cost of goods sold seems to be stable, with an improvement (decrease) in 20X6 of only 0.48%. SG&A was down approximately 0.5% as well.

These improvements from (relative) cost reduction, however, only begin to explain the 5% increase in the net profit margin for 20X6. Improvements in two items, amortization and interest and other debt expense, appear to be the most significant factors in the firm's improved profitability in 20X6. Clearly, the analyst must investigate further in both areas to learn whether these improvements represent permanent improvements, or whether these items can be expected to return to previous percentage-of-sales levels in the future.

We can also note that interest expense as a percentage of sales was approximately the same in 20X4 and 20X6. We must investigate the reasons for the higher interest costs in 20X5 to determine whether the current level of 2.85% can be expected to continue into the next period. In addition, more than 3% of the 5% increase in net profit margin in 20X6 is due to a decrease in amortization expense. Because this is a noncash expense, the decrease may have no implications for cash flows looking forward.

This discussion should make clear that common-size analysis doesn't tell an analyst the whole story about this company, but it can certainly point the analyst in the right direction to find out the circumstances that led to the increase in the net profit margin —and to determine the effects, if any, on firm cash flow going forward.

Another way to present financial statement data that is quite useful when analyzing trends over time is a **horizontal common-size balance sheet or income statement**. The divisor here is the first-year values, so they are all standardized to 1.0 by construction. Figure 37.2 illustrates this approach.

Figure 37.2: Horizontal Common-Size Balance Sheet Data

	20X4	20X5	20X6
Inventory	1.0	1.1	1.4
Cash and marketable securities	1.0	1.3	1.2
Long-term debt	1.0	1.6	1.8
PP&E (net of depreciation)	1.0	0.9	0.8

Trends in the values of these items, as well as the relative growth in these items, are readily apparent from a horizontal common-size balance sheet.

> **PROFESSOR'S NOTE**
> We have presented data in Figure 37.1 with information for the most recent period on the left, and in Figure 37.2, we have presented the historical values from left to right. Both presentation methods are common, and on the exam, you should pay special attention to which method is used in the data presented for any question.

We can view the values in the common-size financial statements as ratios. Net income is shown on the common-size income statement as net income or revenues, which is the net profit margin, and it tells the analyst the percentage of each dollar of sales that remains for shareholders after all expenses related to the generation of those sales are

deducted. One measure of financial leverage, long-term debt to total assets, can be read directly from the vertical common-size financial statements. Specific ratios commonly used in financial analysis and the interpretation of their values are covered in detail in this reading.

Graphical Analysis

Graphs can be used to visually present performance comparisons and composition of financial statement elements over time.

A **stacked column graph** (also called a stacked bar graph) shows the changes in items from year to year in graphical form. Figure 37.3 presents such data for a hypothetical corporation.

Another alternative for graphic presentation of data is a **line graph**. Figure 37.4 presents the same data as Figure 37.3, but as a line graph. The increase in trade payables and the decrease in cash are evident in either format and would alert the analyst to potential liquidity problems that require further investigation and analysis.
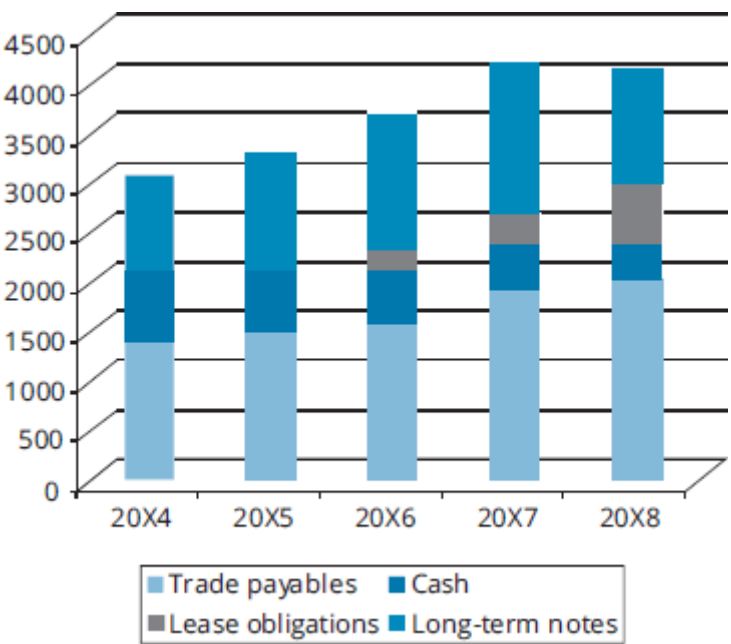
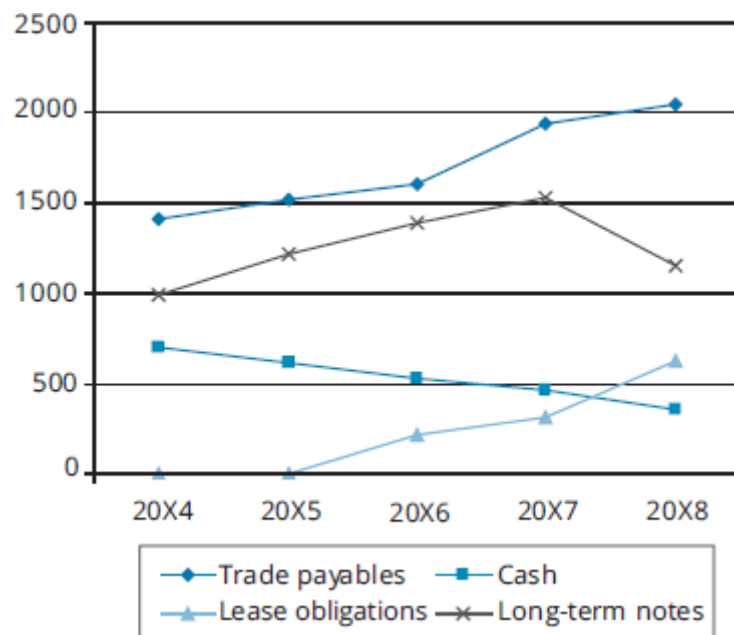**Figure 37.3: Stacked Column (Stacked Bar) Graph**

Figure 37.4: Line Graph

Regression Analysis

Regression analysis can be used to identify relationships between variables. The results are often used for forecasting. For example, an analyst might use the relationship between GDP and sales to prepare a sales forecast.

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Video covering
this content is
available online.

MODULE 37.2: FINANCIAL RATIOS, PART 1

LOS 37.b: Calculate and interpret activity, liquidity, solvency, and profitability ratios.

Financial ratios can be segregated into different classifications by the type of information about the company they provide. Here are such classifications:

- **Activity ratios.** This category includes several ratios also referred to asset utilization or turnover ratios (e.g., inventory turnover, receivables turnover, and total assets turnover). They often give indications of how well a firm uses various assets, such as inventory and fixed assets.
- **Liquidity ratios.** Liquidity, here, refers to the ability to pay short-term obligations as they come due.
- **Solvency ratios.** Solvency ratios give the analyst information on the firm's financial leverage and ability to meet its longer-term obligations.
- **Profitability ratios.** Profitability ratios provide information on how well the company generates operating profits and net profits from its sales.

It should be noted that these categories are not mutually exclusive. For example, an activity ratio, such as payables turnover, may also provide information about the liquidity of a company. There is no one standard set of ratios for financial analysis. Different analysts use different ratios and different calculation methods for similar ratios. Some ratios are so commonly used that there is very little variation in how they are defined and calculated. We will note some alternative treatments and alternative terms for single ratios as we detail the commonly used ratios in each category.

Activity Ratios

Activity ratios (also known as asset utilization ratios or operating efficiency ratios) measure how efficiently the firm is managing its assets.

- A measure of accounts receivable turnover is *receivables turnover*:

$$\text{receivables turnover} = \frac{\text{annual sales}}{\text{average receivables}}$$

> **PROFESSOR'S NOTE**
> In most cases, when a ratio compares a balance sheet account (such as receivables) with an income or cash flow item (such as sales), the balance sheet item will be the average of the account instead of simply the end-of-year balance. Averages are calculated by adding the beginning-of-year account value to the end-of-year account value, then dividing the sum by two. For companies operating in seasonal industries, averages of beginning and ending values may not give an accurate view of the average balance over the period. In these cases, an analyst would want to include more data points, throughout the year, when computing averages.

A high receivables turnover ratio could be the result of doing an excellent job of managing credit terms and collections. On the other hand, it might indicate that a company has stringent credit terms, offers a large discount for early payment, or charges high penalties for late payment. A company that has excessively stringent credit terms will lose sales as a result. Insight into why a company has a high receivables turnover rate can be gained from looking at the company's revenue growth compared to peers. Slower growth could indicate that credit terms may be too stringent, while a high receivables turnover—together with revenue growth at or above the peer group average—could indicate superior credit terms and collections management.

- The inverse of the receivables turnover times 365 is the *average collection period,* or *days of sales outstanding*, which is the average number of days it takes for the company's customers to pay their bills:

$$\text{days of sales outstanding} = \frac{365}{\text{receivables turnover}}$$

- A measure of a firm's efficiency with respect to its processing and inventory management is *inventory turnover*:

$$\text{inventory turnover} = \frac{\text{cost of goods sold}}{\text{average inventory}}$$

> **PROFESSOR'S NOTE**
> Pay careful attention to the numerator in the turnover ratios. For inventory turnover, be sure to use cost of goods sold, not sales.

Inventory turnover that is high may indicate effective management of inventory, but it could also result from holding inventory levels too low so that sales are lost when orders cannot be filled immediately. A low inventory turnover ratio relative to peers could indicate that some inventory is obsolete and slow-selling. In either case, examining revenue growth relative to peers can provide more insight into whether inventory is well managed or poorly managed.

- The inverse of the inventory turnover times 365 is the *average inventory processing period, number of days of inventory,* or *days of inventory on hand*:

$$\text{days of inventory on hand} = \frac{365}{\text{inventory turnover}}$$

- A measure of the use of trade credit by the firm is the *payables turnover* ratio:

$$\text{payables turnover} = \frac{\text{cost of goods sold}}{\text{average trade payables}}$$

> **PROFESSOR'S NOTE**
> Many analysts calculate payables turnover using purchases in the numerator, rather than COGS. Purchases are not typically a financial statement line item, but we can use the inventory equation to calculate them from the financial statements: Purchases = ending inventory – beginning inventory + cost of goods sold.

- The inverse of the payables turnover ratio multiplied by 365 is the *payables payment period* or *number of days of payables*, which is the average amount of time it takes

the company to pay its bills:

$$\text{number of days of payables} = \frac{365}{\text{payables turnover ratio}}$$

> **PROFESSOR'S NOTE**
>
> We have shown the days calculations for payables, receivables, and inventory based on annual turnover and a 365-day year. If turnover ratios are for a quarter rather than a year, the number of days in the quarter should be divided by the quarterly turnover ratios to get the "days" form of these ratios.

A high payables turnover ratio relative to peers may indicate that a company is not fully taking advantage of supplier credit terms, or that the company is paying suppliers early to take advantage of discounts. A payables turnover rate that is low relative to that of peer companies may indicate that a company is having problems with short-term cash flows—or, alternatively, that a company is simply taking advantage of lenient terms negotiated with suppliers. As with inventory turnover, examining other ratios (in this case, liquidity ratios) can provide insight into which interpretation of a relatively high or low payables turnover ratio is more likely.

- The effectiveness of the firm's use of its total assets to create revenue is measured by its *total asset turnover*:

$$\text{total asset turnover} = \frac{\text{revenue}}{\text{average total assets}}$$

Different types of industries might have considerably different turnover ratios. Manufacturing businesses that are capital intensive might have asset turnover ratios near one, while retail businesses might have turnover ratios near 10. As was the case with the current asset turnover ratios discussed previously, it is desirable for the total asset turnover ratio to be close to the industry norm. Low asset turnover ratios might mean that the company has too much capital tied up in its asset base. A turnover ratio that is too high might imply that the firm has too few assets for potential sales, or that the asset base is outdated.

- The use of fixed assets is measured by the *fixed asset turnover* ratio:

$$\text{fixed asset turnover} = \frac{\text{revenue}}{\text{average net fixed assets}}$$

Low fixed asset turnover might mean that the company has too much capital tied up in its asset base or is using the assets it has inefficiently. A turnover ratio that is too high might imply that the firm has obsolete equipment, or at a minimum, that the firm will probably have to incur capital expenditures in the near future to increase capacity to support growing revenues. Because *net* here refers to net of accumulated depreciation, firms with more recently acquired assets will typically have lower fixed asset turnover ratios.

- How effectively a company is using its working capital is measured by the *working capital turnover* ratio:

$$\text{working capital turnover} = \frac{\text{revenue}}{\text{average working capital}}$$

Working capital (sometimes called net working capital) is current assets minus current liabilities. The working capital turnover ratio gives us information about the use of working capital in terms of dollars of sales per dollar of working capital. Some firms may have very low working capital if the outstanding payables equal or exceed inventory and receivables. In this case, the working capital turnover ratio will be very large, may vary significantly from period to period, and is less informative about changes in the firm's operating efficiency.

Liquidity Ratios

Liquidity ratios are employed by analysts to determine the firm's ability to pay its short-term liabilities.

- The *current ratio* is the best-known measure of liquidity:

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

  The higher the current ratio, the more likely it is that the company will be able to pay its short-term bills. A current ratio of less than one means that the company has negative working capital and is probably facing a liquidity crisis. Working capital equals current assets minus current liabilities.

- The *quick ratio* is a more stringent measure of liquidity because it does not include inventories and other assets that might not be very liquid:

$$\text{quick ratio} = \frac{\text{cash} + \text{marketable securities} + \text{receivables}}{\text{current liabilities}}$$

  The higher the quick ratio, the more likely it is that the company will be able to pay its short-term bills. Marketable securities are short-term debt instruments, typically liquid and of good credit quality.

- The most conservative liquidity measure is the *cash ratio*:

$$\text{cash ratio} = \frac{\text{cash} + \text{marketable securities}}{\text{current liabilities}}$$

  The higher the cash ratio, the more likely that the company will be able to pay its short-term bills. The current, quick, and cash ratios differ only in the assumed liquidity of the current assets that the analyst projects will be used to pay off current liabilities.

- The *defensive interval ratio* is another measure of liquidity that indicates the number of days of average cash expenditures the firm could pay with its current liquid assets:

$$\text{defensive interval} = \frac{\text{cash} + \text{marketable securities} + \text{receivables}}{\text{average daily expenditures}}$$

  Expenditures, here, include cash expenses for costs of goods, SG&A, and research and development. If these items are taken from the income statement, noncash charges such as depreciation should be added back just as in the preparation of a statement of cash flows by the indirect method.

- The *cash conversion cycle (net operating cycle)* is the length of time it takes to turn the firm's cash investment in inventory back into cash, in the form of collections from the sales of that inventory. It measures the time between paying suppliers and

receiving cash from customers. The cash conversion cycle is computed from days' sales outstanding, days of inventory on hand, and number of days of payables:

$$\text{cash conversion cycle} = \text{days' sales outstanding} + \text{days of inventory on hand}$$
$$- \text{ number of days of payables}$$

High cash conversion cycles are considered undesirable. A conversion cycle that is too high implies that the company has an excessive amount of capital investment in the sales process. If cash is paid to suppliers before cash is received from customers, the company will require short-term financing to cover the period. For some companies, cash might be received from customers before suppliers are paid, which results in a cash conversion cycle that can be used to finance other parts of the business. Companies in this situation can support a current ratio that is less than one.

[▶]

Video covering this content is available online.

MODULE 37.3: FINANCIAL RATIOS, PART 2

Solvency Ratios

Solvency ratios measure a firm's financial leverage and ability to meet its long-term obligations. Solvency ratios include various **debt ratios** that are based on the balance sheet and **coverage ratios** that are based on the income statement.

- A measure of the firm's use of fixed-cost financing sources is the *debt-to-equity* ratio:

$$\text{debt-to-equity} = \frac{\text{total debt}}{\text{total shareholders' equity}}$$

  Increases and decreases in this ratio suggest a greater or lesser reliance on debt as a source of financing.

  Total debt is calculated differently by different analysts and different providers of financial information. Here, we will define it as interest-bearing long-term and short-term debt.

  Some analysts include non-interest-bearing current liabilities, such as trade payables. Others may deduct cash, cash equivalents, and marketable securities from debt to compute net debt.

  > **PROFESSOR'S NOTE**
  > For the exam, all interest-bearing liabilities should be included in the total debt figure unless otherwise specified. Somewhat surprisingly, the Level I CFA curriculum tells us to exclude leases from total debt calculations, despite the fact that leases are interest bearing. No explanation for excluding them is given. For the exam you should follow this approach when calculating total debt, but be aware that this treatment would result in misleadingly low leverage ratios for industries where using high volumes of leased assets is common, such as airlines.

- Another way of looking at the usage of debt is the *debt-to-capital* ratio:

$$\text{debt-to-capital} = \frac{\text{total debt}}{\text{total debt} + \text{total shareholders' equity}}$$

  Capital equals all short-term and long-term debt plus preferred stock and equity. The ratio shows the proportion of debt in the capital structure of the firm. Increases and decreases in this ratio suggest a greater or lesser reliance on debt as a source of financing.

- A slightly different way of analyzing debt use is the *debt-to-assets* ratio:

$$\text{debt-to-assets} = \frac{\text{total debt}}{\text{total assets}}$$

  Increases and decreases in this ratio suggest a greater or lesser reliance on debt as a source of financing.

- Another measure that is used as an indicator of a company's use of debt financing is the *financial leverage* ratio (or leverage ratio):

$$\text{financial leverage} = \frac{\text{average total assets}}{\text{average total equity}}$$

Average, here, means the average of the values at the beginning and at the end of the period. A ratio close to 1 indicates that equity is being used to finance assets. If the ratio increases above 1, it is an indication that debt is being used. Greater use of debt financing increases financial leverage and, typically, risk to equity holders and bondholders alike.

- The remaining risk ratios help determine the firm's ability to repay its debt obligations. The first of these is the *interest coverage ratio*:

$$\text{interest coverage} = \frac{\text{earnings before interest and taxes}}{\text{interest payments}}$$

The lower this ratio, the more likely it is that the firm will have difficulty meeting its debt payments. Because depreciation and amortization are not cash expenses, another ratio that reflects a firm's ability to meet its debt obligations is the debt-to-EBITDA ratio. The ratio indicates how long it would take to repay current total debt from an approximation of operating cash flow:

$$\text{debt-to-EBITDA} = \frac{\text{total debt}}{\text{EBITDA}}$$

- Another indicator of a company's ability to meet its obligations is the *fixed charge coverage* ratio:

$$\text{fixed charge coverage} = \frac{\text{earnings before interest and taxes} + \text{lease payments}}{\text{interest payments} + \text{lease payments}}$$

Here, lease payments are added back to operating earnings in the numerator. They are also added to interest payments in the denominator. Significant lease obligations will reduce this ratio significantly compared to the interest coverage ratio. Fixed charge coverage is the more meaningful measure for companies that lease a large portion of their assets, such as some airlines. The measure is also useful for U.S. GAAP–based companies with operating leases as currently, unlike finance leases, no interest is recorded in the income statement.

PROFESSOR'S NOTE
With all solvency ratios, the analyst must consider the variability of a firm's cash flows when determining the reasonableness of the ratios. Firms with stable cash flows are usually able to carry more debt.

Profitability Ratios

Profitability ratios measure the overall performance of the firm relative to revenues, assets, equity, and capital.

- The *net profit margin* is the ratio of net income to revenue:

$$\text{net profit margin} = \frac{\text{net income}}{\text{revenue}}$$

Analysts should be concerned if this ratio is too low. The net profit margin should be based on net income from continuing operations, because analysts should be

primarily concerned about future expectations. Below-the-line items, such as discontinued operations, will not affect the company in the future.

Operating profitability ratios look at how good management is at turning their efforts into profits. Operating ratios compare the top of the income statement (sales) to profits. The different ratios are designed to isolate specific costs.

- The *gross profit margin* is the ratio of gross profit (sales less cost of goods sold) to sales:

$$\text{gross profit margin} = \frac{\text{gross profit}}{\text{revenue}}$$

  An analyst should be concerned if this ratio is too low. Gross profit can be increased by raising prices or reducing costs. However, the ability to raise prices may be limited by competition.

- The *operating profit margin* is the ratio of operating profit (gross profit less selling, general, and administrative expenses) to sales. Operating profit is often approximated as earnings before interest and taxes (EBIT):

$$\text{operating profit margin} = \frac{\text{operating income}}{\text{revenue}} \text{ or } \frac{\text{EBIT}}{\text{revenue}}$$

  Strictly speaking, EBIT includes some nonoperating items, such as gains on investment. The analyst, as with other ratios with various formulations, must be consistent in his calculation method and know how published ratios are calculated. Analysts should be concerned if this ratio is too low. Some analysts prefer to calculate the operating profit margin by adding back depreciation and any amortization expense to arrive at earnings before interest, taxes, depreciation, and amortization (EBITDA).

- Sometimes, profitability is measured using earnings before tax (EBT), which can be calculated by subtracting interest from EBIT or from operating earnings. The *pretax margin* is calculated as follows:

$$\text{pretax margin} = \frac{\text{EBT}}{\text{revenue}}$$

- Another set of profitability ratios measures profitability relative to funds invested in the company by common stockholders, preferred stockholders, and suppliers of debt financing. The first of these measures is the return on assets (ROA). Typically, ROA is calculated using net income:

$$\text{ROA} = \frac{\text{net income}}{\text{average total assets}}$$

  This measure is a bit misleading, however, because interest is excluded from net income, but total assets include debt as well as equity. Adding interest adjusted for tax back to net income puts the returns to both equity holders and debtholders in the numerator. The interest expense that should be added back is gross interest expense, not net interest expense (which is gross interest expense less interest income). This results in an alternative calculation for ROA:

$$\text{ROA} = \frac{\text{net income} + \text{interest expense} \, (1 - \text{tax rate})}{\text{average total assets}}$$

- A measure of ROA that includes both taxes and interest in the numerator is the *operating ROA*:

$$\text{operating ROA} = \frac{\text{operating income}}{\text{average total assets}} \text{ or } \frac{\text{EBIT}}{\text{average total assets}}$$

- *Return on invested capital (ROIC)*, which we described in the Corporate Issuers topic area, is the ratio of after-tax operating profit to average long-term capital:

$$\text{return on invested capital} = \frac{\text{after-tax operating profit}}{\text{average long-term capital}}$$

  Long-term capital includes long-term debt, preferred equity, and common equity, but excludes working capital. Analysts should be concerned if this ratio is too low.

- The *return on equity (ROE)*, sometimes called *return on total equity*, is the ratio of net income to average total equity (including preferred stock):

$$\text{ROE} = \frac{\text{net income}}{\text{average total equity}}$$

  Analysts should be concerned if this ratio is too low.

- A similar ratio to the ROE is the *return on common equity*:

$$\text{return on common equity} = \frac{\text{net income} - \text{preferred dividends}}{\text{average common equity}}$$
$$= \frac{\text{net income available to common}}{\text{average common equity}}$$

  This ratio differs from the return on total equity in that it only measures the accounting profits available to, and the capital invested by, common stockholders, instead of common and preferred stockholders. That is why preferred dividends are deducted from net income in the numerator. Analysts should be concerned if this ratio is too low.

  The return on common equity is often more thoroughly analyzed using the DuPont decomposition, which is described later in this reading.

EXAMPLE: Calculating ratios

A balance sheet and income statement for Sedgwick Company are shown in the following tables for this year and the previous year.

Using the company information provided, calculate the following ratios for the current year: current ratio, total asset turnover, net profit margin, return on common equity, and total debt to equity.

