**Financial Statement Analysis**

**Learning Outcomes**

After completing this module, students will be able to:

1. Evaluate the financial performance of a firm using traditional liquidity, asset management, long-term debt-paying ability, profitability, and market valuation ratios.
2. Evaluate the profitability of a firm using a five-way analysis of return on equity and segmented reporting.
3. Evaluate the financial performance of a firm using vertical and horizontal analysis of common-sized financial statements.
4. Evaluate the financial performance of a firm using cash flow-based financial ratios and cash flow statement analysis
5. Recommend actions to address performance issues identified when analyzing a company’s financial statements.
6. Demonstrate how trend analysis and industry average ratios are effectively employed when analyzing a company's financial performance.
7. Describe the accounting and statistical limitations of financial statement analysis.

**Introduction**

One of the most important skills a manager learns is how to analyze a company’s financial statements. Problems such as rising labour costs, slow-moving products, or excessive borrowing can quickly put a company in jeopardy if not addressed.

Financial statement analysis only helps to identify problems. Managers must then put their interpersonal skills and knowledge of other business disciplines such as marketing or supply chain management to work developing and implementing effective solutions. Rising labour costs can be addressed by outsourcing production to low-wage countries. Slow-moving inventory can be quickly cleared using sales promotions or by hiring a new purchasing manager who can better identify consumer trends. Excessive borrowing can be dealt with by cutting dividends or slowing rapid growth to a more sustainable level.

Financial statement analysis is not only important to accountants and finance specialists. Individual investors, professional analysts, and portfolio managers use financial statement analysts to determine what investments to buy or sell themselves or recommend to their clients. Creditors such as banks or leasing companies use financial statements to assess a lending prospect’s creditworthiness and then monitor their loan’s performance on an ongoing basis. Regulators use financial statement analysis to set prices so firms in regulated industries earn a fair return without exploiting consumers. Governments use financial statement analysis to monitor the health of an industry and implement national industrial policies. Unions use financial statements to ascertain the additional salary and benefits that employers can afford to give their workers during labour negotiations, or the concessions employees must make in a declining industry. Finally, social activists use financial statement analysis to determine if a company’s prices are excessive, sensitive resource projects are viable, or resources are available for environmental protection initiatives.

* 1. **| Financial Statement Analysis Tools**

Managers use an assortment of tools to analyze a company’s financial statements. The information provided by one technique frequently duplicates another, but they should all be combined to produce the most thorough analysis possible. The tools include:

**Ratio analysis.** Traditional financial ratios relate different components of a company’s income statement or balance sheet to measure a company’s performance. Liquidity ratios gauge whether a company has sufficient cash and other liquid assets to pay its current liabilities. The asset management or activity ratios indicate how efficiently a company is utilizing its inventory, accounts receivable, and fixed assets. Long-term debt-paying ability or solvency ratios establish whether a company is over or under borrowing and if it can service its debt. Profitability ratios compare a company’s profits to its sales or the shareholders’ investment. Market valuation ratios determine if a company’s common shares are fairly valued. Cash flow-based financial ratios complement traditional financial ratios by substituting cash flow from operations for accounting income as it is less sensitive to accounting manipulation and better able to detect liquidity and solvency problems.

**Vertical analysis.** All accounts are expressed as a percentage of net sales on the income and cash flow statements, and total assets on the balance sheet in a given year. These ratios supplement the traditional financial ratios by providing greater detail.

**Horizontal analysis.** All accounts are expressed as a percentage of themselves in a common base year producing a growth rate for each item over a specific period. These growth rates are then compared to the growth rate of sales or total assets to identify important trends.

**Cash flow statement analysis.** A company’s cash flow statement is divided into cash flow from operations (CFO), cash flow from investing (CFI), and cash flow from financing (CFF). Typically, a successful company’s CFO is positive. CFO is usually not sufficient to pay for all capital expenditures in CFI so additional financing is raised in CFF. Most companies want to maintain a stable cash balance, so CFO, CFI, and CFF normally net to zero leaving the cash balance unchanged from the beginning to the end of the year. This is what typically happens, but companies are often forced to borrow heavily to compensate for poor operating results, large inventory buildups, slow collections, or costly business expansions. Managers can quickly identify cash flow problems and their causes by carefully examining the cash flow statement.

Financial statement analysis is most valuable when an analyst examines a company’s financial statements and ratios over a specific period to identify important trends. These ratios should also be benchmarked against industry average ratios or averages of comparable companies to ascertain how the firm is performing relative to its competitors.

**1.2 | Liquidity**

The long-term goal of most companies is to earn a fair return for their shareholders. But their focus in the short-term is to remain liquid so they can pay their expenses on time. Liquid means a firm’s assets can be quickly and cheaply converted into cash without having to accept less than their fair market value – any asset can be sold quickly if the owner offers a large enough price discount. Even companies with excellent long-term prospects may experience financial distress or even go bankrupt if they do not carefully monitor their liquidity.

Liquidity ratios compare a firm’s liquid assets to its short-term obligations. They are especially important to creditors such as bankers or suppliers or when analyzing cyclical companies with variable cash flows that are difficult to predict. Companies do not want their liquidity reserve, which is the difference between their liquid assets and short-term obligations, to become too small and risk bankruptcy. Nor do they want it to become too big as holding excess liquid assets such as cash and short-term investments are expensive. An optimal liquidity ratio balances these two costs.

It is useful to study trends and industry averages for the different liquidity ratios but remember the averages are only approximations. Ratios vary significantly among firms in the same industry depending on how well they are managed and their different working capital management practices.

**Current ratio.**  This ratio measures a company’s ability to satisfy its current liabilities with its current assets if it is forced to liquidate.

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

Current assets are convertible into cash within a year and consist primarily of cash and cash equivalents, short-term investments, accounts receivables, and inventory. Current liabilities are due within a year and consist primarily of accounts payable, short-term bank borrowing, wages payable, taxes payable, the current portion of long-term debt, and other accrued liabilities. Logically, the current ratio should be at least 1.0, but most firms maintain a higher ratio like 1.5 or 2.0 as a liquidity reserve against unexpected cash flow fluctuations.

A common fallacy in finance is that a firm’s current ratio should always be above 1.0, but it depends on its net operating cycle. The net operating cycle is the time from when a company invests cash in new inventory to when it gets its cash back after collecting the accounts receivable. The longer a firm’s net operating cycle, the higher its current ratio. For companies that sell their inventory quickly for cash and receive generous trade credit from suppliers, their net operating cycle will be negative meaning their current ratio will be less than 1.0. Most firms have current ratios above 1.0 but there are significant differences between industries.

Most lenders require firms to maintain a current ratio above a specific level as a condition of the loan. If a company is having difficulty meeting this requirement, they may resort to a type of financial manipulation called “window dressing.” The current ratio can be increased by reducing the numerator and denominator of the current ratio formula by the same amount as long as the ratio is above 1.0. If the ratio is below 1.0, the opposite is true. The normal practice is to first increase cash by accelerating accounts receivable collections using early payment discounts, selling receivables early to a factor or standalone sales finance company, or temporarily reducing inventory balances. These actions do not reduce current assets but only convert accounts receivable and inventory into cash. To reduce both the numerator and denominator, the cash generated is used to pay down accounts payable, short-term borrowing, or other current liabilities which causes the current ratio to rise.

Companies select year-ends at their seasonal low point when cash balances are high and inventory, accounts receivable, and accounts payable are low. The current ratio will likely be overstated at year-end so analysts should examine it at different times throughout the year but especially during the seasonal high when liquidity problems are more common. Also, a current ratio may be high, but if the accounts receivable are past due, inventory is slow-moving, obsolete, or damaged, or cash is subject to restrictions that prevent it from being used to settle liabilities in the next 12 months, then the firm’s liquidity will be overstated. For example, banks frequently require companies to maintain a minimum cash balance as a condition of a loan to ensure they have sufficient funds to make their next payment, so not available to pay other liabilities.

**Quick ratio or acid test.** This ratio measures a firm’s ability to satisfy its current liabilities using its more liquid assets and is thus more conservative than the current ratio.

$$Quick ratio= \frac{Cash and cash equivalents+Short–term investments+Accounts receivable}{Current liabilities}$$

Cash can be used to pay obligations immediately while cash equivalents are safe, highly liquid debt securities such as bank deposits or treasury bills that mature in under three months. Short-term investments are similar but mature in three months to a year. Accounts receivable are legally enforceable sales agreements. Some accounts receivable may have to be written off or collection delayed especially during an economic downturn, but most cash payments are received on time.

Inventory is not included in the quick ratio as its value is only realized if it is sold. This may be difficult in a recession, if the inventory is slow-moving, obsolete or damaged, or the company is bankrupt. Inventory is the most illiquid current asset especially if it consists of raw materials and work-in-progress instead of finished goods. Both raw materials and finished goods inventories are ready to sell, but raw material prices can vary considerably in the short-term. Work-in-progress must be completed before it can be sold. If the quick ratio is less than 1.0, the company is dependent on its inventory to pay its short-term obligations which exposes its creditors to greater risk.

**Cash ratio.** This ratio measures a company’s ability to satisfy its current liabilities with its most liquid assets, so it excludes both inventory and accounts receivable. It is even more conservative than the quick ratio and is used by a firm’s short-term creditors.

$$Cash ratio= \frac{Cash and cash equivalents+Short–term investments}{Current liabilities}$$

Having a high cash ratio is less important if the company has a committed operating line of credit that has not reached its borrowing limit. Many companies maintain large cash reserves claiming it is for future business acquisitions or contingencies, but the CEO is usually just being overly cautious. Excess cash should be paid out as dividends so shareholders can find more profitable investments and not hoarded in short-term deposits earning low returns.

**Net working capital to total assets ratio.**  Net working capital is the difference between current assets and current liabilities or a company’s liquidity reserve. As this reserve grows as a percentage of total assets, it provides greater assurance to a firm’s creditors.

$$Net working capital=Current assets-Current liabilities$$

$$Net working capital to total assets ratio= \frac{Net working capital}{Total assets}$$

Besides traditional financial ratios, the cash flow statement also provides valuable insights about a firm’s liquidity as does the cash budget in the annual master budget. The cash budget is especially valuable as it supplies forward-looking information, while the financial ratios and cash flow statement only summarize historical data. Cash flow statement analysis is examined later in this module. Preparing and analyzing a cash budget is illustrated in the Module: Financial Planning and Growth.

**1.3 | Asset Management**

Asset management ratios, also called turnover or activity ratios, measure how efficiently a company utilizes its current and long-term assets. The reason for holding inventory, extending trade credit, or purchasing property, plant, and equipment is to generate sales and earn a profit. The quicker a business turns over its assets, the more it will earn. Large amounts of equity and borrowed funds are needed to finance current and long-term assets. This places a tremendous burden on companies and puts them at constant risk of going bankrupt if sales do not materialize, so companies must manage their assets efficiently.

