evaluate a firm’s past and future return on equity?
5. What is a quality balance sheet or income statement?
6. Why should you engage in financial statement analysis if markets are efficient and forward-looking?

You have probably already noted that this is a fairly long chapter with several financial statements and numerous financial ratios. The reason for this extensive discussion of how to analyze financial statements is that our ultimate goal (as noted earlier) is to construct a portfolio of investments that will provide returns that are consistent with the risk of the portfolio. In turn, to determine the expected returns on different assets we must estimate the future value of each asset as a major component of the return is the change in asset value over time. Therefore, the crux of investments is valuation. Although we consider various valuation models for common stocks in Web Chapter 20, you are already aware that the value of any financial asset is the present value of the expected cash flows generated by the asset. Therefore we must derive an estimate of the discount rate for the asset (the required return) and its expected cash flows. The main source of information needed to make these two estimates is the financial statement. To derive an estimated return, we need to understand the business and financial risk of the firm. To estimate future cash flows, we must understand the composition of cash flows and what will contribute to the short-run and long-run growth of these cash flows. Financial statements, business and financial risk, and analysis of the composition and growth of cash flow are all topics of this chapter.

We begin by introducing financial statements and discuss why and how financial ratios are useful. We then review ratios that reflect internal liquidity, operating performance, risk analysis, and growth analysis. In addition, we address four main areas in investments where financial ratios have been effectively employed.

Our example in this chapter is Shoppers Drug Mart, the largest retail drugstore chain in Canada. It operates in 1,149 drugstores and 66 Shoppers Home Health Care stores. Pharmacy prescription sales generate over 47% of total sales. The firm’s goal is to be Canada’s most convenient health-care retailer. It takes great pride in its steady sales and earnings growth that have been reflected in strong stock performance.

19.1 Financial Statements

Financial statements are intended to provide information on the resources available to management, how these resources were financed, and what the firm accomplished with them. Annual and
quarterly reports to the shareholder include three financial statements: the balance sheet, the income statement, and the statement of cash flows. In addition, reports that must be filed with the Securities Commission(s) (for example, Annual Information Form or AIF) carry detailed information about the firm, such as information on loan agreements, material contracts, and the like. Information from the basic financial statements can be used to calculate financial ratios and to analyze the operations of the firm to determine what factors influence a firm’s earnings, cash flows, and risk characteristics.

**19.1.1 Generally Accepted Accounting Principles**

Among the input used to construct the financial statements are generally accepted accounting principles (GAAP), which are formulated by the Canadian Institute of Chartered Accountants (CICA). The CICA recognizes that it would be improper for all companies to use identical and restrictive accounting principles. Therefore, the CICA allows companies some flexibility to choose among appropriate GAAP. This flexibility allows the firm’s managers to choose accounting standards that best reflect company practice. On the negative side, this flexibility can allow firms to appear healthier than they really are.\(^1\) Given this possibility, the financial analyst must rigorously analyze the available financial information to separate those firms that appear attractive from those that actually are in good financial shape.

Fortunately, the CICA requires that financial statements include notes that indicate which accounting principles were used by the firm. Because accounting principles frequently differ among firms, the information in the notes assists the analyst in adjusting the financial statements of companies so that they can better compare “apples with apples.”\(^2\)

**19.1.2 Balance Sheet**

The balance sheet shows what resources (assets) the firm controls and how it has financed these assets. Specifically, it indicates the current and capital assets available to the firm at a point in time (the end of the fiscal year or the end of a quarter). In most cases, the firm owns these assets, but some firms lease assets on a long-term basis. How the firm has financed the acquisition of these assets is indicated by its mixture of current liabilities (accounts payable or short-term borrowing), long-term liabilities (fixed debt and leases), and owners’ equity (preferred stock, common stock, and retained earnings).

The balance sheet for Shoppers Drug Mart in Exhibit 19.1 represents the stock of assets and its financing mix as at their fiscal year, 2005–2008.

**19.1.3 Income Statement**

The income statement contains information on the operating performance of the firm during some period of time (a quarter or a year). In contrast to the balance sheet, which is at a fixed point in time, the income statement indicates the flow of sales, expenses, and earnings during a period of time. The income statement for Shoppers Drug Mart for the years 2005–2008 appears in Exhibit 19.2. We concentrate on earnings from operations after tax as the relevant net earnings figure.

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1. The Enron fiasco clearly makes this point. For a general discussion on this topic, see Byrnes and Henry (2001), Henry (2001), and Byrnes, McNamee, Brady, Lavelle, and Palmeri (2002).
2. The Canadian Accounting Standards Board has confirmed January 1, 2011 as the date that the international financial reporting standards (IFRS) will replace Canadian GAAP. Although generally similar some significant differences exist.
### Exhibit 19.1

Shoppers Drug Mart Corporation Consolidated Balance Sheet ($ millions), Years Ended 2005–2008

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2007</th>
<th>2006</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assets</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Current</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td>37</td>
<td>27</td>
<td>63</td>
<td>24</td>
</tr>
<tr>
<td>Accounts receivable</td>
<td>448</td>
<td>372</td>
<td>308</td>
<td>257</td>
</tr>
<tr>
<td>Inventory</td>
<td>1,743</td>
<td>1,546</td>
<td>1,372</td>
<td>1,217</td>
</tr>
<tr>
<td>Income taxes recoverable</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Future income taxes</td>
<td>83</td>
<td>70</td>
<td>46</td>
<td>38</td>
</tr>
<tr>
<td>Prepaid expenses</td>
<td>64</td>
<td>135</td>
<td>32</td>
<td>29</td>
</tr>
<tr>
<td>Total current assets</td>
<td>2,384</td>
<td>2,150</td>
<td>1,821</td>
<td>1,565</td>
</tr>
<tr>
<td>Property and equipment</td>
<td>1,442</td>
<td>1,127</td>
<td>908</td>
<td>749</td>
</tr>
<tr>
<td>Deferred costs</td>
<td>47</td>
<td>33</td>
<td>26</td>
<td>22</td>
</tr>
<tr>
<td>Goodwill</td>
<td>2,427</td>
<td>2,245</td>
<td>2,122</td>
<td>2,019</td>
</tr>
<tr>
<td>Other intangible assets</td>
<td>98</td>
<td>58</td>
<td>45</td>
<td>18</td>
</tr>
<tr>
<td>Other assets</td>
<td>21</td>
<td>9</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total assets</strong></td>
<td>6,419</td>
<td>5,622</td>
<td>4,929</td>
<td>4,376</td>
</tr>
<tr>
<td><strong>Liabilities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Current</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bank indebtedness</td>
<td>241</td>
<td>225</td>
<td>134</td>
<td>163</td>
</tr>
<tr>
<td>Commercial paper</td>
<td>340</td>
<td>544</td>
<td>504</td>
<td>470</td>
</tr>
<tr>
<td>Short-term debt</td>
<td>198</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Accounts payable and accrued liabilities</td>
<td>1,018</td>
<td>990</td>
<td>843</td>
<td>698</td>
</tr>
<tr>
<td>Income taxes payable</td>
<td>0</td>
<td>65</td>
<td>71</td>
<td>40</td>
</tr>
<tr>
<td>Dividends payable</td>
<td>47</td>
<td>35</td>
<td>26</td>
<td>21</td>
</tr>
<tr>
<td>Current portion of long-term debt</td>
<td>0</td>
<td>299</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total current liabilities</strong></td>
<td>1,844</td>
<td>2,158</td>
<td>1,578</td>
<td>1,392</td>
</tr>
<tr>
<td>Long-term debt</td>
<td>647</td>
<td>0</td>
<td>300</td>
<td>325</td>
</tr>
<tr>
<td>Other long-term liabilities</td>
<td>303</td>
<td>245</td>
<td>189</td>
<td>141</td>
</tr>
<tr>
<td>Future income taxes</td>
<td>47</td>
<td>30</td>
<td>21</td>
<td>14</td>
</tr>
<tr>
<td><strong>Total liabilities</strong></td>
<td>2,841</td>
<td>2,433</td>
<td>2,088</td>
<td>1,872</td>
</tr>
<tr>
<td><strong>Associate interest</strong></td>
<td>119</td>
<td>113</td>
<td>117</td>
<td>117</td>
</tr>
<tr>
<td><strong>Shareholder’s equity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Share capital</td>
<td>1,514</td>
<td>1,506</td>
<td>1,491</td>
<td>1,441</td>
</tr>
<tr>
<td>Contributed surplus</td>
<td>11</td>
<td>10</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Retained earnings</td>
<td>1,934</td>
<td>1,560</td>
<td>1,226</td>
<td>942</td>
</tr>
<tr>
<td><strong>Total shareholder equity</strong></td>
<td>3,459</td>
<td>3,076</td>
<td>2,724</td>
<td>2,387</td>
</tr>
<tr>
<td><strong>Total liabilities and shareholder’s equity</strong></td>
<td>6,419</td>
<td>5,622</td>
<td>4,929</td>
<td>4,376</td>
</tr>
</tbody>
</table>

Source: Prepared by Authors using publicly available information for Shoppers Drug Mart
19.1.4 Statement of Cash Flows

The statement of cash flows integrates the effects on the firm’s cash flow of income flows (based on the most recent year’s income statement) and changes on the balance sheet (based on the two most recent annual balance sheets). Analysts use these cash flow values to estimate the value of a firm and to evaluate the risk and return of the firm’s bonds and stock.

The statement of cash flows has three sections: cash flows from operating activities, cash flows from investing activities, and cash flows from financing activities. The total cash flows from the three sections is the net change in the cash position of the firm that should equal the difference in the cash balance between the ending and beginning balance sheets. The statements of cash flow for Shoppers for 2005–2008 appear in Exhibit 19.3.

**Cash Flows from Operating Activities** This section of the statement lists the sources and uses of cash that arise from the normal operations of a firm. The net cash flow from operations is computed as the net income reported on the income statement including changes in net working capital items (i.e., receivables, inventories, and so on) plus adjustments for non-cash revenues and expenses (such as amortization), or:

\[
\text{Cash Flow from Operating Activities} = \text{Net Income} + \text{Non-cash Revenue and Expenses} + \text{Changes in Net Working Capital Items}
\]

Consistent with our previous discussion, the cash account is not included in the calculation. Notably, Shoppers has been able to generate consistently large and growing cash flows from operations even after accounting for consistent increases in accounts receivable and inventory required by the firm’s growth.
### Exhibit 19.3  
Shoppers Drug Mart Corporation Consolidated Statements of Cash Flows for the Year Ended  
2005–2008 (in thousands)

<table>
<thead>
<tr>
<th>Year</th>
<th>2008</th>
<th>2007</th>
<th>2006</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating activities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net earnings</td>
<td>565</td>
<td>490</td>
<td>422</td>
<td>364</td>
</tr>
<tr>
<td>Amortization expense</td>
<td>220</td>
<td>181</td>
<td>150</td>
<td>129</td>
</tr>
<tr>
<td>Future income taxes</td>
<td>-1</td>
<td>-7</td>
<td>-9</td>
<td>9</td>
</tr>
<tr>
<td>Loss on disposal of property and equipment</td>
<td>3</td>
<td>4</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Stock-based compensation</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>789</td>
<td>672</td>
<td>574</td>
<td>508</td>
</tr>
<tr>
<td>Net change in non-cash working capital balances</td>
<td>-325</td>
<td>-134</td>
<td>-26</td>
<td>-89</td>
</tr>
<tr>
<td>Increase in other liabilities</td>
<td>45</td>
<td>49</td>
<td>39</td>
<td>44</td>
</tr>
<tr>
<td>Store opening costs</td>
<td>-30</td>
<td>-22</td>
<td>-17</td>
<td>-12</td>
</tr>
<tr>
<td>Cash flows from operating activities</td>
<td>479</td>
<td>565</td>
<td>570</td>
<td>451</td>
</tr>
<tr>
<td><strong>Investing activities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchase of property and equipment</td>
<td>-522</td>
<td>-395</td>
<td>-287</td>
<td>-249</td>
</tr>
<tr>
<td>Proceeds from disposition of property and equipment</td>
<td>25</td>
<td>18</td>
<td>3</td>
<td>-25</td>
</tr>
<tr>
<td>Business acquisitions</td>
<td>-244</td>
<td>-140</td>
<td>-94</td>
<td>0</td>
</tr>
<tr>
<td>Deposits</td>
<td>89</td>
<td>-94</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other assets</td>
<td>-12</td>
<td>-2</td>
<td>-3</td>
<td>0</td>
</tr>
<tr>
<td>Cash flows used in investing activities</td>
<td>-664</td>
<td>-613</td>
<td>-381</td>
<td>-274</td>
</tr>
<tr>
<td><strong>Financing activities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bank indebtedness, net</td>
<td>16</td>
<td>91</td>
<td>-29</td>
<td>-39</td>
</tr>
<tr>
<td>Commercial paper, net</td>
<td>-203</td>
<td>41</td>
<td>34</td>
<td>167</td>
</tr>
<tr>
<td>Issuance of short-term debt</td>
<td>200</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Issuance of Series 2 notes</td>
<td>450</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Revolving-term debt</td>
<td>200</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Repayment of Series 1 notes</td>
<td>-300</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Repayment of long-term debt</td>
<td>0</td>
<td>0</td>
<td>-27</td>
<td>-250</td>
</tr>
<tr>
<td>Deferred financing costs</td>
<td>-6</td>
<td>0</td>
<td>0</td>
<td>-5</td>
</tr>
<tr>
<td>Associate interest</td>
<td>6</td>
<td>-4</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Proceeds from shares issued for stock options exercised</td>
<td>7</td>
<td>14</td>
<td>11</td>
<td>18</td>
</tr>
<tr>
<td>Repayment of share purchase loans</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Repurchase of share capital</td>
<td>0</td>
<td>-42</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dividends paid</td>
<td>-175</td>
<td>-130</td>
<td>-99</td>
<td>-64</td>
</tr>
<tr>
<td>Cash flows from (used in) financing activities</td>
<td>195</td>
<td>12</td>
<td>-150</td>
<td>-166</td>
</tr>
<tr>
<td><strong>(Decrease) increase in cash</strong></td>
<td>9</td>
<td>-35</td>
<td>38</td>
<td>10</td>
</tr>
<tr>
<td>Cash, beginning of period</td>
<td>28</td>
<td>63</td>
<td>25</td>
<td>14</td>
</tr>
<tr>
<td>Cash, end of period</td>
<td>37</td>
<td>28</td>
<td>63</td>
<td>24</td>
</tr>
</tbody>
</table>

Source: Prepared by Authors using publicly available information for Shoppers Drug Mart
**Cash Flows from Investing Activities** A firm makes investments in both its own non-current and capital assets and the equity of other firms (which may be subsidiaries or joint ventures of the parent firm—they are listed in the “investment” account of the balance sheet). Increases and decreases in these non-current accounts are considered investment activities. The cash flow from investing activities is the change in gross plant and equipment plus the change in the investment account. The changes are positive if they represent a source of funds (e.g., sale of some plant and/or equipment); otherwise they are negative. The dollar changes in these accounts are computed using the firm’s two most recent balance sheets. Most firms (including Shoppers) experience negative cash flows from investments due to significant capital expenditures.