Sedgwick Company Balance Sheet

	Current Year	Previous Year
Assets		
Cash and marketable securities	$105	$95
Receivables	205	195
Inventories	310	290
Total current assets	620	580
Gross property, plant, and equipment	1,800	1,700
Accumulated depreciation	360	340
Net property, plant, and equipment	1,440	1,360
Total assets	$2,060	$1,940
Liabilities		
Payables	$110	$90
Short-term debt	160	140
Current portion of long-term debt	55	45
Current liabilities	325	275
Long-term debt	610	690
Deferred taxes	105	95
Common stock at par	300	300
Additional paid in capital	400	400
Retained earnings	320	180
Common shareholders' equity	1,020	880
Total liabilities and equity	$2,060	$1,940

Sedgwick Company Income Statement

	Current Year
Sales	$4,000
Cost of goods sold	3,000
Gross profit	1,000
Operating expenses	650
Operating profit	350
Interest expense	50
Earnings before taxes	300
Taxes	100
Net income	200
Common dividends	60

Answer:

- current ratio $= \dfrac{\text{current assets}}{\text{current liabilities}}$

  current ratio $= \dfrac{620}{325} = 1.9$

- total asset turnover $= \dfrac{\text{revenue}}{\text{average assets}}$

  total asset turnover $= \dfrac{4{,}000}{(2{,}060 + 1{,}940)\,/\,2} = 2.0$

- net profit margin $= \dfrac{\text{net income}}{\text{revenue}}$

  net profit margin $= \dfrac{200}{4{,}000} = 5.0\%$

- return on common equity $= \dfrac{\text{net income} - \text{preferred dividends}}{\text{average common equity}}$

  return on common equity $= \dfrac{200}{(1{,}020 + 880)\,/\,2} = 21.1\%$

- debt-to-equity ratio $= \dfrac{\text{total debt}}{\text{total equity}}$

  debt-to-equity ratio $= \dfrac{610 + 160 + 55}{1{,}020} = 80.9\%$

Note that preferred equity would be included in the denominator if there were any, and that we have included short-term debt and the current portion of long-term debt in calculating total (interest-bearing) debt.

LOS 37.c: Describe relationships among ratios and evaluate a company using ratio analysis.

EXAMPLE: Relationships among ratios

An analyst calculates the following activity and liquidity ratios for a company over the last three years:

	20X8	20X7	20X6
Current ratio	2.0	1.5	1.2
Quick ratio	0.5	0.8	1.0
Days of inventory	60	50	30
Days' sales outstanding	20	30	40

Determine what the analyst should infer from these ratios taken together.

Answer:

The current ratio has increased over this period, while the quick ratio has decreased. This could result from inventories increasing or from current assets other than inventories decreasing. The increase in days of inventory on hand suggests increasing inventories explain the opposing trends in the current and quick ratios.

The decrease in days' sales outstanding indicates that the company has been collecting cash from customers sooner than it had been in the past. Taken together,

these ratios suggest the company may be accelerating its collections to make up for a drain on cash from poor inventory management.

EXAMPLE: Using ratios to evaluate a company

An analyst is comparing the values of several ratios for the current year to their prior-year values, the current industry average values, and industry average ratios for Sedgwick Company. These selected ratio values are shown in the following table.

	Current Year	Previous Year	Industry Average
Current ratio	1.9	2.1	1.5
Total asset turnover	2.0	2.3	2.4
Net profit margin	5.0%	5.8%	6.5%
Return on common equity	21.1%	24.1%	19.8%
Debt-to-equity	80.9%	99.4%	35.7%

Discuss how these ratios compare with the company's performance last year and with the industry performance.

Answer:

Although the firm's liquidity (as measured by the current ratio) has decreased over the past year, it remains above the industry average.

Total asset turnover has declined over the past year and now appears to be significantly lower than the industry average.

Net profit margin is lower than last year and is much lower than the industry average.

ROE is lower than last year but still higher than the industry average. Given the decline in net profit margin and total asset turnover, it is likely that higher-than-average financial leverage is the reason for this ROE outperformance.

Our supposition about the firm's financial leverage is confirmed by its debt-to-equity ratios. While the current year's ratio is lower than last year's, it is still more than twice the industry average ratio. The significant decrease in the company's debt-to-equity ratio over the past year suggests the company is trying to get its debt level more in line with the industry average.

MODULE QUIZ 37.1, 37.2, 37.3

1. To study trends in a firm's cost of goods sold (COGS), the analyst should standardize the COGS numbers to a common-sized basis by dividing COGS by:
   A. assets.
   B. sales.
   C. net income.

2. Which of the following is *least likely* a limitation of financial ratios?
   A. Data on comparable firms are difficult to acquire.

B. Determining the target or comparison value for a ratio requires judgment.

C. Different accounting treatments require the analyst to adjust the data before comparing ratios.

3. RGB, Inc.'s purchases during the year were $100,000. The balance sheet shows an average accounts payable balance of $12,000. RGB's payables payment period is *closest* to:

A. 37 days.

B. 44 days.

C. 52 days.

4. RGB, Inc., has a gross profit of $45,000 on sales of $150,000. The balance sheet shows average total assets of $75,000 with an average inventory balance of $15,000. RGB's inventory turnover and total asset turnover are *closest* to:

	Inventory turnover	Total asset turnover
A.	2.00 times	7.00 times
B.	7.00 times	2.00 times
C.	0.33 times	0.50 times

5. If RGB, Inc., has annual sales of $100,000, average accounts payable of $30,000, and average accounts receivable of $25,000, RGB's receivables turnover and average collection period are *closest* to:

	Receivables turnover	Average collection period
A.	2.1 times	174 days
B.	3.3 times	111 days
C.	4.0 times	91 days

6. A company's current ratio is 1.9. If some of the accounts payable are paid off from the cash account, then the:

A. numerator would decrease by a greater percentage than the denominator, resulting in a lower current ratio.

B. denominator would decrease by a greater percentage than the numerator, resulting in a higher current ratio.

C. numerator and denominator would decrease proportionally, leaving the current ratio unchanged.

7. A company's quick ratio is 1.2. If inventory were purchased for cash, then the:

A. numerator would decrease more than the denominator, resulting in a lower quick ratio.

B. denominator would decrease more than the numerator, resulting in a higher quick ratio.

C. numerator and denominator would decrease proportionally, leaving the quick ratio unchanged.

8. All other things held constant, which of the following transactions will increase a firm's current ratio if the ratio is greater than 1?

A. Accounts receivable are collected, and the funds received are deposited in the firm's cash account.

B. Fixed assets are purchased from the cash account.

C. Accounts payable are paid with funds from the cash account.

9. RGB, Inc.'s receivable turnover is 10 times, the inventory turnover is 5 times, and the payables turnover is 9 times. RGB's cash conversion cycle is *closest* to:

A. 69 days.

B. 104 days.

C. 150 days.

10. An analyst who is interested in a company's long-term solvency would *most likely* examine the:

    A. return on total capital.
    B. defensive interval ratio.
    C. fixed charge coverage ratio.

11. RGB, Inc.'s income statement shows sales of $1,000, cost of goods sold of $400, pre-interest operating expense of $300, and interest expense of $100. RGB's interest coverage ratio is *closest* to:

    A. 2 times.
    B. 3 times.
    C. 4 times.

MODULE 37.4: DUPONT ANALYSIS

LOS 37.d: Demonstrate the application of DuPont analysis of return on equity and calculate and interpret effects of changes in its components.

The **DuPont system of analysis** is an approach that can be used to analyze return on equity (ROE). It uses basic algebra to break down ROE into a function of different ratios, so an analyst can see the impact of leverage, profit margins, and turnover on shareholder returns. There are two variants of the DuPont system: the original three-part approach and the extended five-part system.

For the original approach, start with ROE defined as follows:

$$ROE = \frac{net\ income}{average\ equity}$$

Average or year-end values for equity can be used. Multiplying ROE by (average total assets / average total assets) and rearranging terms produces the following:

$$ROE = \left(\frac{net\ income}{average\ total\ assets}\right)\left(\frac{average\ total\ assets}{average\ stockholders'\ equity}\right)$$

The first term is the ROA, and the second term is a financial leverage ratio that will increase as the use of debt financing increases:

$$ROE = ROA \times financial\ leverage$$

We can expand this further by multiplying these terms by (revenue / revenue), and rearranging terms:

$$ROE = \left(\frac{net\ income}{revenue}\right)\left(\frac{revenue}{average\ total\ assets}\right)\left(\frac{average\ total\ assets}{average\ stockholders'\ equity}\right)$$

The first term becomes net profit margin, the second term is now total asset turnover, and the third term is still financial leverage:

$$ROE = net\ profit\ margin \times total\ asset\ turnover \times financial\ leverage$$

This is the original DuPont equation. It is arguably the most important equation in ratio analysis because it breaks down a very important ratio (ROE) into three key components. If ROE is relatively low, it must be that at least one of the following is true: the company has a poor profit margin, the company has poor asset turnover, or the firm has too little leverage.

EXAMPLE: Decomposition of ROE with original DuPont

Staret, Inc., has maintained a stable and relatively high ROE of approximately 18% over the last three years. Use traditional DuPont analysis to decompose this ROE into its three components and comment on trends in company performance.

Staret, Inc., Selected Balance Sheet and Income Statement Items (Millions)

Year	20X3	20X4	20X5
Net income	21.5	22.3	21.9
Revenue	305	350	410
Average equity	119	124	126
Average assets	230	290	350

Answer:

ROE:

20X3: 21.5 / 119 = 18.1%

20X4: 22.3 / 124 = 18.0%

20X5: 21.9 / 126 = 17.4%

DuPont:

20X3: 7.0% × 1.33 × 1.93

20X4: 6.4% × 1.21 × 2.34

20X5: 5.3% × 1.17 × 2.78

Note that values were rounded in these calculations.

While ROE has dropped only slightly, both total asset turnover and net profit margin have declined. The effects of declining net margins and turnover on ROE have been offset by a significant increase in leverage. The analyst should be concerned about the decrease in net margin and determine the combination of pricing pressure and

> increasing expenses that caused this situation. The company has become more risky due to increased debt financing.

The **extended (5-way) DuPont equation** takes the net profit margin and breaks it down further:

$$ROE = \left(\frac{net\ income}{EBT}\right)\left(\frac{EBT}{EBIT}\right)\left(\frac{EBIT}{revenue}\right)\left(\frac{revenue}{average\ assets}\right)\left(\frac{average\ assets}{average\ equity}\right)$$

The first term in the 3-part DuPont equation, net profit margin, has been decomposed into three terms:

$\frac{net\ income}{EBT}$ is called the **tax burden** and is equal to $(1 - \text{tax rate})$

$\frac{EBT}{EBIT}$ is called the **interest burden**

$\frac{EBIT}{revenue}$ is called the **EBIT margin**

We then have the following:

$$ROE = \left(\begin{array}{c}tax\\burden\end{array}\right)\left(\begin{array}{c}interest\\burden\end{array}\right)\left(\begin{array}{c}EBIT\\margin\end{array}\right)\left(\begin{array}{c}total\ asset\\turnover\end{array}\right)\left(\begin{array}{c}financial\\leverage\end{array}\right)$$

An increase in interest expense as proportion of EBIT will increase the interest burden (i.e., decrease the interest burden ratio). Increases in either the tax burden or the interest burden (i.e., decreases in the ratios) will tend to decrease ROE.

EBIT in the second two expressions can be replaced by operating earnings. In this case, we have the operating margin rather than the EBIT margin. The interest burden term would then show the effects of nonoperating income as well as the effect of interest expense.

Note that in general, high profit margins, leverage, and asset turnover will lead to high levels of ROE. However, this version of the formula shows that more leverage *does not always* lead to higher ROE. As leverage rises, so does the interest burden. Hence, the positive effects of leverage can be offset by the higher interest payments that accompany more debt. Note that higher taxes will always lead to lower levels of ROE.

> **EXAMPLE: Extended DuPont analysis**
>
> An analyst has gathered data from two companies in the same industry. Use the extended DuPont analysis to explain the critical factors that account for the differences between the two companies' ROEs.
>
> **Selected Income and Balance Sheet Data**

	Company A	Company B
Revenues	$500	$900
EBIT	35	100
Interest expense	5	0
EBT	30	100
Taxes	10	40
Net income	20	60
Average assets	250	300
Total debt	100	50
Average equity	$150	$250

Answer:

return on equity = net income / average equity

Company A: 20 / 150 = 13.3%

Company B: 60 / 250 = 24.0%

EBIT margin = EBIT / revenue

Company A: 35 / 500 = 7.0%

Company B: 100 / 900 = 11.1%

total asset turnover = revenue / average assets

Company A: 500 / 250 = 2.0

Company B: 900 / 300 = 3.0

interest burden = EBT / EBIT

Company A: 30 / 35 = 85.7%

Company B: 100 / 100 = 1

financial leverage = average assets / average equity

Company A: 250 / 150 = 1.67

Company B: 300 / 250 = 1.2

tax burden = net income / EBT

Company A: 20 / 30 = 66.7%

Company B: 60 / 100 = 60.0%

Company B has a higher tax burden but a lower interest burden (a lower ratio indicates a higher burden). Company B has better EBIT margins and better asset use (perhaps management of inventory, receivables, or payables, or a lower cost basis in its fixed assets due to their age), and less leverage. Company B's higher EBIT margins

and asset turnover are the main factors leading to its significantly higher ROE, which it achieves with less leverage than Company A.

MODULE 37.5: INDUSTRY-SPECIFIC FINANCIAL RATIOS

LOS 37.e: Describe the uses of industry-specific ratios used in financial analysis.

As no two industries are the same, the importance of each individual ratio will vary depending on the key performance indicators of an industry. For some industries, analysts calculate ratios to evaluate metrics that might not be relevant for other industries. For example:

- *Net income per employee* and *sales per employee* are used in the analysis and valuation of service and consulting companies.

- *Growth in same-store sales* is used in the restaurant and retail industries to indicate growth without the effects of new locations that have been opened. It is a measure of how well the firm is doing at attracting and keeping existing customers. In the case of locations with overlapping markets, decreases in same-store sales growth may indicate that new locations are taking customers from existing ones. *Sales per square foot* is another metric commonly used in the retail industry.

- In the hotel industry, *average daily rate*, or room revenue divided by number of rooms sold, is a key indicator of profitability. *Occupancy rates*, used to analyze the total number of rooms sold relative to the total number available, are a key activity ratio.

- For subscription services such as streaming providers, *average revenue per user* is often a key metric.

Banks, insurance companies, and other financial firms carry their own challenges for analysts. Financial firms often have to maintain minimums or maximums of certain ratios to comply with regulations. Part of the challenge is to understand the commonly used terms and the ratios they represent.

- *Capital adequacy* typically refers to some monetary measure of a firm's risk, both operational and financial, as a percentage of its equity capital. Regulators monitor capital adequacy ratios to ensure that a financial firm has a buffer to absorb losses. A common measure of capital risk is *value at risk*, which is an estimate of the money size of the loss that a firm will exceed only some specific percentage of the time, over a specific period of time.

- Banks are subject to minimum *reserve requirements*. Their ratios of various liabilities to their central bank reserves must be above the minimums. The ratio of a bank's liquid assets to certain liabilities is called its *liquid asset requirement*.

- The performance of financial companies that lend funds is often summarized as the *net interest margin*, which is simply interest income divided by the firm's interest-

earning assets.

Business Risk

The standard deviation of revenue, standard deviation of operating income, and standard deviation of net income are all indicators of the variation in and the uncertainty about a firm's performance. Because they all depend on the size of the firm to a great extent, analysts employ a size-adjusted measure of variation. The **coefficient of variation** for a variable is its standard deviation divided by its expected value.

Certainly, different industries have different levels of uncertainty about revenues, expenses, taxes, and nonoperating items. Comparing coefficients of variation for a firm across time, or among a firm and its peers, can aid the analyst in assessing both the relative and absolute degree of risk a firm faces in generating income for its investors.

$$\text{CV sales} = \frac{\text{standard deviation of sales}}{\text{mean sales}}$$

$$\text{CV operating income} = \frac{\text{standard deviation of operating income}}{\text{mean operating income}}$$

$$\text{CV net income} = \frac{\text{standard deviation of net income}}{\text{mean net income}}$$

LOS 37.f: Describe how ratio analysis and other techniques can be used to model and forecast earnings.

Ratio analysis can be used in preparing **pro forma financial statements** that provide estimates of financial statement items for one or more future periods. The preparation of pro forma financial statements and related forecasts is covered in more detail in the Equity Investments topic area. Here, some examples will suffice.

A forecast of financial results begins with an estimate of a firm's next-period revenues. If the analyst has no reason to believe that COGS in relation to sales will change for the next period, the COGS percentage from a common-size income statement can be used in constructing a pro forma income statement for the next period based on the estimate of sales.

Similarly, the analyst may believe that certain ratios will remain the same, or change in one direction or the other for the next period. In the absence of any information indicating a change, an analyst may choose to incorporate the operating profit margin from the prior period into a pro forma income statement for the next period. Beginning

with an estimate of next-period sales, the estimated operating profit margin can be used to forecast operating profits for the next period.

Rather than point estimates of sales and net and operating margins, the analyst may examine possible changes to create a range of possible values for key financial variables.

Three methods of examining the variability of financial outcomes around point estimates are *sensitivity analysis*, *scenario analysis*, and *simulation*. Sensitivity analysis is based on "what if" questions such as, "What will be the effect on net income if sales increase by 3% rather than the estimated 5%?" Scenario analysis is based on specific scenarios (a specific set of outcomes for key variables) and will also yield a range of values for financial statement items. Simulation is a technique in which probability distributions for key variables are selected, and a computer is used to generate a distribution of values for outcomes based on a repeated random selection of values for the key variables.

MODULE QUIZ 37.4, 37.5

1. Return on equity using the traditional DuPont formula equals:
    A. (net profit margin) (interest component) (solvency ratio).
    B. (net profit margin) (total asset turnover) (tax retention rate).
    C. (net profit margin) (total asset turnover) (financial leverage multiplier).

2. Which of the following equations *least accurately* represents return on equity?
    A. (net profit margin)(equity turnover).
    B. (net profit margin)(total asset turnover)(assets / equity).
    C. (ROA)(interest burden)(tax retention rate).

3. Which of the following statements about coefficient of variation is *least accurate*?
    A. A coefficient of variation for an income statement measure represents variation per monetary unit.
    B. The coefficient of variation is calculated by dividing a mean value by its standard deviation.
    C. The coefficient of variation is a size-adjusted measure of variation.

4. An analyst who needs to model and forecast a company's earnings for the next three years would be *least likely* to:
    A. assume that key financial ratios will remain unchanged for the forecast period.
    B. use common-size financial statements to estimate expenses as a percentage of net income.
    C. examine the variability of the predicted outcomes by performing a sensitivity or scenario analysis.

KEY CONCEPTS

LOS 37.a

Ratios can be used to project earnings and future cash flow, evaluate a firm's flexibility, assess management's performance, evaluate changes in the firm and industry over time, and compare the firm with industry competitors.

Vertical common-size data are stated as a percentage of sales for income statements, or as a percentage of total assets for balance sheets. Horizontal common-size data present each item as a percentage of its value in a base year.

Ratio analysis has limitations. Ratios are not useful when viewed in isolation and require adjustments when different companies use different accounting treatments. Comparable ratios may be hard to find for companies that operate in multiple industries. Ratios must be analyzed relative to one another, and determining the range of acceptable values for a ratio can be difficult.

LOS 37.b

Activity ratios indicate how well a firm uses its assets. They include receivables turnover, days of sales outstanding, inventory turnover, days of inventory on hand, payables turnover, payables payment period, and turnover ratios for total assets, fixed assets, and working capital.

Liquidity ratios indicate a firm's ability to meet its short-term obligations. They include the current, quick, and cash ratios; the defensive interval; and the cash conversion cycle.

Solvency ratios indicate a firm's ability to meet its long-term obligations. They include the debt-to-equity, debt-to-capital, debt-to-assets, financial leverage, interest coverage, and fixed charge coverage ratios.

Profitability ratios indicate how well a firm generates operating income and net income. They include net, gross, and operating profit margins; pretax margin; return on assets; operating return on assets; return on total capital; return on total equity; and return on common equity.

LOS 37.c

An analyst should use an appropriate combination of different ratios to evaluate a company over time and relative to comparable companies. The interpretation of an increase in ROE, for example, may be quite different for a firm that has significantly increased its financial leverage compared to one that has maintained or decreased its financial leverage.

LOS 37.d

2-stage decomposition of ROE:

$$\text{ROE} = \left(\frac{\text{net income}}{\text{average total assets}}\right)\left(\frac{\text{average total assets}}{\text{average stockholders' equity}}\right)$$

$$\text{ROE} = \text{ROA} \times \text{leverage}$$

Original DuPont equation (3-stage decomposition):

$$\text{ROE} = \left(\frac{\text{net income}}{\text{sales}}\right)\left(\frac{\text{sales}}{\text{average total assets}}\right)\left(\frac{\text{average total assets}}{\text{average stockholders' equity}}\right)$$

$$\text{ROE} = \text{net profit margin} \times \text{asset turnover} \times \text{leverage}$$

Extended DuPont equation (5-stage decomposition):

$$ROE = \left(\frac{\text{net income}}{\text{EBT}}\right)\left(\frac{\text{EBT}}{\text{EBIT}}\right)\left(\frac{\text{EBIT}}{\text{revenue}}\right)\left(\frac{\text{revenue}}{\text{total assets}}\right)\left(\frac{\text{total assets}}{\text{total equity}}\right)$$

$$ROE = \text{tax burden} \times \text{interest burden} \times \text{EBIT margin} \times \text{asset turnover} \\ \times \text{leverage}$$

LOS 37.e

The skill of an analyst involves identifying ratios that relate to the industry being analyzed and the performance, position, and flexibility of the firm, both currently and in the future.

Financial institutions have to comply with capital adequacy directives designed to prevent insolvency and contagion.

LOS 37.f

Ratio analysis, in conjunction with other techniques, can be used to construct pro forma financial statements based on a forecast of sales growth and assumptions about the relation of changes in key income statement and balance sheet items to growth of sales.

ANSWER KEY FOR MODULE QUIZZES

Module Quiz 37.1, 37.2, 37.3

1. **B** With a vertical common-size income statement, all income statement accounts are divided by sales. (Module 37.1, LOS 37.a)

2. **A** Company and industry data are widely available from numerous private and public sources. The other statements describe limitations of financial ratios. (Module 37.1, LOS 37.a)

3. **B** payables turnover = (purchases / avg. AP) = 100 / 12 = 8.33

   payables payment period = 365 / 8.33 = 43.8 days

   (Module 37.2, LOS 37.b)

4. **B** total asset turnover = (sales / total assets) = 150 / 75 = 2 times

   inventory turnover = (COGS / avg. inventory) = (150 − 45) / 15 = 7 times

   (Module 37.2, LOS 37.b)

5. **C** receivables turnover = (sales / avg. AR) = 100 / 25 = 4

   average collection period = 365 / 4 = 91.25 days

   (Module 37.2, LOS 37.b)

6. **B** Current ratio = current assets / current liabilities. If cash (a current asset) and AP (a current liability) decrease by the same amount and the current ratio is greater than 1, then the numerator decreases less in percentage terms than the denominator, and the current ratio increases. (Module 37.2, LOS 37.b)

7. **A**   Quick ratio = (cash + marketable securities + AR) / current liabilities. If cash decreases, the quick ratio will also decrease. The denominator is unchanged. (Module 37.2, LOS 37.b)

8. **C**   Current ratio = current assets / current liabilities. If CR is > 1, then if CA and CL both fall, the overall ratio will increase. (Module 37.2, LOS 37.b)

9. **A**   (365 / 10 + 365 / 5 − 365 / 9) = 69 days

(Module 37.2, LOS 37.b)

10. **C**   Fixed charge coverage is a solvency ratio. Return on total capital is a measure of profitability, and the defensive interval ratio is a liquidity measure. (Module 37.3, LOS 37.b)

11. **B**   interest coverage ratio = EBIT / interest = (1,000 − 400 − 300) / 100 = 3 times

(Module 37.3, LOS 37.b)

Module Quiz 37.4, 37.5

1. **C**   This is the correct formula for the three-ratio DuPont model for ROE. (Module 37.4, LOS 37.d)

2. **C**   (ROA)(interest burden)(tax retention rate) is not one of the DuPont models for calculating ROE. (Module 37.4, LOS 37.d)

3. **B**   Coefficient of variation is computed by dividing standard deviation by mean; therefore, it can be interpreted as risk per monetary unit for the income statement variable considered. Variation in income statement items such as sales, operating profit, and net income is related to the size of a company. By dividing the standard deviation by the mean value of the variable, size is adjusted for, giving risk per unit of the variable. (Module 37.5, LOS 37.e)

4. **B**   An earnings forecast model would typically estimate expenses as a percentage of sales. (Module 37.5, LOS 37.f)

READING 38

INTRODUCTION TO FINANCIAL STATEMENT MODELING

MODULE 38.1: FINANCIAL STATEMENT MODELING

LOS 38.a: Demonstrate the development of a sales-based pro forma company model.