Most asset turnover ratios relate a company’s sales to the value of its total assets or a specific asset category such as inventory or fixed assets. A turnover ratio of 5.0 means a company is generating CAD 5.00 in sales each period for a CAD 1.00 investment in assets. Generally, the higher the asset turnover ratio the better, but sometimes a rising turnover ratio is the result of short-sighted decision-making like lowering prices to meet sales quotas or carrying less inventory to conserve cash that will reduce the firm’s profitability in the longer term. The goal is the find the optimal turnover ratio that maximizes a firm’s profits. As with liquidity ratios, it is useful to study trends and industry averages for the different asset management ratios, but the industry averages are only approximations.

**Inventory turnover.** This ratio indicates how quickly a company is selling its inventory and can be expressed as either a ratio or in days.

$$Inventory turnover= \frac{Cost of sales}{Average inventories}$$

$$Inventory turnover in days= \frac{365}{Inventory turnover}$$

To better understand what the inventory turnover ratio means, imagine a company with CAD 5,000 of inventory. The stock is held in the warehouse but is then sold all at once and immediately replaced. If this scenario continues, inventory averages CAD 5,000 over the year. Each time the inventory is sold, CAD 5,000 is added to the cost of sales. At the end of the year, the cost of sales divided by average inventories equals the number of times the inventory is sold or turned over each year. To make the inventory turnover ratio more understandable for users, it can be divided into 365 days per year, so it indicates how many days it takes to sell the stock. The inventory turnover in days is also referred to as the days of sales in inventory or inventory period.

Cost of sales is used instead of net sales because inventories are usually recorded at historical cost and not fair market value. If net sales are used, the ratio would be overstated although some users prefer knowing the sales generated per dollar of inventory. It is also important to use average inventory for seasonal businesses. Most companies choose their seasonal low as their year-end as they have more time to complete their annual report and less inventory to count. If the inventory turnover ratio is calculated using low year-end inventory, the ratio will again be overstated. Average monthly inventory balances are preferred, but quarterly averages are often used as they are available in the company’s interim financial statements issued each quarter. Many financial information providers only supply industry average ratios that use the year-end inventory or the average of this year’s and last year’s year-end inventory, so analysts should ensure ratios are calculated the same way before making comparisons. Averaging this year’s and last year’s inventory does account for the growth or decline in inventory over the year but it does not include the seasonal variations. If a company is experiencing rapid growth or a major decline in its business, using year-end inventory will provide a more up-to-date turnover ratio. Merchandising businesses have only one type of inventory, but manufacturers calculate turnover ratios separately for their raw materials, work-in-process, and finished goods inventories to better monitor operations.

Managers need to know more than their inventory turnover in days is rising or falling over time or that it is above or below the industry average. They must also understand why this is occurring so they can take appropriate action.

Why inventory turnover in days might decrease?

* Adoption of just-in-time inventory and production practices
* Lower input costs and improved manufacturing methods
* Improved e-commerce presence
* Faster order processing and distribution
* Greater product selection, lower prices, more generous credit terms, or free shipping
* Better product quality, customer service, and business location
* Change in sales mix towards faster-selling items
* Lower purchases due to product shortages or insufficient cash and trade credit

Why inventory turnover in days might increase?

* Large batch production
* Higher input costs and inefficient manufacturing or distribution
* Weaker demand caused by an economic recession, increased competition, or changing consumer tastes
* Higher sales prices or less generous credit terms
* Lack of selection, low quality, poor service, overstocking, or obsolete products
* Change is sales mix towards slower selling items
* A buildup in inventory to cope with high seasonal demand, expected work stoppages, potential inventory shortages, or a major new sales contract
* Taking advantage of quantity discounts by buying in bulk
* Pressure by suppliers to buy more inventory at year-end to meet their sales quotas

Surplus inventories have several negative effects such as increased storage and financing costs, employee layoffs caused by production cuts, and lower profit margins as prices are reduced to move excess stock.

**Accounts receivable turnover.** This ratio indicates how quickly a company is collecting its accounts receivable and can be expressed as either a ratio or in days. In days form, it is also referred to as the days of sales outstanding or the average collection period.

$$Accounts receivable turnover= \frac{Net sales}{Average accounts receivable}$$

$$Accounts receivable turnover in days= \frac{365}{Accounts receivable turnover}$$

Sales are either net credit sales or net sales which include both credit and cash transactions. If cash sales are included, the accounts receivable turnover in days is not comparable to the company’s credit terms. For example, if a firm’s credit terms are net 30 or 2/10, net 30, the accounts receivable turnover in days should approximate 30 days or 10 days. If it is higher, the company is likely experiencing collection problems. It is unlikely to be lower than 30 days or 10 days as customers normally take as long as possible before paying. Like inventory turnover in days, an average of monthly or quarterly accounts receivable should be used instead of the year-end balance so the ratio reflects seasonal variations.

Managers need to know more than their accounts receivable turnover in days is rising or falling over time or that it is above or below the industry average. They must also understand why this is occurring so they can take appropriate action.

Why might accounts receivable turnover in days increase?

* A national or local recession that reduces customers’ ability to pay
* Increase in credit sales at year-end to help meet sales quotas
* Offering more generous credit terms to increase sales or match those of a competitor
* Change in sales mix towards products with longer credit terms
* Poor credit approval, monitoring, and collections processes

Why might accounts receivable turnover in days decrease?

* An economic expansion increases the customers’ ability to pay
* Less generous credit terms to increase profits
* Change in sales mix towards products with shorter credit terms
* Improved credit approval, monitoring, and collections processes
* Offering early payment discounts such as 2/10, net 30
* Faster electronic payment practices
* Increased factoring

In addition to monitoring the accounts receivable turnover in days, analysts should assess the quality of a firm’s receivables by reviewing customer credit ratings and preparing an aging of accounts. They should also look for a lack of diversification with sales focused on too few customers, a limited number of geographical regions, or a single industry. This sales breakdown must be disclosed under International Financial Reporting Standards (IFRS).

**Accounts payable turnover.** This ratio measures how long a company has from when it buys to when it pays for its inventory and can be expressed as a ratio or in days. Suppliers normally extend trade credit to increase sales and provide customers with needed financing until they can sell the product.

$$Accounts payable turnover= \frac{Purchases}{Average accounts payable}$$

$$Accounts payable turnover in days= \frac{365}{Accounts payable turnover}$$

Purchases should be used instead of the cost of sales as accounts payable result from inventory purchases and not the sale of stock. Some analysts use the cost of sales as it is readily available in a company’s financial statements, but purchases can be calculated using the formula:

Cost of sales = Purchases + Beginning inventory - Ending inventory

Most inventory purchases are on credit, so the accounts payable turnover in days should approximate suppliers’ credit terms such as net 60. Due to competition, suppliers in the same industry usually offer similar terms. Companies may take longer to pay than the prescribed terms because of a cash shortage. “Stretching” accounts payable is not recommended as a firm could be placed on cash on delivery (COD) or cash before delivery (CBD) and have its credit rating reduced. Interest is also usually charged on overdue accounts. Companies will not pay sooner than the prescribed terms as they want to take maximum advantage of the interest-free trade credit. The only exception is if an early payment discount is offered such as 3/15, net 60. Here, companies will likely pay early on the 15th day to receive the 3.0% discount.

**Operating and net operating cycle.**  The operating cycle is the number of days it takes a company to purchase inventory, sell the product, and collect the amount owed. For example, if a company buys inventory for CAD 10, waits 20 days before selling it on credit for CAD 15, and then collects the amount owed in 30 days, its operating cycle is 50 days. This is the time it takes to convert inventory back into cash and realize the CAD 5 return.

$$Operating cycle= Inventory turnover in days+Accounts receivable turnover in days$$

Businesses monitor their operating cycle very carefully as a shorter cycle means they will realize the profit more often. This measure is imprecise as it does not consider that the company is given time by its suppliers to pay for purchases. The net operating cycle, also called the cash conversion cycle, deducts accounts payable turnover in days from inventory turnover in days to more accurately measure the time from when the company invests cash to when it is paid.

$$Net operating cycle= Inventory turnover in days-Accounts payable turnover in days+Accounts receivable turnover in days$$

**Net working capital turnover.** This ratio measures the sales a firm generates for each dollar invested in net working capital. Net working capital is the difference between current assets and current liabilities and is normally viewed as a separate asset class. When companies purchase current assets, they receive financing in the form of accounts payable and short-term bank loans which reduce the net investment they must make.

$$Net working capital turnover= \frac{Net sales}{Average net working capital}$$

Some businesses such as airlines invest little in net working capital, while for others like retailers it is their largest asset class. Net working capital turnover measures the turnover of inventory, accounts receivable, and accounts payable together, but it also includes other asset groups such as cash and cash equivalents and short-term investments. Analysts typically measure the efficiency of each asset class separately but may choose to study their combined effect using the net working capital turnover ratio.

**Fixed assets turnover.** This ratio measures the sales a company generates for each dollar invested in fixed assets.

$$Fixed assets turnover= \frac{Net sales}{Average fixed assets}$$

This is an important ratio for capital intensive companies like railways or airlines. The addition of new property, plant, and equipment will likely lead to a short-term decline in turnover as it takes time to generate additional sales using these new assets. Managers often say that “sales lag expenditures.” Companies that are more capital intensive or have younger assets with higher book values will also have lower ratios compared to other firms.

**Total assets turnover.**  This ratio combines the effects of the net working capital and fixed assets turnover ratios by using total assets.

$$Total assets turnover= \frac{Net sales}{Average total assets}$$

This ratio is important for companies, such as manufacturers that have large investments in both net working capital and fixed assets. It is also used as an input in other ratios because it measures the overall efficiency of the firm.

Liquidity and asset management ratios are very interdependent. Declining turnover means lower sales or higher asset balances which reduce cash and potentially lead to liquidity problems. The inventory, accounts receivable, and accounts payable turnover ratios are frequently classified as liquidity ratios by financial information providers.

**1.4 | Long-term Debt Paying Ability**

Business risk is the variability of a company’s operating profits or earnings before interest and taxes (EBIT) which is determined by its sales risk and operating risk. Sales risk increases as businesses become more cyclical and experience greater industry competition and technological change. Operating risk increases as a firm uses more operating leverage and the variability of its input prices rise. Operating leverage is the level of fixed costs in a company’s cost structure. Higher fixed costs cause more variability of EBIT as these costs remain constant regardless of sales volume.