**Cash Flows from Financing Activities** Cash inflows are created by increasing notes payable and long-term liability and equity accounts, such as bond and stock issues. Financing uses (outflows) include decreases in such accounts (i.e., repaying debt or the repurchase of common shares). Dividend payments are a significant financing cash outflow. For many firms, the repurchase of shares has also been a main financing outflow in recent years.

The total cash flows from operating, investing, and financing activities are the net increase or decrease in the firm’s cash. The statement of cash flows provides cash flow detail that is lacking in the balance sheet and income statement.

### 19.1.5 Measures of Cash Flow

There are several cash flow measures an analyst can use to determine the underlying health of the corporation. You should become familiar with these alternative measures.

**Traditional Cash Flow** The traditional measure of cash flow equals net income plus amortization expense and future taxes. But as we have just seen, it is also necessary to adjust for changes in operating (current) assets and liabilities that either use or provide cash. These changes can add to or subtract from the cash flow estimated from the traditional measure of cash flow: net income plus non-cash expenses.

The table below compares the cash flow from operations figures (Exhibit 19.3) to the traditional cash flow figures for Shoppers from 2005–2008.

<table>
<thead>
<tr>
<th>Year</th>
<th>Traditional Cash Flow Equals Net Income + Amortization + Change in Future Taxes</th>
<th>Cash Flow from Operations from Statement of Cash Flows</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>788</td>
<td>479</td>
</tr>
<tr>
<td>2007</td>
<td>671</td>
<td>565</td>
</tr>
<tr>
<td>2006</td>
<td>574</td>
<td>570</td>
</tr>
<tr>
<td>2005</td>
<td>498</td>
<td>451</td>
</tr>
</tbody>
</table>

For all four years the cash flow from operations was less than the traditional cash flow estimate because of the several adjustments needed to arrive at cash flow from operations. For many firms, this is fairly typical because the effect of working capital changes is often a large negative cash flow due to necessary increases in receivables or inventory to support sales growth (especially for high-growth companies).

**Free Cash Flow** Free cash flow modifies cash flow from operations to recognize that some investing and financing activities are critical to the firm. It is assumed that these expenditures must be made before a firm can use its cash flow for other purposes such as reducing debt outstanding or repurchasing common stock. Two additional items are considered: (1) capital
expenditures (investing expenditure) and (2) the disposition of property and equipment (a source of cash). These two items are used to modify Shoppers cash flow from operations as follows (most analysts only subtract net capital expenditures, but conservative analysts also subtract dividends).

<table>
<thead>
<tr>
<th>Year</th>
<th>EBITDA</th>
<th>Traditional Cash Flow</th>
<th>Cash Flow from Operations</th>
<th>Free Cash Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>1,088</td>
<td>788</td>
<td>479</td>
<td>−262</td>
</tr>
<tr>
<td>2007</td>
<td>958</td>
<td>671</td>
<td>565</td>
<td>48</td>
</tr>
<tr>
<td>2006</td>
<td>829</td>
<td>574</td>
<td>570</td>
<td>192</td>
</tr>
<tr>
<td>2005</td>
<td>720</td>
<td>498</td>
<td>451</td>
<td>176</td>
</tr>
</tbody>
</table>

For firms involved in leveraged buyouts, this free cash flow number is critical because the new owners typically want to use the firm’s free cash flow as funds available for retiring outstanding debt. It is not unusual for a firm’s free cash flow to be a negative value. For Shoppers, the free cash flow value had been positive but not large from 2005 to 2007 and negative in 2008 due to the significant capital expenditures related to store growth. Despite a weakening economy and lower cash flows, the company continued its growth plans through a corporate acquisition and by opening new stores. Notably, this free cash flow value or a variation of it will be used in the subsequent cash flow valuation models.³

**EBITDA** The widely-used EBITDA (earnings before interest, taxes, depreciation, and amortization) measure of cash flow is extremely liberal. It adds back depreciation and amortization (as in the traditional measure) along with both interest expense and taxes, but does not consider the effect of changes in working capital items (such as additions to receivables and inventory) or the significant impact of capital expenditures. The following table demonstrates the large differences among these measures. Notably, because EBITDA does not consider several of these necessary expenditures, it consistently has the highest value among cash flow measures.

3 As we will show in Web Chapter 20, small modifications of this free cash flow—called free cash flow to equity (FCFE), free cash flow to the firm (FCFF), and net operating profits less applicable taxes (NOPLAT)—are used in valuation models and also the economic value added (EVA) model.

4 For a detailed discussion of the problems with using EBITDA, see Greenberg (2000).
19.1.6 **Purpose of Financial Statement Analysis**

Financial statement analysis seeks to evaluate management performance in several important areas, including profitability, efficiency, and risk. Although we analyze historical data, the ultimate goal is to provide insights that will help us project future management performance, including pro forma balance sheets, income statements, cash flows, and risk. It is the firm’s expected future performance that determines whether we should lend money to a firm or invest in it.

19.2 **Analysis of Financial Ratios**

Just as a single number from a financial statement is of little use, an individual financial ratio has little value except in relation to comparable ratios for other entities. That is, *only relative financial ratios are relevant*. Therefore, it is important to compare a firm’s performance relative to

- The aggregate economy
- Its industry or industries
- Its main competitors within the industry
- Its past performance (time-series analysis)

The comparison to the aggregate economy is important because almost all firms are influenced by economic fluctuations. For example, it is unreasonable to expect a firm’s profit margins to increase during a recession; a stable margin might be encouraging under such conditions. In contrast, a small increase in a firm’s profit margin during a major business expansion may be a sign of weakness. Thus, this analysis that considers the economic environment helps investors understand how a firm reacts to the business cycle and should improve an estimate of the future performance of the firm during subsequent business cycles.

Probably the most significant comparison relates a firm’s performance to that of its industry. Different industries affect the firms within them differently, but this relationship is always significant. The industry effect is strongest for industries with homogeneous products such as steel, rubber, glass, and wood products, because all firms within these industries experience coincidental shifts in demand. In addition, these firms employ fairly similar technology and production processes. As a result, even the best-managed steel firm experiences a decline in sales and profit margins during a recession. In such a case, the relevant question is not whether sales and margins declined, but how bad was the decline relative to other steel firms? In addition, investors should examine an industry’s performance relative to the economy to understand how the industry responds to the business cycle, as discussed in Chapter 8.

When comparing a firm’s financial ratios to industry ratios, investors may not want to use the average (mean) industry value when there is wide variation among firms in the industry. Alternatively, if we believe that a firm has a unique component, a **cross-sectional analysis** in which we compare the firm to a subset of industry firms comparable in size or characteristics, may be appropriate. As an example, we would compare the performance of George Weston Limited (Loblaws) to that of other national food chains rather than regional food chains or specialty food chains.

Another practical problem with comparing a firm to its industry is that many large firms are multi-industry. Inappropriate comparisons can arise when a multi-industry firm is evaluated against the ratios from a single industry. To mitigate this problem, we can use a cross-sectional analysis that compares the firm against a rival that operates in
many of the same industries. Alternatively, we can construct composite industry average ratios for the firm. To do this, we use the firm's annual report to identify each industry in which the firm operates and the proportion of total firm sales and operating earnings derived from each industry. The composite industry ratios would be the weighted-average ratios based on the proportion of firm sales and operating earnings derived from each industry.

Finally, time-series analysis, in which we examine a firm’s relative performance over time to determine whether it is progressing or declining, is helpful when estimating future performance. Calculating the five- or ten-year average of a ratio without considering the time-series trend can result in misleading conclusions. For example, an average return of 10% can be the result of returns that have increased from 5% to 15% over time or the result of a series that declined from 15% to 5%. Obviously, the difference in the trend for these series would have a significant impact on our estimate for the future. Ideally, an analyst should examine a firm’s time series of relative financial ratios compared to its industry and the economy.

19.3 Financial Ratios

We divide the ratios into five main categories that underscore the important economic characteristics of a firm:

1. Common size statements
2. Internal liquidity (solvency)
3. Operating performance
   a. Operating efficiency
   b. Operating profitability
4. Risk analysis
   a. Business risk
   b. Financial risk
   c. External liquidity risk
5. Growth analysis

19.3.1 Common Size Statements

These normalize balance sheet and income statement items to allow easier comparison of different-sized firms. A common size balance sheet expresses all balance sheet accounts as a percentage of total assets. A common size income statement expresses all income statement items as a percentage of sales. Exhibit 19.4 is the common size balance sheet for Shoppers, and Exhibit 19.5 contains its common size income statement. Common size ratios are useful to quickly compare two different-sized firms and to examine trends over time within a single firm. Common size statements also give insight into a firm’s financial condition, for example, the proportion of liquid assets, the proportion of short-term liabilities, or the percentage of sales consumed by production costs or interest expense. In the case of Shoppers, the common size balance sheet shows a consistent increase in both the percent of current assets and net property. Alternatively, the common size income statement shows that Shoppers’ cost of goods sold and other operating expenses were quite stable from 2003 to 2008 in proportion to sales. As a result of this stability, the firm has experienced virtually a constant operating profit margin before and after taxes. The ability of Shoppers to experience consistent growth in sales (around 9% per year) and a constant profit margin is impressive.

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2007</th>
<th>2006</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assets</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Current</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td>0.58%</td>
<td>0.48%</td>
<td>1.28%</td>
<td>0.55%</td>
</tr>
<tr>
<td>Accounts receivable</td>
<td>6.98%</td>
<td>6.62%</td>
<td>6.25%</td>
<td>5.87%</td>
</tr>
<tr>
<td>Income taxes recoverable</td>
<td>27.15%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Inventory</td>
<td>0.14%</td>
<td>27.50%</td>
<td>27.84%</td>
<td>27.81%</td>
</tr>
<tr>
<td>Future income taxes</td>
<td>1.29%</td>
<td>1.25%</td>
<td>0.93%</td>
<td>0.87%</td>
</tr>
<tr>
<td>Prepaid expenses</td>
<td>1.00%</td>
<td>2.40%</td>
<td>0.65%</td>
<td>0.66%</td>
</tr>
<tr>
<td><strong>Total current assets</strong></td>
<td>37.14%</td>
<td>38.24%</td>
<td>36.94%</td>
<td>35.76%</td>
</tr>
<tr>
<td>Property and equipment</td>
<td>22.46%</td>
<td>20.05%</td>
<td>18.42%</td>
<td>17.12%</td>
</tr>
<tr>
<td>Deferred costs</td>
<td>0.73%</td>
<td>0.59%</td>
<td>0.53%</td>
<td>0.50%</td>
</tr>
<tr>
<td>Goodwill</td>
<td>37.81%</td>
<td>39.93%</td>
<td>43.05%</td>
<td>46.14%</td>
</tr>
<tr>
<td>Other intangible assets</td>
<td>1.53%</td>
<td>1.03%</td>
<td>0.91%</td>
<td>0.41%</td>
</tr>
<tr>
<td>Other assets</td>
<td>0.33%</td>
<td>0.16%</td>
<td>0.14%</td>
<td>0.07%</td>
</tr>
<tr>
<td><strong>Total assets</strong></td>
<td>100.00%</td>
<td>100.00%</td>
<td>100.00%</td>
<td>100.00%</td>
</tr>
<tr>
<td><strong>Liabilities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Current</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bank indebtedness</td>
<td>3.75%</td>
<td>4.00%</td>
<td>2.72%</td>
<td>3.72%</td>
</tr>
<tr>
<td>Commercial paper</td>
<td>5.30%</td>
<td>9.68%</td>
<td>10.23%</td>
<td>10.74%</td>
</tr>
<tr>
<td>Short-term debt</td>
<td>3.08%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Accounts payable and accrued liabilities</td>
<td>15.86%</td>
<td>17.61%</td>
<td>17.10%</td>
<td>15.95%</td>
</tr>
<tr>
<td>Income taxes payable</td>
<td>0.00%</td>
<td>1.16%</td>
<td>1.44%</td>
<td>0.91%</td>
</tr>
<tr>
<td>Dividends payable</td>
<td>0.73%</td>
<td>0.62%</td>
<td>0.53%</td>
<td>0.48%</td>
</tr>
<tr>
<td>Current portion of long-term debt</td>
<td>0.00%</td>
<td>5.32%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td><strong>Total current liabilities</strong></td>
<td>28.73%</td>
<td>38.38%</td>
<td>32.01%</td>
<td>31.81%</td>
</tr>
<tr>
<td>Long-term debt</td>
<td>10.08%</td>
<td>0.00%</td>
<td>6.09%</td>
<td>7.43%</td>
</tr>
<tr>
<td>Other long-term liabilities</td>
<td>4.72%</td>
<td>4.36%</td>
<td>3.83%</td>
<td>3.22%</td>
</tr>
<tr>
<td>Future income taxes</td>
<td>0.73%</td>
<td>0.53%</td>
<td>0.43%</td>
<td>0.32%</td>
</tr>
<tr>
<td><strong>Total liabilities</strong></td>
<td>44.26%</td>
<td>43.28%</td>
<td>42.36%</td>
<td>42.78%</td>
</tr>
<tr>
<td>Associate interest</td>
<td>1.85%</td>
<td>2.01%</td>
<td>2.37%</td>
<td>2.65%</td>
</tr>
<tr>
<td><strong>Shareholder's equity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Share capital</td>
<td>23.59%</td>
<td>26.79%</td>
<td>30.25%</td>
<td>32.93%</td>
</tr>
<tr>
<td>Contributed surplus</td>
<td>0.17%</td>
<td>0.18%</td>
<td>0.14%</td>
<td>0.09%</td>
</tr>
<tr>
<td>Retained earnings</td>
<td>30.13%</td>
<td>27.75%</td>
<td>24.87%</td>
<td>21.53%</td>
</tr>
<tr>
<td><strong>Total shareholder's equity</strong></td>
<td>53.89%</td>
<td>54.71%</td>
<td>55.26%</td>
<td>54.55%</td>
</tr>
<tr>
<td><strong>Total liabilities and shareholder's equity</strong></td>
<td>100.00%</td>
<td>100.00%</td>
<td>100.00%</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

Source: Calculated by Authors using publicly available information for Shoppers Drug Mart
19.4 Evaluating Internal Liquidity

Internal liquidity (solvency) ratios are intended to indicate the ability of the firm to meet future short-term financial obligations. They compare near-term financial obligations, such as accounts payable or notes payable, to current assets or cash flows that will be available to meet these obligations.