A sales-based pro forma company model consists of projected future financial statements, based on an analyst's estimate of a company's future revenues. We summarize the steps in creating such a model here. In our Equity Investments reading on Company Analysis: Forecasting, we will describe some of these steps in more detail.

Step 1: Estimate revenue growth and future revenue, based on market growth and market share, a trend growth rate, or growth relative to GDP.

Step 2: Estimate COGS based on a percentage of sales, or on a more detailed method based on business strategy or competitive environment.

Step 3: Estimate SG&A as either fixed, growing with revenue, or using some other estimation technique.

Step 4: Estimate financing costs using interest rates, debt levels, and the effects of any large anticipated increases or decreases in capital expenditures or anticipated changes in financial structure.

Step 5: Estimate income tax expense and cash taxes using historical effective rates and trends, segment information for different tax jurisdictions, and anticipated growth in high- and low-tax segments, taking into account changes in deferred tax items.

Step 6: Model the balance sheet based on items that flow from the income statement (working capital accounts).

Step 7: Use depreciation and capital expenditures (for maintenance and for growth) to estimate capital expenditures and net PP&E for the balance sheet.

Step 8: Use the completed pro forma income statement and balance sheet to construct a pro forma cash flow statement.

Like everyone, those in the financial industry are prone to behavioral biases. For analysts, these biases can result in inaccurate forecasts.

1. **Overconfidence bias.** This is having too much faith in one's own work. Analysts may underestimate their forecasting errors; hence, they have a narrower confidence interval for their forecasts than warranted. Research has shown that analysts who "go against the grain" (i.e., forecasting what others are not) are more likely to suffer from overconfidence bias. This bias may be mitigated by sharing forecasts and soliciting critique. Analysts should evaluate their past forecasts and learn from their own forecasting errors, which should lead to a widening of their confidence intervals. Using scenario analysis to produce a range of forecasts may help to identify any shortcomings.

2. **Illusion of control bias.** This is related to overconfidence, but refers specifically to overestimating what an analyst can control and trying to control things an analyst cannot control. This bias is manifested in two primary ways: seeking "expert" opinions to justify a forecast, and making a model more complex (e.g., by including more independent variables). Overfitted models perform poorly out of sample and can also conceal assumptions that need to be updated based on new information. Illusion of control can be mitigated by focusing only on variables with known explanatory power, and by seeking outside opinions only from those who have a relevant perspective.

3. **Conservatism bias.** This is also called *anchoring,* where the analyst makes only small adjustments to their prior forecasts when new information becomes available. Usually, conservatism results in reluctance to incorporate new negative information; however, it could also lead to lags in incorporating positive news. Mitigating this bias requires periodic evaluation of forecasting errors, and using simpler models that are easier to adjust for new or changed assumptions.

4. **Representativeness bias.** This bias occurs due to a tendency to rely on known classifications. Sometimes, new information may only be superficially similar to a known classification but may be better viewed from a fresh perspective. One common form of representativeness bias is **base-rate neglect**, where an observation's membership (its base rate, or rate of incidence in a larger population) is neglected in favor of situation or member-specific information. Fixating on a firm's company-specific factors is known as the *inside view*, while viewing the company as a member of a particular industry (focusing on the base rate) is sometimes known as the *outside view*. Analysts should consider both inside and outside views to generate forecasts.

5. **Confirmation bias.** Confirmation bias causes an analyst to seek out (or pay attention to) data that affirms their earlier convictions, and to disregard or underestimate information that calls those opinions into question. For example, an analyst who has a positive view of a particular company may choose to discuss the firm with colleagues who share the same point of view. Two ways to reduce confirmation bias are to keep abreast of research from analysts who have an

opposite view, and to seek out the points of view of colleagues who have no emotional investment in the opinion. Analysts should also be aware of their own confirmation bias when they evaluate a company management's representations. Managements tend to portray their companies in a positive way, and analysts who have (or want to have) positive outlooks on companies must be careful not to simply take management's comments at face value.

> **PROFESSOR'S NOTE**
> The focus here is on how behavioral biases affect analysts. We will revisit these biases in the context of investors' behavior in the Portfolio Management topic area.

LOS 38.c: Explain how the competitive position of a company based on a Porter's five forces analysis affects prices and costs.

The competitive environment that a firm operates in and how successful it is in that environment are key in determining the firm's future financial results. There are no formulas for, or clear rules about, how a firm's competitive environment affects its future revenue and costs, but a firm's future competitive success is possibly the most important factor in its future revenue and profitability.

Porter's five forces are a framework analysts commonly use to evaluate a company's competitive position. We will introduce them here and describe them further in our Equity Investments reading on Industry and Competitive Analysis.

1. Companies have more pricing power when the **threat of substitute products** is low and switching costs are high. They have less pricing power when good substitutes are or may become available, and when it is less costly for customers to switch to those products.

2. Companies have more pricing power when the **intensity of industry rivalry** is low, and less pricing power when competitive intensity is high. Industry rivalry tends to be more intense when an industry has many competitors (is less concentrated), when fixed costs and exit barriers are high, when industry growth is slow or negative, and when products are not differentiated significantly.

3. Pressure on a company's costs may be higher, and its prospects for earnings growth lower, when the **bargaining power of suppliers** is high. If suppliers are few, they may be able to extract a larger portion of any value added.

4. Companies have less pricing power when the **bargaining power of customers** is higher, especially if a small number of customers are responsible for a large proportion of a firm's sales, or if switching costs are low.

5. Companies have more pricing power and better prospects for earnings growth when the **threat of new entrants** is low. Significant barriers to entry into an industry make it possible for existing companies to sustain economic profits over time.

Input costs can be significant in many industries. The cost of jet fuel in the airline industry, the cost of grains to cereal and baking companies, and the cost of coffee beans to coffee shops are all variable. Changes in these costs can significantly affect earnings.

Companies with commodity-type inputs can hedge their exposure to changes in input prices through derivatives, or more simply through fixed-price contracts for future delivery. Such hedging will reduce the effect of short-term changes in input prices and increase the time until longer-term price changes affect costs and earnings. Companies that are vertically integrated (in effect, their own suppliers) are relatively less exposed to input cost risk.

For a company that neither hedges input price exposure nor is vertically integrated, the issue for an analyst is to determine how rapidly, and to what extent, an increase in costs can be passed on to customers, as well as the expected effect of price increases on sales volume and sales revenue.

An analyst should monitor a company's production costs by product category and geographic location, with a focus on the significant factors that affect input prices, such as weather, government regulation and taxation, tariffs, and the characteristics of input markets. It may be that a firm can reduce the impact of an increase in an input price by switching to a substitute input; for example, rising oil prices may lead power generation firms to switch from oil to natural gas.

When estimating the effects of an increase in input prices, an analyst must make assumptions about the company's pricing strategy and the effects of price increases on unit sales. When increases in input costs are thought to be temporary, a company may cut other costs (e.g., advertising expenses) to preserve operating margins. This strategy is, however, not appropriate for long-term increases in input costs.

The effects of raising a product's price depend on its elasticity of demand. For most firms, product demand is relatively elastic. With elastic demand, the percentage reduction in unit sales is greater than the percentage increase in price, and a price increase will decrease total sales revenue.

Elasticity of demand is most affected by the availability of substitute products. In a competitive industry, the pricing decisions of other firms in the industry can affect the market shares of its competitors. A company that is the first to increase prices in response to increased costs will experience a greater decrease in unit sales than a company that increases prices after other firms have already done so. A firm may decide to delay increasing prices to gain market share when other firms increase prices in response to increased costs. Firms that are too quick to increase prices will experience declining sales volumes, while firms that are slow to increase prices will experience declining gross margins.

If the money amount of the increase in cost per unit is added to product price and unit sales do not decrease (this is unlikely), the amount of operating profit is unchanged, but gross margins, operating margins, and net margins will decrease.

Alfredo, Inc., sells a specialized network component. The firm's income statement for the past year follows.

Alfredo, Inc., Income Statement for the Year Ended 20X1

Revenues	1,000 @ $100	$100,000
COGS	1,000 @ $40	$40,000
Gross profit		$60,000
SG&A		$30,000
Operating profit		$30,000

For 20X2, the input costs (COGS) will increase by $5 per unit.

1. Calculate the gross margin and operating margin for Alfredo, Inc., for 20X1.
2. Calculate the 20X2 gross margin and operating margin assuming the following:
   a. The entire increase in input cost is passed on to the customers through an equal increase in selling price. The number of units sold is not affected.
   b. The selling price is increased by 5% and the number of units sold decreases by 5%.
   c. The selling price is increased by 5% and the number of units sold decreases by 10%.

Answer:

1. gross margin = gross profit / sales = $60,000 / $100,000 = 60%

   operating margin = operating profit / sales = $30,000 / $100,000 = 30%

2. a. 20X2, given an increase in unit price by $5 and no change in units sold:

Revenues	1,000 units @ $105	$105,000
COGS	1,000 units @ $45	$45,000
Gross profit		$60,000
SG&A		$30,000
Operating profit		$30,000
Gross margin		$57%
Operating margin		$29%

gross margin = gross profit / sales = $60,000 / $105,000 = 57%

operating margin = operating profit / sales = $30,000 / $105,000 = 29%

   b. 20X2, given an increase in unit price by $5 and a decrease of 50 in units sold:

Revenues	950 units @ $105	$99,750
COGS	950 units @ $45	$42,750
Gross profit		$57,000
SG&A		$30,000
Operating profit		$27,000
Gross margin		$57%
Operating margin		$27%

gross margin = gross profit / sales = $57,000 / $99,750 = 57%
operating margin = operating profit / sales = $27,000 / $99,750 = 27%

c. 20X2, given an increase in unit price by $5 and a decrease of 100 in units sold:

Revenues	900 units @ $105	$94,500
COGS	900 units @ $45	$40,500
Gross profit		$54,000
SG&A		$30,000
Operating profit		$24,000
Gross margin		$57%
Operating margin		$25%

gross margin = gross profit / sales = $54,000 / $94,500 = 57%

operating margin = operating profit / sales = $24,000 / $94,500 = 25%

LOS 38.e: Explain considerations in the choice of an explicit forecast horizon and an analyst's choices in developing projections beyond the short-term forecast horizon.

For a buy-side analyst, the appropriate forecast horizon may simply be the expected holding period for a stock. For example, a portfolio with a 25% annual turnover has an average holding period of four years, so four years may be the most appropriate forecast horizon.

Highly cyclical companies present difficulties when choosing a forecast horizon. The horizon should be long enough that the effects of the current phase of the economic cycle are not driving above-trend or below-trend earnings effects. The forecast horizon should be long enough to include the middle of a business cycle so the analyst's forecast includes a midcycle level of sales and profits. **Normalized earnings** are expected midcycle earnings or, alternatively, expected earnings when the current (temporary) effects of events or cyclicality are no longer affecting earnings.

Events such as acquisitions, mergers, or restructurings should be considered temporary. The forecast horizon should be long enough that the perceived benefits of such events can be realized (or not).

It may also be the case that the forecast horizon is dictated by an analyst's manager.

For earnings projections beyond the short term, one method of forecasting future financial results is to assume that a trend growth rate of revenue over the previous cycle will continue. An analyst can estimate pro forma financial results based on the projection of each future period's revenue.

An analyst will typically value a stock using earnings or some measure of cash flow over a forecast period, along with the stock's terminal value at the end of the forecast horizon. This terminal value is usually estimated using either a relative valuation (i.e., price multiple) approach or a discounted cash flow approach.

PROFESSOR'S NOTE
We will describe these approaches to estimating stock values in our Equity Investments reading on Equity Valuation: Concepts and Basic Tools.

When using a multiples approach, an analyst must ensure that the multiple used is consistent with the estimate of the company's growth rate and required rate of return. Using the average P/E ratio for the company over the last 10 years, for example, presupposes that the growth in earnings and required rate of return of the stock will be, on average, the same in the future as it was over the previous 10 years.

When using a discounted cash flow approach to estimate the terminal value, two key inputs are a cash flow or earnings measure and an expected future growth rate. The expected earnings or cash flow should be normalized to a midcycle value that is not affected by temporary events. Because the terminal value is calculated as the present value of a perpetuity, small changes in the estimated (perpetual) growth rate of future earnings or cash flows can have large effects on estimated terminal values—and, hence, the current stock value.

Assuming that growth in future profitability will be the same as average profitability growth in the past may not be justified. A difficult part of an analyst's job is recognizing **inflection points**, those instances when the future will not be like the past. Examples of inflection points include changes in the economic environment or business cycle stage, government regulations, or technology.

MODULE QUIZ 38.1

1. An analyst continues to add independent variables to a forecasting model, even when doing so does not improve its accuracy significantly. The analyst *most likely* exhibits:
    A. confirmation bias.
    B. illusion of control bias.
    C. representativeness bias.

2. Which of Porter's five forces should an analyst focus on when evaluating risks to a company's input costs?
    A. Threat of new entrants.
    B. Intensity of industry rivalry.
    C. Bargaining power of suppliers.

3. When analyzing a cyclical company, the forecast horizon should include:
    A. a full business cycle.
    B. the midpoint of a business cycle.

C. the next change in phase of a business cycle.

KEY CONCEPTS

LOS 38.a

Developing sales-based pro forma financial statements includes the following steps:

Step 1: Estimate revenue growth and future expected revenue.

Step 2: Estimate COGS.

Step 3: Estimate SG&A.

Step 4: Estimate financing costs.

Step 5: Estimate income tax expense and cash taxes, taking into account changes in deferred tax items.

Step 6: Model the balance sheet based on items that flow from the income statement and estimates for important working capital accounts.

Step 7: Use historical depreciation and capital expenditures to estimate future capital expenditures and net PP&E for the balance sheet.

Step 8: Use the completed pro forma income statement and balance sheet to construct a pro forma cash flow statement.

LOS 38.b

Behavioral factors may affect analyst's forecasts:

1. Overconfidence bias
2. Illusion of control bias
3. Conservatism bias or anchoring
4. Representativeness bias
5. Confirmation bias

LOS 38.c

Expectations of a firm's future competitive success are important factors in forecasting future revenue and financial statements. An analyst can evaluate the competitive position of a company based on Porter's five forces:

1. Companies have less (more) pricing power when the threat of substitute products is high (low) and switching costs are low (high).
2. Companies have less (more) pricing power when the intensity of industry rivalry is high (low).
3. Pressure on input costs is higher when the bargaining power of suppliers is high.
4. Companies have less pricing power when the bargaining power of customers is high.
5. Companies have more pricing power when the threat of new entrants is low.

LOS 38.d

Increases in input costs will increase COGS unless the company has hedged the risk of input price increases with derivatives or contracts for future delivery. Vertically integrated companies are likely to be less affected by increasing input costs. The effect on sales of increasing product prices to reflect higher COGS will depend on the elasticity of demand for the products and on the timing and amount of competitors' price increases.

LOS 38.e

For a buy-side analyst, the appropriate forecast horizon to use may be the expected holding period for a stock.

For highly cyclical companies, the forecast horizon should include the middle of a cycle so that the analyst can forecast normalized earnings.

Events such as acquisitions, mergers, or restructurings, should be considered temporary. The forecast horizon should be long enough that the perceived benefits of such events can be realized.

Earnings projections over a forecast period beyond the short term are often based on the historical average growth rate of revenue over the previous economic cycle.

An analyst will typically estimate a terminal value for a stock at the end of the forecast horizon, using either a price multiple or a discounted cash flow approach. Small changes in the estimated growth rate of future profits or cash flows can have large effects on the estimated stock value.

ANSWER KEY FOR MODULE QUIZ

Module Quiz 38.1

1. **B** Making a forecasting model overly complex, even when doing so brings no significant improvement, most likely reflects illusion of control bias. (LOS 38.b)

2. **C** Of Porter's five forces, bargaining power of suppliers has the most direct influence on a company's input costs. The other four forces more directly affect a company's pricing power. (LOS 38.c)

3. **B** The forecast horizon for a cyclical company should include the midpoint of a business cycle, at which the company is expected to produce normalized earnings. (LOS 38.e)

TOPIC QUIZ: FINANCIAL STATEMENT ANALYSIS

You have now finished the Financial Statement Analysis topic section. Please log into your Schweser online dashboard and take the Topic Quiz on this section. The Topic Quiz provides immediate feedback on how effective your study has been for this material. Questions are more exam-like than typical Module Quiz or QBank questions; a score of less than 70% indicates that your study likely needs improvement. These tests are best taken timed; allow 1.5 minutes per question.

READING 39

MARKET ORGANIZATION AND STRUCTURE

MODULE 39.1: MARKETS, ASSETS, AND INTERMEDIARIES

LOS 39.a: Explain the main functions of the financial system.

The three main functions of the financial system are to:

1. Allow entities to save and borrow money, raise equity capital, manage risks, trade assets currently or in the future, and trade based on their estimates of asset values.
2. Determine the returns (i.e., interest rates) that equate the total supply of savings with the total demand for borrowing.
3. Allocate capital to its most efficient uses.

The financial system allows the transfer of assets and risks from one entity to another as well as across time. Entities who utilize the financial system include individuals, firms, governments, charities, and others.

Achievement of Purposes in the Financial System

The financial system allows entities to save, borrow, issue equity capital, manage risks, exchange assets, and to utilize information. The financial system is best at fulfilling these roles when the markets are liquid, transactions costs are low, information is readily available, and when regulation ensures the execution of contracts.

Savings. Individuals will save (e.g., for retirement) and expect a return that compensates them for risk and the use of their money. Firms save a portion of their sales to fund future expenditures. Vehicles used for saving include stocks, bonds, certificates of deposit, real assets, and other assets.

Borrowing. Individuals may borrow in order to buy a house, fund a college education, or for other purposes. A firm may borrow in order to finance capital expenditures and for other activities. Governments may issue debt to fund their expenditures. Lenders can require collateral to protect them in the event of borrower defaults, take an equity position, or investigate the credit risk of the borrower.

Issuing equity. Another method of raising capital is to issue equity, where the capital providers will share in any future profits. Investment banks help with issuance, analysts value the equity, and regulators and accountants encourage the dissemination of information.

Risk management. Entities face risks from changing interest rates, currency values, commodities values, and defaults on debt, among other things. For example, a firm that owes a foreign currency in 90 days can lock in the price of this foreign currency in domestic currency units by entering into a forward contract. Future delivery of the foreign currency is guaranteed at a domestic-currency price set at inception of the contract. In this transaction, the firm would be referred to as a *hedger*. This hedging allows the firm to enter a market that it would otherwise be reluctant to enter by reducing the risk of the transaction. Hedging instruments are available from exchanges, investment banks, insurance firms, and other institutions.

Exchanging assets. The financial system also allows entities to exchange assets. For example, Proctor and Gamble may sell soap in Europe but have costs denominated in U.S. dollars. Proctor and Gamble can exchange their euros from soap sales for dollars in the currency markets.

Utilizing information. Investors with information expect to earn a return on that information in addition to their usual return. Investors who can identify assets that are currently undervalued or overvalued in the market can earn extra returns from investing based on their information (when their analysis is correct).

Return Determination

The financial system also provides a mechanism to determine the rate of return that equates the amount of borrowing with the amount of lending (saving) in an economy. Low rates of return increase borrowing but reduce saving (increase current consumption). High rates of return increase saving but reduce borrowing. The **equilibrium interest rate** is the rate at which the amount individuals, businesses, and governments desire to borrow is equal to the amount that individuals, businesses, and governments desire to lend. Equilibrium rates for different types of borrowing and lending will differ due to differences in risk, liquidity, and maturity.

Allocation of Capital

With limited availability of capital, one of the most important functions of a financial system is to allocate capital to its most efficient uses. Investors weigh the expected risks and returns of different investments to determine their most preferred investments. As long as investors are well informed regarding risk and return and markets function well, this results in an allocation to capital to its most valuable uses.

LOS 39.b: Describe classifications of assets and markets.

Financial assets include securities (stocks and bonds), derivative contracts, and currencies. **Real assets** include real estate, equipment, commodities, and other

physical assets.

Financial securities can be classified as debt or equity. **Debt securities** are promises to repay borrowed funds. **Equity securities** represent ownership positions.

Public (publicly traded) securities are traded on exchanges or through securities dealers and are subject to regulatory oversight. Securities that are not traded in public markets are referred to as **private securities**. Private securities are often illiquid and not subject to regulation.

Derivative contracts have values that depend on (are derived from) the values of other assets. **Financial derivative contracts** are based on equities, equity indexes, debt, debt indexes, or other financial contracts. **Physical derivative contracts** derive their values from the values of physical assets such as gold, oil, and wheat.

Markets for immediate delivery are referred to as **spot markets**. Contracts for the future delivery of physical and financial assets include forwards, futures, and options. Options provide the buyer the right, but not the obligation, to purchase (or sell) assets over some period or at some future date at predetermined prices.

The **primary market** is the market for newly issued securities. Subsequent sales of securities are said to occur in the **secondary market**.

Money markets refer to markets for debt securities with maturities of one year or less. **Capital markets** refer to markets for longer-term debt securities and equity securities that have no specific maturity date.

Traditional investment markets refer to those for debt and equity. **Alternative markets** refer to those for hedge funds, commodities, real estate, collectibles, gemstones, leases, and equipment. Alternative assets are often more difficult to value, illiquid, require investor due diligence, and therefore often sell at a discount.

LOS 39.c: Describe the major types of securities, currencies, contracts, commodities, and real assets that trade in organized markets, including their distinguishing characteristics and major subtypes.

Assets can be classified as securities, currencies, contracts, commodities, and real assets. Their characteristics and subtypes are as follows.

Securities

Securities can be classified as fixed-income or equity securities, and individual securities can be combined in pooled investment vehicles. Corporations and governments are the most common issuers of individual securities. The initial sale of a security is called an **issue** when the security is sold to the public.

Fixed-income securities typically refer to debt securities that are promises to repay borrowed money in the future. Short-term fixed-income securities generally have a maturity of less than one or two years; long-term term maturities are longer than five to ten years, and intermediate term maturities fall in the middle of the maturity range.

Although the terms are used loosely, *bonds* are generally long term, whereas *notes* are intermediate term. *Commercial paper* refers to short-term debt issued by firms. Governments issue *bills* and banks issue *certificates of deposit*. In *repurchase agreements*, the borrower sells a high-quality asset and has both the right and obligation to repurchase it (at a higher price) in the future. Repurchase agreements can be for terms as short as one day.

Convertible debt is debt that an investor can exchange for a specified number of equity shares of the issuing firm.

Equity securities represent ownership in a firm and include common stock, preferred stock, and warrants.