A firm’s business is risk is the main determinant of its optimal capital structure or level of borrowing. Firms prefer to finance their operations using debt because of its low after-tax cost. But they are not going to borrow more if they already have high business risk as the variability of EBIT will put them in jeopardy of not being able to service their debt. Firms with high business risk borrow less than firms with low business risk on average.

The long-term debt-paying ability or solvency ratios measure a firm’s level of borrowing and are divided into coverage and leverage ratios. Coverage ratios measure a company’s ability to service its debt while leverage ratios show how dependent it is on debt financing. Higher coverage ratios and lower leverage ratios are better for a company’s creditors, but the firm does not want to be debt-free as using a reasonable amount of borrowing will increase its return on equity (ROE). How to determine a firm’s optimal capital structure is discussed later in this module and the Module: Optimal Capital Structure.

**Coverage Ratios**

**Times interest earned.** This ratio, also called the interest coverage ratio, is the number of times a firm can pay its interest expense using EBIT. A high ratio means it can easily pay its interest and can take on additional debt.

$$Times interest earned= \frac{EBIT}{Interest expense}$$

The times interest earned ratio is problematic as EBIT is an accounting figure that can be manipulated by adopting different accounting policies and practices. EBIT also includes non-cash expenses particularly depreciation and amortization, so it understates the operating cash flow available to pay interest costs. Some companies use earnings before interest, taxes, depreciation, and amortization (EBITDA) instead of EBIT to address this problem, but another issue is many financing charges besides interest are ignored. Despite these problems, times interest earned is the most popular coverage ratio and it is frequently included as a loan condition. Borrowers must maintain their times interest earned ratio above a prescribed level or the lending institution can call in their loans which means they demand immediate repayment of all outstanding interest and principal.

**Fixed-charge coverage ratio.** This ratio improves on the times interest earned ratio by using EBITDA instead of EBIT and including other required financing payments.

$$Fixed-charge coverage ratio= \frac{EBITDA+Lease expense}{Lease expense+Interest expense+ \frac{Preferred dividends }{(1-t)}+ \frac{Principal Payments}{(1-t)}}$$

If a company does not make the required interest and principal payments on its loans, it will be declared bankrupt. Also, firms rely heavily on leasing as an alternative to buying assets using commercial loans. If they fail to make these payments, the leased assets will be re-possessed causing the businesses to fail. In financial statement analysis, preferred shares are equivalent to debt as investors in these securities do not vote, receive regular fixed payment only, and are not entitled to a portion of the firm’s residual income like debt holders. Companies can delay preferred dividend payments without being declared bankrupt, but the stock market impact is so grave that most take every measure possible to avoid it. Also, when preferred share dividends are in arrears, preferred shareholders can vote along with the common shareholders at investor meetings. They are likely to be very vocal, so firms desperately try to pay their preferred dividends on time. As a result, preferred dividends are treated as required payments like interest, principal, and lease obligations. The preferred dividends and principal payments are divided by (1 – t) because they are not tax-deductible expenses, so they have to be paid in after-tax dollars. This means companies must earn the necessary funds, pay taxes, and use the residual to pay them.

(Pre-tax income) (1 – t) = After-tax preferred dividend or principal payment

Pre-tax income = $\frac{After–tax preferred dividend or principal payment}{(1-t)}$

If a company is experiencing financial difficulties, it will probably not pay taxes so the (1 – t) should be removed.

**Leverage Ratios**

**Debt ratio.** This ratio measures what portion of a firm’s total assets are financed with debt. Companies with high debt ratios are susceptible to economic downturns because the high fixed interest and principal payments must be paid despite declining cash flows.

$$Debt ratio= \frac{Total debt}{Total assets}$$

The debt ratio is also problematic as total debt is defined differently. Some analysts simply use total assets minus total equity, so it includes all debt obligations. Others subtract current liabilities like accounts payable, short-term borrowing, wages payable, taxes payable, and other accrued liabilities but leave in the current portion of long-term debt. These amounts are removed because they relate to the day-to-day operation of the business and vary considerably over the year. Total debt will include all interest-bearing long-term debt plus other long-term obligations such as future income taxes or defined benefit pension liabilities. Whatever definition is chosen, analysts must ensure the same method is used when comparing ratios from different sources.

**Debt-to-equity ratio.** This ratio expresses total debt as a multiple of total equity. A higher multiple means a firm is more reliant on debt financing, so creditors assume greater risk.

$$Debt–to–equity ratio= \frac{Total debt}{Total equity }$$

Total debt and total equity are normally calculated using book values. Tangible net worth is sometimes substituted for total equity. Tangible net worth is a firm’s total equity minus its intangible assets and goodwill. Given the questionable value of these types of assets, this adjustment to equity results in a more conservative debt-to-equity ratio.

Some analysts feel using book value overstates the debt-to-equity because while the book value of total debt typically approximates its market value, the market value of equity is usually considerably higher than its book value. In practice, conservative lenders normally require that book value be used for both debt and equity, but researchers and financial information providers frequently use the book value of debt and the market value of equity. They also classify preferred shares as debt using book value.

**Long-term debt to total capitalization ratio.** This ratio measures what portion of a firm’s total capitalization is long-term debt.

$$Long–term debt to total capitalization ratio= \frac{Long–term debt}{Long–term debt+Total equity}$$

Total capitalization is the long-term debt and equity financing specifically raised to finance a company. Long-term debt includes interest-bearing long-term liabilities only plus the current portion of long-term debt. Short-term bank borrowing and other current and long-term liabilities like future income taxes or pension liabilities are excluded. Financial information providers prefer the long-term debt to total capital ratio because it uses total capitalization and interest-bearing debt only. Total capitalization is specifically raised to finance the business over the long-term and interest-bearing debt is the riskiest form of funding as non-payment quickly leads to bankruptcy.

In addition to examining leverage and coverage ratios to determine if a company is over or under borrowing or having difficulty servicing its debt, analysts must find answers to several other important questions.

1. Is the company defaulting on any interest or principal requirements or violating any other loan conditions?
2. Do any of the loan conditions designed to conserve cash for debt servicing and protect loan collateral place operational limitations on the company?
* The current ratio, net working capital, or other ratio requirements
* Restrictions on share repurchases or dividend payments
* Restrictions on the acquisition of new fixed assets
* Restrictions on the issuance of new debt
* Restrictions on sale or sale/leaseback of assets
1. What is the maturity structure of the company’s long-term debts? Are they due soon? Are there any large loan “balloon” payments due shortly?
2. Is short-term borrowing non-committed or committed?
3. Are defined benefit pension and healthcare plans underfunded? Are the liabilities rapidly increasing due to rising benefit costs? Are the company’s actuarial assumptions unreasonable indicating that the liability is understated?
4. Are floating interest rates and foreign currency loans properly hedged or is the company exposed to fluctuating interest and exchange rates?
5. Are there any convertible debts that will be turned into equity soon avoiding further payments?

Other factors may indicate better long-term debt-paying ability than a firm’s coverage and leverage ratios support. These include:

* + - Unused borrowing capacity on existing loan agreements
		- Unpledged assets that can be used as collateral for new loans
		- Highly marketable financial and fixed assets that can be quickly liquidated if needed
		- Access to the public debt and equity markets as a publicly-traded company
		- A strong credit rating that makes it easier to negotiate new financing
		- Parent company who can provide loan guarantees and direct financing
* Strong track record of profitability that attracts new lenders
* Operating in a stable industry where companies are not prone to financial distress
* A large company with significant market power when dealing with lenders and suppliers
* High level of discretionary expenses such as marketing, training, or advertising that can be reduced if funds are required
* Lower business risk due to lower operating leverage allowing more borrowing
* Reduced exposure to strikes or other potential supply problems

Module: Maturity Matching and Module: Permanent Debt and Equity Financing examine the commercial lending process in detail.

**1.5 | Profitability**

A firm’s profitability is measured relative to its sales and the shareholders’ investment in the business. Measuring profitability from both these perspectives is important. For example, a company may be able to earn a CAD 60 million profit on sales of CAD 2 billion for a 3.0% profit relative to sales, but if shareholders had to invest CAD 20 billion, this is only a 0.3% return on investment. Given that riskless investments such as government bonds pay approximately 3.0% over the long term, this return is not sufficient to attract investors. Making a profit relative to sales is not enough unless investors earn a fair return on investment as well.

Potential businesses should not be discouraged by companies with low profitability relative to sales. A firm may only earn a few cents on every sales dollar, but if this is combined with high asset turnover, it will magnify these profits many times. Food and discount department stores have very low profits relative to sales, but they also turn over their stock very quickly. Women’s clothing retailers have high profits relative to sales, but it takes them much longer to turn over their stock. Profitability relative to sales and asset turnover must always be considered together. A low price and high turnover strategy versus a high price and low turnover strategy may generate the same profits and return on investment for shareholders.

**Relative to Sales**

**Gross profit margin.** This ratio measures a company’s profitability as a percentage of net sales after the cost of sales only.

$$Gross profit margin= \frac{Gross profit}{Net sales}$$

The cost of sales includes the cost of resold inventory for a merchandising business, and direct materials, direct labour, and manufacturing overhead for a manufacturing business. Managers pay close attention to the gross profit margin as it includes the revenues and expenses directly traceable to a product. This information is combined with an item’s inventory turnover ratio to determine its total profitability. In a retail environment, less profitable products may be relegated to the top shelf or the back of the store so more profitable items can be located in high traffic areas. Unprofitable products are discontinued entirely to focus on more promising items.

Gross profit margin is affected by both changing prices and purchasing or manufacturing costs. Prices may change due to:

* Increased domestic or international competition
* National or local recessions
* Price discounts to move excess inventories or promote new products or store openings
* Superior branding, customer service, product selection, location, product quality, or technology
* Change in pricing strategy

Purchasing and manufacturing costs may change due to:

* Varying raw materials and parts prices
* Lower domestic and overseas sourcing costs
* Greater use of quantity discounts, competitive bidding, and early payment discounts
* Labour difficulties or more expensive union contracts
* Introduction of self-directed work teams that improve employee efficiency
* Greater use of just-in-time inventory and production management
* Factory automation or relocation to lower-cost areas domestically or internationally
* Reduced theft, spoilage, or scrap

**Operating profit margin.** This ratio measures a company’s profitability as a percentage of net sales after both cost of sales and operating expenses.

$$Operating profit margin= \frac{Operating income or EBIT}{Net sales}$$

Operating expenses include selling, general, and administration (S,G,&A) expenses. They are not directly traceable to a product and are usually under the direct control of senior management. These costs are not relevant when evaluating the profitability of a particular product but are important when examining the profitability of a division or the entire firm. Analysts should consider the following:

* Many operating costs are fixed so they fall as a percentage of sales over a certain production range, but then increase once the limit is reached. Fixed costs make operating income more variable in the short term.
* Capital-intensive companies with newer assets have higher depreciation expense as a percentage of sales.
* Capital-intensive companies with older assets have higher maintenance expenses as a percentage of sales.
* Corporate administration is prone to becoming “fat” especially in a cyclical upturn when cash flows are high and there are no pressures to reduce expenses. Companies should try staying “lean and mean” by downsizing corporate staff; effectively using information technology; relocating their head offices to lower rent areas in the suburbs, a new city, or a new country; or outsourcing administrative functions such as call centers, computing services, and benefits administration.
* Rapid growth usually lowers operating profit margins initially as expenditures have to be made developing new markets and customers before sales can expand.
* Rising selling costs as a percentage of sales could be due to entering new sales territories; increased competition due to market saturation; or improved customer service and support.
* Companies may reduce discretionary expenses such as maintenance, advertising, research and development, or employee training to cope with cash shortages but reducing these important expenditures will have serious long-term consequences.

