
The following is a review of the Analysis of Equity Investments principles designed to address the learning outcome statements set forth by CFA Institute®. This topic is also covered in:

AN INTRODUCTION TO SECURITY VALUATION AND INDUSTRY ANALYSIS

Study Session 14

EXAM FOCUS

To estimate the market value of any investment, find the present value of its future cash flows: estimate the number and dollar amount of future cash flows, estimate when they will be received and what form they will take, and discount these cash flows to the present using the required rate of return. The required return on any investment is the real rate of interest plus premiums for inflation and risk. To make an

investment decision, compare the estimated value of the security to its current market price. For success on the Level 1 exam, candidates should be prepared to calculate the value of an investment with the valuation formulas presented in this review. All of them are variations of the same discounted cash flow technique. The single LOS for Reading 60 is included here.

LOS 59.a: Explain the top-down approach, and its underlying logic, to the security valuation process.

The **top-down, three-step approach** to security valuation starts with a forecast of the direction of the general economy. Next, based on this economic forecast, project the outlook for each industry under review. Third, within each industry, select the firms most likely to perform the best given these economic and industry forecasts. As indicated, this approach is a three-step analytical process:

economic analysis → industry analysis → stock analysis

Step 1: Forecast macroeconomic influences

Fiscal policy is a direct approach to affect aggregate demand in an attempt to manage the rate of economic growth. Tax cuts encourage spending (demand) and speed up the economy; tax increases discourage spending and slow economic growth. Government spending creates jobs, thus increasing aggregate demand.

Monetary policy is used by the central bank to manage economic growth. Decreasing the money supply causes interest rates to rise, putting upward pressure on costs and downward pressure on demand. Increasing the money supply reduces interest rates and increases demand. Inflation can result from increasing the money supply too fast. Rising interest rates reduce the demand for investment funds and rising consumer prices reduce product demand.

From a global (import/export) perspective, the potential domestic economic impact from political changes in major international economies must be considered.

Step 2: Determine industry effects

Identify industries that should prosper or suffer from the economic outlook identified in Step 1. Consider how these industries react to economic change: some industries are cyclical, some are counter-cyclical, and some are noncyclical.

Consider global economic shifts: an industry's prospects within the global business environment determine how well or poorly individual firms in the industry will do. Thus, industry analysis should precede company analysis.

Step 3: Perform firm analysis

After performing an industry analysis, compare firms within each attractive industry using financial ratios and cash flow analysis. For stock purchases, identify the company with the most upside potential. For short selling, identify the firm whose stock should perform the worst. This involves not only examining a firm's past performance, but also its prospects.

LOS 59.b: Explain the various forms of investment returns.

The returns (broadly defined) on an investment can be measured in several ways, including cash flows from projects, interest income on bonds, and dividend income on stocks. Capital gains, the increase in the price of an asset, are another form of investment returns.

We might also measure investment returns as earnings (per share of common stock), operating cash flow, or some other cash flow measure. In this topic review, we focus on dividends and capital gains as the relevant return measures for valuing shares of stock. Based on the dividend discount model's assumptions, we will also value a share of stock based on its earnings per share.

LOS 59.c: Calculate and interpret the value of a preferred stock, or of a common stock, using the dividend discount model (DDM).

Valuing preferred stock is easy since the dividend is fixed and the income stream (dividends) is theoretically infinite (it's a perpetuity):

$$\text{preferred stock value} = \frac{D_P}{(1+k_P)^1} + \frac{D_P}{(1+k_P)^2} + \dots + \frac{D_P}{(1+k_P)^\infty} = \frac{D_P}{k_P}$$

Again, the only problem is determining the required return, k_P . Because of default risk factors, the firm's required rate on preferred (k_P) should be above the firm's bond rate (k_D). However, since dividends paid to corporate investors are subject to the *dividends received deduction* (i.e., 80% of dividends paid are tax exempt), preferred yields are below the yields on the firm's highest grade bonds.

Throughout this review, we will be computing "values," all of which are simply the present value of expected future dividends and an eventual sale price, or of an infinite stream of expected cash dividends. Keep in mind that value is the same as price if markets are in equilibrium (efficient), so we are essentially calculating what the price "should" be. This is often referred to as intrinsic value.

Example: Preferred stock valuation

A company's bonds are currently yielding 8.5%, and its preferred shares are selling to yield 50 basis points (0.5%) below the firm's bond yield. Calculate the value of the company's 5%, \$100 par preferred stock.

Professor's Note: The dividend on preferred stock is usually expressed as a percentage of par. If CFA Institute gives you a preferred dividend in this manner, take care not to confuse the dividend rate with the discount rate, or the par value with the price.