- **Common stock** is a residual claim on a firm's assets. Common stock dividends are paid only after interest is paid to debtholders and dividends are paid to preferred stockholders. Furthermore, in the event of firm liquidation, debtholders and preferred stockholders have priority over common stockholders and are usually paid in full before common stockholders receive any payment.
- **Preferred stock** is an equity security with scheduled dividends that typically do not change over the security's life and must be paid before any dividends on common stock may be paid.
- **Warrants** are similar to options in that they give the holder the right to buy a firm's equity shares (usually common stock) at a fixed exercise price prior to the warrant's expiration.

Pooled investment vehicles include mutual funds, depositories, and hedge funds. The term refers to structures that combine the funds of many investors in a portfolio of investments. The investor's ownership interests are referred to as *shares*, *units*, *depository receipts*, or *limited partnership interests*.

- **Mutual funds** are pooled investment vehicles in which investors can purchase shares, either from the fund itself (open-end funds) or in the secondary market (closed-end funds).
- **Exchange-traded funds (ETFs)** and **exchange-traded notes (ETNs)** trade like closed-end funds but have special provisions allowing conversion into individual portfolio securities, or exchange of portfolio shares for ETF shares, that keep their market prices close to the value of their proportional interest in the overall portfolio. These funds are sometimes referred to as *depositories*, with their shares referred to as *depository receipts*.
- **Asset-backed securities** represent a claim to a portion of a pool of financial assets such as mortgages, car loans, or credit card debt. The return from the assets is passed through to investors, with different classes of claims (referred to as *tranches*) having different levels of risk.
- **Hedge funds** are organized as limited partnerships, with the investors as the limited partners and the fund manager as the general partner. Hedge funds utilize various strategies and purchase is usually restricted to investors of substantial wealth and investment knowledge. Hedge funds often use leverage. Hedge fund managers are

compensated based on the amount of assets under management as well as on their investment results.

> **PROFESSOR'S NOTE**
>
> Asset-backed securities are described in more detail in Fixed Income. Mutual funds and ETFs are discussed in Portfolio Management. Hedge funds are discussed in Alternative Investments.

Currencies

Currencies are issued by a government's central bank. Some are referred to as **reserve currencies**, which are those held by governments and central banks worldwide. These include the dollar and euro and, secondarily, the British pound, Japanese yen, and Swiss franc. In spot currency markets, currencies are traded for immediate delivery.

Contracts

Contracts are agreements between two parties that require some action in the future, such as exchanging an asset for cash. Financial contracts are often based on securities, currencies, commodities, or security indexes (portfolios). They include futures, forwards, options, swaps, and insurance contracts.

A **forward contract** is an agreement to buy or sell an asset in the future at a price specified in the contract at its inception. An agreement to purchase 100 ounces of gold 90 days from now for $2,000 per ounce is a forward contract. Forward contracts are not traded on exchanges or in dealer markets.

Futures contracts are similar to forward contracts except that they are standardized as to amount, asset characteristics, and delivery time and are traded on an exchange (in a secondary market) so that they are liquid investments.

In a **swap contract**, two parties make payments that are equivalent to one asset being traded (swapped) for another. In a simple *interest rate swap*, floating rate interest payments are exchanged for fixed-rate payments over multiple settlement dates. A *currency swap* involves a loan in one currency for the loan of another currency for a period of time. An *equity swap* involves the exchange of the return on an equity index or portfolio for the interest payment on a debt instrument.

An **option contract** gives its owner the right to buy or sell an asset at a specific exercise price at some specified time in the future. A **call option** gives the option buyer the right (but not the obligation) to buy an asset. A **put option** gives the option buyer the right (but not the obligation) to sell an asset.

Sellers, or writers, of call (put) options receive a payment, referred to as the *option premium*, when they sell the options but incur the obligation to sell (buy) the asset at the specified price if the option owner chooses to exercise it.

Options on currencies, stocks, stock indexes, futures, swaps, and precious metals are traded on exchanges. Customized options contracts are also sold by dealers in the over-the-counter market.

An **insurance contract** pays a cash amount if a future event occurs. They are used to hedge against unfavorable, unexpected events. Examples include life, liability, and automobile insurance contracts. Insurance contracts can sometimes be traded to other parties and often have tax-advantaged payouts.

Credit default swaps are a form of insurance that makes a payment if an issuer defaults on its bonds. They can be used by bond investors to hedge default risk. They can also be used by parties that will experience losses if an issuer experiences financial distress and by others who are speculating that the issuer will experience more or less financial trouble than is currently expected.

Commodities

Commodities trade in spot, forward, and futures markets. They include precious metals, industrial metals, agricultural products, energy products, and credits for carbon reduction.

Futures and forwards allow both hedgers and speculators to participate in commodity markets without having to deliver or store the physical commodities.

Real Assets

Examples of **real assets** are real estate, equipment, and machinery. Although they have been traditionally held by firms for their use in production, real assets are increasingly held by institutional investors both directly and indirectly.

Buying real assets directly often provides income, tax advantages, and diversification benefits. However, they often entail substantial management costs. Furthermore, because of their heterogeneity, they usually require the investor to do substantial due diligence before investing. They are illiquid because their specialization may result in a limited pool of investors for a particular real asset.

Rather than buying real assets directly, an investor may choose to buy them indirectly through an investment such as a *real estate investment trust (REIT)* or *master limited partnership (MLP)*. The investor owns an interest in these vehicles, which hold the assets directly. Indirect ownership interests are typically more liquid than ownership of the assets themselves. Another indirect ownership method is to buy the stock of firms that have large ownership of real assets.

LOS 39.d: Describe types of financial intermediaries and services that they provide.

Financial intermediaries stand between buyers and sellers, facilitating the exchange of assets, capital, and risk. Their services allow for greater efficiency and are vital to a well-functioning economy. Financial intermediaries include brokers and exchanges, dealers, securitizers, depository institutions, insurance companies, arbitrageurs, and clearinghouses.

Brokers, Dealers, and Exchanges

Brokers help their clients buy and sell securities by finding counterparties to trades in a cost efficient manner. They may work for large brokerage firms, for banks, or at exchanges.

Block brokers help with the placement of large trades. Typically, large trades are difficult to place without moving the market. For example, a large sell order might cause a security's price to decrease before the order can be fully executed. Block brokers help conceal their clients' intentions so that the market does not move against them.

Investment banks help corporations sell common stock, preferred stock, and debt securities to investors. They also provide advice to firms, notably about mergers, acquisitions, and raising capital.

Exchanges provide a venue where traders can meet. Exchanges sometimes act as brokers by providing electronic order matching. Exchanges regulate their members and require firms that list on the exchange to provide timely financial disclosures and to promote shareholder democratization. Exchanges acquire their regulatory power through member agreement or from their governments.

Alternative trading systems (ATS), which serve the same trading function as exchanges but have no regulatory function, are also known as **electronic communication networks (ECNs)** or **multilateral trading facilities (MTFs)**. ATS that do not reveal current client orders are known as *dark pools*.

Dealers facilitate trading by buying for or selling from their own inventory. Dealers provide liquidity in the market and profit primarily from the spread (difference) between the price at which they will buy (bid price) and the price at which they will sell (ask price) the security or other asset.

Some dealers also act as brokers. **Broker-dealers** have an inherent conflict of interest. As brokers, they should seek the best prices for their clients, but as dealers, their goal is to profit through prices or spreads. As a result, traders typically place limits on how their orders are filled when they transact with broker-dealers.

Dealers that trade with central banks when the banks buy or sell government securities in order to affect the money supply are referred to as **primary dealers**.

Securitizers

Securitizers pool large amounts of securities or other assets and then sell interests in the pool to other investors. The returns from the pool, net of the securitizer's fees, are passed through to the investors. By securitizing the assets, the securitizer creates a diversified pool of assets with more predictable cash flows than the individual assets in the pool. This creates liquidity in the assets because the ownership interests are more easily valued and traded. There are also economies of scale in the management costs of large pools of assets and potential benefits from the manager's selection of assets.

Assets that are often securitized include mortgages, car loans, credit card receivables, bank loans, and equipment leases. The primary benefit of securitization is to decrease the funding costs for the assets in the pool. A firm may set up a *special purpose vehicle (SPV)* or *special purpose entity (SPE)* to buy firm assets, which removes them from the firm's balance sheet and may increase their value by removing the risk that financial trouble at the firm will give other investors a claim to the assets' cash flows.

The cash flows from securitized assets can be segregated by risk. The different risk categories are called *tranches*. The senior tranches provide the most certain cash flows, while the junior tranches have greater risk.

Depository Institutions

Examples of **depository institutions** include banks, credit unions, and savings and loans. They pay interest on customer deposits and provide transaction services such as checking accounts. These financial intermediaries then make loans with the funds, which offer diversification benefits. The intermediaries have expertise in evaluating credit quality and managing the risk of a portfolio of loans of various types.

Other intermediaries, such as payday lenders and factoring companies, lend money to firms and individuals on the basis of their wages, accounts receivable, and other future cash flows. These intermediaries often finance the loans by issuing commercial paper or other debt securities.

Securities brokers provide loans to investors who purchase securities on margin. When this margin lending is to hedge funds and other institutions, the brokers are referred to as *prime brokers*.

The equity owners (stockholders) of banks, brokers, and other intermediaries absorb any loan losses before depositors and other lenders. The more equity capital an intermediary has, the less risk for depositors. Poorly capitalized intermediaries (those with less equity) have less incentive to reduce the risk of their loan portfolios because they have less capital at risk.

Insurance Companies

Insurance companies are intermediaries, in that they collect insurance premiums in return for providing risk reduction to the insured. The insurance firm can do this efficiently because it provides protection to a diversified pool of policyholders, whose risks of loss are typically uncorrelated. This provides more predictable losses and cash flows compared to a single insurance contract, in the same way that a bank's diversified portfolio of loans diversifies the risk of loan defaults.

Insurance firms also provide a benefit to investors by managing the risks inherent in insurance: moral hazard, adverse selection, and fraud. **Moral hazard** occurs because the insured may take more risks once he is protected against losses. **Adverse selection** occurs when those most likely to experience losses are the predominant buyers of insurance. In **fraud**, the insured purposely causes damage or claims fictitious losses so he can collect on his insurance policy.

Arbitrageurs

In its pure (riskless) form, **arbitrage** refers to buying an asset in one market and reselling it in another at a higher price. By doing so, arbitrageurs act as intermediaries, providing liquidity to participants in the market where the asset is purchased and transferring the asset to the market where it is sold.

In markets with good information, pure arbitrage is rare because traders will favor the markets with the best prices. More commonly, arbitrageurs try to exploit pricing differences for similar instruments. For example, a dealer who sells a call option will often also buy the stock because the call and stock price are highly correlated. Likewise, arbitrageurs will attempt to exploit discrepancies in the pricing of the call and stock. Many (risk) arbitrageurs use complex models for valuation of related securities and for risk control. Creating similar positions using different assets is referred to as *replication*. This is also a form of intermediation because similar risks are traded in different forms and in different markets.

Clearinghouses and Custodians

Clearinghouses act as intermediaries between buyers and sellers in financial markets and provide:

- Escrow services (transferring cash and assets to the respective parties).
- Guarantees of contract completion.
- Assurance that margin traders have adequate capital.
- Limits on the aggregate net order quantity (buy orders minus sell orders) of members.

Through these activities, clearinghouses limit **counterparty risk**, the risk that the other party to a transaction will not fulfill its obligation. In some markets, the clearinghouse ensures only the trades of its member brokers and dealers, who, in turn, ensure the trades of their retail customers.

Custodians also improve market integrity by holding client securities and preventing their loss due to fraud or other events that affect the broker or investment manager.

MODULE 39.2: POSITIONS AND LEVERAGE

Video covering
this content is
available online.

LOS 39.e: Compare positions an investor can take in an asset.

An investor who owns an asset, or has the right or obligation under a contract to purchase an asset, is said to have a **long position**. A **short position** can result from borrowing an asset and selling it, with the obligation to replace the asset in the future (a short sale). The party to a contract who must sell or deliver an asset in the future is also said to have a short position. In general, investors who are long benefit from an increase in the price of an asset and those who are short benefit when the asset price declines.

Hedgers use short positions in one asset to hedge an existing risk from a long position in another asset that has returns that are strongly correlated with the returns of the asset shorted. For example, wheat farmers may take a short position in (i.e., sell) wheat futures contracts. If wheat prices fall, the resulting increase in the value of the short futures position offsets, partially or fully, the loss in the value of the farmer's crop.

> **PROFESSOR'S NOTE**
>
> As a rule of thumb, hedgers must "do in the futures market what they must do in the future." Thus, the farmer who must sell wheat in the future can reduce the risk from wheat price fluctuations by selling wheat futures.

The buyer of an option contract is said to be long the option. The seller is short the option and is said to have written the option. Note that an investor who is long (buys) a call option on an asset profits when the value of the underlying asset increases in value, while the party short the option has losses. A long position in a put option on an asset has the right to sell the asset at a specified price and profits when the price of the underlying asset falls, while the party short the option has losses.

In swaps, each party is long one asset and short the other, so the designation of the long and short side is often arbitrary. Usually, however, the side that benefits from an increase in the quoted price or rate is referred to as the long side.

In a currency contract, each party is long one currency and short the other. For example, the buyer of a euro futures contract priced in dollars is long the euro and short the dollar.

Short Sales and Positions

In a **short sale**, the short seller (1) simultaneously borrows and sells securities through a broker, (2) must return the securities at the request of the lender or when the short sale is closed out, and (3) must keep a portion of the proceeds of the short sale on deposit with the broker. Short sellers hope to profit from a fall in the price of the security or asset sold short, buying at a lower price in the future in order to repay the loan of the asset originally sold at a higher price. The repayment of the borrowed security or other asset is referred to as "covering the short position."

In a short sale, the short seller must pay all dividends or interest that the lender would have received from the security that has been loaned to the short seller. These payments are called **payments-in-lieu** of dividends or interest. The short seller must also deposit the proceeds of the short sale as collateral to guarantee the eventual repurchase of the security. The broker then earns interest on these funds and may return a portion of this interest to the short seller at a rate referred to as the **short rebate rate**. The short rebate rate is usually only provided to institutional investors and is typically 0.1% less than overnight interest rates. If the security is difficult to borrow, the short rebate rate may be lower or negative. The difference between the interest earned on the proceeds from the short sale and the short rebate paid is the return to the lender of the securities. A short sale may also require the short seller to deposit additional margin in the form of cash or short-term riskless securities.

Leveraged Positions

The use of borrowed funds to purchase an asset results in a **leveraged position** and the investor is said to be using leverage. Investors who use leverage to buy securities by borrowing from their brokers are said to buy on **margin** and the borrowed funds are referred to as a **margin loan**. The interest rate paid on the funds is the **call money rate**, which is generally higher than the government bill rate. The call money rate is lower for larger investors with better collateral.

At the time of a new margin purchase, investors are required to provide a minimum amount of equity, referred to as the **initial margin requirement**. This requirement may be set by the government, exchange, clearinghouse, or broker. Lower risk in an investor's portfolio will often result in the broker lending more funds.

The use of leverage magnifies both the gains and losses from changes in the value of the underlying asset. The additional risk from the use of borrowed funds is referred to as risk from **financial leverage**.

LOS 39.f: Calculate and interpret the leverage ratio, the rate of return on a margin transaction, and the security price at which the investor would receive a margin call.

The **leverage ratio** of a margin investment is the value of the asset divided by the value of the equity position. For example, an investor who satisfies an initial margin requirement of 50% equity has a 2-to-1 leverage ratio so that a 10% increase (decrease) in the price of the asset results in a 20% increase (decrease) in the investor's equity amount.

> **EXAMPLE: Margin transaction**
>
> Given the following information:
>
> | | |
> |---|---|
> | Shares purchased | 1,000 |
> | Purchase price per share | $100 |
> | Annual dividend per share | $2.00 |
> | Initial margin requirement | 40% |
> | Call money rate | 4% |
> | Commission per share | $0.05 |
> | Stock price after one year | $110 |
>
> Calculate (1) the leverage ratio and (2) the investor's return on the margin transaction (return on equity) if the stock is sold at the end of one year.
>
> **Answer:**
>
> 1. The leverage ratio = 1 / 0.40 = 2.5.
> 2. The total purchase price is 1,000 × $100 = $100,000. The investor must post initial margin of 40% × $100,000 = $40,000. The remaining $60,000 is borrowed. The

commission on the purchase is 1,000 × $0.05 = $50. Thus, the total initial equity investment is $40,050.

At the end of one year, the stock value is 1,000 × $110 = $110,000, for a gain of $9,950. Dividends received are 1,000 × $2.00 = $2,000. Interest paid is $60,000 × 4% = $2,400. The commission on the sale is 1,000 × $0.05 = $50.

The gain on the transaction in one year is $9,950 + $2,000 − $2,400 − $50 = $9,500. The return on the equity investment is $9,500 / $40,050 = 23.72%. The investor's net return is less than the asset total return (10% price appreciation + 2% dividend = 12%) multiplied by the leverage ratio (12% × 2.5 = 30%) because of the loan interest and commissions.

We can also solve for the return on the margin transaction with the cash flow functions on a financial calculator. The initial cash outflow is the $40,000 initial margin + $50 purchase commission = $40,050. The inflow after one year is the $110,000 stock value + $2,000 dividends − $60,000 margin repayment − $2,400 margin interest − $50 sale commission = $49,550. Using the cash flow functions: CF_0 = −40,050; CF_1 = 49,550; CPT IRR = 23.72%.

To ensure that the loan is covered by the value of the asset, an investor must maintain a minimum equity percentage, called the **maintenance margin requirement**, in the account. This minimum is typically 25% of the current position value, but brokers may require a greater minimum equity percentage for volatile stocks.

If the percentage of equity in a margin account falls below the maintenance margin requirement, the investor will receive a **margin call**, a request to bring the equity percentage in the account back up to the maintenance margin percentage. An investor can satisfy this request by depositing additional funds or depositing other unmargined securities that will bring the equity percentage up to the minimum requirement. If the investor does not meet the margin call, the broker must sell the position.

The stock price which results in a margin call can be calculated by using the following formula:

$$\text{margin call price} = P_0\left(\frac{1 - \text{initial margin}}{1 - \text{maintenance margin}}\right)$$

where:
P_0 = initial purchase price

EXAMPLE: Margin call price

If an investor purchases a stock for $40 per share with an initial margin requirement of 50% and the maintenance margin requirement is 25%, at what price will the investor get a margin call?

Answer:

$$\frac{\$40(1 - 0.5)}{1 - 0.25} = \$26.67$$

> A margin call is triggered at a price below $26.67.

In a short sale, the investor must deposit initial margin equal to a percentage of the value of the shares sold short to protect the broker in case the share price increases. An increase in the share price can decrease the margin percentage below the maintenance margin percentage and generate a margin call.

MODULE QUIZ 39.1, 39.2

1. An investor who buys a government bond from a dealer's inventory is said to obtain a:

   A. real asset in a primary market transaction.
   B. financial asset in a primary market transaction.
   C. financial asset in a secondary market transaction.

2. Daniel Ferramosco is concerned that a long-term bond he holds might default. He therefore buys a contract that will compensate him in the case of default. What type of contract does he hold?

   A. Physical derivative contract.
   B. Primary derivative contract.
   C. Financial derivative contract.

3. A financial intermediary buys a stock and then resells it a few days later at a higher price. Which intermediary would this *most likely* describe?

   A. Broker.
   B. Dealer.
   C. Arbitrageur.

4. Which of the following is *most* similar to a short position in the underlying asset?

   A. Buying a put.
   B. Writing a put.
   C. Buying a call.

5. An investor buys 1,000 shares of a stock on margin at a price of $50 per share. The initial margin requirement is 40% and the margin lending rate is 3%. The investor's broker charges a commission of $0.01 per share on purchases and sales. The stock pays an annual dividend of $0.30 per share. One year later, the investor sells the 1,000 shares at a price of $56 per share. The investor's rate of return is *closest* to:

   A. 12%.
   B. 27%.
   C. 36%.

MODULE 39.3: ORDER EXECUTION AND VALIDITY

Video covering this content is available online.

LOS 39.g: Compare execution, validity, and clearing instructions.

LOS 39.h: Compare market orders with limit orders.

Securities dealers provide prices at which they will buy and sell shares. The **bid price** is the price at which a dealer will buy a security. The **ask** or **offer price** is the price at which a dealer will sell a security. The difference between the bid and ask prices is

referred to as the **bid-ask spread** and is the source of a dealer's compensation. The bid and ask are quoted for specific trade sizes (**bid size** and **ask size**).

> **PROFESSOR'S NOTE**
> Calculations with bid and ask prices are unlikely to appear on the Level I exam but they do appear at Level II. If you need to work with bid and ask prices, just remember that the price you get will be the one that is *worse for you*.
>
> - Securities: If you are buying, you must pay the higher price. If you are selling, you only receive the lower price.
> - Currencies: The bid or ask price you get is the one that gives you less of the currency you are acquiring. This works regardless of which way the exchange rate is quoted.

The quotation in the market is the highest dealer bid and lowest dealer ask from among all dealers in a particular security. More liquid securities have market quotations with bid-ask spreads that are lower (as a percentage of share price) and therefore have lower transactions costs for investors. Traders who post bids and offers are said to *make a market*, while those who trade with them at posted prices are said to *take the market*.

When investors want to buy or sell, they must enter orders that specify the size of the trade and whether to buy or sell. The order can also include *execution instructions* that specify how to trade, *validity instructions* that specify when the order can be filled, and *clearing instructions* that specify how to settle the trade.

Execution Instructions

The most common orders, in terms of execution instructions, are market or limit orders. A **market order** instructs the broker to execute the trade immediately at the best possible price. A **limit order** places a minimum execution price on sell orders and a maximum execution price on buy orders. For example, a buy order with a limit of $6 will be executed immediately as long as the shares can be purchased for $6 or less.

A market order is often appropriate when the trader wants to execute quickly, as when the trader has information she believes is not yet reflected in market prices. The disadvantage of market orders is that they may execute at unfavorable prices, especially if the security has low trading volume relative to the order size. A market buy order may execute at a high price or a market sell order may execute at a low price. Executing at an unfavorable price represents a concession by the trader for immediate liquidity. Unfortunately, these price concessions are unpredictable.

To avoid price execution uncertainty, a trader can place a limit order instead of the market order. The disadvantage of the limit order is that it might not be filled. For example, if a trader places a limit buy order of $50 and no one is willing to sell at $50, the order will not be filled. Furthermore, if the stock price rises over time, the trader misses out on the gains.

A limit buy order above the best ask or a limit sell order below the best bid are said to be *marketable* or *aggressively priced* because at least part of the order is likely to

execute immediately. If the limit price is between the best bid and the best ask, a limit order is said to be *making a new market* or *inside the market*. Limit orders waiting to execute are called **standing limit orders**.

A limit buy order at the best bid or a limit sell order at the best ask are said to *make the market*. Again, the order might not be filled. A buy order with a limit price below the best bid, or a sell order with a limit price above the best ask, is said to be *behind the market*. It will likely not execute until security prices move toward the limit price. A limit buy order with a price considerably lower than the best bid, or a limit sell order with a price significantly higher than the best ask, is said to be *far from the market*.

Other execution instructions concern the volume of the trade. **All-or-nothing orders** execute only if the whole order can be filled. Orders can specify the minimum size of a trade, which is beneficial when trading costs depend on the number of executed trades rather than the size of the order.

Trade visibility can also be specified. **Hidden orders** are those for which only the broker or exchange knows the trade size. These are useful for investors that have a large amount to trade and do not want to reveal their intentions. Traders can also specify **display size**, where some of the trade is visible to the market, but the rest is not. These are also referred to as **iceberg orders** because part of most of the order is hidden from view. They allow the investor to advertise some of the trade, with the rest of the trade potentially executed once the visible part has executed. Sometimes entering trades for part of the position the trader wishes to establish is a way to estimate the liquidity of, or the buying interest in, the security in question.