19.4.1 Internal Liquidity Ratios

**Current Ratio** Clearly the best-known liquidity measure is the current ratio, which examines the relationship between current assets and current liabilities as follows:

\[
\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}
\]

For Shoppers, the current ratios were:

<table>
<thead>
<tr>
<th>Year</th>
<th>Current Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>1.29</td>
</tr>
<tr>
<td>2007</td>
<td>1.00</td>
</tr>
<tr>
<td>2006</td>
<td>1.15</td>
</tr>
<tr>
<td>2005</td>
<td>1.12</td>
</tr>
</tbody>
</table>
These current ratios remained stable over the four years and are consistent with the typical current ratio. Note that the improvement in 2008 is primarily due to restructuring of its short- and long-term liabilities. As always, it is important to compare these values with similar figures for the firm’s industry and the aggregate market. If the ratios differ from the industry results, we need to determine what might explain it in terms of specific current assets and liabilities. (We will discuss comparative analysis in a later section.)

**Quick Ratio** Some observers question using total current assets to gauge the ability of a firm to meet its current obligations because inventories and some other current assets might not be very liquid. They prefer the quick ratio, which relates current liabilities to only relatively liquid current assets (cash items and accounts receivable) as follows:

\[
\text{Quick Ratio} = \frac{\text{Cash} + \text{Marketable Securities} + \text{Receivables}}{\text{Current Liabilities}}
\]

Shoppers’ quick ratios were

\[
\begin{align*}
2008: & \quad \frac{485}{1,844} = 0.26 \\
2007: & \quad \frac{399}{2,158} = 0.18 \\
2006: & \quad \frac{371}{1,578} = 0.24 \\
2005: & \quad \frac{281}{1,392} = 0.20
\end{align*}
\]

Once again, we see some good stability in this ratio with an improvement in 2008 due to the debt restructuring. As before, we should compare these values to other firms in the industry and to the aggregate economy.

**Cash Ratio** The most conservative liquidity ratio is the cash ratio, which relates the firm’s cash and short-term marketable securities to its current liabilities as follows:

\[
\text{Cash Ratio} = \frac{\text{Cash and Marketable Securities}}{\text{Current Liabilities}}
\]

Shoppers Drug Mart’s cash ratios were

\[
\begin{align*}
2008: & \quad \frac{37}{1,844} = 0.02 \\
2007: & \quad \frac{27}{2,158} = 0.01
\end{align*}
\]
Although low, this ratio indicates Shoppers keeps minimal cash balances and is likely using lines of credit for working capital needs.

**Receivables Turnover** In addition to examining total liquid assets, it is useful to analyze the quality (liquidity) of the accounts receivable by calculating how often the firm’s receivables turn over, which implies an average collection period. The faster these accounts are paid, the sooner the firm gets the funds to pay off its own current liabilities. Receivables turnover is computed as

\[
\text{Receivable Turnover} = \frac{\text{Net Annual Sales}}{\text{Average Receivables}}
\]

The average receivables figure is typically equal to the beginning receivables figure plus the ending value divided by two. Receivables turnover ratios for Shoppers were

\[
\begin{align*}
2006: & \quad \frac{63}{1,578} = 0.04 \\
2005: & \quad \frac{24}{1,392} = 0.02
\end{align*}
\]

A turnover value for 2005 has not been computed as the information we’ve provided does not include an ending receivables figure for 2004.

Given these annual receivables turnover figures, the average collection period is

\[
\frac{365}{\text{Annual Receivables Turnover}}
\]

For Shoppers,

\[
\begin{align*}
2008: & \quad \frac{365}{22.98} = 15.9 \text{ days}
\end{align*}
\]
These results indicate that Shoppers currently is taking about 16 days to collect its accounts receivable; it is slightly worrisome to see this creeping up since 2006. To determine whether these account collection numbers are good or bad, it is essential that they be related to the firm’s credit policy and to comparable numbers for other firms in the industry. The length of the receivables collection period value varies dramatically for different firms (e.g., from 10 to over 60), and it is mainly due to the product and the industry. An industry comparison would indicate similar rapid collection periods for other drugstore chains, as most sales are for cash.

The receivables turnover is one of the ratios in which a firm does not want to deviate too much from the norm. In an industry where the norm is 40 days, a collection period of 80 days would indicate slow-paying customers, which increases the capital tied up in receivables and the possibility of bad debts. Therefore, the firm wants to be somewhat below the norm (e.g., 35 days versus 40 days) but a figure substantially below the norm (e.g., 20 days) might indicate overly stringent credit terms relative to the competition, which could be detrimental to sales in the long run.

### 19.4.2 Inventory Turnover

We should also examine the liquidity of inventory based on the firm’s inventory turnover (i.e., how many times it is sold during a year) and the implied processing time. Inventory turnover can be calculated relative to sales or cost of goods sold. The preferred turnover ratio is relative to cost of goods sold (CGS), which does not include the profit implied in sales.

For Shoppers, the inventory turnover ratios were

\[
\text{2007: } \frac{365}{24.94} = 14.6 \text{ days} \\
\text{2006: } \frac{365}{27.56} = 13.2 \text{ days}
\]

\[
\text{2007: } \frac{7,520}{1,546 + 1,372} \div 2 = 5.15 \text{ times} \\
\text{2006: } \frac{6,958}{1,372 + 1,217} \div 2 = 5.38 \text{ times}
\]

\[
\text{2008: } \frac{8,335}{1,743 + 1,546} \div 2 = 5.07 \text{ times}
\]

5 Operating expenses have been included in the COGS figure as Shoppers has not broken them out separately; typically, operating expenses are around 20% of sales.
Given these turnover values, we can compute the average inventory processing time as follows:

\[
\text{Average Inventory Processing Period} = \frac{365}{\text{Annual Inventory Turnover}}
\]

For Shoppers,

\[
\begin{align*}
2008: & \quad \frac{365}{5.07} = 72.0 \text{ days} \\
2007: & \quad \frac{365}{5.15} = 70.9 \text{ days} \\
2006: & \quad \frac{365}{5.38} = 67.9 \text{ days}
\end{align*}
\]

Although this seems low, it is encouraging that the inventory processing period, even with the slight increase over time, has been relatively stable. Still, it is essential to examine this turnover ratio relative to an industry norm and/or the firm's main competition. Notably, this ratio will also be affected by the products carried—for instance, high-profit margin items, such as cosmetics, have lower turnover rates. Also note that we have used the cost of goods sold and other operating expenses, later we will use sales to calculate inventory turnover.

As with receivables, an extremely low inventory turnover value and long processing time implies that capital is being tied up in inventory and could signal obsolete inventory (especially for firms in the technology sector). Alternatively, an abnormally high inventory turnover and a short processing time could mean inadequate inventory that could lead to outages, backorders, and slow delivery to customers, which would eventually have an adverse effect on sales.

**Cash Conversion Cycle** A very useful measure of overall internal liquidity is the cash conversion cycle, which combines information from the receivables, inventory, and the accounts payable turnover ratios. Cash is tied up in receivables and in inventory for a number of days. At the same time, the firm receives an offset to this capital commitment from its own suppliers who provide interest-free loans to the firm by carrying the firm’s payables. Specifically, the payables’ payment period is equal to 365 divided by the payables’ turnover ratio. In turn, the payables’ turnover ratio is

\[
\text{Payables Turnover Ratio} = \frac{\text{Cost of Goods Sold}}{\text{Average Trade Payables}}
\]

For Shoppers, the payables’ turnover ratios were

\[
2008: \quad \frac{8,335}{1,018 + 990} = 8.30 \text{ times}
\]
Therefore, the cash conversion cycle for Shoppers (with components rounded) equals:

\[
\begin{align*}
2007: \quad & \frac{7,520}{990 + 843} = \frac{7,520}{2} = 3,760 = 8.21 \text{ days} \\
2006: \quad & \frac{6,958}{843 + 698} = \frac{6,958}{2} = 3,479 = 8.03 \text{ days}
\end{align*}
\]

Payables Payment Period = \frac{365 \text{ days}}{\text{Payable Turnover}}

\[
\begin{align*}
2008: \quad & \frac{365}{8.30} = 44.0 \text{ days} \\
2007: \quad & \frac{365}{8.21} = 44.5 \text{ days} \\
2006: \quad & \frac{365}{9.03} = 40.4 \text{ days}
\end{align*}
\]

Therefore, the cash conversion cycle for Shoppers (with components rounded) equals:

<table>
<thead>
<tr>
<th>Year</th>
<th>Receivables Collection Days</th>
<th>+</th>
<th>Inventory Processing Days</th>
<th>−</th>
<th>Payables Payment Period</th>
<th>=</th>
<th>Cash Conversion Cycle</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>16</td>
<td>+</td>
<td>72</td>
<td>−</td>
<td>44</td>
<td>=</td>
<td>44 days</td>
</tr>
<tr>
<td>2007</td>
<td>15</td>
<td>+</td>
<td>71</td>
<td>−</td>
<td>45</td>
<td>=</td>
<td>41 days</td>
</tr>
<tr>
<td>2006</td>
<td>13</td>
<td>+</td>
<td>68</td>
<td>−</td>
<td>40</td>
<td>=</td>
<td>41 days</td>
</tr>
</tbody>
</table>

Shoppers has an increase in both its receivables days and in its inventory processing days and this has been partially offset by taking longer to pay its bills. The overall result is a very small increase in the cash conversion cycle. Although the overall cash conversion cycle appears to be quite good (about 44 days), as always we should examine the firm’s long-term trend and how it compares to peers.

19.5 Evaluating Operating Performance

The operating performance ratios can be divided into two subcategories: (1) operating efficiency and (2) operating profitability. These ratios examine how management uses its assets and capital, measured by dollars of sales generated by various asset or capital categories. Profitability ratios analyze the profits as a percentage of sales and as a percentage of the assets and capital employed.
19.5.1 OPERATING EFFICIENCY RATIOS

**Total Asset Turnover** The total asset turnover ratio indicates the effectiveness of the firm’s use of its total asset base (net assets equals gross assets minus amortization on capital assets). It is computed as

\[
\text{Total Asset Turnover} = \frac{\text{Net Sales}}{\text{Average Total Net Assets}}
\]

Shoppers’ total asset turnover values were

\[
\begin{align*}
2008: & \quad \frac{9,423}{6,419 + 5,622} \div 2 = 1.57 \text{ times} \\
2007: & \quad \frac{8,478}{5,622 + 4,929} \div 2 = 1.61 \text{ times} \\
2006: & \quad \frac{7,786}{4,929 + 4,375} \div 2 = 1.67 \text{ times}
\end{align*}
\]

This ratio must be compared to that of other firms within an industry because it varies substantially between industries. For example, total asset turnover ratios range from less than 1 for capital-intensive industries (e.g., steel, automotive, and heavy manufacturing firms) to over 10 for some retailing or service operations. It also can be affected by the use of leased facilities.

As well, we must consider a range of turnover values consistent with the industry. It is poor management to have an exceedingly high asset turnover relative to the industry because this might imply too few assets for the potential business (sales), or it could be due to the use of outdated, fully depreciated assets. It is equally poor management to have an extremely low asset turnover because this implies that the firm is tying up capital in excess assets relative to the needs of the firm and compared with its competitors.

Beyond the analysis of the firm’s total asset base, it is insightful to examine the utilization of some specific assets, such as receivables, inventories, and capital assets. This detailed analysis is especially important if the firm has experienced a substantial decline in its total asset turnover because we want to know the cause of the decline, that is, which of the component turnovers (receivables, inventory, capital assets) contributed to the decline. The receivables and inventory turnover were examined as part of our liquidity analysis; we now examine the capital asset turnover ratio.

**Net Capital Asset Turnover** The net capital asset turnover ratio reflects the firm’s utilization of capital assets.\(^6\) It is computed as

---

\(^6\) When analyzing asset turnover it is important to be aware of intangible assets such as goodwill or patents that can be substantial items. In such cases, analysts will often consider only “tangible” assets or “operating” assets. Given the growth strategy of Shoppers, this is not a problem.
Shoppers’ capital asset turnover ratios were:

\[
\text{Capital Asset Turnover} = \frac{\text{Net Sales}}{\text{Average Net Capital Assets}}
\]

These turnover ratios, which indicate a slight decline during the last few years, must be compared with industry competitors and should consider the impact of leased assets (this is especially significant for retail firms). Again, an abnormally low or high asset turnover ratio can indicate poor capital asset management.\(^7\)

**Equity Turnover** In addition to specific asset turnover ratios, it is useful to examine the turnover for capital components. An important one, equity turnover, is computed as:

\[
\text{Equity Turnover} = \frac{\text{Net Sales}}{\text{Average Equity}}
\]

Equity includes preferred and common stock, paid-in capital, contributed surplus, and retained earnings.\(^8\) This ratio differs from total asset turnover in that it excludes current liabilities and long-term debt. Therefore, when examining this series, it is very important to consider the firm’s capital structure ratios, because the firm can increase (or decrease) its equity turnover ratio by increasing (or decreasing) its proportion of debt.

Shoppers’ equity turnover ratios were:

\[
\begin{align*}
2008: & \quad \frac{9,423}{1,442 + 1,127} = 7.34 \text{ times} \\
2007: & \quad \frac{8,478}{1,127 + 908} = 8.33 \text{ times} \\
2006: & \quad \frac{7,786}{908 + 749} = 9.40 \text{ times}
\end{align*}
\]

\(7\) “The DuPont System” section of this chapter contains an analysis of this total asset turnover ratio over a longer term.

\(8\) Some investors prefer to consider only owner’s equity, which would not include preferred stock.
This ratio has decreased slightly indicating that equity and sales growth are proportionate. In our later analysis of sustainable growth, we examine the variables that affect the equity turnover ratio to understand what variables might cause changes.

Following an analysis of the firm’s operating efficiency, the next step is to examine its profitability in relation to its sales and capital.

### 19.5.2 Operating Profitability Ratios

There are two facets of profitability: (1) the profit on sales (profit margin) and (2) the percentage return on capital employed. The analysis of profitability of sales actually entails several component profit margins that consider various expense categories. These component margins provide important information relative to the final net profit margin. Thus, if we determine that a firm has experienced a significant increase or decrease in its net profit margin, the analysis of the component profit margins will help us to determine the specific causes of the change. Therefore, we will briefly discuss each of the margins below but will defer calculations and comments on the trends until we discuss the common size income statement.