**Net profit margin.** This ratio measures a company’s profitability as a percentage of net sales after all expenses.

$$Net profit margin= \frac{Net income}{Net sales}$$

The difference between operating and net income are interest and income tax expense. Interest expense falls due to lower interest rates, less borrowing, and greater use of lower rate short-term debt or interest-free financing such as accounts payable. Income tax as a percentage of earnings before taxes (EBT) declines due to lower statutory tax rates, more generous tax credits, a greater proportion of foreign income from a low-tax jurisdiction, and effective tax planning strategies.

**Relative to Investment**

**Operating return on assets.**  This ratio compares a firm’s operating income to the total assets used to generate that profit.

$$Operating return on assets= \frac{Operating income or EBIT}{Average total assets}$$

It measures the profitability of a firm’s underlying products and services regardless of how they are financed or taxed. Firms often use the operating return to measure the performance of their different business units. Managers of these units generally have the authority to set prices and incur operating expenses, but interest expense is determined by senior management who decides the company’s level of borrowing and negotiates any financing. Income tax expense is also determined by the government although senior management does have some control over this cost through the effectiveness of its tax planning strategies.

**Return on assets.** This ratio relates a firm’s operating income or EBIT after tax to the total assets used to generate that profit.

$$Return on assets= \frac{EBIT (1-t)}{Average total assets}$$

People often joke that there are only two inevitabilities in life which are death and taxes. Even though taxes are not directly related to a business unit and are not controlled by its managers, the return on assets includes them because they are unavoidable. Interest is still not included, so the return on assets is unaffected by how a company is financed. For simplicity, many financial information providers calculate return on assets (ROA) as net income divided by average total assets, so be certain how the ratio was calculated before making comparisons.

**Return on equity.** This ratio relates a firm’s net income to the equity investment made by its common shareholders and reflects how the business is financed and taxed.

$$Return on equity= \frac{Net income}{Average total equity}$$

Borrowing reduces the equity investment that shareholders must make in a new business, but interest costs reduce the profit. If a company can earn more than what it costs to borrow, it can raise its ROE above its ROA. This is commonly referred to as “putting other people’s money to work for you” or the “magic of financial leverage.” An example in Exhibit 1 explains this concept.

**Exhibit 1: Raising the Return on Equity**

**Assets = CAD 100**

**Operating income = CAD 10**

**Cost of borrowing = 8.0%**

**Tax Rate = 25.0%**

**Debt Ratio = 0.0%**

**Debt Ratio = 50.0%**

**Debt Ratio = 90.0%**

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| --- | --- | --- | --- |
| Operating return on assets | = 10 ÷ 100= 10.0% | = 10 ÷ 100= 10.0% | = 10 ÷ 100= 10.0% |
| ROA | = (10)(1 – .25) ÷ 100= 7.5% | = (10)(1 – .25) ÷ 100= 7.5% | = (10)(1 – .25) ÷ 100= 7.5% |
| ROE | = (10 – (0)(.08))(1 – .25) ÷ 100= (10 – 0)(1 – .25) ÷ 100= 7.5 ÷ 100 = 7.5% | = (10 – (50)(.08))(1 – .25) ÷ 50= (10 – 4)(1 – .25) ÷ 50= 4.5 ÷ 50= 9.0% | = (10 – (90)(.08)) (1 – .25) ÷ 10= (10 – 7.2)(1 – .25) ÷ 10= 2.1 ÷ 10= 21.0% |

ABC has CAD 100 in assets and earns operating income of CAD 10 annually yielding an operating return on assets of 10.0% and a return on assets of 7.5%. These returns are the same regardless of ABC’s debt ratio as both are calculated before interest. ABC is currently not borrowing any funds, but its operating return on assets of 10.0% is higher than its cost of borrowing, so it decides to raise its ROE by borrowing. At a debt ratio of 0.0%, ABC’s ROA and ROE are the same as there are no interest costs. At a debt ratio of 50.0%, ABC will lower its equity investment to CAD 50 by borrowing CAD 50 or half of its total assets. With the loan, interest expense of CAD 4 will be incurred and deducted from operating income of CAD 10. After deducting income tax at a rate of 25%, ABC’s net income is CAD 4.5.

ABC’s net income has fallen from CAD 7.5 at a debt ratio of 0.0% to CAD 4.5 at a debt ratio of 50.0% due to higher interest costs. Interest increased by CAD 4.0, but net income only fell by CAD 2.5 because the interest is tax-deductible which saves ABC taxes and reduces the expense. Specifically, being able to deduct CAD 4 interest saves ABC CAD 1.0 (CAD 4 × 0.25) which reduces the expense to CAD 3.0 (CAD 4 – CAD 1 or CAD 4 × (1 – 0.25)). Although ABC’s net income has fallen by 40.0% ((7.5 – 4.5) ÷ 7.5), the equity investment by its common shareholders has fallen faster by 100.0% ((100 – 50) ÷ 50). If the denominator in the ROE formula falls at a faster rate than the numerator, the ratio will rise. ABC’s ROE rose from 7.5% to 9.0% which is a 20.0% ((9.0 – 7.5) ÷ 7.5) increase in return.

If ABC wants to raise ROE further, it can borrow more. At a debt ratio of 90.0%, its ROE would rise to 21.0% or an increase of 133.3%, but ABC operates in an industry with an average debt ratio of only 50.0%. Why would its competitors not have a debt ratio of 90.0% or higher to maximize their ROE? The reason is that borrowing increases a firm’s risk of going bankrupt due to the risk of having insufficient operating income to pay the fixed interest payments. At a debt ratio of 90.0%, ABC would have interest costs of CAD 7.2. If its operating income of CAD 10 remains stable, it will be able to pay the required interest. Most businesses are cyclical to some degree which means operating income will rise and fall over the business cycle. Competitive industries or those subject to considerable technological change will have even greater variability in their operating income. If ABC’s operating income falls below CAD 7.2, it will not be able to pay the interest owed and it will be declared bankrupt by its creditors. To ensure bankruptcy does not occur, most companies limit their borrowing so the required interest payments on their debt can be paid even in an economic downturn when operating income falls. The optimal level of borrowing is determined primarily by the variability of a firm’s operating income. In ABC’s industry, an average debt ratio of 50.0% was found to be safe.

**Analysis of Return on Equity**

Shareholders will only invest in a business if it earns a competitive profit relative to their investment. A firm’s ROE ultimately determines whether it is successful or not.

$$Formula 1 Return on equity= \frac{Net income}{Average total equity}$$

Given the importance of ROE, companies are not satisfied just knowing that the ratio went up or down or how it compares to the industry average. They want to understand why it changed so they can address problems and capitalize further on successes. This can be accomplished by disaggregating the basic ROE formula into its different components.

Net profit margin

Total asset turnover ratio

Equity multiplier

Return on assets

$$Formula 2 Return on equity= \frac{Net income}{Sales} × \frac{Sales}{Average total assets} × \frac{Average total assets}{Average total equity}$$

Formulas 1 and 2 are equivalent as both sales and average total assets in Formula 2 cancel leaving Formula 1. Formula 2 shows that ROE is a function of profitability relative to sales, turnover, and financial leverage. Holding the other components constant, a firm’s ROE will increase if either its net profit margin or total asset turnover rises. Net profit margin and total assets turnover are interdependent. As shown in formula 2, net profit margin × total assets turnover equals ROA as sales in the two equations cancel leaving net income ÷ average total assets or ROA. Practically, companies frequently raise prices hoping to increase their ROA. Higher prices will cause the net profit margin to rise, but it will also cause total asset turnover to fall as customers buy fewer units. If a firm’s demand curve is inelastic, profits will rise as the benefits from higher prices are greater than any losses from the decline in the units sold. Companies also try to raise profits by lowering prices hoping the higher total assets turnover compensates for the lower net profit margin. Companies are constantly trying to find the price point that maximizes their profits and ROA.

Equity multiplier measures a company’s level of borrowing. As it borrows more, ROE rises as its equity becomes smaller.

$$Formula 3 Return on equity= \frac{\frac{Net income}{Sales} × \frac{Sales}{Average total assets}}{\frac{Average total equity}{Average total assets}}$$

$$Formula 4 Return on equity= \frac{\frac{Net income}{Sales} × \frac{Sales}{Average total assets}}{1- \frac{Average total debt}{Average total assets}}$$

Debt ratio

Instead of the equity multiplier, the debt ratio can be used to measure financial leverage. In Formula 3, the equity multiplier is inverted and move into the denominator. In Formula 4, the ratio of average total equity to average total assets is replaced by 1 - debt ratio. If the debt ratio rises, the denominator will become smaller and the ROE will rise as long as the firm is earning its cost of borrowing.

The three-way analysis of ROE can be expanded further to include more components. The five-way analysis disaggregates the net profit margin to operating profit margin × interest burden × tax burden as shown in Formula 5. Both EBIT and EBT in the first three components cancel leaving net profit margin, so Formula 4 and 5 are equivalent.

Operating profit margin

Tax burden

Interest burden

Total asset turnover ratio

Return on assets

Debt ratio

$$Formula 5 Return on equity= \frac{\frac{EBIT}{Sales}× \frac{EBT}{EBIT}×\frac{NI}{EBT}× \frac{Sales}{Average total assets}}{1- \frac{Average total debt}{Average total assets}}$$

The operating profit measures profitability after the cost of sales and operating expenses but before interest and taxes. The interest burden ratio monitors interest expense separately. Ideally, a company wants to pay an interest rate of 0.0% on its loans. If this occurs, the interest burden ratio would be 1.0 as EBT and EBIT are the same. As interest rates rise, the interest burden ratio falls. The ratio also falls if the interest rate remains constant but the company’s borrowing level rises. The logic is the same for the tax burden. A falling tax burden ratio means a company’s tax rate is increasing.