Validity Instructions

Validity instructions specify when an order should be executed. Most orders are **day orders**, meaning they expire if unfilled by the end of the trading day. **Good til canceled** orders last until they are filled. **Immediate-or-cancel** orders are canceled unless they can be filled immediately. They are also known as **fill-or-kill** orders. **Good-on-close** orders are only filled at the end of the trading day. If they are market orders, they are referred to as **market-on-close** orders. These are often used by mutual funds because their portfolios are valued using closing prices. There are also **good-on-open** orders.

Stop orders are those that are not executed unless the stop price has been met. They are often referred to as **stop loss orders** because they can be used to prevent losses or to protect profits. Suppose an investor purchases a stock for $50. If the investor wants to sell out of the position if the price falls 10% to $45, he can enter a stop-sell order at $45. If the stock trades down to $45 or lower, this triggers a market order to sell. There is no guarantee that the order will execute at $45, and a rapidly falling stock could be sold at a price significantly lower than $45.

A stop-buy order is entered with a stop (trigger) above the current market price. There are two primary reasons a trader would enter a stop-buy order. (1) A trader with a short position could attempt to limit losses from an increasing stock price with a stop-buy order. (2) It is often said, "You don't get paid for being right until the market agrees with you." With this in mind, an investor who believes a stock is undervalued, but does not wish to own it until there are signs that market participants are being convinced of

this undervaluation, may place a stop-buy order at a price some specific percentage above the current price.

Note that stop orders reinforce market momentum. Stop-sell orders execute when market prices are falling, and stop-buy orders execute when the market is rising. Execution prices for stop orders are therefore often unfavorable.

> **EXAMPLE: Using stop orders**
>
> Raymond Flowers believes that the shares of Acme Corp. that he owns are overvalued currently but knows that stocks often continue to increase above their intrinsic values for some time before correcting. What type of order should Flowers place if he wants to sell his shares when the price begins to fall a significant amount?
>
> **Answer:**
>
> Flowers should enter a good til canceled stop-sell order at a price some percentage below the current level. If, for example, the shares are trading at 40, he could enter a stop-sell order at 36, 10% below the current level. Investors sometimes move these stops up as a stock continues to increase in price. In response to a price increase to 42, Flowers might move his stop-sell order up to 37.80, 10% below the new price. Note that a limit order to sell with a limit price below the current market price would likely execute immediately.

Clearing Instructions

Clearing instructions tell the trader how to clear and settle a trade. They are usually standing instructions and not attached to an order. Retail trades are typically cleared and settled by the broker, whereas institutional trades may be settled by a custodian or another broker, which might be the trader's prime broker. Using two brokers allows the investor to keep one broker as her prime broker for margin and custodial services while using a variety of other brokers for specialized execution.

One important clearing instruction is whether a sell order is a short sale or long sale. In the former, the broker must confirm that the security can be borrowed and in the latter, that the security can be delivered.

LOS 39.i: Define primary and secondary markets and explain how secondary markets support primary markets.

Primary capital markets refer to the sale of newly issued securities. New equity issues involve either:

- New shares issued by firms whose shares are already trading in the marketplace. These issues are called **seasoned offerings** or **secondary issues**.
- First-time issues by firms whose shares are not currently publicly traded. These are called **initial public offerings (IPOs)**.

Secondary financial markets are where securities trade after their initial issuance. Placing a buy order on the London Stock Exchange is an order in the secondary market and will result in purchase of existing shares from their current owner.

Primary Market: Public Offerings

Corporate stock or bond issues are almost always sold with the assistance of an investment banking firm. The investment bank finds investors who agree to buy part of the issue. These are not actual orders but are referred to as **indications of interest**. When the number of shares covered by indications of interest are greater (less) than the number of shares to be offered, the offering price may be adjusted upward (downward). This process of gathering indications of interest is referred to as **book building**. In London, the book builder is referred to as the **book runner**. In Europe, an **accelerated book build** occurs when securities must be issued quickly. To build a book, the investment bank disseminates information about the firm's financials and prospects. The issuer must also make disclosures including how the funds will be used.

The most common way an investment bank assists with a security issuance is through an **underwritten offering**. Here, the investment bank agrees to purchase the entire issue at a price that is negotiated between the issuer and bank. If the issue is undersubscribed, the investment bank must buy the unsold portion. In the case of an IPO, the investment bank also agrees to make a market in the stock for a period after the issuance to provide price support for the issue.

An investment bank can also agree to distribute shares of an IPO on a **best efforts** basis, rather than agreeing to purchase the whole issue. If the issue is undersubscribed, the bank is not obligated to buy the unsold portion.

Note that investment banks have a conflict of interest in an underwritten offer. As the issuer's agents, they should set the price high to raise the most funds for the issuer. But, as underwriters, they would prefer that the price be set low enough that the whole issue sells. This also allows them to allocate portions of an undervalued IPO to their clients. This results in IPOs typically being underpriced. Issuers also could have an interest in underpricing the IPO because of the negative publicity when an undersubscribed IPO initially trades at a price below the IPO price investors pay. An IPO that is oversubscribed and has the expectation of trading significantly above its IPO price is referred to as a hot issue.

Primary Market: Private Placements and Other Transactions

In a **private placement**, securities are sold directly to qualified investors, typically with the assistance of an investment bank. Qualified investors are those with substantial wealth and investment knowledge. Private placements do not require the issuer to disclose as much information as they must when the securities are being sold to the public. The issuance costs are less with a private placement and the offer price is also lower because the securities cannot be resold in public markets, making them less valuable than shares registered for public trading.

In a **shelf registration**, a firm makes its public disclosures as in a regular offering but then issues the registered securities over time when it needs capital and when the markets are favorable.

A **dividend reinvestment plan** (**DRP** or **DRIP**) allows existing shareholders to use their dividends to buy new shares from the firm at a slight discount.

In a **rights offering**, existing shareholders are given the right to buy new shares at a discount to the current market price. Shareholders tend to dislike rights offerings because their ownership is diluted unless they exercise their rights and buy the additional shares. However, rights can be traded separately from the shares themselves in some circumstances.

In addition to firms issuing securities, governments issue short-term and long-term debt, either by auction or through investment banks.

Importance of the Secondary Market

Secondary markets are important because they provide liquidity and price/value information. Liquid markets are those in which a security can be sold quickly without incurring a discount from the current price. The better the secondary market, the easier it is for firms to raise external capital in the primary market, which results in a lower cost of capital for firms with shares that have adequate liquidity.

LOS 39.j: Describe how securities, contracts, and currencies are traded in quote-driven, order-driven, and brokered markets.

The trading of securities in the secondary market has encouraged the development of market structures to facilitate trading. Trading can be examined according to when securities are traded and how they are traded.

Securities markets may be structured as call markets or continuous markets. In **call markets**, the stock is only traded at specific times. Call markets are potentially very liquid when in session because all traders are present, but they are obviously illiquid between sessions. In a call market, all trades, bids, and asks are declared, and then one negotiated price is set that clears the market for the stock. This method is used in smaller markets but is also used to set opening prices and prices after trading halts on major exchanges.

In **continuous markets**, trades occur at any time the market is open. The price is set by either the auction process or by dealer bid-ask quotes.

Market Structures

There are three main categories of securities markets: *quote-driven markets* where investors trade with dealers, *order-driven markets* where rules are used to match buyers and sellers, and *brokered markets* where investors use brokers to locate a counterparty to a trade.

Quote-Driven Markets

In **quote-driven markets**, traders transact with dealers (market makers) who post bid and ask prices. Dealers maintain an inventory of securities. Quote-driven markets are thus sometimes called **dealer markets**, **price-driven markets**, or **over-the-counter markets**. Most securities other than stocks trade in quote-driven markets. Trading often takes place electronically.

Order-Driven Markets

In **order-driven markets**, orders are executed using trading rules, which are necessary because traders are usually anonymous. Exchanges and automated trading systems are examples of order-driven markets. Two sets of rules are used in these markets: order matching rules and trade pricing rules.

Order matching rules establish an *order precedence hierarchy*. **Price priority** is one criteria, where the trades given highest priority are those at the highest bid (buy) and lowest ask (sell). If orders are at the same prices, a **secondary precedence rule** gives priority to non-hidden orders and earliest arriving orders. These rules encourage traders to price their trades aggressively, display their entire orders, and trade earlier, thereby improving liquidity.

After orders are created using order matching rules, **trade pricing rules** are used to determine the price. Under the *uniform pricing rule*, all orders trade at the same price, which is the price that results in the highest volume of trading. The *discriminatory pricing rule* uses the limit price of the order that arrived first as the trade price.

In an electronic crossing network, the typical trader is an institution. Orders are batched together and crossed (matched) at fixed points in time during the day at the average of the bid and ask quotes from the exchange where the stock primarily trades. This pricing rule is referred to as the *derivative pricing rule* because it is derived from the security's main market. The price is not determined by orders in the crossing network.

Brokered Markets

In **brokered markets**, brokers find the counterparty in order to execute a trade. This service is especially valuable when the trader has a security that is unique or illiquid. Examples are large blocks of stock, real estate, and artwork. Dealers typically do not carry an inventory of these assets and there are too few trades for these assets to trade in order-driven markets.

Market Information

A market is said to be **pre-trade transparent** if investors can obtain pre-trade information regarding quotes and orders. A market is **post-trade transparent** if investors can obtain post-trade information regarding completed trade prices and sizes.

Buy-side traders value transparency because it allows them to better understand security values and trading costs. Dealers, on the other hand, prefer opaque markets because this provides them with an informational advantage over traders who trade

less frequently in the security. Transactions costs and bid-ask spreads are larger in opaque markets.

LOS 39.k: Describe characteristics of a well-functioning financial system.

A well-functioning financial system allows entities to achieve their purposes. More specifically, **complete markets** fulfill the following:

- Investors can save for the future at fair rates of return.
- Creditworthy borrowers can obtain funds.
- Hedgers can manage their risks.
- Traders can obtain the currencies, commodities, and other assets they need.

If a market can perform these functions at low trading costs (including commissions, bid-ask spreads, and price impacts), it is said to be **operationally efficient**. If security prices reflect all the information associated with fundamental value in a timely fashion, then the financial system is **informationally efficient**. A well-functioning financial system has complete markets that are operationally and informationally efficient, with prices that reflect fundamental values.

A well-functioning financial system has financial intermediaries that:

- Organize trading venues, including exchanges, brokerages, and alternative trading systems.
- Supply liquidity.
- Securitize assets so that borrowers can obtain funds inexpensively.
- Manage banks that use depositor capital to fund borrowers.
- Manage insurance firms that pool unrelated risks.
- Manage investment advisory services that assist investors with asset management inexpensively.
- Provide clearinghouses that settle trades.
- Manage depositories that provide for asset safety.

The benefits of a well-functioning financial system are tremendous. Savers can fund entrepreneurs who need capital to fund new companies. Company risks can be shared so that risky companies can be funded. These benefits are enhanced because the transactions can occur among strangers, widening the opportunities for capital formation and risk sharing in the economy.

Furthermore, in informationally efficiently markets, capital is allocated to its most productive use. That is, they are **allocationally efficient**. Informational efficiency is brought about by traders who bid prices up and down in response to new information that changes estimates of securities' fundamental values. If markets are operationally efficient, security prices will be more informationally efficient because low trading costs encourage trading based on new information. The existence of accounting standards and financial reporting requirements also reduces the costs of obtaining information and increases security values.

LOS 39.l: Describe objectives of market regulation.

Without market regulation, many problems could persist in financial markets:

- *Fraud and theft*: In complex financial markets, the potential for theft and fraud increases because investment managers and others can take advantage of unsophisticated investors. Furthermore, if returns are often random, it is difficult for investors to determine if their agents (e.g., investment managers and brokers) are performing well.

- *Insider trading*: If investors believe traders with inside information will exploit them, they will exit the market and liquidity will be reduced.

- *Costly information*: If obtaining information is relatively expensive, markets will not be as informationally efficient and investors will not invest as much.

- *Defaults*: Parties might not honor their obligations in markets.

To solve these problems, market regulation should:

- Protect unsophisticated investors so that trust in the markets is preserved.

- Require minimum standards of competency and make it easier for investors to evaluate performance. The CFA Program and the Global Investment Performance Standards are part of this effort.

- Prevent insiders from exploiting other investors.

- Require common financial reporting requirements (e.g., those of the International Accounting Standards Board) so that information gathering is less expensive.

- Require minimum levels of capital so that market participants will be able to honor their long-term commitments. This is especially important for insurance companies and pension funds that individuals depend on for their financial future. With capital at stake, market participants have more incentive to be careful about the risks they take.

Regulation can be provided by governments as well as industry groups. For example, most exchanges, clearinghouses, and dealer trade organizations are self-regulating organizations (SROs), meaning that they regulate their members. Governments sometimes delegate regulatory authority to SROs.

When they fail to address the problems mentioned previously, financial markets do not function well. Liquidity declines, firms shun risky projects, new ideas go unfunded, and economic growth slows.

MODULE QUIZ 39.3

1. A stock is selling at $50. An investor's valuation model estimates its intrinsic value to be $40. Based on her estimate, she would *most likely* place a:
   A. short-sale order.
   B. stop order to buy.
   C. market order to buy.

2. Which of the following limit buy orders would be the *most likely* to go unexecuted?
   A. A marketable order.

B. An order behind the market.

C. An order making a new market.

3. New issues of securities are transactions in the:

A. primary market.

B. secondary market.

C. seasoned market.

4. In which of the following types of markets do stocks trade any time the market is open?

A. Exchange markets.

B. Call markets.

C. Continuous markets.

5. A market is said to be informationally efficient if it features:

A. market prices that reflect all available information about the value of the securities traded.

B. timely and accurate information about current supply and demand conditions.

C. many buyers and sellers that are willing to trade at prices above and below the prevailing market price.

6. Which of the following would *least likely* be an objective of market regulation?

A. Reduce burdensome accounting standards.

B. Make it easier for investors to evaluate performance.

C. Prevent investors from using inside information in securities trading.

KEY CONCEPTS

LOS 39.a

The three main functions of the financial system are to:

1. Allow entities to save, borrow, issue equity capital, manage risks, exchange assets, and utilize information.

2. Determine the return that equates aggregate savings and borrowing.

3. Allocate capital efficiently.

LOS 39.b

Assets and markets can be classified as:

- Financial assets (e.g., securities, currencies, derivatives) versus real assets (e.g., real estate, equipment).

- Debt securities versus equity securities.

- Public securities that trade on exchanges or through dealers versus private securities.

- Physical derivative contracts (e.g., on grains or metals) versus financial derivative contracts (e.g., on bonds or equity indexes).

- Spot versus future delivery markets.

- Primary markets (issuance of new securities) versus secondary markets (trading of previously issued securities).

- Money markets (short-term debt instruments) versus capital markets (longer-term debt instruments and equities).
- Traditional investment markets (bonds, stocks) versus alternative investment markets (e.g., real estate, hedge funds, fine art).

LOS 39.c

The major types of assets are securities, currencies, contracts, commodities, and real assets.

Securities include fixed income (e.g., bonds, notes, commercial paper), equity (common stock, preferred stock, warrants), and pooled investment vehicles (mutual funds, exchange-traded funds, hedge funds, asset-backed securities).

Contracts include futures, forwards, options, swaps, and insurance contracts.

Commodities include agricultural products, industrial and precious metals, and energy products and are traded in spot, forward, and futures markets.

Most national currencies are traded in spot markets and some are also traded in forward and futures markets.

LOS 39.d

Financial intermediaries perform the following roles:

- Brokers, exchanges, and alternative trading systems connect buyers and sellers of the same security at the same location and time. They provide a centralized location for trading.
- Dealers match buyers and sellers of the same security at different points in time.
- Arbitrageurs connect buyers and sellers of the same security at the same time but in different venues. They also connect buyers and sellers of non-identical securities of similar risk.
- Securitizers and depository institutions package assets into a diversified pool and sell interests in it. Investors obtain greater liquidity and choose their desired risk level.
- Insurance companies create a diversified pool of risks and manage the risk inherent in providing insurance.
- Clearinghouses reduce counterparty risk and promote market integrity.

LOS 39.e

A long position in an asset represents current or future ownership. A long position benefits when the asset increases in value.

A short position represents an agreement to sell or deliver an asset or results from borrowing an asset and selling it (i.e., a short sale). A short position benefits when the asset decreases in value.

When an investor buys a security by borrowing from a broker, the investor is said to buy on margin and has a leveraged position. The risk of investing borrowed funds is referred to as financial leverage. More leverage results in greater risk.

LOS 39.f

The leverage ratio is the value of the asset divided by the value of the equity position. Higher leverage ratios indicate greater risk.

The return on a margin transaction is the increase in the value of the position after deducting selling commissions and interest charges, divided by the amount of funds initially invested, including purchase commissions.

The maintenance margin is the minimum percentage of equity that a margin investor is required to maintain in his account. If the investor's equity falls below the maintenance margin, the investor will receive a margin call. The stock price that will result in a margin call is:

$$\text{margin call price} = P_0\left(\frac{1 - \text{initial margin}}{1 - \text{maintenance margin}}\right)$$

where:
P_0 = initial purchase price

LOS 39.g

Execution instructions specify how to trade. Market orders and limit orders are examples of execution instructions.

Validity instructions specify when an order can be filled. Day orders, good til canceled orders, and stop orders are examples of validity instructions.

Clearing instructions specify how to settle a trade.

LOS 39.h

A market order is an order to execute the trade immediately at the best possible price. A market order is appropriate when the trader wants to execute a transaction quickly. The disadvantage of a market order is that it may execute at an unfavorable price.

A limit order is an order to trade at the best possible price, subject to the price satisfying the limit condition. A limit order avoids price execution uncertainty. The disadvantage of a limit order is that it may not be filled. A buy (sell) order with a limit of $18 will only be executed if the security can be bought (sold) at a price of $18 or less (more).

LOS 39.i

New issues of securities are sold in primary capital markets. Secondary financial markets are where securities trade after their initial issuance.

In an underwritten offering, the investment bank guarantees that the issue will be sold at a price that is negotiated between the issuer and bank. In a best efforts offering, the bank acts only as a broker.

In a private placement, a firm sells securities directly to qualified investors, without the disclosures of a public offering.

A liquid secondary market makes it easier for firms to raise external capital in the primary market, which results in a lower cost of capital for firms.

LOS 39.j

There are three main categories of securities markets:

1. Quote-driven markets: Investors trade with dealers that maintain inventories of securities, currencies, or contracts.
2. Order-driven markets: Order-matching and trade-pricing rules are used to match the orders of buyers and sellers.
3. Brokered markets: Brokers locate a counterparty to take the other side of a buy or sell order.

In call markets, securities are only traded at specific times. In continuous markets, trades occur at any time the market is open.

LOS 39.k

A well-functioning financial system has the following characteristics:

- Complete markets: Savers receive a return, borrowers can obtain capital, hedgers can manage risks, and traders can acquire needed assets.
- Operational efficiency: Trading costs are low.
- Informational efficiency: Prices reflect fundamental information quickly.
- Allocational efficiency: Capital is directed to its highest valued use.

LOS 39.l

The objectives of market regulation are to:

- Protect unsophisticated investors.
- Establish minimum standards of competency.
- Help investors to evaluate performance.
- Prevent insiders from exploiting other investors.
- Promote common financial reporting requirements so that information gathering is less expensive.
- Require minimum levels of capital so that market participants will be able to honor their commitments and be more careful about their risks.

ANSWER KEY FOR MODULE QUIZZES

Module Quiz 39.1, 39.2

1. **C** Bonds are financial assets. Real assets are physical things such as a commodity or a factory. Buying a bond from a dealer is a secondary market transaction. A primary market transaction is an issuance of securities by an entity that is raising funds. (Module 39.1, LOS 39.b)

2. **C** Daniel holds a derivative contract that has a value determined by another financial contract; in this case, the long-term bond. (Module 39.1, LOS 39.c)

3. **B** This situation best describes a dealer. A dealer buys an asset for its inventory in the hopes of reselling it later at a higher price. Brokers stand between buyers and sellers of the same security at the same location and time. Arbitrageurs trade in the same security simultaneously in different markets. (Module 39.1, LOS 39.d)

4. **A** Buying a put is most similar to a short position in the underlying asset because the put increases in value if the underlying asset value decreases. The writer of a put and the holder of a call have a long exposure to the underlying asset because their positions increase in value if the underlying asset value increases. (Module 39.2, LOS 39.e)

5. **B** The total purchase price is 1,000 × $50 = $50,000. The investor must post initial margin of 40% × $50,000 = $20,000. The remaining $30,000 is borrowed. The commission on the purchase is 1,000 × $0.01 = $10. Thus, the initial equity investment is $20,010.

   In one year, the sales price is 1,000 × $56 = $56,000. Dividends received are 1,000 × $0.30 = $300. Interest paid is $30,000 × 3% = $900. The commission on the sale is 1,000 × $0.01 = $10. Thus, the ending value is $56,000 – $30,000 + $300 – $900 – $10 = $25,390.

   The return on the equity investment is $25,390 / $20,010 – 1 = 26.89%. (Module 39.2, LOS 39.f)

Module Quiz 39.3

1. **A** If the investor believes the stock is overvalued in the market, the investor should place a short-sale order, which would be profitable if the stock moves toward her value estimate. (LOS 39.g, 39.h)

2. **B** A behind-the-market limit order would be least likely executed. In the case of a buy, the limit buy order price is below the best bid and will likely not execute until security prices decline. A marketable buy order is the most likely to trade because it is close to the best ask price. In an order that is making a new market or inside the market, the limit buy order price is between the best bid and ask. (LOS 39.h)

3. **A** The primary market refers to the market for newly issued securities. (LOS 39.i)

4. **C** Continuous markets are defined as markets where stocks can trade any time the market is open. Some exchange markets are call markets where orders are accumulated and executed at specific times. (LOS 39.j)

5. **A** Informational efficiency means the prevailing price reflects all available information about the value of the asset, and the price reacts quickly to new information. (LOS 39.k)

6. **A** Market regulation should require financial reporting standards so that information gathering is less expensive and the informational efficiency of the markets is enhanced. (LOS 39.l)

READING 40

SECURITY MARKET INDEXES

MODULE 40.1: INDEX WEIGHTING METHODS

LOS 40.a: Describe a security market index.

A **security market index** is used to represent the performance of an asset class, security market, or segment of a market. They are usually created as portfolios of individual securities, which are referred to as the **constituent securities** of the index. An index has a numerical value that is calculated from the market prices (actual when available, or estimated) of its constituent securities at a point in time. An index return is the percentage change in the index's value over a period of time.

LOS 40.b: Calculate and interpret the value, price return, and total return of an index.

An index return may be calculated using a **price index** or a **return index**. A price index uses only the prices of the constituent securities in the return calculation. A rate of return that is calculated based on a price index is referred to as a **price return**.

A return index includes both prices and income from the constituent securities. A rate of return that is calculated based on a return index is called a **total return**. If the assets in an index produce interim cash flows such as dividends or interest payments, the total return will be greater than the price return.

Once returns are calculated for each period, they then can be compounded together to arrive at the return for the measurement period:

$$R_P = (1 + R_{S1})(1 + R_{S2})(1 + R_{S3})(1 + R_{S4})...(1 + R_{Sk}) - 1$$

where:
R_P = portfolio return during the measurement period
k = total number of subperiods
R_{Sk} = portfolio return during the subperiod k

For example, if the returns for the first two periods were 0.50% and 1.04%, they would be geometrically linked to produce 1.55%:

$$R_P = (1 + R_{S1})(1 + R_{S2}) - 1 = (1.005)(1.0104) - 1 = 0.0155 \text{ or } 1.55\%$$

If the starting index value is 100, its value after two periods would be 100 × 1.0155 = 101.55.

LOS 40.c: Describe the choices and issues in index construction and management.

Index providers must make several decisions:

- What is the *target market* the index is intended to measure?
- Which securities from the target market should be included?
- How should the securities be weighted in the index?
- How often should the index be rebalanced?
- When should the selection and weighting of securities be re-examined?