**Gross Profit Margin** Gross profit equals net sales minus the cost of goods sold. The gross profit margin is computed as

\[
\text{Gross Profit Margin} = \frac{\text{Gross Profit}}{\text{Net Sales}}
\]

This ratio indicates the basic cost structure of the firm. An analysis of this ratio over time shows the firm’s relative cost-price position. As always, we must compare these margins to comparable industry results and to main competitors. Notably, this margin can also be impacted by a change in the firm’s product mix toward higher or lower profit-margin items. As Shoppers does not provide a figure for cost of goods sold, we must consider the operating profit margin.

**Operating Profit Margin** Operating profit is gross profit minus sales, general, and administrative (SG&A) expenses. It is also referred to as EBIT—earnings before interest and taxes.

\[
\text{Operating Profit Margin} = \frac{\text{Operating Profit}}{\text{Net Sales}}
\]

The variability of the operating profit margin over time is a prime indicator of the business risk for a firm and should be compared to the volatility of similar ratios for competitors and the industry.

Deducting interest expense and net foreign exchange loss from operating profit results in earnings before income taxes.
Some investors add back the firm’s amortization expense to operating income (EBIT) to compute a profit margin (EBITDA) that is then used as a proxy for pretax cash flow, however, as discussed earlier, we consider this to be a biased cash flow estimate.

**Net Profit Margin** This margin relates after-tax net income to sales. In the case of Shoppers, this is the same as operating income after taxes, because the firm does not have any significant non-operating adjustments. This margin is equal to

\[
\text{Net Profit Margin} = \frac{\text{Net Income}}{\text{Net Sales}}
\]

This ratio should be computed using sales and earnings from *continuing* operations, because our analysis seeks to derive insights about *future* expectations. Therefore, we do not consider earnings from discontinued operations, or the gain or loss from the sale of these operations. Likewise, you do not want to include any non-recurring income or expenses.

**Common Size Income Statement** As noted earlier, these profit margin ratios are basically included in a common size income statement, which lists all expense and income items as a percentage of sales. This statement provides useful insights regarding the trends in cost figures and profit margins.

Exhibit 19.5 shows a common size income statement for Shoppers for 2005–2008. As noted earlier, the most striking characteristic of the various profit margins for Shoppers (operating and net) is the significant stability in those margins over time. This stability is notable because the firm has experienced a growth rate of sales during this period (better than 9% per year), and it is generally a challenge to control costs when growing rapidly.

Beyond the analysis of earnings on sales, the ultimate measure of management performance is the profits earned on the assets or the capital committed to the enterprise. Several ratios help us evaluate this important relationship.

**Return on Total Invested Capital** The return on total invested capital ratio (or ROIC) relates the firm’s earnings to all the invested capital involved in the enterprise (debt, preferred stock, and common stock). Therefore, the earnings figure used is the net income from continuing operations (before any dividends) plus the interest paid on debt. While there might be a tendency to equate total capital with total assets, most analysts differentiate due to the term *invested capital*, which does not include non-interest-bearing debt such as trade accounts payable, accrued expenses, income taxes payable, and future income taxes. In contrast, short-term debt such as bank borrowings and principal payments due on long-term debt are interest bearing and would be included as invested capital. Therefore, the ratio would be:

\[
\text{Return on Total Invested Capital} = \frac{\text{Net Income} + \text{Interest Expense}}{\text{Average Total Invested Capital}^*}
\]

*Interest bearing debt plus shareholder’s equity

Shoppers incurred interest expense for long- and short-term debt.\(^9\)

---

\(^9\) Subsequently, in connection with the analysis of financial risk, we discuss why and how to capitalize the operating lease payments that are reported in notes. When we do this, we will add this capitalized value to the balance sheet in terms of additional leased assets and also lease obligations along with the implied interest on the leases. At that point, we demonstrate the affect of this on the firm’s ROIC and several other financial ratios—mainly financial risk ratios.
Shoppers’ returns on total invested capital (ROIC) were

\[
2008: \frac{565 + 64}{5,188 + 4,389} = 13.14\% \\
2007: \frac{490 + 53}{4,389 + 3,851} = 13.18\% \\
2006: \frac{422 + 50}{3,851 + 3,486} = 12.87\%
\]

This ratio indicates the firm’s return on all its invested capital. It should be compared with the ratio for other firms in the industry and the economy. For Shoppers, the results are stable, with a slight increase over the 2006 figures.

**Return on Owner’s Equity** The return on owner’s equity (ROE) ratio is extremely important to the common shareholder because it indicates the return management has earned on the capital provided by shareholders, after accounting for payments to all other capital suppliers. If we consider all equity (including preferred stock), this return would equal

\[
\text{Return on Total Equity} = \frac{\text{Net Income}}{\text{Average Total Equity}}
\]

If we are concerned only with owner’s equity (the common shareholder’s equity), the ratio would be

\[
\text{Return on Owner’s Equity} = \frac{\text{Net Income} - \text{Preferred Dividend}}{\text{Average Common Equity}}
\]

Shoppers generated return on owner’s equity of

\[
2008: \frac{565 - 0}{3,459 + 3,076} = 17.29\% \\
2007: \frac{490 - 0}{3,076 + 2,724} = 16.90\% \\
2006: \frac{422 - 0}{2,724 + 2,387} = 16.51\%
\]

10 In the case of Shoppers, return on total equity and return on owner’s equity is the same, since there is no preferred stock outstanding (it is authorized but not issued).
This ratio should be consistent with the firm’s overall business risk, and it should reflect the financial risk assumed by the common shareholder because of the prior claims of the firm’s bondholders.

**The DuPont System** The importance of ROE as an indicator of performance makes it desirable to divide the ratio into several component ratios that provide insights into the causes of a firm’s ROE or any changes in it. This breakdown is generally referred to as the DuPont system. First, ROE can be broken down into two familiar ratios—net profit margin and equity turnover.

\[
ROE = \frac{\text{Net Income}}{\text{Common Equity}} = \frac{\text{Net Income}}{\text{Net Sales}} \times \frac{\text{Net Sales}}{\text{Common Equity}}
\]

This breakdown is an identity because we have both multiplied and divided by net sales. To maintain the identity, the common equity value used is the year-end figure rather than the average of the beginning and ending value.\(^\text{11}\) This identity reveals that ROE equals the net profit margin times the equity turnover, which implies that a firm can improve its return on equity by either using its equity more efficiently (increasing its equity turnover) or by becoming more profitable (increasing its net profit margin).

Recall that a firm’s equity turnover can be increased by using more debt. We can see this effect by considering the following:

\[
\frac{\text{Net Sales}}{\text{Common Equity}} = \frac{\text{Net Sales}}{\text{Total Assets}} \times \frac{\text{Total Assets}}{\text{Common Equity}}
\]

Similar to the prior breakdown, this is an identity because we have both multiplied and divided the equity turnover ratio by total assets. This equation indicates that the equity turnover ratio equals the firm’s total asset turnover (a measure of efficiency) times the ratio of total assets to equity (a measure of financial leverage). Specifically, this financial leverage ratio indicates the proportion of total assets financed with debt. All assets have to be financed by either equity or some form of debt (either current or long-term). Therefore, the higher the ratio of assets to equity, the higher the proportion of debt to equity. A total asset-equity ratio of 2, for example, indicates that for every two dollars of assets there is a dollar of equity, which means the firm financed one-half of its assets with equity and the other half with debt. Likewise, a total asset-equity ratio of 3 indicates that only one-third of total assets was financed with equity and two-thirds must have been financed with debt. Thus a firm can increase its equity turnover either by increasing its total asset turnover (becoming more efficient) or by increasing its financial leverage ratio (financing assets with a higher proportion of debt). This financial leverage ratio is also referred to as the financial leverage multiplier, because the first two ratios (profit margin times total asset turnover) equal return on total assets (ROTA), and ROTA times the financial leverage multiplier equals ROE.

---

11 The effect of using the year-end equity rather than the average for the year will cause a lower ROE since the equity is generally increasing over time. Two points regarding this difference: First, the conservative bias is generally small—for Shoppers (which is growing fast), the average equity result above for 2008 was 17.29% versus 16.41% using the year-end equity. Second, the important trend results will be evident, along with the component trends that are very important.
Combining these two breakdowns, we see that a firm’s ROE is composed of three ratios, as follows:

\[
\frac{\text{Net Income}}{\text{Common Equity}} = \frac{\text{Net Income}}{\text{Net Sales}} \times \frac{\text{Net Sales}}{\text{Total Assets}} \times \frac{\text{Total Assets}}{\text{Common Equity}}
\]

\[
= \frac{\text{Profit Margin}}{\text{Total Assets Turnover}} \times \frac{\text{Total Assets Turnover}}{\text{Financial Leverage Multiplier}}
\]

As an example of this important set of relationships, the data in Exhibit 19.6 indicate what has happened to the ROE for Shoppers and the components of its ROE during the six-year period from 2003 to 2008. As noted, these ratio values employ year-end balance sheet figures (assets and equity) rather than the average of beginning and ending data, so they will differ from our individual ratio computations.

The DuPont results in Exhibit 19.6 indicate several significant trends:

1. The total asset turnover ratio was relatively stable: a total range of 1.34 to 1.63.
2. The profit margin series experienced a consistent increase from 2004.
3. The product of the total asset turnover and the net profit margin is equal to return on total assets (ROTA), which experienced an overall increase from 2005 to 2007 after the decline between 2004 and 2005. The 2008 decline was due primarily from the asset growth.
4. The financial leverage multiplier (total assets/equity) experienced a decline from 2005 to 2007 and then increased again to 1.96. Most of this debt is non-interest-bearing trade credit, bank indebtedness, and commercial paper. The impact of the long-term leases are discussed and analyzed in the subsequent financial risk section.
5. Finally, as a result of the overall increase in ROTA and a declining financial leverage, the firm’s ROE has experienced steady improvement overall except for 2004 when profit margins were down. In 2008, total asset turnover decreased slightly while the firm borrowed more, leaving the ROE close to the previous year.

### Exhibit 19.6 Components of Return on Total Equity for Shoppers Drug Mart

<table>
<thead>
<tr>
<th>Year</th>
<th>Sales/Total Assets (Times)</th>
<th>Net Profit Margin (%)</th>
<th>Return on Total Assets (%)</th>
<th>Total Assets/Equity (Times)</th>
<th>Return on Equity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>1.34</td>
<td>5.82</td>
<td>7.80</td>
<td>1.96</td>
<td>15.29</td>
</tr>
<tr>
<td>2004</td>
<td>1.59</td>
<td>4.68</td>
<td>7.44</td>
<td>1.97</td>
<td>14.66</td>
</tr>
<tr>
<td>2005</td>
<td>1.63</td>
<td>5.09</td>
<td>8.30</td>
<td>1.83</td>
<td>15.19</td>
</tr>
<tr>
<td>2006</td>
<td>1.58</td>
<td>5.42</td>
<td>8.56</td>
<td>1.81</td>
<td>15.49</td>
</tr>
<tr>
<td>2007</td>
<td>1.51</td>
<td>5.78</td>
<td>8.73</td>
<td>1.83</td>
<td>15.97</td>
</tr>
<tr>
<td>2008</td>
<td>1.47</td>
<td>6.00</td>
<td>8.82</td>
<td>1.86</td>
<td>16.41</td>
</tr>
</tbody>
</table>

*Ratios use year-end data for total assets and common equity rather than averages of the year.
*Column (3) is equal to column (1) times column (2).
*Column (5) is equal to column (3) times column (4).

Note: When the three component ratios are multiplied the product may not equal the ROE based on year-end statements due to the rounding of the three ratios.
An Extended DuPont System

Beyond the original DuPont system, some analysts have suggested using an extended DuPont system, which provides additional insights into the effect of financial leverage on the firm and also pinpoints the effect of income taxes on the firm’s ROE. Because both financial leverage and tax rates have changed over the past decade, these additional insights are important. The concept and use of the model is the same as the basic DuPont system except for a further breakdown of components.

We now begin with the operating profit margin (EBIT divided by sales) and introduce additional ratios to derive an ROE value. Combining the operating profit margin and the total asset turnover ratio yields the following:

\[
\frac{\text{EBIT}}{\text{Net Sales}} \times \frac{\text{Net Sales}}{\text{Total Assets}} = \frac{\text{EBIT}}{\text{Total Assets}}
\]

This ratio is the operating profit return on total assets. To consider the negative effects of financial leverage, we examine the effect of interest expense as a percentage of total assets:

\[
\frac{\text{EBIT}}{\text{Total Assets}} - \frac{\text{Interest Expense}}{\text{Total Assets}} = \frac{\text{Net Before Tax (NBT)}}{\text{Total Assets}}
\]

We consider the positive effect of financial leverage with the financial leverage multiplier as follows:

\[
\frac{\text{Net Before Tax (NBT)}}{\text{Total Assets}} \times \frac{\text{Total Assets}}{\text{Common Equity}} = \frac{\text{Net Before Tax (NBT)}}{\text{Common Equity}}
\]

This indicates the pretax return on equity. Finally, to arrive at ROE, we must consider the tax-rate effect. We do this by multiplying the pre-tax ROE by a tax-retention rate as follows:

\[
\frac{\text{Net Before Tax}}{\text{Common Equity}} \times \left(100\% - \frac{\text{Income Taxes}}{\text{Net Before Tax}}\right) = \frac{\text{Net Income}}{\text{Common Equity}}
\]

In summary, we have the following five components:

1. \(\frac{\text{EBIT}}{\text{Sales}} = \text{Operating Profit Margin}\)
2. \(\frac{\text{Sales}}{\text{Total Assets}} = \text{Total Asset Turnover}\)
3. \(\frac{\text{Interest Expense}}{\text{Total Assets}} = \text{Interest Expense Rate}\)

---

12 The original DuPont system was the three-component breakdown discussed in the prior section. Because this extended analysis also involves the components of ROE, some still refer to it as the DuPont system. In our presentation, we refer to it as the extended DuPont system to differentiate it from the original three-component analysis.
Exhibit 19.7 contains the calculations, using the five components for 2003 through 2008. The first column indicates that the firm’s operating profit margin has been growing steadily since 2004. We know from the prior discussion that the firm’s total asset turnover (Column 2) has also been improving after a drop in 2006 and 2008. The resulting operating profit return on assets has shown steady improvement from 2004. As discussed, the amount of interest and non-interest-bearing debt has increased proportionately to asset growth (combined with a low-interest rate environment). Column 4 shows little negative impact on leverage until 2008, however, this is no worse than the 2003 figure.