Summarizing, a firm’s ROE is a function of its operating profit margin, interest burden, tax burden, total asset turnover, and debt ratio. It will rise if any ratio increases and fall if any ratio decreases. With all these ratios working together, it is difficult to comprehend the importance of each component. This problem can be addressed by changing one ratio at a time and determining the effect on ROE. These amounts add up to the total change in ROE.

**Segmented Reporting**

A company could be doing well overall, but this could disguise serious problems with a number of its operating segments. Managers must be able to measure each segment’s performance so resources can be allocated effectively, which could include divesting or closing struggling business units. Profits margins also vary between different products, customers, export markets, so changes in sales mix can dramatically affect profits. Finally, overemphasizing one product, customer, region, or country at the expense of greater diversification puts a company at considerable risk if difficulties arise.

Under IFRS, companies are required to provide segmented financial information. An operating segment is a business component that earns revenues and incurs expenses, produces separate financial information, and regularly reports to senior management who assess its performance and allocate resources. An operating segment is disclosed separately if it accounts for 10.0% or more of a company’s combined revenues, assets, profits, or losses. The operating segments identified must account for at least 75% of a company’s revenue with an “other operating segments” category used for the remainder. In addition to sales, each segment should provide a detailed accounting of its profits, losses, assets, and liabilities if the information is available.

A company’s combined revenues should also be reported by product category, customer type, and domestic versus international. Specific customers or countries with a material amount of sales are also disclosed separately.

**1.6 | Market Valuation**

The goal of any public company is to maximize the value of its common shares. Firms try to ensure management is focused on this task by using share-based compensation plans that only reward them if the share price rises. Managers also need to know if its common shares are fairly valued at specific times so they can effectively time certain transactions. For example, public companies try to repurchase existing shares when they are undervalued and sell new shares when they are overvalued to benefit shareholders.

Market valuation ratios relate a public company’s share price to different accounting-based performance measures. These ratios are less important to private companies whose shares do not trade publicly.

**Basic earnings per common share.** This ratio measures the net income earned by each common share after paying any preferred dividends.

$$Basic earnings per common share= \frac{Net income-Preferred dividends}{Weighted average number of common shares}$$

Preferred dividends are deducted each year regardless of whether they are paid or not because preferred shareholders must normally be paid in full, including any dividends in arrears, before common shareholders can receive a dividend. If shares are issued or repurchased during the year, a weighted average number of shares is computed reflecting the date of each transaction. In addition to basic earnings per common share (EPS), firms must also report diluted EPS. Many corporations issue dilutive securities such as stock options, convertible bonds, convertible preferred shares, or warrants that increase the number of common shares if they are exercised or converted. Diluted EPS is a “what if” analysis that shows the effect these transactions would have on basic EPS. In addition to increasing the number of common shares which lowers diluted EPS, any interest and dividends paid on the convertible bonds and preferred share are eliminated which raises diluted EPS. Based on the conservatism principle of accounting, diluted EPS is only reported if it is lower than basic EPS. Basic and diluted EPS are also adjusted for any stock splits assuming they occurred at the beginning of the fiscal year.

**Dividend payout ratio.** This ratio indicates what portion of a company’s net income is paid to its common shareholders as dividends.

$$Dividend payout ratio= \frac{Dividends per common share}{Earnings per common share}$$

Retained earnings are an important source of financing. This is especially true for small businesses with limited access to the financial markets or companies experiencing rapid growth. Their dividend payout ratios are low, so they need all their earnings to finance growth. As a business matures and its growth rate declines its dividend payout ratio rises. To provide greater financial flexibility, companies are increasingly distributing earnings to their common shareholders by repurchasing common shares on an irregular basis, so the firm is not obligated to pay regular cash dividends. Since stock repurchases are a substitute for paying cash dividends, many analysts combine these two amounts when calculating the dividend payout ratio. The retention ratio is a variation of the dividend payout ratio which indicates the portion of earnings retained in the business.

$$Retention ratio= 1- Dividend payout ratio$$

**Dividend yield.** This ratio is a common shareholders’ cash return on investment. It relates the annual cash dividend to the market price of the share, which is what an investor currently pays to buy one common share.

$$Dividend yield= \frac{Dividends per common share}{Market value of common share}$$

As the dividend payout ratio, the dividend yield is low for small businesses who need their earnings to grow, but it rises as they mature.

**Earnings yield.** This ratio is a common shareholder’s total return on investment. It relates annual earnings to the market value of the share.

$$Earnings yield= \frac{Earning per common share}{Market value of common share}$$

The dividend yield understates an investor’s return because it only includes their cash dividend and not the earnings retained in the business. These earnings are eventually realized when the share is sold at a profit.

**Price-to-earnings ratio.** This ratio indicates the number of times a company’s current EPS investors are willing to pay for its common share. It is the reciprocal of the earnings yield.

$$Price–to–earnings ratio= \frac{Market value of common share}{Earnings per common share}$$

A high price-to-earnings (PE) ratio usually means a company has strong growth prospects. Investors are willing to pay more for current earnings as they expect future earnings to grow rapidly. A low PE ratio means a firm has lower growth prospects or higher risk. A company’s PE ratio is often compared to the industry average. If it is higher than the industry average, the share may be overvalued. The company could decide to sell new shares now at a higher price before the PE ratio falls to the industry average. If its PE ratio is lower than the industry average, the share may be undervalued. The company could decide to repurchase shares while the price is low and re-sell them later at a higher price after the PE ratio has risen to the industry average. The PE ratio is approximately 16.0 for U.S. firms but there is considerable variation by industry and over time.

**Book value per common share.** This ratio equals total shareholders’ equity minus the book value of any preferred shares divided by the number of common shares.

$$Book value per common share= \frac{Common shareholders^{'}equity}{Weighted average number of common shares}$$

Book value per common share is considered a floor price for a company’s common share. Many of its assets are recorded at historical cost instead of fair market value and other assets like intangibles or goodwill are excluded entirely, so the market value per common share is likely much higher. Other analysts take a more pessimistic view of book value per common share and subtract all intangible assets and goodwill because of their uncertain future value. This is referred to as tangible net worth per common share.

**Price-to-book value ratio.** This ratio indicates the number of times book value per common share investors will pay for a firm’s common share.

$$Price–to–book value ratio= \frac{Market value per common share}{Book value per common share}$$

Like the price-earnings ratio, a high price-to-book ratio usually means that a company has strong earnings growth prospects, while a low PBV ratio means it has low earnings growth prospects or higher risk. This ratio can be compared to the industry average PBV ratio to determine if a company’s share is under or overvalued. Some analysts use tangible net worth instead of book value per common share to provide a more conservative valuation. The PBV ratio is approximately 3.0 for U.S. firms but there is considerable variation by industry and over time.

**1.7 | Vertical and Horizontal Analysis using Common-sized Financial Statements**

Analysts frequently compare the financial statements of different companies, but this is difficult if they are different sizes. Net income of CAD 1 million may be a great success for a smaller business but a major disappointment for a larger firm. This problem is solved by using common-sized financial statements with vertical or horizontal analysis.

With vertical analysis, the financial statements are adjusted for size by dividing all amounts on the income statement and cash flow statement by net sales, and all amounts on the balance sheet by total assets. These percentages duplicate some financial ratios such as the gross or net profit margins, but they provide considerable additional information. Analysts can assess these ratios in a specific year or compare them over time to spot important operational successes and failures. Exhibit 2 provides an example of a vertical analysis for Churchill Ltd.

**Exhibit 2: Vertical Analysis for Churchill Ltd.**

|  |
| --- |
| **Churchill Ltd.****Income Statement****For the Year Ending December 31** |
|  | **2010** | **2011** | **2012** |
| Sales | 100.00% | 100.00% | 100.00% |
|  Cost of sales | 76.48% | 77.61% | 70.00% |
| Gross profit | 23.52% | 22.39% | 30.00% |
|  Depreciation expense | 0.48% | 0.49% | 1.44% |
|  Operating expenses | 15.41% | 15.07% | 25.00% |
| Income before interest and taxes | 7.64% | 6.82% | 3.56% |
|  Interest expense | 1.21% | 1.15% | 3.48% |
| Income before taxes | 6.43% | 5.67% | 0.08% |
|  Income tax expense | 2.57% | 2.27% | 0.03% |
| Net Income | 3.86% | 3.40% | 0.05% |

|  |
| --- |
| **Churchill Ltd.****Balance Sheet****As of December 31** |
|  | **2010** | **2011** | **2012** |
| Cash and cash equivalents | 7.88% | 6.03% | 0.99% |
| Accounts receivable | 3.95% | 4.86% | 3.81% |
| Inventory | 58.75% | 61.01% | 53.20% |
| Prepaid expenses | 1.85% | 2.16% | .99% |
|  Total current assets | 72.43% | 74.06% | 59.00% |
| Property, plant, and equipment | 28.71% | 27.90% | 43.69% |
| Less: Accumulated depreciation | 1.15% | 1.95% | 2.69% |
| Net property, plant, and equipment | 27.57% | 25.94% | 41.00% |
| Total assets | 100.00% | 100.00% | 100.00% |
| Accounts payable | 5.00% | 4.86% | 8.10% |
| Line of credit | 16.42% | 24.71% | 28.59% |
| Other payables | 5.36% | 5.78% | 9.75% |
| Current portion of long-term debt | 1.48% | 1.26% | 1.97% |
|  Total current liabilities | 28.27% | 36.61% | 48.41% |
| Long-term debt | 19.51% | 17.64% | 29.54% |
| Shareholders’ equity | 52.22% | 45.75% | 22.05% |
| Total liabilities and equities | 100.00% | 100.00% | 100.00% |

Looking at the income statement, Churchill’s gross profit margin rose substantially due to either higher prices or declining sales costs. Depreciation and operating expenses as a percentage of sales rose significantly causing a decline in the operating margin. Depreciation likely rose due to asset purchases to support the company’s growth. Operating expenses may have risen due to inefficiencies or sales lagging expenditures during an expansion. Interest expense as a percentage of sales increased due to higher interest rates and more borrowing resulting in lower EBT. Income tax expense declined due to falling EBT.

The balance sheet confirms Churchill is purchasing new assets as net property, plant, and equipment rose substantially as a percentage of total assets. These assets were financed with a combination of cash and debt causing cash and cash equivalents to fall and long-term debt to rise dramatically. Cash and cash equivalents are at a dangerously low level putting the company at risk of bankruptcy. Long-term debt has nearly doubled but the company has also “stretched” its payables and borrowed heavily on its line of credit. A line of credit should only be used to finance accounts receivable and inventory, but these assets have decreased. Accounts receivable are stable as a percentage of sales, but it is a relatively minor item. Inventories may have declined due to improved management or been intentionally reduced to address the cash shortage.