The target market may be defined broadly (e.g., stocks in the United States) or narrowly (e.g., small-cap value stocks in the United States). It may also be defined by geographic region or by economic sector (e.g., cyclical stocks). The constituent stocks in the index could be all the stocks in that market or just a representative sample. The selection process may be determined by an objective rule or subjectively by a committee.

LOS 40.d: Compare the different weighting methods used in index construction.

Weighting schemes for stock indexes include price weighting, equal weighting, market capitalization weighting, float-adjusted market capitalization weighting, and fundamental weighting.

A **price-weighted index** is simply an arithmetic average of the prices of the securities included in the index. The divisor of a price-weighted index is adjusted for stock splits and changes in the composition of the index when securities are added or deleted, such that the index value is unaffected by such changes.

The advantage of a price-weighted index is that its computation is simple. One disadvantage is that a given percentage change in the price of a higher priced stock has a greater impact on the index's value than does an equal percentage change in the price of a lower priced stock. Put another way, higher priced stocks have more weight in the calculation of a price-weighted index. Additionally, a stock's weight in the index going forward changes if the firm splits its stock, repurchases stock, or issues stock dividends, as all of these actions will affect the price of the stock and therefore its weight in the index. A portfolio that has an equal number of shares in each of the constituent stocks will have price returns (ignoring dividends) that will match the returns of a price-weighted index.

Two major price-weighted indexes are the Dow Jones Industrial Average (DJIA) and the Nikkei Dow Jones Stock Average. The DJIA is a price-weighted index based on 30 U.S. stocks. The Nikkei Dow is constructed from the prices of 225 stocks that trade in the first section of the Tokyo Stock Exchange.

An **equal-weighted index** is calculated as the arithmetic average return of the index stocks and, for a given time period, would be matched by the returns on a portfolio that had equal dollar amounts invested in each index stock. As with a price-weighted index, an advantage of an equal-weighted index is its simplicity.

One complication with an equal-weighted index return is that a matching portfolio would have to be adjusted periodically (rebalanced) as prices change so that the values of all security positions are made equal each period. The portfolio rebalancing required to match the performance of an equal-weighted index creates high transactions costs that would decrease portfolio returns.

Another concern with an equal-weighted index is that the weights placed on the returns of the securities of smaller capitalization firms are greater than their proportions of the overall market value of the index stocks. Conversely, the weights on the returns of large capitalization firms in the index are smaller than their proportions of the overall market value of the index stocks.

The Value Line Composite Average and the Financial Times Ordinary Share Index are well-known examples of equal-weighted indexes.

A **market capitalization-weighted index** (or **value-weighted index**) has weights based on the market capitalization of each index stock (current stock price multiplied by the number of shares outstanding) as a proportion of the total market capitalization of all the stocks in the index. A market capitalization-weighted index return can be matched with a portfolio in which the value of each security position in the portfolio is the same proportion of the total portfolio value as the proportion of that security's market capitalization to the total market capitalization of all of the securities included in the index. This weighting method more closely represents changes in aggregate investor wealth than price weighting. Because the weight of an index stock is based on its market capitalization, a market capitalization-weighted index does not need to be adjusted when a stock splits or pays a stock dividend.

An alternative to using a firm's market capitalization to calculate its weight in an index is to use its **market float**. A firm's market float is the total value of the shares that are actually available to the investing public and excludes the value of shares held by controlling stockholders because they are unlikely to sell their shares. For example, the float for Microsoft would exclude shares owned by Bill Gates and Paul Allen (the founders) and those of certain other large shareholders as well. The market float is often calculated excluding those shares held by corporations or governments as well. Sometimes the market float calculation excludes shares that are not available to foreign buyers and is then referred to as the **free float**. The reason for this is to better match the index weights of stocks to their proportions of the total value of all the shares of index stocks that are actually available to investors.

A **float-adjusted market capitalization-weighted index** is constructed like a market capitalization-weighted index. The weights, however, are based on the proportionate value of each firm's shares that are available to investors to the total market value of the shares of index stocks that are available to investors. Firms with relatively large percentages of their shares held by controlling stockholders will have less weight than they have in an unadjusted market-capitalization index.

The advantage of market capitalization-weighted indexes of either type is that index security weights represent proportions of total market value. The primary disadvantage of value-weighted indexes is that the relative impact of a stock's return on the index increases as its price rises and decreases as its price falls. This means that stocks that are possibly overvalued are given disproportionately high weights in the index and stocks that are possibly undervalued are given disproportionately low weights. Holding a portfolio that tracks a value-weighted index is, therefore, similar to following a momentum strategy, under which the most successful stocks are given the greatest weights and poor performing stocks are underweighted.

The Standard and Poor's 500 (S&P 500) Index Composite is an example of a market capitalization-weighted index.

An index that uses **fundamental weighting** uses weights based on firm fundamentals, such as earnings, dividends, or cash flow. In contrast to market capitalization index weights, these weights are unaffected by the share prices of the index stocks (although related to them over the long term). Fundamental weights can be based on a single measure or some combination of fundamental measures.

An advantage of a fundamental-weighted index is that it avoids the bias of market capitalization-weighted indexes toward the performance of the shares of overvalued firms and away from the performance of the shares of undervalued firms. A fundamental-weighted index will actually have a value tilt, overweighting firms with high value-based metrics such as book-to-market ratios or earnings yields. Note that a firm with a high earnings yield (total earnings to total market value) relative to other index firms will by construction have a higher weight in an earnings-weighted index because, among index stocks, its earnings are high relative to its market value.

LOS 40.e: Calculate and analyze the value and return of an index given its weighting method.

Price Weighting

A price-weighted index adds the market prices of each stock in the index and divides this total by the number of stocks in the index. The divisor, however, must be adjusted for stock splits and other changes in the index portfolio to maintain the continuity of the series over time.

$$\text{price-weighted index} = \frac{\text{sum of stock prices}}{\text{number of stocks in index adjusted for splits}}$$

> **EXAMPLE: Price-weighted index**
>
> Given the information for the three stocks presented in the following figure, calculate a price-weighted index return over a one-month period.
>
> **Index Firm Data**

	Share Price December 31, 20X6	Share Price January 31, 20X7
Stock X	$10	$20
Stock Y	$20	$15
Stock Z	$60	$40

Answer:

The price-weighted index is (10 + 20 + 60) / 3 = 30 as of December 31 and (20 + 15 + 40) / 3 = 25 as of January 31. Hence, the price-weighted 1-month percentage return is:

$$\frac{25}{30} - 1 = -16.7\%$$

EXAMPLE: Adjusting a price-weighted index for stock splits

At the market close on Day 1, Stock A has a price of $10, Stock B has a price of $20, and Stock C has a price of $90. The value of a price-weighted index of these three stocks is (10 + 20 + 90) / 3 = 40 at the close of trading. If Stock C splits 2-for-1, effective on Day 2, what is the new denominator for the index?

Answer:

The effect of the split on the price of Stock C, in the absence of any change from the price at the end of Day 1, would be to reduce it to $90 / 2 = $45. The index denominator will be adjusted so that the index value would remain at 40 if there were no changes in the stock prices other than to adjust for the split. The new denominator, d, must satisfy (10 + 20 + 45) / d = 40 and equals 1.875.

The returns on a price-weighted index could be matched by purchasing an equal number of shares of each stock represented in the index. Because the index is price weighted, a percentage change in a high-priced stock will have a relatively greater effect on the index than the same percentage change in a low-priced stock.

Market Capitalization Weighting

A market capitalization-weighted index is calculated by summing the total value (current stock price multiplied by the number of shares outstanding) of all the stocks in the index. This sum is then divided by a similar sum calculated during the selected base period. The ratio is then multiplied by the index's base value (typically 100).

For example, if the total market values of the index portfolio on December 31 and January 31 are $80 million and $95 million, respectively, the index value at the end of January is:

$$\text{current index value} = \frac{\text{current total market value of index stocks}}{\text{base year total market value of index stocks}}$$

$$\times \text{ base year index value}$$

$$\text{current index value} = \frac{\$95 \text{ million}}{\$80 \text{ million}} \times 100 = 118.75$$

Thus, the market capitalization-weighted index percentage return is:

$$(118.75 \text{ / } 100) - 1 = 18.75\%$$

The following example of price-weighting versus market value-weighting shows how these two indexes are calculated and how they differ.

EXAMPLE: **Price-weighted vs. market capitalization-weighted indexes**

Consider the three firms described in the following table. Compare the effects on a price-weighted index and a market capitalization-weighted index if Stock A doubles in price or if Stock C doubles in price. Assume the period shown in the table is the base period for the market capitalization-weighted index and that its base value is 100.

Index Firm Data

Company	Number of Shares Outstanding (000s)	Stock Price	Capitalization
A	100	$100	$10,000,000
B	1,000	$10	$10,000,000
C	20,000	$1	$20,000,000

Answer:

The price-weighted index equals:

$$\frac{100 + 10 + 1}{3} = 37$$

If Stock A doubles in price to $200, the price-weighted index value is:

$$\frac{200 + 10 + 1}{3} = 70.33$$

If Stock C doubles in price to $2, the price-weighted index value is:

$$\frac{100 + 10 + 2}{3} = 37.33$$

If Stock A doubles in value, the index goes up 33.33 points, while if Stock C doubles in value, the index only goes up 0.33 points. Changes in the value of the firm with the highest stock price have a disproportionately large influence on a price-weighted index.

For a market capitalization-weighted index, the base period market capitalization is $(100,000 \times \$100) + (1,000,000 \times \$10) + (20,000,000 \times \$1) = \$40,000,000$.

If Stock A doubles in price to $200, the index goes to:

$$\frac{100{,}000 \times \$200 + 1{,}000{,}000 \times \$10 + 20{,}000{,}000 \times \$1}{\$40{,}000{,}000} \times 100 = 125$$

If Stock C doubles in price to $2, the index goes to:

$$\frac{100{,}000 \times \$100 + 1{,}000{,}000 \times \$10 + 20{,}000{,}000 \times \$2}{\$40{,}000{,}000} \times 100 = 150$$

In the market capitalization-weighted index, the returns on Stock C have the greatest influence on the index return because Stock C's market capitalization is larger than that of Stock A or Stock B.

Equal Weighting

An equal-weighted index places an equal weight on the returns of all index stocks, regardless of their prices or market values. A $2 change in the price of a $20 stock has the same effect on the index as a $30 change in the price of a $300 stock regardless of the size of the company. The return of an equal-weighted index over a given period is often calculated as a simple average of the returns of the index stocks.

EXAMPLE: Equally weighted index

Calculate the equal-weighted index value for the three stocks described in the following table, assuming an initial index value of 131.

Equal-Weighted Index Data

Stock	Initial Price	Current Price	Price Change
A	$12	$15	+25.0%
B	$52	$48	−7.7%
C	$38	$45	+18.4%

Answer:

$$\text{change in index} = \frac{25\% - 7.7\% + 18.4\%}{3} = 11.9\%$$
$$\text{new index value} = 131(1 + 0.119) = 146.59$$

Note that for a total return index, period returns would include any dividends paid over the period.

MODULE QUIZ 40.1

1. Choices that must be made when constructing a security market index *least likely* include whether to:
   A. use a nominal or interval scale.
   B. measure the performance of an entire market or market segment.

C. weight the securities equally or by some firm-specific characteristic.

Use the information in the following table to answer Questions 2 through 4.

	As of January 1		As of December 31	
	Share Price	Number of Shares Outstanding (thousands)	Share Price	Number of Shares Outstanding (thousands)
Stock A	$22	1,500	$28	1,500
Stock B	$40	10,000	$50	10,000
Stock C	$34	3,000	$30	3,000

2. The 1-year return on a price-weighted index of these three stocks is *closest* to:

    A. 12.5%.

    B. 13.5%.

    C. 18.0%.

3. The 1-year return on an equal-weighted index of these three stocks is *closest* to:

    A. 12.0%.

    B. 12.5%.

    C. 13.5%.

4. The 1-year return on a market capitalization-weighted index of these stocks is *closest* to:

    A. 12.5%.

    B. 13.5%.

    C. 18.0%.

5. Market float of a stock is *best* described as its:

    A. total outstanding shares.

    B. shares that are available to domestic investors.

    C. outstanding shares, excluding those held by controlling shareholders.

6. For which of the following indexes will rebalancing occur *most* frequently?

    A. A price-weighted index.

    B. An equal-weighted index.

    C. A market capitalization-weighted index.

MODULE 40.2: USES AND TYPES OF INDEXES

LOS 40.f: Describe rebalancing and reconstitution of an index.

Rebalancing refers to adjusting the weights of securities in a portfolio to their target weights after price changes have affected the weights. For index calculations, rebalancing to target weights on the index securities is done on a periodic basis, usually quarterly. Because the weights in price- and value-weighted indexes (portfolios) are adjusted to their correct values by changes in prices, rebalancing is an issue primarily for equal-weighted indexes. As noted previously, the weights on security returns in an (initially) equal-weighted portfolio are not equal as securities prices change over time. Therefore, rebalancing the portfolio at the end of each period used to calculate index returns is necessary for the portfolio return to match the index return.

Index **reconstitution** refers to periodically adding and deleting securities that make up an index. Securities are deleted if they no longer meet the index criteria and are replaced by other securities that do. Indexes are reconstituted to reflect corporate events such as bankruptcy or delisting of index firms and are at the subjective judgment of a committee.

When a security is added to an index, its price tends to rise as portfolio managers seeking to track that index in a portfolio buy the security. The prices of deleted securities tend to fall as portfolio managers sell them. Note that additions and deletions also require that the weights on the returns of other index stocks be adjusted to conform to the desired weighting scheme.

LOS 40.g: Describe uses of security market indexes.

Security market indexes have several uses:

- *Reflection of market sentiment.* Indexes provide a representative market return and thus reflect investor confidence. Although the Dow Jones Industrial Average is a popular index, it reflects the performance of only 30 stocks and thus may not be a good measure of sentiment with regard to the broader market.

- *Benchmark of manager performance.* An index can be used to evaluate the performance of an active manager. Because portfolio performance depends to a large degree on its chosen style, the benchmark should be consistent with the manager's investment approach and style to assess the manager's skill accurately. The index stocks should be those that the manager will actually choose from. For example, a value manager should be compared against a value index, not a broad market index, because portfolio securities will be selected from among value stocks.

- *Measure of market return and risk.* In asset allocation, estimates of the expected return and standard deviation of returns for various asset classes are based on historical returns for an index of securities representing that asset class.

- *Measure of beta and risk-adjusted return.* The use of the capital asset pricing model (CAPM) to determine a stock's expected return requires an estimate of its beta and the return on the market. Index portfolio returns are used as a proxy for the returns on the market portfolio, both in estimating a stock's beta, and then again in calculating its expected return based on its systematic (beta) risk. Expected returns can then be compared to actual stock returns to determine systematic risk-adjusted returns.

- *Model portfolio for index funds.* Investors who wish to invest passively can invest in an index fund, which seeks to replicate the performance of a market index. There are index mutual funds and index exchange-traded funds, as well as private portfolios that are structured to match the return of an index.

LOS 40.h: Describe types of equity indexes.

Investors can use a variety of equity market indexes. These equity indexes can be classified as follows:

- *Broad market index*. Provides a measure of a market's overall performance and usually contains more than 90% of the market's total value. For example, the Wilshire 5000 Index contains more than 6,000 equity securities and is, therefore, a good representation of the overall performance of the U.S. equity market.

- *Multi-market index*. Typically constructed from the indexes of markets in several countries and is used to measure the equity returns of a geographic region (e.g., Latin America indexes), markets based on their stage of economic development (e.g., emerging markets indexes), or the entire world (e.g., MSCI World Index).

- *Multi-market index with fundamental weighting*. Uses market capitalization-weighting for the country indexes but then weights the country index returns in the global index by a fundamental factor (e.g., GDP). This prevents a country with previously high stock returns from being overweighted in a multi-market index.

- *Sector index*. Measures the returns for an industry sector such as health care, financial, or consumer goods firms. Investors can use these indexes in cyclical analysis because some sectors do better than others in various phases of the business cycle. Sector indexes can be for a particular country or global. These indexes are used to evaluate portfolio managers and to construct index portfolios.

- *Style index*. Measures the returns to market capitalization and value or growth strategies. Some indexes reflect a combination of the two (e.g., small-cap value fund). Because there is no widely accepted definition of large-cap, mid-cap, or small-cap stocks, different indexes use different definitions. These definitions may be specified values of market capitalization or relative definitions, such as defining large-cap stocks as the largest 500 firms in a given market. In constructing value stock and growth stock indexes, price-to-earnings ratios or dividend yields are often used to identify value and growth stocks. Over time, stocks can migrate from one classification to another. For example, a successful small-cap company might grow to become a mid-cap or large-cap company. This causes style indexes to typically have higher turnover of constituent firms than broad market indexes.

LOS 40.i: Compare types of security market indexes.

The following table summarizes some of the noteworthy characteristics of various global indexes. Notice from the table that most security market indexes are market capitalization-weighted and often adjusted for the float (securities actually available for purchase). The number of securities in many of these indexes can vary.

Index	Reflects	Number of Constituent Securities	Weighting Method	Notes
Dow Jones Industrial Average	Large U.S. stocks	30	Price	Stocks are chosen by Wall Street Journal editors
Nikkei Stock Average	Large Japanese stocks	225	Modified price	Price weighted and adjusted for high-priced shares
TOPIX	All stocks on the Tokyo Stock Exchange First Section	Variable	Market capitalization, adjusted for float	Has a large number of small illiquid stocks making it hard to replicate. Contains 93% of the market cap of Japanese equities
MSCI All Country World Index	Stocks in 23 developed and 24 emerging markets	Variable	Market capitalization, adjusted for float	Available in both U.S. dollars and local currency
S&P Developed Ex-U.S. BMI Energy Sector Index	Global energy stocks outside the United States	Variable	Market capitalization, adjusted for float	Is the model portfolio for an ETF
Barclays Capital Global Aggregate Bond Index	Global investment-grade bonds	Variable	Market capitalization	Formerly compiled by Lehman Brothers
Markit iBoxx Euro High-Yield Bond Indexes	Below investment-grade bonds	Variable	Market capitalization	Represents liquid portion of market and rebalanced monthly
FTSE EPRA/ NAREIT Global Real Estate Index	Global real estate	Variable	Market capitalization, adjusted for float	Represents publicly traded REITs
HFRX Global Hedge Fund Index	Global hedge funds	Variable	Asset weighted	Contains a variety of hedge fund strategies and is weighted based on the amount invested in each hedge fund
HFRX Equal Weighted Strategies EUR Index	Global hedge funds	Variable	Equal weighted	Contains same strategy funds as HFRX Global Hedge Fund Index and is equal weighted
Morningstar Style Indexes	U.S. stocks grouped by value/growth and market cap	Variable	Market capitalization, adjusted for float	Nine categories classified by combinations of three cap categories and three value/growth categories

LOS 40.j: Describe types of fixed-income indexes.

Fixed-income securities vary widely with respect to their coupon rates, ratings, maturities, and embedded options such as convertibility to common stock. Consequently, a wide variety of fixed-income indexes is available. Like equity indexes, fixed-income indexes are created for various sectors, geographic regions, and levels of country economic development. They can also be constructed based on type of issuer or collateral, coupon, maturity, default risk, or inflation protection. Broad market indexes, sector indexes, style indexes, and other specialized indexes are available.

Investors should be aware of several issues with the construction of fixed-income indexes:

- *Large universe of securities*. The fixed-income security universe is much broader than the universe of stocks. Fixed-income securities are issued not just by firms, but also by governments and government agencies. Each of these entities may also issue various types of fixed-income securities. Also, unlike stocks, bonds mature and must be replaced in fixed-income indexes. As a result, turnover is high in fixed-income indexes.

- *Dealer markets and infrequent trading*. Fixed-income securities are primarily traded by dealers, so index providers must depend on dealers for recent prices. Because fixed-income securities are typically illiquid, a lack of recent trades may require index providers to estimate the value of index securities from recent prices of securities with similar characteristics.

The large number of fixed-income securities results in large differences in the number of index securities among fixed-income indexes. Illiquidity, transactions costs, and high turnover of constituent securities make it both difficult and expensive for fixed-income portfolio managers to replicate a fixed-income index.

LOS 40.k: Describe indexes representing alternative investments.

Alternative assets are of interest to investors because of their potential diversification benefits. Three of the most widely held alternative assets are commodities, real estate, and hedge funds.

Commodity indexes represent futures contracts on commodities such as grains, livestock, metals, and energy. Examples include the Thomson Reuters/Core Commodity CRB Index (previously the Commodity Research Bureau Index) and the S&P GSCI (previously the Goldman Sachs Commodity Index).

The issues in commodity indexes relevant for investors are as follows:

- *Weighting method*. Commodity index providers use a variety of weighting schemes. Some use equal weighting, others weight commodities by their global production values, and others use fixed weights that the index provider determines. As a result, different indexes have significantly different commodity exposures and risk and return characteristics. For example, one index may have a large exposure to the prices of energy commodities while another has a large exposure to the prices of agricultural products.

- *Futures vs. actual*. Commodity indexes are based on the prices of commodity futures contracts, not the spot prices of commodities. Commodity futures contracts reflect the risk-free rate of return, changes in futures prices, and the roll yield. Furthermore, the contracts mature and must be replaced over time by other contracts. For these reasons, the return on commodity futures differs from the returns on a long position in the commodity itself.

Real estate indexes can be constructed using returns based on appraisals of properties, repeat property sales, or the performance of Real Estate Investment Trusts

(REITs). REITs are similar to closed-end mutual funds in that they invest in properties or mortgages and then issue ownership interests in the pool of assets to investors. While real properties are quite illiquid, REIT shares trade like any common shares and many offer very good liquidity to investors. FTSE International produces a family of REIT indexes.

Hedge funds pool investor money and invest in nontraditional assets, using leverage (borrowed money or derivative contracts) and both long and short positions. Most **hedge fund indexes** equally weight the returns of the hedge funds included in the index.

Hedge funds are largely unregulated and are not required to report their performance to index providers. Consequently, some funds will report to one index but not another. The performance of different indexes can thus vary substantially.

Furthermore, it is often the case that those funds that report are the funds that have been successful, as the poorly performing funds do not want to publicize their performance. Funds that have reported in the past but have recently had poor returns may stop reporting their performance. The result is an upward bias in index returns, with hedge funds appearing to be better investments than they actually are.

MODULE QUIZ 40.2

1. The publisher of an index that includes 50 corporate bonds removes from the index three bonds that are nearing maturity and one whose issuer has defaulted and selects four actively traded bonds to replace them in the index. This bond index is said to have been:
   A. redefined.
   B. rebalanced.
   C. reconstituted.

2. Which of the following would *most likely* represent an inappropriate use of an index?
   A. As a reflection of market sentiment.
   B. Comparing a small-cap manager against a broad market.
   C. Using the CAPM to determine the expected return and beta.

3. An index of 200 mid-cap growth stocks is *best* described as a:
   A. style index.
   B. sector index.
   C. broad market index.

4. Which of the following is *least accurate* regarding fixed-income indexes?
   A. Replicating the return on a fixed-income security index is difficult for investors.
   B. There is a great deal of heterogeneity in the composition of fixed-income security indexes.
   C. Due to the large universe of fixed-income security issues, data for fixed-income securities are relatively easy to obtain.

5. Which of the following indexes of alternative investments is *most likely* to be calculated from derivatives prices?
   A. Real estate index.
   B. Commodity index.
   C. Hedge fund index.

6. Most of the widely used global security indexes are:

A. price weighted.
B. equal weighted.
C. market capitalization weighted.

KEY CONCEPTS

LOS 40.a

A security market index represents the performance of an asset class, security market, or segment of a market. The performance of the market or segment over a period of time is represented by the percentage change in (i.e., the return on) the value of the index.