Column 5 reflects the firm’s operating performance before the positive impact of financing (the leverage multiplier) and the impact of taxes. These results are virtually identical to Column 3 due to extensive use of non-interest-bearing debt. Column 6 reflects a slow decline in non-lease financial leverage, with a slight increase in 2008. As a result of the overall declining leverage and improved profitability multiplier, the before-tax ROE in Column 7 has remained constant except for 2004. Column 8 shows the strong positive effect of lower tax rates, which caused a higher tax-retention rate, even with the increased taxes paid in 2008.

In summary, this breakdown helps you to understand what happened to a firm’s ROE and why it happened. The intent is to determine what happened to the firm’s internal operating

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**Exhibit 19.7** Extended DuPont System Analysis for Shoppers: 2003–2008

<table>
<thead>
<tr>
<th>Year</th>
<th>EBIT/Sales (%)</th>
<th>Sales/Total Assets (Times)</th>
<th>EBIT/Total Assets (%)</th>
<th>Interest Expense/Total Assets (%)</th>
<th>Net Before Tax/Total Assets (%)</th>
<th>Total Assets/Common Equity (Times)</th>
<th>Net Before Tax/Common Equity (%)</th>
<th>Tax Retention Rate (%)</th>
<th>Return on Equity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>11.03</td>
<td>1.34</td>
<td>14.74</td>
<td>2.30</td>
<td>12.44</td>
<td>1.96</td>
<td>24.40</td>
<td>0.63</td>
<td>15.29</td>
</tr>
<tr>
<td>2004</td>
<td>8.16</td>
<td>1.59</td>
<td>13.02</td>
<td>1.46</td>
<td>11.56</td>
<td>1.97</td>
<td>22.82</td>
<td>0.64</td>
<td>14.72</td>
</tr>
<tr>
<td>2005</td>
<td>8.38</td>
<td>1.63</td>
<td>13.69</td>
<td>1.12</td>
<td>12.57</td>
<td>1.83</td>
<td>23.04</td>
<td>0.66</td>
<td>15.26</td>
</tr>
<tr>
<td>2006</td>
<td>8.77</td>
<td>1.58</td>
<td>13.86</td>
<td>1.01</td>
<td>12.84</td>
<td>1.81</td>
<td>23.24</td>
<td>0.67</td>
<td>15.50</td>
</tr>
<tr>
<td>2007</td>
<td>9.27</td>
<td>1.51</td>
<td>13.98</td>
<td>0.94</td>
<td>13.04</td>
<td>1.83</td>
<td>23.83</td>
<td>0.67</td>
<td>15.94</td>
</tr>
<tr>
<td>2008</td>
<td>9.36</td>
<td>1.47</td>
<td>13.76</td>
<td>1.00</td>
<td>12.76</td>
<td>1.86</td>
<td>23.74</td>
<td>0.69</td>
<td>16.38</td>
</tr>
</tbody>
</table>

aThe percents in this table may not be the same as in Exhibit 19.6 due to rounding.
bColumn 3 is equal to column 1 times column 2.
cColumn 5 is equal to column 3 minus column 4.
dColumn 7 is equal to column 5 times column 6.
eColumn 9 is equal to column 7 times column 8.
results, what has been the negative and positive effect of its financial leverage policy, and what was the effect of external government tax policy. Although the two breakdowns should provide the same ending value, they typically differ by small amounts because of the rounding of components.

19.6 Risk Analysis

Risk analysis examines the uncertainty of income flows for the total firm and for the individual sources of capital (i.e., debt, preferred stock, and common stock). The typical approach examines the main factors that cause a firm’s income flows to vary. More volatile income flows mean greater risk (uncertainty) facing the investor.

The total risk of the firm has two internal components: business risk and financial risk. We first discuss the concept of business risk: how to measure it, what causes it, and how to measure its individual causes. Then we consider financial risk and the several ratios by which we measure it. Following this analysis of a firm’s internal risk factors, we discuss an important external risk factor, external liquidity risk—that is, the ability to buy or sell the firm’s stock in the secondary equity market.

19.6.1 Business Risk

Recall that business risk is the uncertainty of operating income caused by the firm’s industry. In turn, this uncertainty is due to the firm’s variability of operating earnings caused by its products, customers, and the way it produces its products. Specifically, a firm’s operating earnings vary due to two factors: (1) the volatility of the firm’s sales over time, and (2) how the firm produces its products in terms of its mix of fixed and variable costs—that is, its operating leverage. For example, the earnings for a steel firm will probably vary more than those of a grocery chain because (1) over the business cycle, steel sales are more volatile than grocery sales; and (2) the steel firm’s large fixed production costs (high operating leverage) make its earnings vary more than its sales.

Business risk is generally measured by the variability of the firm’s operating income over time determined by the standard deviation of the historical operating earnings series. You will recall from Chapter 1 that the standard deviation is influenced by the size of the numbers, so investors standardize this measure of volatility by dividing it by the mean value for the series (i.e., the average operating earnings). The resulting ratio of the standard deviation of operating earnings divided by the average operating earnings is the coefficient of variation (CV) of operating earnings:

\[
\text{Business Risk} = f(\text{Coefficient of Variation of Operating Earnings}) = \frac{\text{Standard Deviation of Operating Earnings (OE)}}{\text{Mean Operating Earnings}}
\]

\[
= \sqrt{\frac{\sum_{i=1}^{n} (OE_i - \overline{OE})^2}{n}} / \frac{\sum_{i=1}^{n} OE_i}{n}
\]

The CV of operating earnings allows comparisons between standardized measures of business risk for firms of different sizes. To compute the CV of operating earnings, you need a minimum of 5 years up to about 10 years. Less than 5 years is not very meaningful, and data more
than 10 years old are typically out of date. Besides measuring overall business risk, it is very insightful to examine the two factors that contribute to the variability of operating earnings: sales variability and operating leverage.

**Sales Variability** Sales variability is the prime determinant of operating earnings variability. In turn, the variability of sales is affected by a firm’s industry and is largely outside of management control. For example, in a cyclical industry such as automobiles or steel, sales will be quite volatile over the business cycle compared to those in a non-cyclical industry, such as retail food or hospital supplies. Like operating earnings, the variability of a firm’s sales is typically measured by the CV of sales during the most recent 5 to 10 years.

\[
\text{Sales Volatility} = f(\text{Coefficient of Variation of Sales}) = \frac{\sqrt{\sum_{i=1}^{n} (S_i - \bar{S})^2/n}}{\sum_{i=1}^{n} S_i/n}
\]

**Adjusting Volatility Measures for Growth** Besides normalizing the standard deviation of EBIT and sales for size by computing the CV, it is also important to recognize that the standard deviation is measured relative to the mean value for the series or deviations from “expected value.” A problem arises for firms that experience significant growth even if it is constant as there will be very large deviations from the mean for the series. To avoid this bias we measure deviations from the growth path of the series.

**Operating Leverage** The variability of a firm’s operating earnings also depends on its mixture of production costs. Total production costs of a firm with no fixed production costs would vary directly with sales, and operating profits would be a constant proportion of sales. In such an example, the firm’s operating profit margin would be constant and its operating profits would have the same relative volatility as its sales. Realistically, firms always have some fixed production costs such as buildings, machinery, or relatively permanent personnel. Fixed production costs cause operating profits to vary more than sales over the business cycle. Specifically, during slow periods, operating profits will decline by a larger percentage than sales, while during an economic expansion, operating profits will increase by a larger percentage than sales.

The use of fixed production costs is referred to as **operating leverage**. Clearly, greater operating leverage (caused by a higher proportion of fixed production costs) makes the operating earnings series more volatile relative to the sales series. This basic relationship between operating profit and sales leads us to measure operating leverage as the average of the annual percentage change in operating earnings relative to the percentage change in sales during a specified period as follows:

\[
\text{Operating Leverage} = \frac{\sum_{i=1}^{n} \frac{\% \Delta OE}{\% \Delta S}}{n}
\]

We take the absolute value of the percentage changes because the two series can move in opposite directions. The direction of the change is not important, but the relative size of the
change is relevant. By implication, the more volatile the operating earnings as compared to the volatility of sales, the greater the firm’s operating leverage.

### 19.6.2 Financial Risk

**Financial risk**, you will recall, is the additional uncertainty of returns to equity holders due to a firm’s use of fixed financial obligation securities. This financial uncertainty is in addition to the firm’s business risk. When a firm issues bonds, the interest payments are fixed contractual obligations. As with operating leverage, during an economic expansion, the net earnings available for common stock after the fixed interest payments will experience a larger percentage increase than operating earnings. In contrast, during a business decline, the earnings available to shareholders will decline by a larger percentage than operating earnings because of these fixed financial costs (i.e., interest payments). Remember, as a firm increases its relative debt financing with fixed contractual obligations, it increases its financial risk and the possibility of default and bankruptcy.

**Relationship between Business Risk and Financial Risk** Remember that the acceptable level of financial risk for a firm depends on its business risk. If the firm has low business risk (i.e., stable operating earnings), investors are willing to accept higher financial risk. For example, retail food companies typically have stable operating earnings over time, which implies low business risk and means that investors and bond-rating firms will allow the firms to have higher financial risk. In contrast, if a firm is in an industry that is subject to high business risk (i.e., it experiences high sales volatility and it has high operating leverage), such as steel, automobile, and airline companies, an investor would not want these firms to also have high financial risk. The two risks would compound and the probability of bankruptcy would be substantial.  

In our analysis, we employ three sets of financial ratios to measure financial risk, and all three sets should be considered. First, there are balance sheet ratios that compare the proportion of capital derived from debt and equity sources. Second are ratios that compare the earnings or cash flows available to the required fixed financial charges. Third are ratios that consider the cash flows available and relate these cash flows to the book value of the outstanding debt. Before we discuss and demonstrate these financial risk ratios, it is necessary to consider the topic of operating lease obligations.

**Consideration of Lease Obligations** Many firms lease buildings and equipment rather than borrow the funds and purchase the assets. The accounting for the lease obligation depends on the type of lease. For a *capital* lease, the value of the asset and the lease obligation is included on the balance sheet as an asset and liability. If it is an *operating* lease, it is recorded in the notes and perhaps the Management, Discussion and Analysis (M, D & A) but is not specifically included on the balance sheet.  

Because operating leases are a form of financing used extensively by retailers (such as Shoppers, Sears, and Danier) and airlines, it is necessary to recognize this obligation, capitalize estimated future lease payments, and include this capitalized lease value on the balance sheet as both an asset and a long-term liability. In the following subsection, we discuss how to do this, and demonstrate the significant impact this adjustment can have on several financial risk ratios.

---

13 Support for this specific relationship is found in a set of tables (see Standard & Poor’s, 2008, p. 21) that suggest specific required financial risk ratios necessary for a firm to be considered for a specific bond rating. The required ratios differ on the basis of the perceived business risk of the firm.

14 A discussion of the technical factors that will cause a lease to be capital versus operating is beyond the scope of this book, but it is covered in most intermediate accounting texts.
**Capitalizing Operating Leases** Capitalizing leases basically involves an estimate of the present value of a firm’s future required lease payments. Therefore, an analyst must estimate both an appropriate discount rate (typically the firm’s long-term debt rate) and the firm’s future lease payment obligations.

An estimate of the discounted value of the future lease payments can be done one of two ways: (1) a multiple of the forthcoming minimum lease payments or (2) the discounted value of the future lease payments provided in the annual report at the firm’s cost of long-term debt. The traditional multiple technique multiplies the minimum lease payment in year $t + 1$ (next year) by 8. In the case of Shoppers, the future minimum lease payments in the 2008 annual report are as follows:

<table>
<thead>
<tr>
<th>Years Relating to Year-End</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Later</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Payments ($ millions)</td>
<td>314</td>
<td>325</td>
<td>318</td>
<td>302</td>
<td>287</td>
<td>2,154</td>
</tr>
</tbody>
</table>

Given these data, the estimate using the multiple technique would produce an estimate of $8 \times 314 = 2.51$ billion. To derive an estimate using the discounted value technique, we need to estimate the firm’s cost of long-term debt and consider how to handle the lump-sum later payments. Our debt rate estimate is 7.00%, which is consistent with the prevailing interest rate on 20-year, A-rated corporate bonds. For the later lump-sum payment, we need to derive a reasonable estimate regarding how many years to assume for this payout. A liberal assumption is that the lump-sum payment is spread evenly over 15 years, based on the standard building lease for Shoppers of 20 years ($2,154/15 = 144$ million per year). An alternative estimate of the spread period is derived by dividing the lump-sum payment in the later period $t + 6$ by the $t + 5$ payment, which implies a time estimate $(2,154/287 = 7.51)$. If we round this up to 8 years, we have an annual payment of $2,154/8 = 269$ million per year for 8 years.

If all the annual and “later” flows over 15 years are discounted at 7.00%, we derive an estimate of the lease debt of $2.21$ billion. A similar calculation using the 8-year spread indicates an estimate of lease debt of $2.42$ billion. Therefore, we have the following three estimates:

- 8 times the $t + 1$ lease payment $2.51$ billion
- Discounting the lease payments assuming a 15-year spread $2.21$ billion
- Discounting the lease payments assuming an 8-year spread $2.42$ billion

We will use the $2.21$ billion discount method given that the figure is not substantially different from the conservative discounting method that assumes an 8-year spread. If we add this amount (or that estimated by the other methods) to both capital assets and long-term debt we will have a better measure of the assets utilized by the firm and the complete funding of the assets (recognition of substantially more debt).

**Implied Interest for Leased Assets** When computing the return on total capital (ROTC) that considers these leased assets, we must also add the implied interest expense for the leases. The interest expense component of a lease is typically estimated by bond-rating agencies and many other analysts as equal to one-third of the lease payment in year $t + 1$ (in our example, $314\text{ million}/3 = 105$ million).

---

15 These minimum lease payments have been assumed to occur annually although the annual report provides only bi-annual lease obligations.