Many of Churchill’s expenses increased as a percentage of sales. It is difficult to tell whether this is due to inefficiencies or whether these costs are largely fixed and rose as a percentage of declining sales. To supplement the vertical analysis in Exhibit 2, a horizontal analysis was prepared in Exhibit 3 where all amounts on the financial statements are expressed as a percentage of their values in a common base year providing a growth rate for each item.

**Exhibit 3: Horizontal Analysis for Churchill Ltd.**

|  |
| --- |
| **Churchill Ltd.****Income Statement****For the Year Ending December 31** |
|  | **2010** | **2011** | **2012** |
| Sales | 100.00 | 129.17 | 143.81 |
|  Cost of sales | 100.00 | 131.09 | 131.63 |
| Gross profit | 100.00 | 122.93 | 183.41 |
|  Depreciation expense | 100.00 | 133.33 | 434.41 |
|  Operating expenses | 100.00 | 126.33 | 233.33 |
| Income before interest and taxes | 100.00 | 115.40 | 66.98 |
|  Interest expense | 100.00 | 122.46 | 412.80 |
| Income before taxes | 100.00 | 114.07 | 1.74 |
|  Income tax expense | 100.00 | 114.07 | 1.74 |
| Net income | 100.00 | 114.07 | 1.74 |

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| --- |
| **Churchill Ltd.****Balance Sheet****As of December 31** |
|  | **2010** | **2011** | **2012** |
| Cash and cash equivalents | 100.00 | 105.02 | 36.05 |
| Accounts receivable | 100.00 | 168.75 | 275.00 |
| Inventory | 100.00 | 142.53 | 258.57 |
| Prepaid expenses | 100.00 | 160.00 | 153.33 |
|  Total current assets | 100.00 | 140.32 | 232.57 |
| Property, plant, and equipment | 100.00 | 133.33 | 434.41 |
| Less: Accumulative depreciation | 100.00 | 233.33 | 667.74 |
| Net property, plant, and equipment | 100.00 | 129.17 | 424.69 |
|  Total assets | 100.00 | 137.25 | 285.53 |
| Accounts payable | 100.00 | 133.33 | 462.22 |
| Other payables | 100.00 | 148.09 | 519.50 |
| Line of credit | 100.00 | 206.48 | 497.03 |
| Current portion of long-term debt | 100.00 | 116.67 | 379.17 |
|  Total current liabilities | 100.00 | 177.76 | 488.95 |
| Long-term debt | 100.00 | 124.05 | 432.28 |
| Shareholders’ equity | 100.00 | 120.25 | 120.56 |
|  Total Liabilities and Equities | 100.00 | 137.25 | 285.53 |

The income statement confirms sales rose dramatically due to greater unit sales or higher prices. In a horizontal analysis of the income statement, analysts should focus on items that grew at a materially different rate than sales. The growth rate of the gross profit margin exceeds the growth rate of sales indicating higher prices or lower costs of sales. Depreciation, operating, and interest expenses all rose at a much higher rate than sales due to asset purchases, inefficiencies, sales lagging expenditures, and greater borrowing as discussed. With the balance sheet, users should focus on items that grew at a materially different rate than total assets. Cash and cash equivalents fell, and current and long-term liabilities rose dramatically compared to total assets to fund asset purchases. Accounts receivable grew at a similar rate to sales, but inventory fell as the company reduced its inventories to generate needed cash.

Overall, sales and gross profit are increasing rapidly at Churchill, but its EBIT is declining due to rising operating costs. Too many assets were purchased to support growth. The company’s use of financial leverage is excessive, and it is nearly out of cash. Churchill risks going bankrupt unless it reduces operating costs and asset purchases.

**1.8 | Cash Flow Analysis**

Net income based on accrual accounting is a strong measure of a firm’s financial performance, but it can be manipulated by choosing different accounting policies, practices, and estimates, or through fraud. Alternatively, cash flows are much less sensitive to management discretion providing a better indicator of a company’s ability to pay its operating expenses to various suppliers, interest and principal to debt holders, taxes to the government, and dividends to shareholders. If a firm exhausts its cash reserves, it will likely go bankrupt, so managers frequently use the phrase that “cash is king.”

Recognizing the importance of cash, accountants have long supplemented the income statement and balance sheet with the cash flow statement. Some analysts have also replaced traditional financial ratios that use information from the income statement and balance sheet only with cash flow-based ratios that take information from the cash flow statement as well.

**Cash Flow Statement Analysis**

The cash flow statement explains why a firm’s cash and cash equivalents changed over a period. Beginning cash and cash equivalents plus cash flow from operations (CFO), cash flow from investing (CFI), and cash flow from financing (CFF) equals ending cash and cash equivalents.

**Exhibit 4: Cash Flow Statement Analysis at Techno Ltd.**

|  |
| --- |
| **Techno Ltd.****Cash Flow Statement****For the Year Ending December 31 (CAD thousands)** |
| Cash flow from operations |   |   | Cash flow from investing |   |   |
| Net income |   |  114,450  |  Purchase of land | (63,000) |   |
| Add (deduct): |   |   |  Purchase of equipment | (55,650) |   |
|  Depreciation and amortization | 16,800  |   |  Overhaul of equipment | (11,550) |   |
|  Loss on sale of equipment | 1,575  |   |  Sale of equipment | 4,200  |   |
|  Increase in accounts receivable | (59,325) |   | Net cash flow from investing |   | (126,000) |
|  Increase in inventories | (156,450) |   | Cash flow from financing |   |   |
|  Decrease in prepaid expenses | 525  |   |  Issuance of loan payable | 82,425  |   |
|  Increase in accounts payable | 1,050  |   |  Issuance of common shares | 151,200  |   |
|  Increase in other liabilities | 4,200  |   |  Cash dividend | (6,300) |   |
|  Decrease in taxes payable | (13,650) | (205,275) |  Share repurchases | (17,850) |   |
| Net cash flow from operations |   | (90,825) | Net cash flow from financing |   | 209,475  |
|   |   |   | Beginning cash and cash equivalents |   | 47,460  |
|   |   |   | Ending cash and cash equivalents |   | 40,110  |

CFO is the cash generated from a firm’s normal business operations. It starts with net income, adds back depreciation and amortization, removes gains and losses on asset sales, and adjusts for any inventory changes, accounts receivable, accounts payable, and other working capital items. Depreciation and amortization are added back to net income because they are non-cash expenses. Gains and losses on asset sales are removed as they do not equal the cash flows from the transactions and do not relate to normal business operations. If inventory increased, the firm purchased more inventory than was included in the cost of sales causing CFO to fall. If inventory decreased, existing inventory that had already been paid for was used to meet current sales causing CFO to rise. If accounts receivable rose, customers took longer to pay so cash collections were lower than sales. If accounts receivable fell, cash collections included accounts receivable from the previous year as well as the current year so cash collections were higher than sales. Its accounts payable increased, the company took longer to pay its obligations causing CFO to rise. If accounts payable decreased, it paid both this year’s obligations and some from the previous year causing CFO to fall.

CFI consists of cash outflows from capital expenditures but also includes cash inflows from the sale of older property, plant, and equipment and cash outflows and inflows from the purchase and sale of financial assets. When preparing a cash flow statement, cash equivalents are added to cash, but the purchase and sale of short-term and long-term investments are included in CFO. Gain or losses are calculated based on an asset’s book value, so they are not equal to the cash flow from its sale. CFF includes cash inflows from new debt and equity funding and cash outflows from debt repayment and cash distributions to shareholders.

Most companies have a target cash balance, so changes in cash and cash equivalents from one accounting period to the next are usually minimal. Regardless, careful analysis of CFO, CFI, and CFF provides important information about a firm’s financial performance as seen in Exhibit 4. Techco Ltd. is a rapidly growing technology start-up that has been in operation for five years and is currently controlled by its founder.

**Cash flow from operations**. Techno is profitable but its CFO is negative. A business’s operations normally generate cash flow. Techco’s operations are a cash drain because of large increases in accounts receivable and inventory. Further investigation reveals the company provided generous credit terms to its retail network. Retailers are small independent businesses that have difficulty being approved for bank financing and, therefore, rely heavily on Techco for assistance. Inventory is increasing because of a parts shortage that forced Techno to stockpile inventory. The company’s rapid growth and lack of production experience also led to higher work-in-progress and finished goods inventory.

**Cash flow from investing.** Investing is normally a major use of cash. Techco expanded output by buying new equipment and completing a major overhaul of older equipment. The land purchased indicates the company plans to construct a new factory or a factory extension to address capacity constraints resulting from its rapid growth. This will lead to additional construction costs and equipment purchases in the future.

**Cash flow from financing.** CFO and CFF are used to finance CFI and balance out any fluctuations in cash and cash equivalents. CFO was negative due to an increase in accounts receivable and inventory, so Techco had no alternative but to negotiate a large bank loan and issue a significant number of common shares. Techco borrowed 70.0% of the value of the new land and equipment, so raising additional debt is not an option this period as lenders want to ensure that their collateral is worth more than the value of the loan. The share issuance will cause a dilution of ownership for the founder and potentially a loss of control if it is repeated in the future as the company continues to grow. Whether to raise new equity to finance growth is a major dilemma for start-ups. Entrepreneurs must decide if they want to own a smaller percentage of a much larger firm by selling new shares or continue to own 100.0% of a smaller company. The first option is probably more lucrative especially if the smaller company is eventually put out of business by its larger competitors.

**Cash Flow Statement Manipulation**

IFRS gives companies considerable discretion in classifying certain transactions which allows them to manipulate CFO. Normally interest paid and interest and dividend income received are classified as operating activities as they are included in net income. Interest paid can also be classified as a financing activity as it is a cost of borrowing which increases CFO. Interest and dividends received may be classified as investing activities as they are investment returns which lowers CFO. Dividends paid are normally classified as a financing activity because they are a cost of financing. They may be classified as an operating activity to assist users in determining an entity’s ability to pay dividends out of operating cash flow which lowers CFO.

To raise CFO further, companies can capitalize additional costs as fixed assets, so they appear as investing and not operating activities. Over the short-term, they can also defer payments on accounts payable, delay discretionary costs such as advertising, maintenance, and research and development, reduce inventory purchases, or accelerate accounts receivable collections using expensive cash discounts or factoring. Non-recurring or one-time items such as restructuring charges or legal settlements can also be recognized as needed to manipulate CFO.

Under US GAAP, interest paid, and interest and dividend income received must be included in operating activities while dividends paid are classified as financing activities. This provides a more accurate measure of CFO to finance capital expenditures, make required principal payments, and pay dividends. These amounts must be disclosed separately under IFRS so analysts can easily reclassify them. Other adjustments relating to the manipulation of CFO and non-recurring items should be made if the necessary information is available.