LOS 40.b

A price index uses only the prices of the constituent securities in the return calculation. The rate of return is called a price return.

A total return index uses both the price of and the income from the index securities in the return calculation.

LOS 40.c

Decisions that index providers must make when constructing and managing indexes include:

- The target market the index will measure.
- Which securities from the target market to include.
- The appropriate weighting method.
- How frequently to rebalance the index to its target weights.
- How frequently to re-examine the selection and weighting of securities.

LOS 40.d

A price-weighted index is the arithmetic mean of the prices of the index securities. The divisor, which is initially equal to the number of securities in the index, must be adjusted for stock splits and changes in the composition of the index over time.

An equal-weighted index assigns the same weight to each of its constituent securities.

A market capitalization-weighted index gives each constituent security a weight equal to its proportion of the total market value of all securities in the index. Market capitalization can be adjusted for a security's market float or free float to reflect the fact that not all outstanding shares are available for purchase.

A fundamental-weighted index uses weights that are independent of security prices, such as company earnings, revenue, assets, or cash flow.

LOS 40.e

$$\text{Price-weighted index} = \frac{\text{sum of stock prices}}{\text{number of stocks in index adjusted for splits}}$$

Market capitalization-weighted index =

$$\frac{\text{current total market value of index stocks}}{\text{base year total market value of index stocks}} \times \text{base year index value}$$

$$\text{Equal-weighted index} = (1 + \text{average percentage change in index stocks}) \times \text{initial index value}$$

LOS 40.f

Index providers periodically rebalance the weights of the constituent securities. This is most important for equal-weighted indexes.

Reconstitution refers to changing the securities that are included in an index. This is necessary when securities mature or when they no longer have the required characteristics to be included.

LOS 40.g

Indexes are used for the following purposes:

- Reflection of market sentiment.
- Benchmark of manager performance.
- Measure of market return.
- Measure of beta and excess return.
- Model portfolio for index funds.

LOS 40.h

Broad market equity indexes represent the majority of stocks in a market.

Multi-market equity indexes contain the indexes of several countries. Multi-market equity indexes with fundamental weighting use market capitalization weighting for the securities within a country's market but then weight the countries within the global index by a fundamental factor.

Sector indexes measure the returns for a sector (e.g., health care) and are useful because some sectors do better than others in certain business cycle phases. These indexes are used to evaluate portfolio managers and as models for sector investment funds.

Style indexes measure the returns to market capitalization and value or growth strategies. Stocks tend to migrate among classifications, which causes style indexes to have higher constituent turnover than broad market indexes.

LOS 40.i

Security market indexes available from commercial providers represent a variety of asset classes and reflect target markets that can be classified by:

- Geographic location, such as country, regional, or global indexes.

- Sector or industry, such as indexes of energy producers.
- Level of economic development, such as emerging market indexes.
- Fundamental factors, such as indexes of value stocks or growth stocks.

LOS 40.j

Fixed-income indexes can be classified by issuer, collateral, coupon, maturity, credit risk (e.g., investment grade versus high-yield), and inflation protection. They can be delineated as broad market, sector, style, or other specialized indexes. Indexes exist for various sectors, regions, and levels of development.

The fixed-income security universe is much broader than the equity universe, and fixed-income indexes have higher turnover. Index providers must depend on dealers for fixed-income security prices, and the securities are often illiquid. Fixed-income security indexes vary widely in their numbers of constituent securities and can be difficult and expensive to replicate.

LOS 40.k

Indexes have been developed to represent markets for alternative assets such as commodities, real estate, and hedge funds.

Issues in creating commodity indexes include the weighting method (different indexes can have vastly different commodity weights and resulting risk and return) and the fact that commodity indexes are based on the performance of commodity futures contracts, not the actual commodities, which can result in different performance for a commodity index versus the actual commodity.

Real estate indexes include appraisal indexes, repeat property sales indexes, and indexes of real estate investment trusts.

Because hedge funds report their performance to index providers voluntarily, the performance of different hedge fund indexes can vary substantially and index returns have an upward bias.

ANSWER KEY FOR MODULE QUIZZES

Module Quiz 40.1

1. **A** To be useful, a security market index must have a numerical value. Selecting the target market and determining the weighting method are among the choices that must be made when constructing a securities index. (LOS 40.a, 40.c)

2. **A** $\frac{22 + 40 + 34}{3} = 32, \frac{28 + 50 + 30}{3} = 36, \frac{36}{32} - 1 = 0.125 = 12.5\%$

   (LOS 40.b, 40.d, 40.e)

3. **C** $\left[\left(\frac{28}{22} - 1\right) + \left(\frac{50}{40} - 1\right) + \left(\frac{30}{34} - 1\right)\right]\left(\frac{1}{3}\right) = 0.135 = 13.5\%$

   (LOS 40.b, 40.d, 40.e)

4. **C** Total portfolio value January 1:

22(1,500) + 40(10,000) + 34(3,000) = $535,000

Total portfolio value December 31:

$28(1,500) + 50(10,000) + 30(3,000) = \$632,000$

$\frac{632}{535} - 1 = 0.1813 \approx 18\%$

From a base value of 100, the December 31 index value would be

$\frac{632}{535} \times 100 = 118.13.$

(LOS 40.b, 40.d, 40.e)

5. **C** Market float represents shares available to the investing public and excludes shares held by controlling shareholders. Free float is a narrower measure that also excludes shares that are not available to foreign investors. (LOS 40.d)

6. **B** An equal-weighted index will be rebalanced most frequently because as stock prices change, their representation in the index needs to be adjusted. Price-weighted and market capitalization-weighted indexes do not usually need rebalancing. (LOS 40.d)

Module Quiz 40.2

1. **C** Changing the constituent securities of an index is referred to as reconstituting the index. Rebalancing refers to adjusting the index weights to their target levels. (LOS 40.f)

2. **B** Comparing a small-cap manager against a broad market would be an inappropriate use of an index. A benchmark should be consistent with the manager's investment approach and style. A manager's performance will depend to a large degree on its chosen style. (LOS 40.g)

3. **A** An index for mid-cap growth stocks is best described as a style index. Sector indexes typically measure returns for a specific industry or sector of the economy (e.g., utilities or financial services firms). (LOS 40.h)

4. **C** Fixed-income securities are largely traded by dealers and trade infrequently. Data are therefore difficult to obtain. (LOS 40.j)

5. **B** Commodity indexes are typically calculated from prices of commodity futures contracts. (LOS 40.k)

6. **C** Most global security indexes are market capitalization-weighted with a float adjustment to reflect the amount of shares available to investors. (LOS 40.i)

READING 41

MARKET EFFICIENCY

MODULE 41.1: MARKET EFFICIENCY

LOS 41.a: Describe market efficiency and related concepts, including their importance to investment practitioners.

An **informationally efficient capital market** is one in which the current price of a security fully, quickly, and rationally reflects all available information about that security. This is really a statistical concept. An academic might say, "Given all available information, current securities prices are unbiased estimates of their values, so that the expected return on any security is just the equilibrium return necessary to compensate investors for the risk (uncertainty) regarding its future cash flows." This concept is often put more intuitively as, "You can't beat the market."

In a perfectly efficient market, investors should use a **passive investment** strategy (i.e., buying a broad market index of stocks and holding it) because **active investment** strategies will underperform due to transactions costs and management fees. However, to the extent that market prices are inefficient, active investment strategies can generate positive risk-adjusted returns.

One method of measuring a market's efficiency is to determine the time it takes for trading activity to cause information to be reflected in security prices (i.e., the lag from the time information is disseminated to the time prices reflect the value implications of that information). In some very efficient markets, such as foreign currency markets, this lag can be as short as a minute. If there is a significant lag, informed traders can use the information to potentially generate positive risk-adjusted returns.

Note that market prices should not be affected by the release of information that is well anticipated. Only new information (information that is unexpected and changes expectations) should move prices. The announcement that a firm's earnings were up 45% over the last quarter may be good news if the expected increase was 20%. On the other hand, this may be bad news if a 70% increase was anticipated or no news at all if market participants correctly anticipated quarterly earnings.

LOS 41.b: Contrast market value and intrinsic value.

The **market value** of an asset is its current price. The **intrinsic value** or **fundamental value** of an asset is the value that a rational investor with full knowledge about the

asset's characteristics would willingly pay. For example, a bond investor would fully know and understand a bond's coupon, maturity, default risk, liquidity, and other characteristics and would use these to estimate its intrinsic value.

In markets that are highly efficient, investors can typically expect market values to reflect intrinsic values. If markets are not completely efficient, active managers will buy assets for which they think intrinsic values are greater than market values and sell assets for which they think intrinsic values are less than market values.

Intrinsic values cannot be known with certainty and are estimated by investors who will have differing estimates of an asset's intrinsic value. The more complex an asset, the more difficult it is to estimate its intrinsic value. Furthermore, intrinsic value is constantly changing as new (unexpected) information becomes available.

LOS 41.c: Explain factors that affect a market's efficiency.

Markets are generally neither perfectly efficient nor completely inefficient. The degree of informational efficiency varies across countries, time, and market types. The following factors affect the degree of market efficiency.

Number of market participants. The larger the number of investors, analysts, and traders who follow an asset market, the more efficient the market. The number of participants can vary through time and across countries. For example, some countries prevent foreigners from trading in their markets, reducing market efficiency.

Availability of information. The more information is available to investors, the more efficient the market. In large, developed markets such as the New York Stock Exchange, information is plentiful and markets are quite efficient. In emerging markets, the availability of information is lower, and consequently, market prices are relatively less efficient. Some assets, such as bonds, currencies, swaps, forwards, mortgages, and money market securities that trade in over-the-counter (OTC) markets, may have less available information.

Access to information should not favor one party over another. Therefore, regulations such as the U.S. Securities and Exchange Commission's Regulation FD (fair disclosure) require that firms disclose the same information to the public that they disclose to stock analysts. Traders with material inside information about a firm are prohibited from trading on that information.

Impediments to trading. Arbitrage refers to buying an asset in one market and simultaneously selling it at a higher price in another market. This buying and selling of assets will continue until the prices in the two markets are equal. Impediments to arbitrage, such as high transactions costs or lack of information, will limit arbitrage activity and allow some price inefficiencies (i.e., mispricing of assets) to persist.

Short selling improves market efficiency. The sales pressure from short selling prevents assets from becoming overvalued. Restrictions on short selling, such as an inability to borrow stock cheaply, can reduce market efficiency.

Transaction and information costs. To the extent that the costs of information, analysis, and trading are greater than the potential profit from trading misvalued securities, market prices will be inefficient. It is generally accepted that markets are efficient if, after deducting costs, there are no risk-adjusted returns to be made from trading based on publicly available information.

LOS 41.d: Contrast weak-form, semi-strong-form, and strong-form market efficiency.

Professor Eugene Fama originally developed the concept of market efficiency and identified three forms of market efficiency. The difference among them is that each is based on a different set of information.

1. **Weak-form market efficiency.** The weak form of the efficient markets hypothesis (EMH) states that current security prices *fully reflect all currently available security market data*. Thus, past price and volume (market) information will have no predictive power about the future direction of security prices because price changes will be independent from one period to the next. In a weak-form efficient market, an investor cannot achieve positive risk-adjusted returns on average by using technical analysis.

2. **Semi-strong-form market efficiency.** The semi-strong form of the EMH holds that security prices rapidly adjust without bias to the arrival of all new public information. As such, current security prices *fully reflect all publicly available information*. The semi-strong form says security prices include all past security market information and nonmarket information available to the public. The implication is that an investor cannot achieve positive risk-adjusted returns on average by using fundamental analysis.

3. **Strong-form market efficiency.** The strong form of the EMH states that security prices *fully reflect all information from both public and private sources*. The strong form includes all types of information: past security market information, public, and private (inside) information. This means that no group of investors has monopolistic access to information relevant to the formation of prices, and none should be able to consistently achieve positive abnormal returns.

Given the prohibition on insider trading in most markets, it would be unrealistic to expect markets to reflect all private information. The evidence supports the view that markets are not strong-form efficient.

> **PROFESSOR'S NOTE**
> As a base level knowledge of the EMH, you should know that the weak form is based on past security market information; the semi-strong form is based on all public information (including market information); and the strong form is based on both public information and inside or private information.

LOS 41.e: Explain the implications of each form of market efficiency for fundamental analysis, technical analysis, and the choice between active and

Abnormal profit (or **risk-adjusted returns**) calculations are often used to test market efficiency. To calculate abnormal profits, the expected return for a trading strategy is calculated given its risk, using a model of expected returns such as the CAPM or a multifactor model. If returns are, on average, greater than equilibrium expected returns, we can reject the hypothesis of efficient prices with respect to the information on which the strategy is based.

The results of tests of the various forms of market efficiency have implications about the value of technical analysis, fundamental analysis, and portfolio management in general.

Technical analysis seeks to earn positive risk-adjusted returns by using historical price and volume (trading) data. Tests of weak-form market efficiency have examined whether technical analysis produces abnormal profits. Generally, the evidence indicates that technical analysis does not produce abnormal profits, so we cannot reject the hypothesis that markets are weak-form efficient. However, technical analysis has been shown to have success in emerging markets, and there are so many possible technical analysis trading strategies that they cannot all be tested. As noted previously, the success of any technical analysis strategy should be evaluated considering the costs of information, analysis, and trading.

Fundamental analysis is based on public information such as earnings, dividends, and various accounting ratios and estimates. The semi-strong form of market efficiency suggests that all public information is already reflected in stock prices. As a result, investors should not be able to earn abnormal profits by trading on this information.

One method of testing the semi-strong form is an **event study**. Event studies examine abnormal returns before and after the release of new information that affects a firm's intrinsic value, such as earnings announcements or dividend changes. The null hypothesis is that investors should not be able to earn positive abnormal returns on average by trading based on firm events because prices will rapidly reflect news about a firm's prospects. The evidence in developed markets indicates that markets are generally semi-strong form efficient. However, there is evidence of semi-strong form inefficiency in some emerging markets.

The evidence that developed markets are generally semi-strong form efficient raises questions about the usefulness of fundamental analysis. It must be fundamental analysis, however, that results in informationally efficient market prices. Fundamental analysis can also be of use to those exceptionally skilled investors who can generate abnormal profits through its use and to those who act rapidly before new information is reflected in prices.

> **PROFESSOR'S NOTE**
> Markets can be weak-form efficient without being semi-strong or strong-form efficient. If markets are semi-strong form efficient, they must be weak-form efficient because public information includes market information, but semi-strong form efficient markets need not be strong-form efficient.

Active vs. Passive Portfolio Management

If markets are semi-strong form efficient, investors should invest passively (i.e., invest in an index portfolio that replicates the returns on a market index). Indeed, the evidence shows that most mutual fund managers cannot outperform a passive index strategy over time.

If so, what is the role of a portfolio manager? Even if markets are efficient, portfolio managers can add value by establishing and implementing portfolio risk and return objectives and by assisting clients with portfolio diversification, asset allocation, and tax management.

An anomaly is something that deviates from the common rule. Tests of the EMH are frequently called *anomaly studies*, so in the efficient markets literature, a **market anomaly** is something that would lead us to reject the hypothesis of market efficiency.

Just by chance, some variables will be related to abnormal returns over a given period, although in fact these relationships are unlikely to persist over time. Thus, analysts using historical data can find patterns in security returns that appear to violate market efficiency but are unlikely to recur in the future. If the analyst uses a 5% significance level and examines the relationship between stock returns and 40 variables, two of the variables are expected to show a statistically significant relationship with stock returns by random chance. Recall that the significance level of a hypothesis test is the probability that the null hypothesis (efficiency here) will be rejected purely by chance, even when it is true. Investigating data until a statistically significant relation is found is referred to as **data snooping** or **data mining**. Note that 1,000 analysts, each testing different hypotheses on the same data set, could produce the same results as a single researcher who performed 1,000 hypothesis tests.

To avoid data snooping bias, analysts should first ask if there is an economic basis for the relationships they find between certain variables and stock returns and then test the discovered relationships with a large sample of data to determine if the relationships are persistent and present in various subperiods.

Anomalies in Time-Series Data

Calendar anomalies. The **January effect** or **turn-of-the-year effect** is the finding that during the first five days of January, stock returns, especially for small firms, are significantly higher than they are the rest of the year. In an efficient market, traders would exploit this profit opportunity in January, and in so doing, eliminate it.

Possible explanations for the January effect are **tax-loss selling**, as investors sell losing positions in December to realize losses for tax purposes and then repurchase stocks in January, pushing their prices up, and **window dressing**, as portfolio managers sell risky stocks in December to remove them from their year-end statements and repurchase them in January. Evidence indicates that each of these explains only a

portion of the January effect. However, after adjustments are made for risk, the January effect does not appear to persist over time.

Other calendar anomalies that were found at one time but no longer appear to persist are the *turn-of-the-month effect* (stock returns are higher in the days surrounding month end), the *day-of-the-week effect* (average Monday returns are negative), the *weekend effect* (positive Friday returns are followed by negative Monday returns), and the *holiday effect* (pre-holiday returns are higher).

Overreaction and momentum anomalies. The **overreaction effect** refers to the finding that firms with poor stock returns over the previous three or five years (losers) have better subsequent returns than firms that had high stock returns over the prior period. This pattern has been attributed to investor overreaction to both unexpected good news and unexpected bad news. This pattern is also present for bonds and in some international markets. **Momentum effects** have also been found where high short-term returns are followed by continued high returns. This pattern is present in some international markets as well.

Both the overreaction and momentum effects violate the weak form of market efficiency because they provide evidence of a profitable strategy based only on market data. Some researchers argue that the evidence of overreaction to new information is due to the nature of the statistical tests used and that evidence of momentum effects in securities prices reflects rational investor behavior.

Anomalies in Cross-Sectional Data

The **size effect** refers to initial findings that small-cap stocks outperform large-cap stocks. This effect could not be confirmed in later studies, suggesting that either investors had traded on, and thereby eliminated, this anomaly or that the initial finding was simply a random result for the time period examined.

The **value effect** refers to the finding that **value stocks** [those with lower price-to-earnings (P/E), lower market-to-book (M/B), and higher dividend yields] have outperformed **growth stocks** (those with higher P/E, higher M/B, and lower dividend yields). This violates the semi-strong form of market efficiency because the information necessary to classify stocks as value or growth is publicly available. However, some researchers attribute the value effect to greater risk of value stocks that is not captured in the risk adjustment procedure used in the studies.

Other Anomalies

Closed-end investment funds. The shares of **closed-end investment funds** trade at prices that sometimes deviate from the **net asset value (NAV)** of the fund shares, often trading at large discounts to NAV. Such large discounts are an anomaly because, by arbitrage, the value of the pool of assets should be the same as the market price for closed-end shares. Various explanations have been put forth to explain this anomaly, including management fees, taxes on future capital gains, and share illiquidity. None of these explanations fully explains the pricing discrepancy. However, transactions costs

would eliminate any profits from exploiting the unexplained portion of closed-end fund discounts.

Earnings announcements. An **earnings surprise** is that portion of announced earnings that was not expected by the market. Positive earnings surprises (earnings higher than expected) precede periods of positive risk-adjusted post-announcement stock returns, and negative surprises lead to predictable negative risk-adjusted returns. The anomaly is that the adjustment process does not occur entirely on the announcement day. Investors could exploit this anomaly by buying positive earnings surprise firms and selling negative earnings surprise firms. Some researchers argue that evidence of predictable abnormal returns after earnings surprises is a result of estimating risk-adjusted returns incorrectly in the tests and that transactions costs would eliminate any abnormal profits from attempting to exploit this returns anomaly.

Initial public offerings. IPOs are typically underpriced, with the offer price below the market price once trading begins. However, the long-term performance of IPO shares as a group is below average. This suggests that investors overreact, in that they are too optimistic about a firm's prospects on the offer day. Some believe this is not an anomaly, but rather a result of the statistical methodologies used to estimate abnormal returns.

Economic fundamentals. Research has found that stock returns are related to known economic fundamentals such as dividend yields, stock volatility, and interest rates. However, we would expect stock returns to be related to economic fundamentals in efficient markets. The relationship between stock returns and dividend yields is also not consistent over all time periods.

Implications for Investors

The majority of the evidence suggests that reported anomalies are not violations of market efficiency but are due to the methodologies used in the tests of market efficiency. Furthermore, both underreaction and overreaction have been found in the markets, meaning that prices are efficient on average. Other explanations for the evidence of anomalies are that they are transient relations, too small to profit from, or simply reflect returns to risk that the researchers have failed to account for.

The bottom line for investors is that portfolio management based on previously identified anomalies will likely be unprofitable. Investment management based solely on anomalies has no sound economic basis.

LOS 41.g: Describe behavioral finance and its potential relevance to understanding market anomalies.

Behavioral finance examines the actual decision-making processes of investors. Many observers have concluded that investors are not the rational utility-maximizing decision makers with complete information that traditional finance assumes they are. Investors appear to exhibit bias in their decision making, base decisions on the actions of others, and not evaluate risk in the way traditional models assume they do.

Various types of investor irrationality have been proposed as explanations for reported pricing anomalies. Whether widespread investor irrationality is the underlying cause of reported returns anomalies is an open question. Market efficiency does not require an assumption that every investor acts rationally in accordance with traditional finance theory. Semi-strong form market efficiency requires that investors cannot earn positive abnormal returns on average (beat the market) using public information. The evidence on market efficiency certainly suggests that this is the case. Evidence that some investors exhibit bias, or other deviations from perfect rationality, in their investment decision making does not necessarily mean that market prices themselves are irrational, at least not in ways that lead to violations of market efficiency.

Observed investor behaviors and biases that are considered evidence of irrational behavior include:

- **Loss aversion**, which refers to the tendency of investors to be more risk averse when faced with potential losses than they are when faced with potential gains. Put another way, investors dislike a loss more than they like a gain of an equal amount.

- **Investor overconfidence**, which is a tendency of investors to overestimate their abilities to analyze security information and identify differences between securities' market prices and intrinsic values.

- **Herding**, which is a tendency of investors to act in concert on the same side of the market, acting not on private analysis, but mimicking the investment actions of other investors.

An **information cascade** results when investors mimic the decisions of others. The idea is that uninformed or less-informed traders watch the actions of informed traders and follow their investment actions. If those who act first are more knowledgeable investors, others following their actions may, in fact, be part of the process of incorporating new information into securities prices and actually move market prices toward their intrinsic values, improving informational efficiency.

Behavioral finance can explain how securities' market prices can deviate from rational prices and be biased estimates of intrinsic value. If investor rationality is viewed as a prerequisite for market efficiency, then markets are not efficient. If market efficiency only requires that investors cannot consistently earn abnormal risk-adjusted returns, then research supports the belief that markets are efficient.

MODULE QUIZ 41.1

1. In an informationally efficient capital market:
    A. active managers can generate abnormal profits.
    B. security prices quickly reflect new information.
    C. investors react to all information releases rapidly.

2. The intrinsic value of an asset:
    A. changes through time as new information is released.
    B. is the price at which the asset can be bought or sold at a given point in time.
    C. can be easily determined with a financial calculator, given investor risk preferences.

3. In terms of market efficiency, short selling *most likely*:

A. leads to excess volatility, which reduces market efficiency.

B. promotes market efficiency by making assets less likely to become overvalued.

C. has little effect on market efficiency because short sellers face the risk of unlimited losses.

4. The weak-form EMH asserts that stock prices fully reflect which of the following types of information?

A. Market only.

B. Market and public.

C. Public and private.

5. Research has revealed that the performance of professional money managers tends to be:

A. equal to the performance of a passive investment strategy.

B. inferior to the performance of a passive investment strategy.

C. superior to the performance of a passive investment strategy.

6. Which of the following *best* describes the majority of the evidence regarding anomalies in stock returns?

A. Weak-form market efficiency holds, but semi-strong form efficiency does not.

B. Neither weak-form nor semi-strong form market efficiency holds.

C. Reported anomalies are not violations of market efficiency but are the result of research methodologies.

7. Investors who exhibit loss aversion *most likely*:

A. have symmetric risk preferences.

B. are highly risk averse.

C. dislike losses more than they like equal gains.

KEY CONCEPTS

LOS 41.a

In an informationally efficient capital market, security prices reflect all available information fully, quickly, and rationally. The more efficient a market is, the quicker its reaction will be to new information. Only unexpected information should elicit a response from traders.