16 Notably, the “8 times” estimate almost always provides the lowest estimate of debt value, which means that this general rule will tend to underestimate the financial leverage for these firms and the resulting implied interest expense.
An alternative to this general rule would be to derive a specific estimate based on an estimate of the firm’s cost of debt (7%) and the estimate of the present value (PV) of the lease obligation, as follows:

<table>
<thead>
<tr>
<th>Estimating Technique</th>
<th>PV of Lease Obligation ($ billion)</th>
<th>Interest Expense at 7% ($ million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 times estimate of ( t + 1 ) payment</td>
<td>2.51</td>
<td>176</td>
</tr>
<tr>
<td>PV with 15-year spread</td>
<td>2.21</td>
<td>155</td>
</tr>
<tr>
<td>PV with 8-year spread</td>
<td>2.42</td>
<td>169</td>
</tr>
</tbody>
</table>

Notably, all of these estimates of the implied interest expense are substantially higher than the one-third general rule estimate of $105 million. Again, the general rule underestimates the financial leverage related to these lease obligations.

To calculate the ROTC for 2007 and 2008, we need to compute the value of the lease obligations and the implied interest expense for the three years (2006, 2007, and 2008) as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Estimate of PV of Lease Obligation ($ billion)</th>
<th>Estimate of Interest Component of Lease ( ^a ) ($ million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>2.21</td>
<td>155</td>
</tr>
<tr>
<td>2007</td>
<td>1.91</td>
<td>134</td>
</tr>
<tr>
<td>2006</td>
<td>1.57</td>
<td>110</td>
</tr>
</tbody>
</table>

\( ^a \) Equal to 0.07 of the PV of lease obligation.

Adding these values to the prior ROIC ratio (see Equation 19.17) results in the following lease-adjusted return on total invested capital (ROIC) values:

\[
2008: \frac{565 + 64 + 155}{7,398 + 6,299} = 11.45\% \\
2007: \frac{490 + 53 + 134}{6,299 + 5,421} = 11.55\% 
\]

As shown, the ROICs that include the leased assets and lease debt are lower (around 11.5% versus 13%), but they are still quite reasonable.

**Implied Amortization on Leased Assets** Another factor is the implied amortization expense that would be taken if these were not leased assets. One way to calculate this value is to simply use the typical term of the lease or weighted-average term. In the case of Shoppers, this is reasonably clear because almost all leases are 20-year leases on buildings. However, if the value were not clear, a second alternative would be the average percent of amortization as a percent of beginning-of-year net capital assets. In our example, for 2008 this would be

\[
\text{Amortization (2008)} = \$206 \text{ million}; \text{ net capital assets at end of 2007: } \$1,127 \text{ million}
\]
This implies a 18.30% (206/1,127), which is clearly higher than the 5% on buildings. Obviously, Shoppers has many assets being amortized over shorter lives. For these calculations related to leases on buildings, we assume the 20-year life as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Estimate of PV of Lease Obligation ($ billion)</th>
<th>Estimate of Implied Amortization Expense of Lease* ($ million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>2.21</td>
<td>111</td>
</tr>
<tr>
<td>2007</td>
<td>1.91</td>
<td>96</td>
</tr>
<tr>
<td>2006</td>
<td>1.57</td>
<td>79</td>
</tr>
<tr>
<td>2005</td>
<td>1.29</td>
<td>65</td>
</tr>
</tbody>
</table>

*Assumes straight-line amortization over a 20-year life.

These implied amortization charges should be included in ratios that include amortization expenses.

### 19.6.3 Proportion of Debt (Balance Sheet) Ratios

The proportion of debt ratios indicate what proportion of the firm’s capital is derived from debt compared to other sources of capital, such as preferred stock, common stock, and retained earnings. A higher proportion of debt compared to equity makes earnings more volatile (i.e., more financial leverage) and increases the probability that a firm could default on the debt. Therefore, higher proportion of debt ratios indicate greater financial risk. The following are the most common debt ratios used to measure financial risk.

**Debt–Equity Ratio** The debt–equity ratio is

\[
\text{Debt–Equity Ratio} = \frac{\text{Total Long–Term Debt}}{\text{Total Equity}}
\]

The debt figure includes all long-term fixed obligations, including subordinated convertible bonds. The equity typically is the book value of equity and includes preferred stock, common stock, and retained earnings. Some analysts prefer to exclude preferred stock and consider only common equity. Total equity is preferable if some of the firms being analyzed have preferred stock.

Notably, debt ratios can be computed with and without future taxes. Most balance sheets include an accumulated future tax figure. There is some controversy regarding whether these future taxes should be treated as a liability or as part of permanent capital. Some argue that if the future tax has accumulated because of the difference in capital cost allowance and straight-line amortization, this liability may never be paid. That is, as long as the firm continues to grow and add new assets, this total future tax account continues to grow. Alternatively, if the future tax account is caused by differences in the recognition of income on long-term contracts, there will be a reversal and this liability must eventually be paid. To resolve this question, the analyst must determine the reason for the future tax account and examine its long-term trend. Shoppers’ future tax account is because of a amortization difference and it has typically grown over time.

A second consideration when computing debt ratios is the existence of operating leases. As noted, given a firm like Shoppers with extensive leased facilities, it is necessary to include an estimate of the present value of the lease payments as long-term debt.
To show the effect of these two significant items on the financial risk of Shoppers, we define the ratios to include both of these factors, but they will be broken out to identify the effect of each of the components of total debt. Thus, the debt–equity ratio is

\[
\text{Debt–Equity Ratio} = \frac{\text{Total Long-Term Debt}}{\text{Total Equity}} = \frac{\text{Non-current Liabilities + Future Taxes + PV of Lease Obligations}}{\text{Total Equity}}
\]

For Shoppers, the debt–equity ratios were

- 2006: \( \frac{647 + 303 + 47 + 2,210}{3,459} = 43.31\% \)
- 2007: \( \frac{245 + 30 + 1,910}{3,076} = 71.03\% \)
- 2008: \( \frac{300 + 189 + 21 + 1,570}{2,724} = 92.71\% \)

These ratios demonstrate the significant impact of including the present value of the lease payments as part of long-term debt—for example, the debt–equity ratio for 2008 went from roughly 29% without lease obligations to over 92% when capitalized leases are included.

**Long-Term Debt-Total Capital Ratio** The long-term debt-total capital ratio indicates the proportion of long-term capital derived from long-term debt. It is computed as

\[
\text{Long-Term Debt–Total Capital Ratio} = \frac{\text{Total Long-Term Debt}}{\text{Total Long-Term Capital}}
\]

The total long-term debt values are the same as above. The total long-term capital would include all long-term debt, any preferred stock, and total equity. The long-term debt-total capital ratios for Shoppers were

- 2006: \( \frac{300}{1,570} = 19.25\% \)
- 2007: \( \frac{245}{1,910} = 12.82\% \)
- 2008: \( \frac{647}{2,210} = 29.25\% \)

Including Future Taxes and Lease Obligations as Long-Term Debt

- 2008: \( \frac{3,207}{3,207 + 3,459} = 48.11\% \)
- 2007: \( \frac{2,185}{2,185 + 3,076} = 41.53\% \)
- 2006: \( \frac{2,081}{2,081 + 2,724} = 43.31\% \)

Again, this ratio, which includes the present value of lease obligations, shows that a significant percent of long-term capital is debt obligations. This differs substantially from a ratio without the lease obligations.
**Total Debt–Total Capital Ratios** In many cases, it is useful to compare total debt to total invested capital. Earlier when we computed return on invested capital, we did not consider non-interest-bearing capital such as accounts payable, accrued expenses, income taxes payable, or future taxes (caused by amortization). In such a case, total debt would be long-term debt (without future taxes), which would be other non-current liabilities plus capitalized leases. Total capital would be this interest-bearing debt plus shareholder’s equity, as follows:

\[
\text{Total Debt–Total Capital Ratio} = \frac{\text{Total Interest-Bearing Debt}}{\text{Total Invested Capital}}
\]

\[
= \frac{\text{Capitalized Leases} + \text{Non-Current Liabilities}}{\text{Total Interest-Bearing Debt} + \text{Shareholders Equity}}
\]

<table>
<thead>
<tr>
<th>Year</th>
<th>Interest Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006:</td>
<td>(2,210 + 647 + 303) (2,210 + 647 + 303 + 3,459) = 47.74%</td>
</tr>
<tr>
<td>2007:</td>
<td>(1,910 + 245) (1,910 + 245 + 3,076) = 41.20%</td>
</tr>
<tr>
<td>2008:</td>
<td>(1,570 + 300 + 189) (1,570 + 300 + 189 + 2,724) = 43.05%</td>
</tr>
</tbody>
</table>

While these adjustments cause the debt percents to be lower, they are still quite high. These ratios confirm the importance of considering the impact of lease obligations on the financial risk of firms like Shoppers that employ lease financing.

**19.6.4 Earnings and Cash Flow Coverage Ratios**

In addition to ratios that indicate the proportion of debt on the balance sheet, investors are very conscious of ratios that relate the flow of earnings or cash flows available to meet the required interest and lease payments. A higher ratio of available earnings or cash flow relative to fixed financial charges indicates lower financial risk.

**Interest Coverage Ratio** The standard interest coverage ratio is computed as

\[
\text{Interest Coverage} = \frac{\text{Earnings before Interest and Taxes (EBIT)}}{\text{Debt Interest Charges}}
\]

\[
= \frac{\text{Net Income} + \text{Income Taxes} + \text{Interest Expense}}{\text{Interest Expense}}
\]

This ratio indicates how many times the fixed interest charges are earned, based on the earnings available to pay these expenses. Alternatively, one minus the reciprocal of the interest coverage ratio indicates how far earnings could decline before it would be impossible to pay the interest charges from current earnings. For example, a coverage ratio of 5 means that earnings could decline by 80% (1 minus \(\frac{1}{5}\)), and the firm could still pay its fixed financial charges. Again, for firms like Shoppers that have heavy lease obligations, it is necessary to consider the impact of the lease obligations on this ratio. If we recognize the lease obligations as debt and include the implied interest on the capitalized leases as computed earlier, the coverage ratio would be restated as follows:
Hence, the fixed financial cost coverage ratios for Shoppers were

\[
\begin{align*}
2008: & \quad \frac{882 + 155}{64 + 155} = 4.74 \text{ times} \\
2007: & \quad \frac{786 + 134}{53 + 134} = 4.92 \text{ times} \\
2006: & \quad \frac{683 + 110}{50 + 110} = 4.96 \text{ times}
\end{align*}
\]

These fixed financial cost coverage ratios show a substantially different picture than the coverage ratios that do not consider the impact of the lease obligations. Even so, these coverage ratios are not unreasonable for a firm with very low business risk.

The trend of Shoppers’ coverage ratios has been consistent with the overall trend in the proportion of debt ratios. The proportion of debt ratios and the earnings flow ratios do not always give consistent results because the proportion of debt ratios are not sensitive to changes in earnings or to changes in the interest rates on the debt. For example, if interest rates increase or if the firm replaces old debt with new higher yielding debt, no change would occur in the debt ratios, but the interest coverage ratio would decline. Also, the interest coverage ratio is sensitive to an increase or decrease in earnings. Therefore, the results using balance sheet ratios and coverage ratios can differ. Given a difference between the two sets of ratios, we have a strong preference for the earning or cash flow coverage ratios that reflect the ability of the firm to meet its financial obligations.

Alternatives to these earnings coverage ratios are several ratios that relate the cash flow available from operations to either interest expense or total fixed charges.

**Cash Flow Coverage Ratio** The motivation for this ratio is that a firm’s earnings and cash flow typically will differ substantially (these differences have been noted and will be considered in a subsequent section). The cash flow value used is the cash flow from operating activities figure contained in the cash flow statement. As such, it includes amortization expense, future taxes, and the impact of all working capital changes. Again, it is appropriate to specify the ratio in terms of total fixed financial costs including leases, as follows:

\[
\begin{align*}
\text{Cash Flow Coverage of Fixed Financial Cost} &= \frac{\text{Net Cash Flow from Operating Activities} + \text{Interest Expense} + \text{Implied Lease Interest}}{\text{Interest Expense} + \text{Implied Lease Interest}}
\end{align*}
\]

Note that some analysts adjust both Equations 19.28 and 19.29 to include the impact of before tax preferred dividends. This impact would be added to the numerator and denominator of Equation 19.28 and just the denominator of Equation 19.28.
We use the values given in the cash flow statement, because we are specifically interested in the cash flow effect. The cash flow coverage ratios for Shoppers were:

\[
\begin{align*}
2008: & \quad \frac{479 + 64 + 155}{64 + 155} = 3.19 \text{ times} \\
2007: & \quad \frac{565 + 53 + 134}{53 + 134} = 4.02 \text{ times} \\
2006: & \quad \frac{570 + 50 + 110}{50 + 110} = 4.56 \text{ times}
\end{align*}
\]

While these coverage ratios are not alarming for a firm with very low business risk, it is noteworthy that they have been slowly deteriorating.

### 19.6.5 Cash Flow-Outstanding Debt Ratios

**Cash Flow–Long-Term Debt Ratio** Several studies have used a ratio that relates cash flow from operating activities to a firm’s outstanding debt. The cash flow–outstanding debt ratios are unique because they relate the flow of earnings plus non-cash expenses to the stock of outstanding debt. These ratios have been significant variables in numerous studies concerned with predicting bankruptcies and bond ratings.\(^\text{18}\) Obviously, the higher the percent of cash flow to long-term debt, the stronger the company—i.e., the lower its financial risk. This ratio would be computed as

\[
\frac{\text{Cash Flow}}{\text{Long-Term Debt}} = \frac{\text{Cash Flow from Operating Activities}}{\text{Book Value of Long-Term Debt} + \text{Present Value of Lease Obligations}}
\]

For Shoppers, the ratios were as follows, assuming that future taxes are not included, as they are not interest bearing. Thus, the long-term debt is non-current liabilities and the lease obligations:

\[
\begin{align*}
2008: & \quad \frac{479}{647 + 303 + 2,210} = 15.16\% \\
2007: & \quad \frac{565}{245 + 1,910} = 26.21\% \\
2006: & \quad \frac{570}{300 + 189 + 1,570} = 27.68\%
\end{align*}
\]

**Cash Flow–Total Debt Ratio** Investors also should consider the relationship of cash flow to total debt to check that a firm has not had a significant increase in its short-term borrowing.

\(^{18}\) These studies are listed in the reference section.
Given that Shoppers uses interest-bearing short-term debt, the percents for this ratio will be lower; how much lower will indicate the amount of short-term borrowing by the firm. As before, it is important to compare these flow ratios with similar ratios for other companies in the industry and with the overall economy to gauge the firm’s relative performance.

**Alternative Measures of Cash Flow** As noted, many past studies that included a cash flow variable used the traditional measure of cash flow. The requirement that companies must prepare and report the statement of cash flows to shareholders has raised interest in other exact measures of cash flow. The first alternative measure is the *cash flow from operations*, which is taken directly from the statement of cash flows and is the one we have used. A second alternative measure is *free cash flow*, which is a modification of the cash flow from operations—that is, capital expenditures (minus the cash flow from the sale of assets) are also deducted. Finally, some analysts also subtract dividends. The following table summarizes the values for Shoppers derived earlier in the chapter (page 9).