**Cash Flow-Based Financial Ratios**

Most cash flow-based financial ratios replicate a traditional financial ratio by substituting CFO for net income as it is much less sensitive to accounting manipulation.

**Exhibit 5: Cash Flow-Based Financial Ratios**

|  |  |
| --- | --- |
| **Cash Flow-Based Ratio** | **Traditional Ratio** |
| **Liquidity** |
| $$Operating cash flow ratio= \frac{Cash flow from operations}{Current liabilities}$$Cash flow from operations replaces current assets in the current ratio. This ratio measures a company’s ability to satisfy its current liabilities with its cash flow from operations in a given period. | Current ratio |
| $$Defensive internal= \frac{Cash and cash equivalents+Short–term investments+Receivables}{Average daily cash expenditures}$$This ratio, also called the “burn rate,” measures the number of days a company can pay its regular operating expenses with its liquid assets only. It is used by start-ups and companies experiencing financial distress who will have difficulty generating additional funds soon. Average daily cash expenditures may be approximated by dividing regular operating expenses by 365 days after adjusting for non-cash items like depreciation and amortization. | None |
| $$Cash to income ratio= \frac{Cash flow from operations+Interest expense+Incomes taxes}{Operating income}$$Cash flow from operations is measured relative to operating income. Interest expense and income taxes are added to cash flow from operations because they are not included in operating income which makes the numerator and denominator more comparable. If this ratio falls significantly below 1.0, analysts should be suspicious. The company may be recognizing revenues prematurely or capitalizing operating expenses to inflate operating income. If the cash to income ratio has been well below 1.0 but then suddenly improves, the company may be “stretching” payables, reducing inventories below regular levels, tightening credit terms, or deferring discretionary costs such as maintenance, advertising, and training to raise needed cash and hide a cash flow problem. | None |
| **Asset Management** |
| $$Cash to fixed assets ratio= \frac{Cash flow from operations}{Average fixed assets}$$Cash flow from operations replaces net sales in the fixed asset turnover ratio. This ratio measures cash flow from operations generated by each dollar of fixed assets. Other asset categories such intangible assets or total assets can be substituted for fixed assets. | Fixed asset turnover ratio |
| **Long-term Debt Paying Ability** |
| $$Cash flow coverage= \frac{Cash flow from operations+Interest expense+ Income taxes+Lease expense}{Interest expense+Lease expense+ \frac{Preferred dividends}{(1 –t)}+ \frac{Principal payments}{(1 –t)}}$$Cash flow from operations replaces EBITDA in the fixed charge coverage ratio. EBITDA approximates cash flow by not deducting depreciation and amortization, but EBITDA does not include changes in working capital items such as inventory, accounts receivable, and accounts payable. | Fixed-charge coverage ratio |
| $$Free cash flow= Cash flow from operations –Capital expenditures$$Making regular capital expenditures to replace depreciated assets or facilitate growth is critical to the long-term success of any business. Capital expenditures are any additions to property, plant, and equipment or intangible assets. Free cash flow deducts capital expenditures from cash flow from operations to emphasize their importance.  | None |
| $$Free cash flow coverage= \frac{Free cash flow+Interest expense+ Income taxes+Lease expense}{Lease expense+Interest expense+ \frac{Preferred dividends}{\left(1 –t\right)}+ \frac{Principal Pymts}{\left(1 –t\right)}}$$Free cash flow replaces EBITDA in the fixed charge coverage ratio or cash flow from operations in the cash flow coverage ratio. Free cash flow is a better measure because it deducts capital expenditures before determining if other fixed charges can be covered. | Fixed-charge coverage ratio |
| $$Interest coverage= \frac{Cash flow from operations+Interest paid+Taxes paid}{Interest paid}$$Cash flow from operations replaces EBIT in the times interest earned ratio. Since cash flow from operations usually includes interest and taxes, they must be added back in the numerator. | Times interest earned |
| $$Debt coverage= \frac{Cash flow from operations}{Total long–term debt}$$$$Debt payment coverage= \frac{Cash flow from operations}{Long–term debt payments}$$These ratios measure whether a company can pay its total debt or current long-term debt payments with its cash flow from operations. A firm is unlikely to be able to pay all its debts, but it should be able to cover its long-term debt payments. Remember that cash flow from operations already includes lease, interest, and income tax expense. | None |
| $$Capital expenditure coverage= \frac{Cash flow from operations}{Capital expenditures}$$Like free cash flow, this ratio emphasizes the importance of having sufficient financial resources to fund a firm’s capital expenditures. | None |
| $$Dividend coverage= \frac{Cash flow from operations}{Dividends}$$Reducing or delaying dividend payments can negatively affect a company’s share price, so being able to fund preferred and common share dividends are critical. | Dividend coverage ratio |
| **Profitability** |
| $$Cash flow margin= \frac{Cash flow from operations}{Net sales}$$Cash flow from operations replaces operating income or EBIT in the operating return on assets. It includes interest and taxes, but analysts typically do not adjust for these differences. | Operating return on assets |
| $$Cash return on assets= \frac{Cash flow from operations}{Average total assets}$$Cash flow from operations replaces EBIT (1 – t) in the return on assets. Cash flow from operations includes interest, but analysts typically do not adjust for this difference. | Return on assets |
| $$Cash return on equity= \frac{Cash flow from operations}{Average total equity}$$Cash flow from operations replaces net income in the ROE. Cash flow from operations includes both interest and taxes so in that respect it is similar to net income. | Return on equity |
| **Market Valuation** |
| $$Cash flow per common share= \frac{Cash flow from operations-Preferred dividends}{Weighted average number of common shares outstanding}$$Cash flow from operations replaces net income in the EPS formula. IFRS gives companies the option to report basic and diluted cash flow per share along with basic and diluted EPS showing the importance of cash flow-based ratios. | Basic earnings per common share |
| $$Price–to–cash flow ratio= \frac{Market value of common share}{Cash flow per share}$$Cash flow per share replaces EPS in the PE ratio. This ratio may more accurately measure whether a firm’s share is over or undervalued. | Price-to-earnings ratio |

Research indicates that cash flow-based ratios are superior to traditional financial ratios especially when analysts are trying to identify firms with liquidity and long-term debt-paying ability problems and predicting business failures. CFO more accurately measures a firm’s ability to withstand declining operating performance. Users should employ both traditional and cash-flow-based financial ratios when evaluating a company to provide important checks and balances especially when there is a significant difference between CFO and operating income as measured by the cash-to-income ratio.

Information services providers are supplying more industry average cash flow-based financial ratios so their popularity with users should continue to increase.

**1.9 | Industry Average Ratios**

Financial statement analysis is most valuable when managers examine different financial ratios over time and benchmark them against industry average ratios. This allows companies to identify important trends and determine how they are performing relative to their competitors. Industry averages are available from several different sources in both Canada and the U.S.

**Canada**

In Canada, chartered banks and credit unions may provide industry average ratios for their clients to assess the creditworthiness of their businesses and any new customers, suppliers, or business partners. These ratios are compiled using the financial statements of their banking clients across Canada and the U.S.

Innovation, Science and Economic Development, a department of the Government of Canada, supplies financial ratios through “Financial Performance Data,” a free website that allows small and medium-sized businesses to access a vertical analysis of the income statement and balance sheet and key financial ratios for over 1,000 industries based on the North American Industry Classification System (NAICS). Larger Canadian companies must establish benchmarks using the annual reports of their competitors or rely on U.S. financial information providers. Given the highly integrated nature of the Canadian and U.S. economies, industry averages from U.S. sources, many of which include Canadian companies, are reliable.

**United States**

The main sources of industry average ratios in the U.S. are Risk Management Association’s (RMA) “Annual Statement Studies,” Dun & Bradstreet’s “Key Business Ratios,” and Wolters Kluwer Publishers’ “Almanac of Business and Industrial Financial Ratios.” RMA provides an excellent example of what information these firms provide.

RMA is a not-for-profit professional association of 1,900 institutional members including bank and non-bank lenders and over 18,500 associates who promote sound lending and risk management principles in the financial services industry. Their Annual Statement Studies is used regularly by practitioners. As a not-for-profit, RMA is very open about its methodologies and their statistical limitations.

The RMA [Annual Statement Studies](https://www.rmahq.org/uploadedFiles/Knowledge_Center/Publications_and_Tools/Statement_Studies/FRB_SampleReport_111110SoybeanFarming.pdf) provide the following information for each industry:

* Vertical analysis of a simplified income statement and balance sheet for each of the past five years
* Vertical analysis sorted by company size using either assets or sales
* Traditional liquidity, asset management, long-term debt-paying ability, and profitability ratios for the last five years that are sorted by size using either assets or sales
* Cash-flow based financial ratios
* Net sales and total assets for the industry and each size category
* Median, upper quartile, and lower quartile values for all ratios
* Data source and sample size for all ratios
* Industry name and NAICS code

RMA ratios are based on over 260,000 financial statements from the commercial lending clients and prospects of its member organizations. Ratios are not published for an industry or size category if less than 30 or 10 companies report ensuring the results are statistically accurate. Financial statements can be unqualified, reviewed, compiled, or taken from tax returns and other sources. Unqualified means the financial statements were subject to a full audit and the public accounting firm had no reservations. A review or compilation is a less rigorous review for private companies. Ratios based on a higher proportion of unqualified statements are more reliable.

Industry average ratios are categorized by the size of a firm’s sales and assets to make a fairer comparison between large and small firms. Larger companies have greater economies of scale and more bargaining power with their suppliers and bankers which allows them to negotiate lower prices and interest rates and borrow funds more easily. These advantages generally result in better ratios for larger firms.

Using median, upper quartile, and lower quartile ratios instead of average ratios help eliminate the effect of outliers. The size of the interquartile range (i.e. difference between the lower and upper quartile) measures ratio variability. Providing net sales and total assets for the industry and each size category allows the user to determine the dollar value of the different income statement and balance sheet accounts using the percentages from the vertical analysis.

RMA identifies several reasons why their ratios may not be representative of a specific industry and recommend that they only be used as a general guideline. These include:

* All data supplied by member organizations are incorporated into its studies, so it is not randomly selected.
* Sample sizes for some industries may be small and contain extreme observations that disproportionately influence results.
* Industry classifications are based on a firm’s primary product but financial results from all the industries it operates in are used.
* Different operational methods (i.e. capital versus labour intensive), business strategies (i.e. high versus low quality), and cost differences due to labour market conditions or geographical location make ratios less comparable.
* Varying accounting policies (i.e. depreciation methods, FIFO versus average cost, book value versus fair market value) or one-time transactions (i.e. legal settlements, restructuring charges) make ratios less comparable.
* Only year-end values are used so seasonal variations in assets such as inventory, accounts receivable, or fixed assets are not considered.
* Industry averages ratios vary over the business cycle getting worse in a recession and improving during growth periods, but the benchmarks provided are not adjusted.