If the market is fully efficient, active investment strategies cannot earn positive risk-adjusted returns consistently, and investors should therefore use a passive strategy.

LOS 41.b

An asset's market value is the price at which it can currently be bought or sold.

An asset's intrinsic value is the price that investors with full knowledge of the asset's characteristics would place on the asset.

LOS 41.c

Large numbers of market participants and greater information availability tend to make markets more efficient.

Impediments to arbitrage and short selling and high costs of trading and gathering information tend to make markets less efficient.

LOS 41.d

The weak form of the efficient markets hypothesis (EMH) states that security prices fully reflect all past price and volume information.

The semi-strong form of the EMH states that security prices fully reflect all publicly available information.

The strong form of the EMH states that security prices fully reflect all public and private information.

LOS 41.e

If markets are weak-form efficient, technical analysis does not consistently result in abnormal profits.

If markets are semi-strong form efficient, fundamental analysis does not consistently result in abnormal profits. However, fundamental analysis is necessary if market prices are to be semi-strong form efficient.

If markets are strong-form efficient, active investment management does not consistently result in abnormal profits.

Even if markets are strong-form efficient, portfolio managers can add value by establishing and implementing portfolio risk and return objectives and assisting with portfolio diversification, asset allocation, and tax minimization.

LOS 41.f

A market anomaly is something that deviates from the efficient market hypothesis. Most evidence suggests anomalies are not violations of market efficiency but are due to the methodologies used in anomaly research, such as data mining or failing to adjust adequately for risk.

Anomalies that have been identified in time-series data include calendar anomalies such as the January effect (small firm stock returns are higher at the beginning of January), overreaction anomalies (stock returns subsequently reverse), and momentum anomalies (high short-term returns are followed by continued high returns).

Anomalies that have been identified in cross-sectional data include a size effect (small-cap stocks outperform large-cap stocks) and a value effect (value stocks outperform growth stocks).

Other identified anomalies involve closed-end investment funds selling at a discount to NAV, slow adjustments to earnings surprises, investor overreaction to and long-term underperformance of IPOs, and a relationship between stock returns and prior economic fundamentals.

LOS 41.g

Behavioral finance examines whether investors behave rationally, how investor behavior affects financial markets, and how cognitive biases may result in anomalies. Behavioral finance describes investor irrationality but does not necessarily refute

market efficiency as long as investors cannot consistently earn abnormal risk-adjusted returns.

ANSWER KEY FOR MODULE QUIZ

Module Quiz 41.1

1. **B** In informationally efficient capital markets, new information is quickly reflected in security prices. Investors react only to unexpected information releases because information releases that are expected will already be reflected in securities prices. Active strategies will underperform in an efficient market because they have greater transactions and management costs than passive strategies and will not consistently create positive abnormal returns after adjusting for risk. (LOS 41.a)

2. **A** Intrinsic value changes as new information arrives in the marketplace. It cannot be known with certainty and can only be estimated. The price of an asset at a given point in time is its market value, which will differ from its intrinsic value if markets are not fully efficient. (LOS 41.b)

3. **B** Short selling promotes market efficiency because the sales pressure from short selling can reduce the prices of assets that have become overvalued. (LOS 41.c)

4. **A** Weak-form EMH states that stock prices fully reflect all market (i.e., price and volume) information. (LOS 41.d)

5. **B** Tests indicate that mutual fund performance has been inferior to that of a passive index strategy. (LOS 41.e)

6. **C** The majority of evidence is that anomalies are not violations of market efficiency but are due to the research methodologies used. Portfolio management based on anomalies will likely be unprofitable after transactions costs are considered. (LOS 41.f)

7. **C** Loss aversion refers to the tendency of investors to be more risk averse when faced with potential losses and less risk averse when faced with potential gains. That is, they dislike losses more than they like gains of an equal amount. Their risk preferences are asymmetric. (LOS 41.g)

READING 42

OVERVIEW OF EQUITY SECURITIES

MODULE 42.1: TYPES OF EQUITY INVESTMENTS

LOS 42.a: Describe characteristics of types of equity securities.

Common shares are the most common form of equity and represent an ownership interest. Common shareholders have a residual claim (after the claims of debtholders and preferred stockholders) on firm assets if the firm is liquidated and govern the corporation through voting rights. Firms are under no obligation to pay dividends on common equity; the firm determines what dividend will be paid periodically. Common stockholders are able to vote for the board of directors, on merger decisions, and on the selection of auditors. If they are unable to attend the annual meeting, shareholders can vote by **proxy** (having someone else vote as they direct them, on their behalf).

In a **statutory voting** system, each share held is assigned one vote in the election of each member of the board of directors. Under **cumulative voting**, shareholders can allocate their votes to one or more candidates as they choose. For example, consider a situation where a shareholder has 100 shares and three directors will be elected. Under statutory voting, the shareholder can vote 100 shares for his director choice in each election. Under cumulative voting, the shareholder has 300 votes, which can be cast for a single candidate or spread across multiple candidates. The three receiving the greatest number of votes are elected. Cumulative voting makes it possible for a minority shareholder to have more proportional representation on the board. The way the math works, a holder of 30% of the firm's shares could choose three of ten directors with cumulative voting but could elect no directors under statutory voting.

Preference shares (or **preferred stock**) have features of both common stock and debt. As with common stock, preferred stock dividends are not a contractual obligation, and the shares usually do not mature. Like debt, preferred shares typically make fixed periodic payments to investors and do not usually have voting rights. Preference shares may be callable, giving the firm the right to repurchase the shares at a pre-specified call price. They may also be putable, giving the shareholder the right to sell the preference shares back to the issuer at a specified price.

Cumulative preference shares are usually promised fixed dividends, and any dividends that are not paid must be made up before common shareholders can receive dividends. The dividends of **non-cumulative preference shares** do not accumulate

over time when they are not paid, but dividends for any period must be paid before common shareholders can receive dividends.

Preferred shares have a stated par value and pay a percentage dividend based on the par value of the shares. An $80 par value preferred with a 10% dividend pays a dividend of $8 per year. Investors in **participating preference shares** receive extra dividends if firm profits exceed a predetermined level and may receive a value greater than the par value of the preferred stock if the firm is liquidated. **Non-participating preference shares** have a claim equal to par value in the event of liquidation and do not share in firm profits. Smaller and riskier firms whose investors may be concerned about the firm's future often issue participating preferred stock so investors can share in the upside potential of the firm.

Convertible preference shares can be exchanged for common stock at a conversion ratio determined when the shares are originally issued. They have the following advantages:

- The preferred dividend is higher than a common dividend.
- If the firm is profitable, the investor can share in the profits by converting his shares into common stock.
- The conversion option becomes more valuable when the common stock price increases.
- Preferred shares have less risk than common shares because the dividend is stable and they have priority over common stock in receiving dividends and in the event of liquidation of the firm.

Because of their upside potential, convertible preferred shares are often used to finance risky venture capital and private equity firms. The conversion feature compensates investors for the additional risk they take when investing in such firms.

LOS 42.b: Describe differences in voting rights and other ownership characteristics among different equity classes.

A firm may have different classes of common stock (e.g., "Class A" and "Class B" shares). One class may have greater voting power and seniority if the firm's assets are liquidated. The classes may also be treated differently with respect to dividends, stock splits, and other transactions with shareholders. Information on the ownership and voting rights of different classes of equity shares can be found in the company's filings with securities regulators, such as the Securities and Exchange Commission in the United States.

LOS 42.c: Compare and contrast public and private equity securities.

The discussion so far has centered on equity that is publicly traded. **Private equity** is usually issued to institutional investors via private placements. Private equity markets are smaller than public markets but are growing rapidly.

Compared to public equity, private equity has the following characteristics:

- Less liquidity because no public market for the shares exists.
- Share price is negotiated between the firm and its investors, not determined in a market.
- More limited firm financial disclosure because there is no government or exchange requirement to do so.
- Lower reporting costs because of less onerous reporting requirements.
- Potentially weaker corporate governance because of reduced reporting requirements and less public scrutiny.
- Greater ability to focus on long-term prospects because there is no public pressure for short-term results.
- Potentially greater return for investors once the firm goes public.

The three main types of private equity investments are venture capital, leveraged buyouts, and private investments in public equity.

Venture capital refers to the capital provided to firms early in their life cycles to fund their development and growth. Venture capital financing at various stages of a firm's development is referred to as *seed* or *start-up*, *early stage*, or *mezzanine* financing. Investors can be family, friends, wealthy individuals, or private equity funds. Venture capital investments are illiquid and investors often have to commit funds for three to ten years before they can cash out (exit) their investment. Investors hope to profit when they can sell their shares after (or as part of) an initial public offering or to an established firm.

In a **leveraged buyout (LBO)**, investors buy all of a firm's equity using debt financing (leverage). If the buyers are the firm's current management, the LBO is referred to as a **management buyout (MBO)**. Firms in LBOs usually have cash flow that is adequate to service the issued debt or have undervalued assets that can be sold to pay down the debt over time.

In a **private investment in public equity (PIPE)**, a public firm that needs capital quickly sells private equity to investors. The firm may have growth opportunities, be in distress, or have large amounts of debt. The investors can often buy the stock at a sizeable discount to its market price.

MODULE QUIZ 42.1

1. The advantage of participating preferred shares versus non-participating preferred shares is that participating preferred shares can:
   A. obtain voting rights.
   B. receive extra dividends.
   C. be converted into common stock.

2. Which of the following *best* describes the benefit of cumulative share voting?
   A. It provides significant minority shareholders with proportional representation on the board.
   B. It prevents minority shareholders from exercising excessive control.

C. If cumulative dividends are not paid, preferred shareholders are given voting rights.

3. Compared to public equity, which of the following is *least likely* to characterize private equity?

    A. Lower reporting costs.

    B. Potentially weaker corporate governance.

    C. Lower returns because of its less liquid market.

MODULE 42.2: FOREIGN EQUITIES AND EQUITY RISK

LOS 42.d: Describe methods for investing in non-domestic equity securities.

When capital flows freely across borders, markets are said to be *integrated*. The world's financial markets have become more integrated over time, especially as a result of improved communications and trading technologies. However, barriers to global capital flows still exist. Some countries restrict foreign ownership of their domestic stocks, primarily to prevent foreign control of domestic companies and to reduce the variability of capital flows in and out of their countries.

An increasing number of countries have dropped foreign capital restrictions. Studies have shown that reducing capital barriers improves equity market performance. Furthermore, companies are increasingly turning to foreign investors for capital by listing their stocks on foreign stock exchanges or by encouraging foreign ownership of shares.

From the firm's perspective, listing on foreign stock exchanges increases publicity for the firm's products and the liquidity of the firm's shares. Foreign listing also increases firm transparency due to the stricter disclosure requirements of many foreign markets.

Direct investing in the securities of foreign companies simply refers to buying a foreign firm's securities in foreign markets. Some obstacles to direct foreign investment are that:

- The investment and return are denominated in a foreign currency.

- The foreign stock exchange may be illiquid.

- The reporting requirements of foreign stock exchanges may be less strict, impeding analysis.

- Investors must be familiar with the regulations and procedures of each market in which they invest.

Other methods for investing in foreign companies are provided by global depository receipts (GDRs), American depository receipts (ADRs), global registered shares (GRSs), and baskets of listed depository receipts (BLDRs).

Depository receipts (DRs) represent ownership in a foreign firm and are traded in the markets of other countries in local market currencies. A bank deposits shares of the

foreign firm and then issues receipts representing ownership of a specific number of the foreign shares. The **depository bank** acts as a custodian and manages dividends, stock splits, and other events. Although the investor does not have to convert to the foreign currency, the value of the DR is affected by exchange rate changes, as well as firm fundamentals, economic events, and any other factors that affect the value of any stock.

If the firm is involved with the issue, the depository receipt is a **sponsored DR**; otherwise, it is an **unsponsored DR**. A sponsored DR provides the investor voting rights and is usually subject to greater disclosure requirements. In an unsponsored DR, the depository bank retains the voting rights.

Global depository receipts (GDRs) are issued outside the United States and the issuer's home country. Most GDRs are traded on the London and Luxembourg exchanges. Although not listed on U.S. exchanges, they are usually denominated in U.S. dollars and can be sold to U.S. institutional investors. GDRs are not subject to the capital flow restrictions imposed by governments and thus offer the firm and the investor greater opportunities for foreign investment. The firm usually chooses to list the GDR in a market where many investors are familiar with the firm.

American depository receipts (ADRs) are denominated in U.S. dollars and trade in the United States. The security on which the ADR is based is the **American depository share (ADS)**, which trades in the firm's domestic market. Some ADRs allow firms to raise capital in the United States or use the shares to acquire other firms. Most require U.S. Securities and Exchange Commission (SEC) registration, but some are privately placed (Rule 144A or Regulation S receipts).

The four types of ADRs, with different levels of trading availability and firm requirements, are summarized in Figure 42.1.

Figure 42.1: Types of ADRs

	Level I	Level II	Level III	Rule 144A
Trading location	Over-the-counter (OTC)	NYSE, Nasdaq, and AMEX	NYSE, Nasdaq, and AMEX	Private
SEC registration required	Yes	Yes	Yes	No
Ability to raise capital in United States	No	No	Yes	Yes
Firm listing expenses	Low	High	High	Low

Global registered shares (GRS) are traded in different currencies on stock exchanges around the world.

A **basket of listed depository receipts (BLDR)** is an exchange-traded fund (ETF) that is a collection of DRs. ETF shares trade in markets just like common stocks.

LOS 42.e: Compare the risk and return characteristics of different types of equity securities.

The returns on equity investments consist of price changes, dividend payments, and, in the case of equities denominated in a foreign currency, gains or losses from changes in exchange rates. A Japanese investor who invests in euro-denominated shares will have greater yen-based returns if the euro appreciates relative to the yen.

Gains from dividends and the reinvestment of dividends have been an important part of equity investors' long-term returns. For example, $1 invested in U.S. stocks in 1900 would have been worth $1,402 in real terms in 2016 with dividends reinvested but only $11.90 with price appreciation alone. Over the same time period, the terminal wealth for bonds and bills would have been $9.80 and $2.60, respectively.[1]

The risk of equity securities is most commonly measured as the standard deviation of returns. Preferred stock is less risky than common stock because preferred stock pays a known, fixed dividend to investors that is a large part of the return, whereas common dividends are variable and can vary with earnings. Also, preferred stockholders receive their distributions before common shareholders and have a claim in liquidation equal to the par value of their shares that has priority over the claims of common stock owners. Because it is less risky, preferred stock has a lower average return than common stock.

Cumulative preferred shares have less risk than non-cumulative preferred shares because they retain the right to receive any missed dividends before any common stock dividends can be paid.

For both common and preferred shares, putable shares are less risky and callable shares are more risky compared to shares with neither option. Putable shares are less risky because if the market price drops, the investor can put the shares back to the firm at a fixed price (assuming the firm has the capital to honor the put). Because of this feature, putable shares usually pay a lower dividend yield than non-putable shares.

Callable shares are the most risky because if the market price rises, the firm can call the shares, limiting the upside potential of the shares. Callable shares, therefore, usually have higher dividend yields than non-callable shares.

LOS 42.f: Explain the role of equity securities in the financing of a company's assets.

Equity capital is used for the purchase of long-term assets, equipment, research and development, and expansion into new businesses or geographic areas. Equity securities provide the firm with "currency" that can be used to buy other companies or that can be offered to employees as incentive compensation. Having publicly traded equity securities provides liquidity, which may be especially important to firms that need to meet regulatory requirements, capital adequacy ratios, and liquidity ratios.

LOS 42.g: Contrast the market value and book value of equity securities.

The primary goal of firm management is to increase the book value of the firm's equity and thereby increase the market value of its equity. The **book value of equity** is the value of the firm's assets on the balance sheet minus its liabilities. It increases when the firm has positive net income and retained earnings that flow into the equity account. When management makes decisions that increase income and retained earnings, they increase the book value of equity.

The **market value of equity** is the total value of a firm's outstanding equity shares based on market prices and reflects the expectations of investors about the firm's future performance. Investors use their perceptions of the firm's risk and the amounts and timing of future cash flows to determine the market value of equity. The market value and book value of equity are seldom equal. Although management may be maximizing the book value of equity, this may not be reflected in the market value of equity because book value does not reflect investor expectations about future firm performance.

LOS 42.h: Compare a company's cost of equity, its (accounting) return on equity, and investors' required rates of return.

A key ratio used to determine management efficiency is the **accounting return on equity**, usually referred to simply as the **return on equity (ROE)**. ROE is calculated as net income available to common (net income minus preferred dividends) divided by the average book value of common equity over the period:

$$\text{ROE}_t = \frac{\text{NI}_t}{\text{average BV}_t} = \frac{\text{NI}_t}{(\text{BV}_t + \text{BV}_{t-1})/2}$$

Alternatively, ROE is often calculated using only beginning-of-year book value of equity (i.e., book value of equity for end of year t − 1):

$$\text{ROE}_t = \frac{\text{NI}_t}{\text{BV}_{t-1}}$$

The first method is more appropriate when it is the industry convention or when book value is volatile. The latter method is more appropriate when examining ROE for a number of years or when book value is stable.

Higher ROE is generally viewed as a positive for a firm, but the reason for an increase should be examined. For example, if book value is decreasing more rapidly than net income, ROE will increase. This is not, however, a positive for the firm. A firm can also issue debt to repurchase equity, thereby decreasing the book value of equity. This would increase the ROE but also make the firm's shares riskier due to the increased financial leverage (debt).

> **PROFESSOR'S NOTE**
> The DuPont formula discussed in the reading on Financial Analysis Techniques can help the analyst determine the reasons for changes in ROE.

The book value of equity reflects a firm's financial decisions and operating results since its inception, whereas the market value of equity reflects the market's consensus view of a firm's future performance. The **price-to-book ratio** (also called the **market-to-book ratio**) is the market value of a firm's equity divided by the book value of its equity. The more optimistic investors are about the firm's future growth, the greater its price-to-book ratio. The price-to-book ratio is used as a measure of relative value. Often, firms with low price-to-book ratios are considered *value stocks*, while firms with high price-to-book ratios are considered *growth stocks*.

EXAMPLE: ROE, market, and book value of equity calculations

Given the following data for O'Grady Industries, calculate the return on average equity for 20X9 and the total market value of equity, the book value per share, and the price-to-book ratio at the end of 20X9.

Fiscal Year-End Dec. 31	20X9	20X8
Total stockholder's equity	18,503	17,143
Net income available to common	3,526	3,056
Stock price	$16.80	$15.30
Shares outstanding	3,710	2,790

Answer:

The return on average equity for 20X9 is:

$$ROE_t = \frac{NI_t}{\text{average } BV_t} = \frac{NI_t}{(BV_t + BV_{t-1})/2}$$

$$= \frac{\$3,526}{(\$18,503 + \$17,143)/2} = 19.78\%$$

The total market value of the firm's equity at the end of 20X9 is:

$$\$16.80 \times 3,710 = \$62,328$$

The book value per share at the end of 20X9 is:

$$= \frac{\$18,503}{3,710} = \$4.99$$

The price-to-book ratio at the end of 20X9 is:

$$= \frac{\$16.80}{\$4.99} = 3.37$$

Investors' Required Return and the Cost of Equity

A firm's **cost of equity** is the expected equilibrium total return (including dividends) on its shares in the market. Cost of equity is usually estimated in practice using a dividend discount model or the capital asset pricing model. At any point in time, a decrease in share price will increase the expected return on the shares and an increase in share price will decrease expected returns, other things equal. Because the intrinsic

value of a firm's shares is the discounted present value of its future cash flows, an increase (decrease) in the required return used to discount future cash flows will decrease (increase) intrinsic value.

Investors also estimate the expected market returns on equity shares and compare this to the minimum return they will accept for bearing the risk inherent in a particular stock.

If an investor estimates the expected return on a stock to be greater than her minimum required rate of return on the shares, given their risk, then the shares are an attractive investment. Investors can have different required rates of return for a given risk, different estimates of a firm's future cash flows, and different estimates of the risk of a firm's equity shares. A firm's cost of equity can be interpreted as the minimum rate of return required by investors (in the aggregate) to compensate them for the risk of the firm's equity shares.

MODULE QUIZ 42.2

1. Global depository receipts are most often denominated in:
    A. the currency of the country where they trade and issued outside the United States.
    B. U.S. dollars and issued in the United States.
    C. U.S. dollars and issued outside the United States.

2. Which of the following types of preferred shares has the *most* risk for investors?
    A. Putable shares.
    B. Callable shares.
    C. Non-putable, non-callable shares.

3. Which of the following *best* describes the book value of equity?
    A. Management should attempt to maximize book value of equity.
    B. Book value of equity decreases when retained earnings increase.
    C. Book value of equity reflects investors' perceptions of the firm's future.

4. Which of the following causes of an increase in return on equity is *most likely* a positive sign for a firm's equity investors?
    A. A firm issues debt to repurchase equity.
    B. Net income is increasing at a faster rate than book value of equity.
    C. Net income is decreasing at a slower rate than book value of equity.

KEY CONCEPTS

LOS 42.a

Common shareholders have a residual claim on firm assets and govern the corporation through voting rights. Common shares have variable dividends which the firm is under no legal obligation to pay.

Preferred stock typically does not mature, does not have voting rights, and has dividends that are fixed in amount but are not a contractual obligation of the firm.

Cumulative preferred shares require any dividends that were missed in the past (dividends in arrears) to be paid before common shareholders receive any dividends.

Participating preferred shares receive extra dividends if firm profits exceed a pre-specified level and a value greater than the par value if the firm is liquidated. Convertible preferred stock can be converted to common stock at a pre-specified conversion ratio.

Callable shares allow the firm the right to repurchase the shares at a pre-specified price. Putable shares give the shareholder the right to sell the shares back to the firm at a pre-specified price.

LOS 42.b

Some companies' equity shares are divided into different classes, such as Class A and Class B shares. Different classes of common equity may have different voting rights and priority in liquidation.

LOS 42.c

Compared to publicly traded firms, private equity firms have lower reporting costs, greater ability to focus on long-term prospects, and potentially greater return for investors once the firm goes public. However, private equity investments are illiquid, firm financial disclosure may be limited, and corporate governance may be weaker.

LOS 42.d

Investors who buy foreign stock directly on a foreign stock exchange receive a return denominated in a foreign currency, must abide by the foreign stock exchange's regulations and procedures, and may be faced with less liquidity and less transparency than is available in the investor's domestic markets. Investors can often avoid these disadvantages by purchasing depository receipts for the foreign stock that trade on their domestic exchange.

Global depository receipts are issued outside the United States and outside the issuer's home country. American depository receipts are denominated in U.S. dollars and are traded on U.S. exchanges.

Global registered shares are common shares of a firm that trade in different currencies on stock exchanges throughout the world.

Baskets of listed depository receipts are exchange-traded funds that invest in depository receipts.

LOS 42.e

Equity investor returns consist of dividends, capital gains or losses from changes in share prices, and any foreign exchange gains or losses on shares traded in a foreign currency. Compounding of reinvested dividends has been an important part of an equity investor's long-term return.

Preferred stock is less risky than common stock because preferred stock pays a known, fixed dividend to investors; preferred stockholders must receive dividends before common stock dividends can be paid; and preferred stockholders have a claim equal to par value if the firm is liquidated. Putable shares are the least risky and callable shares are the most risky. Cumulative preferred shares are less risky than non-cumulative