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>788</td>
<td>479</td>
<td>741</td>
<td>−262</td>
<td>175</td>
<td>−437</td>
</tr>
<tr>
<td>2007</td>
<td>671</td>
<td>565</td>
<td>517</td>
<td>48</td>
<td>130</td>
<td>−82</td>
</tr>
<tr>
<td>2006</td>
<td>574</td>
<td>570</td>
<td>378</td>
<td>192</td>
<td>99</td>
<td>93</td>
</tr>
<tr>
<td>2005</td>
<td>498</td>
<td>451</td>
<td>275</td>
<td>176</td>
<td>64</td>
<td>112</td>
</tr>
</tbody>
</table>

As shown, Shoppers has strong cash flow from operations even after considering significant working capital requirements, but the firm has been experiencing declining free cash flow because of substantial net capital expenditures necessitated by the firm’s growth, particularly in 2008.

**19.6.6 External Market Liquidity Risk**

*External Market Liquidity Defined* In Chapter 1 we discussed external market liquidity as the ability to buy or sell an asset quickly with little price change from a prior transaction assuming no new information.

*Determinants of External Market Liquidity* Investors should know the liquidity characteristics of the securities they currently own or may buy because liquidity can be important if they want to change their portfolio composition. Although the main determinants of market liquidity are reflected in market trading data, several internal corporate variables are good proxies for these market variables. The most important determinant of external market liquidity is the number of shares or the dollar value of shares traded (the dollar value adjusts for different price levels). More trading activity indicates a greater probability that one can find someone to take the other side of a desired transaction. A very good measure that is usually available is *trading turnover* (the percentage of outstanding shares traded during a period.
of time), which indicates relative trading activity. In 2008, Shoppers had a trading volume of around 177 million, which indicates annual trading turnover of approximately 82\% (177/217). This compares with the average turnover for the TSX of about 90\%. Another measure of market liquidity is the bid-ask spread, where a smaller spread indicates greater liquidity. In addition, certain corporate variables are correlated with these trading variables:

1. Total market value of common shares outstanding
2. Number of security owners

Numerous studies have shown that the main determinant of the bid-ask spread (besides price) is the dollar value of trading, which is highly correlated with the market value of the outstanding securities.

We can estimate the market value of Shoppers’ outstanding stock as the average number of shares outstanding during the year (as computed above) times the average market price for the year (equal to the high price plus the low price divided by 2) as follows:

\[
\begin{align*}
2008: & \quad 217 \times \frac{48 + 41}{2} = \$9.66 \text{ billion} \\
2007: & \quad 216 \times \frac{58 + 47}{2} = \$11.34 \text{ billion} \\
2006: & \quad 214 \times \frac{51 + 40}{2} = \$9.74 \text{ billion}
\end{align*}
\]

These market values clearly would place Shoppers in the large-cap category, which usually begins at about $5 billion.

### 19.7 Analysis of Growth Potential

#### 19.7.1 Importance of Growth Analysis
Analysis of a firm’s growth potential is important for both lenders and owners. Owners know that the value of the firm depends on its future growth in earnings, cash flow, and dividends. Creditors are also interested in a firm’s growth potential because the firm’s future success is the main determinant of its ability to pay obligations, and the firm’s future success is influenced by its growth. Some credit analysis ratios measure the book value of a firm’s assets relative to its financial obligations, assuming that the firm can sell these assets to pay off the loan in case of default. Selling assets in a forced liquidation will typically yield only about 10 to 15 cents on the dollar. Currently, it is widely recognized that the more relevant analysis is the ability of the firm to pay off its obligations as an ongoing enterprise, which is impacted by its growth potential. This analysis of growth is also relevant to changes of bond ratings. In Web Chapter 20, we review various valuation models.

#### 19.7.2 Determinants of Growth
The growth of business, like the growth of any economic entity, including the aggregate economy, depends on

1. The amount of resources retained and reinvested in the entity
2. The return earned on those funds

---

19 These stock prices (which are for the calendar year) are rounded to the nearest whole dollar.
The more a firm reinvests, the greater its potential for growth. Therefore, the growth rate of equity earnings and cash flows is a function of two variables: (1) the percentage of net earnings retained (the firm’s retention rate) and (2) the return earned on the firm’s equity (the firm’s ROE), because when earnings are retained they become part of the firm’s equity.

\[ g = \text{Percentage of Earnings Retained} \times \text{Return on Equity} = \text{RR} \times \text{ROE} \]

where:

- \( g \) = potential (i.e., sustainable) growth rate
- \( \text{RR} \) = the retention rate of earnings
- \( \text{ROE} \) = the firm’s return on equity

The retention rate is a decision by the board of directors based on the investment opportunities available to the firm. Theory suggests that the firm should retain earnings and reinvest them as long as the expected return on the investment exceeds the firm’s cost of capital.

As discussed earlier regarding the DuPont system, a firm’s ROE is a function of three components:

- Net profit margin
- Total asset turnover
- Financial leverage (total assets/equity)

Therefore, a firm can increase its ROE by increasing its profit margin, by becoming more efficient (increasing its total asset turnover), or by increasing its financial leverage (and its financial risk). All three components should be examined when estimating or evaluating the ROE for a firm.

The sustainable growth potential analysis for Shoppers begins with the retention rate (RR):

\[ \text{Retention Rate} = 1 - \frac{\text{Dividends Declared}}{\text{Net Earnings}} \]

Shoppers’ RR figures were

<table>
<thead>
<tr>
<th>Year</th>
<th>Dividends Declared</th>
<th>Net Earnings</th>
<th>Retention Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>175</td>
<td>565</td>
<td>0.69</td>
</tr>
<tr>
<td>2007</td>
<td>130</td>
<td>490</td>
<td>0.73</td>
</tr>
<tr>
<td>2006</td>
<td>99</td>
<td>422</td>
<td>0.77</td>
</tr>
<tr>
<td>2005</td>
<td>64</td>
<td>364</td>
<td>0.82</td>
</tr>
</tbody>
</table>

Exhibit 19.8 reinforces our understanding of the importance of the firm’s ROE. Shoppers’ retention rate was quite stable from 2005 to 2008 once they began paying dividends. We can see that the firm’s ROE has mainly driven its sustainable growth rate. This analysis confirms that the long-run outlook for the components of return on equity is important. Investors need
to project changes in each of the components of ROE and employ these projections to estimate an ROE to use in the growth model along with an estimate of the firm’s long-run retention rate. Particularly for growth companies where the ROEs are notably above average for the economy and, therefore, vulnerable to competition.

19.8 Comparative Analysis of Ratios

We have discussed the importance of comparative analysis, but so far we have concentrated on the selection and calculation of specific ratios. Exhibit 19.9 contains many of the ratios discussed for Shoppers and the retail drugstore industry (as derived from Dun & Bradstreet Canada Industry Norms and Ratios). The three-year comparison should provide some insights, although we typically would want to examine data for a 5- to 10-year period.

19.8.1 Internal Liquidity

The current and quick ratio indicate less liquidity for Shoppers relative to the industry. The firm’s receivables collection period is below the retail drugstore industry. Because the collection period has been fairly steady, the difference is likely due to the firm’s basic credit policy with associates. Overall, the comparisons indicate reasonably strong internal liquidity. An additional positive liquidity factor is the firm’s ability to borrow by way of commercial paper and bank credit lines.

19.8.2 Operating Performance

Shoppers’ turnover ratios were generally consistent although below those of the retail drugstore industry. Part of this might be explained by the different ratio components used by Dun and Bradstreet (ending versus average, definition of capital assets, and so on). Although the industry norms did not provide information on operating profit margins, we would want to investigate this figure.

The profit performance related to invested capital was historically strong. The return on total assets for Shoppers was consistently above the retail drugstore industry. Shoppers likewise always attained higher ROEs than its industry.

19.8.3 Risk Analysis

Shoppers’ financial risk ratios, measured in terms of proportion of debt, were consistently superior to those of the industry, however, given the industry data it was not possible to compare ratios that

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### Exhibit 19.8  Shoppers’ Components of Growth and the Implied Sustainable Growth Rate

<table>
<thead>
<tr>
<th>Year</th>
<th>Retention Rate</th>
<th>Return on Equity(^a) (%)</th>
<th>Sustainable Growth Rate (^b) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>1.00</td>
<td>15.29</td>
<td>15.29</td>
</tr>
<tr>
<td>2004</td>
<td>1.00</td>
<td>14.66</td>
<td>14.66</td>
</tr>
<tr>
<td>2005</td>
<td>0.82</td>
<td>15.19</td>
<td>12.46</td>
</tr>
<tr>
<td>2006</td>
<td>0.77</td>
<td>15.49</td>
<td>11.93</td>
</tr>
<tr>
<td>2007</td>
<td>0.73</td>
<td>15.97</td>
<td>11.66</td>
</tr>
<tr>
<td>2008</td>
<td>0.69</td>
<td>16.41</td>
<td>11.32</td>
</tr>
</tbody>
</table>

\(^a\)From Exhibit 19.6.

\(^b\)Column (3) is equal to column (1) times column (2).
adjusted for capitalized leases and future income taxes. Based on the information available, it would appear Shoppers has a reasonable amount of financial risk, but it is not of major concern because the firm has very low business risk based on consistently high growth in sales and operating profit. Notably, there are no specific comparative ratios available for both business and external liquidity risk. Also, the trading turnover and market value data indicated low external liquidity risk.

### 19.8.4 Growth Analysis

Shoppers had recently experienced a consistent sustainable growth rate based on both a higher ROE and a high retention rate. In sum, Shoppers has adequate liquidity; a good operating record, including a very consistent growth record that implies low business risk; above-average financial risk even when we consider the leases on stores; and above-average growth performance relative to the aggregate market. Your success as an investor depends on how well you use these historical numbers to derive meaningful estimates of future performance for use in a valuation model. As noted previously, everybody is generally aware of the valuation models, so it is the individual who can provide the best estimates of relevant valuation variables (including the rate of growth and the duration of growth) who will experience superior risk-adjusted performance.
19.8.5 Comparator Numbers
As our brief analysis has shown, comparator numbers may be lacking, incomplete for your purposes, or calculated differently. In order to be confident in comparing trends, you may have to do a full analysis of comparator companies.

19.9 Analysis of Non-Canadian Financial Statements
As we have stressed several times, your portfolio should encompass other economies and markets, numerous global industries, and many foreign firms in these global industries. However, because accounting conventions differ among countries, non-Canadian financial statements will differ from those in this chapter and from what you will see in a typical accounting course. While it is beyond the scope of this text to discuss these alternative accounting conventions in detail, we encourage you to examine the sources in the “Suggested Readings” section entitled Analysis of International Financial Statements.

19.10 The Quality of Financial Statements
Analysts sometimes speak of the quality of a firm’s earnings or the quality of a firm’s balance sheet. In general, quality financial statements are a good reflection of reality; accounting tricks and one-time changes are not used to make the firm appear stronger than it really is. Some factors that lead to lower quality financial statements were mentioned previously when we discussed ratio analysis. Other quality influences are discussed here and in Palepu, Healy, and Bernard (2007, chapter 3).

19.10.1 Balance Sheet
A high-quality balance sheet typically has limited use of debt or leverage. Therefore, the potential of financial distress resulting from excessive debt is quite low. Little use of debt also implies the firm has unused borrowing capacity, which implies that the firm can draw on that unused capacity to make profitable investments.

A quality balance sheet contains assets with market values greater than their book value. The capability of management and the existence of intangible assets—such as goodwill, trademarks, or patents—will make the market value of the firm’s assets exceed their book values. In general, as a result of inflation and historical cost accounting, we might expect the market value of assets to exceed their book values. Overpriced assets on the books occur when a firm has outdated, technologically inferior assets; obsolete inventory; and non-performing assets such as receivables that have not been written off.

The presence of off-balance-sheet liabilities also harms the quality of a balance sheet. Such liabilities may include joint ventures and loan commitments or guarantees to subsidiaries, which are discussed in Stickney, Brown, and Wahlen (2007, chapter 6).

19.10.2 Income Statement
High-quality earnings are repeatable earnings. For example, they arise from sales to customers who are expected to do repeat business with the firm and from costs that are not artificially low as a result of unusual and short-lived input price reductions. One-time and non-recurring items—such as accounting changes, mergers, and asset sales—should be ignored when examining earnings. Unexpected exchange rate fluctuations that work in the firm’s favour to raise revenues or reduce costs should also be viewed as non-recurring.

High-quality earnings result from the use of conservative accounting principles that do not result in overstated revenues and understated costs. The closer the earnings are to cash, the higher the quality of the income statement. Suppose a firm sells furniture on credit by allowing customers
to make monthly payments. A higher quality income statement will recognize revenue using the “installment” principle; that is, as the cash is collected each month, in turn, annual sales will reflect only the cash collected from sales during the year. A lower quality income statement will recognize 100% of the revenue at the time of sale, even though payments may stretch well into next year. A detailed discussion of income items is in Stickney, Brown, and Wahlen (2007, chapter 5).

19.10.3 Notes
A word to the wise: read the notes! The purpose of the notes is to provide information on how the firm handles balance sheet and income items. While the notes may not reveal everything you should know (e.g., Enron), if you do not read them you cannot hope to be informed. The fact is, many analysts recommend that you should read an annual report backward, so that you read the notes first!

19.11 The Value of Financial Statement Analysis

Financial statements, by their nature, are backward-looking. They report the firm’s assets, liabilities, and equity as of a certain (past) date; they report a firm’s revenues, expenses, or cash flows over some (past) time period. An efficient capital market will have already incorporated this past information into security prices; so it may seem, at first glance, that analysis of a firm’s financial statements and ratios is a waste of the analyst’s time.

The fact is, the opposite is true. Financial statement analysis allows the investor to gain knowledge of a firm’s operating and financial strategy and structure. This, in turn, assists them in determining the effects of future events on the firm’s cash flows. Combining knowledge of the firm’s operating and financial leverage, its strategy, and possible macro- and microeconomic scenarios is necessary to determine an appropriate market value for the firm’s stock. Combining the analysis of historical data with potential future scenarios allows analysts to evaluate the risks facing the firm and then to develop an expected return and cash flow forecast based on these risks. The final outcome of the process, as detailed in other chapters, is the determination of the firm’s current intrinsic value based on expected cash flows, which is compared to the stock’s current market price to determine your investment decision. The point is, the detailed analysis of the historical results ensures a better estimation of the expected cash flows and an appropriate discount rate which in turn leads to a superior estimate of the intrinsic value of the firm.