Internationally, the adoption of IFRS has made the financial statement of companies from different countries more comparable. Still, the U.S., China, and Japan, the world’s three largest economies, each follow different standards, although U.S. GAAP is very similar to IFRS.

**1.10 | Financial Statement Analysis at Canadian Companies**

Many industries have developed a unique set of operational measures that supplement the information provided by traditional and cash flow-based financial ratios examined in this module. The airline and banking industries are two examples.

**Air Canada**

Air Canada is Canada’s largest domestic, U.S. transborder, and international carrier. Along with its low-cost carrier Air Canada Rouge, Jazz Aviation, and other partners, it flies approximately 1,600 flights a day to over 200 destinations on six continents with a fleet of over 400 aircraft of various sizes and ranges. Its new loyalty program, Air Canada Altitude, allows it to reward frequent fliers with free travel and enhanced services such as priority check-in or business class upgrades. Membership in the Star Alliance with its 28 partner airlines gives Air Canada passengers access to 1,300 destinations in 190 countries through reciprocal capacity sharing agreements. They can also earn frequent flier miles and use other airline’s business class lounges during their international travels. Air Canada generates additional revenues through Air Canada Vacations and Air Canada Cargo which together account for 10% of its revenues.

In the Highlights section of its annual report, Air Canada provides investors and other stakeholders with a summary of key financial and operating results. This includes traditional and cash flow-based financial ratios, and operational measures unique to the airline industry.

**Exhibit 6: Operational Measures at Air Canada**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **2019** | **2018** | **2017** | **2016** | **2015** |
| Operating income (in millions) | 1,650 | 1,496  | 1,371  | 1,345 | 1,496 |
| Revenue passenger miles (in millions) | 94,113 | 92,360  | 85,137 | 76,481 | 67,545 |
| Available seat miles (in millions) | 112,814 | 110,866  | 103,492 | 92,726 | 80,871 |
| Passenger load factor (%) | 83.4% | 83.3%  | 82.3% | 82.5% | 83.5% |
| Passenger revenue per RPM (in cents) | 18.3 | 17.6  | 17.1 | 16.8 | 18.0 |
| Passenger revenue per ASM (in cents) | 15.3 | 14.6  | 14.1 | 13.9 | 15.1 |
| Operating revenue per ASM (in cents) | 17.0 | 16.3  | 15.7 | 15.8 | 17.1 |
| Operating expense per ASM (in cents) | 15.5 | 15.2  | 14.4 | 14.4 | 15.3 |
| Adjusted CASM (in cents) | 10.9 | 10.6  | 10.6 | 10.9 | 11.3 |
| Average number of full-time equivalent employees  | 32.9 | 29.9  | 27.8 | 26.1 | 24.9 |
| Number of aircraft in the operating fleet at period end | 403 | 400  | 395 | 381 | 370 |
| Average fleet utilization (in hours per day) | 10.6 | 10.4  | 10.4 | 10.2 | 10.0 |
| Seats dispatched (in thousands) | 64,653 | 63,800  | 60,820 | 57,135 | 52,359 |
| Aircraft frequencies (in thousands) | 548.5 | 578.9  | 569.6 | 566 | 567 |
| Average stage length (in miles) | 1,745 | 1,738  | 1,702 | 1,623 | 1,545 |
| Fuel cost per litre (in cents) | 76.1 | 80.4  | 62.6 | 53.9 | 63.0 |
| Fuel litres (in millions) | 5,714 | 5,597  | 5,332 | 4,837 | 4,478 |
| Revenue passengers carried (in thousands) | 51,543 | 50,904  | 48,126 | 44,849 | 41,126 |

**Revenue passenger miles (RPM).** The total number of passengers carried times the miles they are flown on all flights.

**Available seat miles (ASM).** The total number of seats available times the number of miles that the seats are flown on all flights.

**Passenger load factor.** Capacity utilization measure that calculates RPM as a percentage of ASM.

**Passenger revenue per RPM (Yield).** Passenger revenue generated excluding baggage fees for each RPM. It is the average price passengers are charged for each mile flown which is unaffected by the passenger load factor.

**Passenger revenue per ASM (PRASM).** Passenger revenue generated excluding baggage fees for each ASM. It is the average price received for each mile flown regardless of whether the seat is full or not. This measure falls as the passenger load factor declines.

**Operating revenue per ASM.**  Operating revenues of all types generated for each ASM.

**Operating expense per ASM (CASM).** Operating expenses of all types for each ASM.

**Adjusted CASM.** Operating expenses of all types for each ASM excluding fuel costs.

**Seats dispatched.** The total number of seats on all non-stop flights. A non-stop flight has a take-off and landing.

**Aircraft frequencies.** The total number of non-stop flights.

**Average stage length.** The average length of a non-stop flight calculated as ASM divided by seats dispatched.

**Revenue passengers carried.** Total passengers carried on all flights with a separate flight number.

Air Canada ASM rose by 39.5% from 2015 to 2019 and its passenger load factor remained constant yielding an equivalent increase in RPM. The difference between operating revenue per ASM and operating costs per ASM declined, so there was only a 10.3% increase in operating income over the same period. Rising fuel costs were a particular concern in 2018 and 2019 as they are the largest operating cost. The number of full-time equivalent employees also rose by 32.1% which matches the increase in capacity, but possibly greater economies of scale could have been realized. Some positive indicators are the increased average fleet utilization and average stage length. Longer flights are more profitable as there are proportionately fewer take-offs and landings.

**Royal Bank Canada**

Royal Bank Canada (RBC) is Canada’s largest bank and the 24th largest internationally with a workforce of 85,000 employees which earned a net income of 12.9 billion in 2019. It has CAD 1.4 trillion of total assets consisting primarily of deposits, loans, and securities and administers another CAD 5.7 trillion for its 17 million clients in Canada, the U.S., and 34 other countries. Personal and commercial lending is RBC’s largest business segment accounting for half of its profits, but it also operates capital markets, wealth management, investor and treasury services, and insurance units.

In the Selected Financial and Other Highlights section of its annual report, RBC provides its investors and other stakeholders with a summary of key financial results. This includes traditional and cash flow-based financial ratios and risk management measures that are unique to the banking industry. The federal government’s Office of the Superintendent of Financial Institutions (OSFI) requires all Canadian banks to comply with Basel III which is an international regulatory framework that tries to ensure all financial institutions have sufficient short-term liquidity and capital adequacy. It also uses stress tests in various economic scenarios to avoid a repeat of the 2008 financial crisis.

 **Exhibit 7: Risk Management Measures at Royal Bank Canada**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **2019** | **2018** | **2017** | **2016** |
| **Loan Portfolio Performance** |  |  |  |  |
| Loans, net of allowance for loan losses (in CAD millions) | 618,856 | 576,818 | 542,617  | 521,604 |
| Provision for credit losses on loans (in CAD millions) | 1,864 | 1,307 | 1,150  | 1,546 |
| PCL on loans as a % of average net loans and acceptances | 0.31% | 0.23% | 0.21%  | 0.29% |
| PCL on performing loans as a % of average net loans and acceptances | 0.04% | 0.03% | 0.00% | 0.01% |
| PCL on impaired loans as a % of average net loans and acceptances | 0.27% | 0.20% | 0.21%  | 0.28% |
| Gross impaired loans as a % of loans and acceptances | 0.46% | 0.37% | 0.46%  | 0.73% |
| **Short-term Liquidity** |  |  |  |  |
| Liquidity coverage ratio | 127% | 123% | 122%  | 127% |
| **Capital Adequacy** |  |  |  |  |
| Risk weighted assets (in CAD millions) | 512,856 | 496,459 | 474,478  | 449,712 |
| Common equity Tier 1 capital ratio | 12.1% | 11.5% | 10.9%  | 10.8% |
| Tier 1 capital ratio | 13.2% | 12.8% | 12.3%  | 12.3% |
| Total capital ratio | 15.2% | 14.6% | 14.2%  | 14.4% |
| Leverage ratio | 4.3% | 4.4% | 4.4%  | 4.4% |

**Loans, net allowance for loan losses.**  Total loan portfolio less an allowance for potential bad debts.

**Provision for credit losses on loans (PCL).** Amount charged to net income each year to bring the allowance for loan losses for both performing and impaired loans to the appropriate level as determined by management.

**Acceptances.** Loan guarantees for short-term trade credit provided by a bank in exchange for a “stamping fee.”

**Impaired loans.** Loans where the bank is no longer reasonably assured that principal and interest will be collected in full per the lending agreement.

**Gross impaired loans (GIL).** Impaired loans before deducting the allowance for loan losses.

**Liquidity coverage ratio (LCR).** High-quality liquid assets (HQLA) are divided by a bank’s average net cash outflows over 30 days. HQLA can be easily and immediately converted into cash at little or no loss of value during a time of financial stress. OSFI requires a ratio of at least 1.0 which is the same as the Basel III requirement.

**Risk-weighted assets (RWA).** Asset values are adjusted based on their risk with riskier assets receiving a higher weight as specified by OSFI. These adjustments force banks to carry more capital for their riskier assets.

**Common equity Tier 1 capital ratio (CET1).** CET1 divided by RWA. CET1 includes common shareholders’ equity less goodwill, intangible assets, deferred tax assets, pension assets, and other adjustments prescribed by the OSFI. OSFI currently requires a ratio of at least 7.0% which includes a 2.5% capital conservation buffer over the Basel III requirement of 4.5%. Banks with larger common equity cushions are better able to pay their liabilities during periods of economic distress when they are much less likely to receive full value for their assets.

**Tier 1 capital ratio.** Tier 1 capital divided by RWA. Tier 1 capital is CET1 plus preferred shares which do not have required dividend payments and thus are similar to common equity. OSFI requires a ratio of at least 8.5% which includes a 2.5% capital conservation buffer over the Basel III requirement of 6.0%.

**Total capital ratio.** Total capital divided by RWA. Total capital is Tier 1 plus Tier 2 capital. Tier 2 capital includes debentures that are subordinate to depositors and other creditors of the bank and thus are similar to common equity. OSFI requires a ratio of at least 10.5% which includes a 2.5% capital conservation buffer over the Basel III requirement of 8.0%.

**Leverage ratio.**  Tier 1 capital divided total bank assets including specified off-balance sheet assets. OSFI requires a ratio of at least 3.0%.

RBC is currently experiencing no difficulties with its level of impaired loans and is complying with all Basel III short-term liquidity and capital adequacy requirements. Canada has a strong reputation globally for the security of its banking system and the rigor and professionalism of its financial regulators.