19.12 Specific Uses of Financial Ratios

In addition to measuring firm performance and risk, financial ratios have been used in four main areas in investments: (1) stock valuation, (2) the identification of internal corporate variables that affect a stock’s systematic risk, (3) assigning credit quality ratings on bonds, and (4) predicting insolvency (bankruptcy) of firms.

19.12.1 Stock Valuation Models

As we will discuss in Web Chapter 20, most valuation models attempt to derive a stock value based on one of several present value of cash flow models or appropriate relative valuation ratios. All the models require a growth rate estimate for earnings, cash flows, or dividends and the required return on the stock. Clearly, financial ratios can help in estimating these critical inputs.

The typical empirical valuation model has examined a cross-section of companies and used a multiple regression model that relates one of the relative valuations ratios for the sample firms to some of the following (the averages generally consider the past 5 or 10 years).

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20 A list of studies in this area appears in the “Suggested Readings” section at the end of the chapter.
Financial Ratios
1. Average debt-equity
2. Average interest coverage
3. Average dividend payout
4. Average return on equity
5. Average retention rate
6. Average market price to book value
7. Average market price to cash flow
8. Average market price to sales

Variability Measures
1. Coefficient of variation of operating earnings
2. Coefficient of variation of sales
3. Coefficient of variation of net income
4. Systematic risk (beta)

Non-ratio Variable
1. Average growth rate of earnings and cash flows

An alternative use of these ratios is to act as a filter to derive a subset of stocks to analyze from some total universe of stocks. For example, starting with a universe of 5,000 stocks, you would screen on the basis of consistent growth rates, profitability, and stability to generate a subset of 250 stocks that you would analyze in depth.

19.12.2 Estimating Systematic Risk
As discussed in Chapter 7, the capital asset pricing model (CAPM) asserts that the relevant risk variable for an asset should be its systematic risk, which is its beta coefficient related to the market portfolio of all risky assets. In efficient markets, a relationship should exist between internal corporate risk variables and market-determined risk variables such as beta. Numerous studies have tested the relationship between a stock’s systematic risk (beta) and the firm’s internal corporate variable intended to reflect business risk and financial risk.21 The significant variables (usually five-year averages) included were as follows:

Financial Ratios
1. Dividend payout
2. Total debt–total assets
3. Cash flow–total debt
4. Interest coverage
5. Working capital–total assets
6. Current ratio

Variability Measures
1. Coefficient of variation of net earnings
2. Coefficient of variation of operating earnings
3. Coefficient of variation of operating profit margins
4. Operating earnings beta (company earnings related to aggregate earnings)

Non-ratio Variables
1. Asset size
2. Market value of stock outstanding

21 A list of studies in this area appears in the “Suggested Readings” section at the end of the chapter.
19.12.3 Estimating the Ratings on Bonds

Recall from Chapter 3 that various agencies assign credit ratings to bonds on the basis of the issuing company’s ability to meet its obligations related to the bond. Numerous studies have used various financial ratios to predict the rating to be assigned to a bond; these ratios include:\textsuperscript{22}

**Financial Ratios**

1. Long-term debt–total assets
2. Total debt–total capital
3. Net income plus amortization (cash flow)–long-term senior debt
4. Cash flow–total debt
5. Earnings before interest and taxes (EBIT)–interest expense (fixed charge coverage)
6. Cash flow from operations plus interest–interest expense
7. Market value of stock–par value of bonds
8. Net operating profit–sales
9. Net income–owners’ equity (ROE)
10. Net income–total assets (ROA)
11. Working capital–sales
12. Sales–net worth (equity turnover)

**Variability Measures**

1. Coefficient of variation of sales
2. Coefficient of variation of operating earnings
3. Coefficient of variation of net earnings
4. Coefficient of variation of return on assets

**Non-ratio Variables**

1. Subordination of the issue
2. Size of the firm (total assets)
3. Issue size for alternative bond issues
4. Par value of all publicly traded bonds of the firm

19.12.4 Predicting Insolvency (Bankruptcy)

Analysts have always been interested in using financial ratios to identify firms that might default on a loan or declare bankruptcy.\textsuperscript{23} The typical study examines a sample of firms that have declared bankruptcy against a matched sample of firms in the same industry and of comparable size that have not failed. The analysis involves examining a number of financial ratios expected to reflect declining liquidity for several years prior to the declaring of bankruptcy. The goal is to determine which set of ratios correctly predict that a firm will be in the bankrupt or non-bankrupt group. The better models have typically correctly classified more than 80% of the firms one year prior to failure. Some of the financial ratios included in successful models were as follows:

**Financial Ratios**

1. Cash flow–total debt
2. Cash flow–long-term debt
3. Sales–total assets\textsuperscript{*}
4. Net income–total assets
5. EBIT/total assets\textsuperscript{*}

\textsuperscript{22} A list of studies in this area appears in the “Suggested Readings” section at the end of the chapter.

\textsuperscript{23} A list of studies in this area appears in the “Suggested Readings” section at the end of the chapter.
6. Total debt/total assets
7. Market value of stock–book value of debt*
8. Working capital–total assets*
9. Retained earnings–total assets*
10. Current ratio
11. Working capital–sales

In addition to the several studies that have used financial ratios to predict bond ratings and failures, other studies have also used cash flow variables or a combination of financial ratios and cash flow variables for these predictions, and the results have been quite successful. These studies are listed in the “Suggested Readings” section at the end of the chapter. The five ratios designated by an asterisk (*) are the ratios used in the well-known Altman Z-score model (Altman, 1968).

19.12.5 LIMITATIONS OF FINANCIAL RATIOS

We must reinforce an earlier point: You should always consider relative financial ratios. In addition, you should be aware of other questions and limitations of financial ratios:

1. Are firms’ accounting treatments comparable? From your prior accounting courses, you know there are several generally accepted methods for treating various accounting items, which can cause a difference in results. Therefore, you should check on the accounting treatment of significant items and adjust the values if necessary. Comparability is a critical consideration when dealing with foreign firms.
2. How homogeneous is the firm? Many companies have divisions that operate in different industries, which can make it difficult to derive comparable industry ratios.
3. Are the implied results consistent? It is important to develop a total profile of the firm and not depend on only one set of ratios (e.g., internal liquidity ratios). As an example, a firm may be having short-term liquidity problems but be very profitable—the profitability will eventually alleviate the short-run liquidity problems.
4. Is the ratio within a reasonable range for the industry? As noted on several occasions, you typically want to consider a range of appropriate values for the ratio because a value that is either too high or too low for the industry can be a problem.

Summary

1. Financial statements are intended to provide information on the resources available to management, how these resources were financed, and what the firm accomplished with them. Annual and quarterly reports to the shareholder include three financial statements: the balance sheet, the income statement, and the statement of cash flows.
2. The overall purpose of financial statement analysis is to help investors make decisions on investing in a firm’s bonds or stock. Financial ratios should be examined relative to the economy, the firm’s industry, the firm’s main competitors, and the firm’s past relative ratios.
3. The specific ratios can be divided into four categories, depending on the purpose of the analysis: internal liquidity, operating performance, risk analysis, and growth analysis. Internal liquidity ratios are intended to indicate the ability of the firm to meet future short-term financial obligations. Operating performance ratios examine how management uses its assets and capital, measured by dollars of sales generated by various asset or capital categories and the profits as a percentage of sales and as a percentage of the assets and capital employed. Risk analysis ratios examine various components of risk and their sources, whether business, financial or external liquidity. Growth ratios look at sources of growth for the company and the firm’s ability to fund some of that growth internally.
4. The DuPont system divides the ROE ratio into component ratios that provide insights into the causes of a firm’s ROE or any changes in it. The component ratios, net profit margin, total asset turnover, and equity turnover when broken out give some indication on how a firm can improve its return on equity by using more debt (increasing its equity turnover), by becoming more profitable (increasing its net profit margin), by increasing its asset efficiency (total asset turnover), or a combination of these.
5. A high-quality balance sheet typically has limited use of debt and assets with market values greater than their book value. A high-quality income statement has repeatable earnings and the earning result from the use of conservative accounting principles that do not result in overstated revenues and understated costs.

6. Financial statement analysis allows investors to gain knowledge of a firm’s operating and financial strategy and structure. This, in turn, assists them in determining the effects of future events on the firm’s cash flows.

Key Terms

- balance sheet, p. 4
- business risk, p. 28
- cross-sectional analysis, p. 10
- DuPont system, p. 24
- financial risk, p. 30
- free cash flow to equity, p. 8
- generally accepted accounting principles (GAAP), p. 4
- income statement, p. 4
- internal liquidity (solvency) ratios, p. 13
- operating efficiency ratios, p. 19
- operating leverage, p. 29
- operating profitability ratios, p. 18
- quality financial statements, p. 43
- statement of cash flows, p. 6
- sustainable growth rate, p. 43
- time-series analysis, p. 40
- trading turnover, p. 38

Suggested Readings

**General**


**Analysis of International Financial Statements**

- Rueschhoff, Norlin, and David Strupeck. “Equity Returns: Local GAAP versus US GAAP for Foreign Issuers from Developing Countries.” *Journal of International Accounting* 33, no. 3 (Spring 2000).

**Financial Ratios and Stock Valuation Models**


**Financial Ratios and Systematic Risk (Beta)**


**Financial Ratios and Bond Ratings**


**Financial Ratios and Corporate Bankruptcy**


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**Questions**

1. Discuss briefly two decisions that require the analysis of financial statements.

2. Why do analysts use financial ratios rather than the absolute numbers? Give an example.

3. Besides comparing a company’s performance to its total industry, discuss what other comparisons should be considered within the industry.

4. How might a jewellery store and a grocery store differ in terms of asset turnover and profit margin? Would you expect their return on total assets to differ assuming equal business risk? Discuss.

5. Describe the components of business risk, and discuss how the components affect the variability of operating earnings (EBIT).

6. Would you expect a steel company or a retail food chain to have greater business risk? Discuss this expectation in terms of the components of business risk.

7. When examining a firm's financial structure, would you be concerned with the firm's business risk? Why or why not?

8. Give an example of how a cash flow ratio might differ from a proportion of debt ratio. Assuming these ratios differ for a firm (e.g., the cash flow ratios indicate high financial risk, while the proportion of debt ratio indicates low risk), which ratios would you follow? Justify your choice.

9. Why is the analysis of growth potential important to the common shareholder? Why is it important to the debt investor?

10. Discuss the general factors that determine the rate of growth of any economic unit.

11. A firm is earning 24% on equity and has low business and financial risk. Discuss why you would expect it to have a high or low retention rate.

12. The Gold Company earned 18% on equity, whereas the Blue Company earned only 14% on equity. Does this mean that Gold will grow faster than Blue? Explain.

13. In terms of the factors that determine market liquidity, why do investors consider real estate to be a relatively illiquid asset?

14. Discuss some internal company factors that would indicate a firm’s market liquidity.

15. Select one of the limitations of ratio analysis and indicate why you believe it is a major concern.

---

**Problems**

1. The Shamrock Vegetable Company has the following results.

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net sales</td>
<td>6,000,000</td>
</tr>
<tr>
<td>Net total assets</td>
<td>4,000,000</td>
</tr>
<tr>
<td>Amortization</td>
<td>160,000</td>
</tr>
<tr>
<td>Net income</td>
<td>400,000</td>
</tr>
<tr>
<td>Long-term debt</td>
<td>2,000,000</td>
</tr>
<tr>
<td>Equity</td>
<td>1,160,000</td>
</tr>
<tr>
<td>Dividends</td>
<td>160,000</td>
</tr>
</tbody>
</table>

   a. Compute Shamrock’s ROE directly. Confirm this using the three components.

   b. Using the ROE computed in part (a), what is the expected sustainable growth rate for Shamrock?

   c. Assuming the firm’s net profit margin went to 0.04, what would happen to Shamrock’s ROE?

   d. Using the ROE in part (c), what is the expected sustainable growth rate? What if dividends were only $40,000?

2. Three companies have the following results during the recent period.

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For Chapter CFA Questions and Problems, please see Appendix A at the end of this text.
### General Enterprises Consolidated

#### Statement of Income, Years Ended December 31, 20X8 and 20X9

<table>
<thead>
<tr>
<th></th>
<th>20X9</th>
<th>20X8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net sales</td>
<td>$3,500</td>
<td>$2,990</td>
</tr>
<tr>
<td>Cost of goods sold</td>
<td>2,135</td>
<td>1,823</td>
</tr>
<tr>
<td>Selling, general, and administrative expenses</td>
<td>1,107</td>
<td>974</td>
</tr>
<tr>
<td>Operating profit</td>
<td>258</td>
<td>193</td>
</tr>
<tr>
<td>Net interest expense</td>
<td>62</td>
<td>54</td>
</tr>
<tr>
<td>Income from operations</td>
<td>196</td>
<td>139</td>
</tr>
<tr>
<td>Income taxes</td>
<td>66</td>
<td>47</td>
</tr>
<tr>
<td>Net income</td>
<td>130</td>
<td>92</td>
</tr>
<tr>
<td>Preferred dividends</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Net income available for common shares</td>
<td>115</td>
<td>77</td>
</tr>
<tr>
<td>Dividends declared</td>
<td>35</td>
<td>30</td>
</tr>
</tbody>
</table>

### General Enterprises

<table>
<thead>
<tr>
<th></th>
<th>K</th>
<th>L</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net profit margin</td>
<td>0.04</td>
<td>0.06</td>
<td>0.10</td>
</tr>
<tr>
<td>Total assets turnover</td>
<td>2.20</td>
<td>2.00</td>
<td>1.40</td>
</tr>
<tr>
<td>Total assets/equity</td>
<td>2.40</td>
<td>2.20</td>
<td>1.50</td>
</tr>
</tbody>
</table>

### Part 7: Valuation Principles and Practices

#### a. Derive for each its return on equity based on the three DuPont components.

#### b. Given the following earnings and dividends, compute the estimated sustainable growth rate for each firm.

<table>
<thead>
<tr>
<th></th>
<th>K</th>
<th>L</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earnings/share</td>
<td>2.75</td>
<td>3.00</td>
<td>4.50</td>
</tr>
<tr>
<td>Dividends/share</td>
<td>1.25</td>
<td>1.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

#### 3. Given the following balance sheet, fill in the ratio values for 20X9 and discuss how these results compare with both the industry average and prior average performance of General Enterprises.