Answer:

Determine the discount rate: $8.5\% - 0.5\% = 8.0\%$

Value the preferred stock: $D_p/k_p = \$5.00/0.08 = \62.50

The general DDM. Valuing common stock is more difficult than valuing bonds and preferred stock because the size and timing of future cash flows are uncertain, and the required rate of return on common equity, k_e , is unknown. However, a stock's value is still the PV of its future expected cash flows. Since the only cash flows a stockholder ever receives from the firm are dividends (cash or liquidating), the model used is called the *dividend discount model* (DDM).

$$\text{value} = \frac{D_1}{(1+k_e)^1} + \frac{D_2}{(1+k_e)^2} + \frac{D_3}{(1+k_e)^3} + \dots + \frac{D_\infty}{(1+k_e)^\infty}$$

A couple of important comments must be made here. First, if an investor sells the stock, the purchaser is buying the remaining dividend stream, so a stock's value at any point in time is still determined by the dividends it is expected to pay after that point.

Second, if a company declares it will never pay dividends, its shares should be worthless because the stockholders would never receive anything of value from the firm. However, since we see shares of firms that pay no dividends being actively traded in the market, investors must expect to receive something of value, like a liquidating dividend, at some point in the future.

One-year holding period. If your holding period is one year, the value you will place on the stock today is the PV of any dividends you will receive during the year plus the PV of the price you can sell the stock for at the end of the year. The valuation equation is:

$$\text{value} = \frac{\text{dividend to be received}}{(1+k_e)^1} + \frac{\text{year-end price}}{(1+k_e)^1}$$

Steps used to determine a stock's value:

- Identify all expected future cash flows (dividends and future price).
- Estimate the equity discount rate: $k_e = \text{RFR} + \beta (\text{R}_{\text{mkt}} - \text{RFR})$.
- Discount the expected dividend and selling price at the required return.

Example: One-period DDM valuation

Calculate the value of a stock that paid a \$1 dividend last year. You think next year's dividend will be 5% higher ($g = 0.05$), and the stock will sell for \$13.45 at year end. The risk-free rate of interest is 6%, the market return is 12%, and the stock's beta is 1.2.

Answer:

The next dividend is the current dividend increased by the estimated growth rate. In this case, we have:

$$D_1 = D_0 \times (1 + g) = \$1.00 \times (1 + 0.05) = \$1.05$$

Next, we must estimate the required return on equity. Using the CAPM we have:

$$\begin{aligned}k_e &= \text{RFR} + \beta (R_{\text{mkt}} - \text{RFR}) \\&= 0.06 + 1.2(0.12 - 0.06) \\&= 13.2\%\end{aligned}$$

Now we can compute the present value of the expected future cash flows as follows:

$$\begin{aligned}\text{Dividend: } \frac{\$1.05}{1.132} &= \$0.93 \\ \text{Year-end price: } \frac{\$13.45}{1.132} &= \$11.88\end{aligned}$$

Add the PV estimates. The current value based on the investor's expectations is:

$$\text{Stock value} = \$0.93 + \$11.88 = \$12.81$$

Multiple-year holding period DDM. With a multiple-year holding period, we simply estimate all the dividends to be received as well as the expected selling price at the end of the holding period. For a 2-year holding period, we have:

$$\text{value} = \frac{D_1}{(1 + k_e)^1} + \frac{D_2}{(1 + k_e)^2} + \frac{P_2}{(1 + k_e)^2}$$

Professor's Note: It is useful to think of the subscript, t , on dividends (D_t) and prices (P_t) as the "end" of period t . For example, in the preceding equation, P_2 is the price at the end of period (year) 2. Think of it as the price you can sell the stock for, just after you collect D_2 .

Example: Multiple period DDM valuation

Using the stock in the preceding example, we had a current dividend of \$1.00, an expected growth rate of 5%, and the CAPM-determined required rate of return of 13.2%. Calculate the value of this stock assuming that you expect to sell it for \$14.12 in two years.

Answer:

Find the PV of the future dividends:

$$\begin{aligned}D_1 : \frac{\$1.05}{1.132} &= \$0.93 \\ D_2 : \frac{\$1.05(1.05)}{(1.132)^2} &= \frac{\$1.103}{1.2814} = \$0.86\end{aligned}$$

$$\text{PV of dividends} = 0.93 + 0.86 = \$1.79$$

Find the PV of the future price:

$$\frac{\$14.12}{(1.132)^2} = \$11.02$$

Add the present values. The current value based on the investor's expectations is $\$1.79 + \$11.02 = \$12.81$.

The **infinite period DDM** assumes the growth rate, g , in dividends from year to year is constant. Hence, next period's dividend, D_1 , is $D_0(1 + g_c)$, the second year's dividend, D_2 , is $D_0(1 + g_c)^2$, and so on, where g_c is a constant growth rate. The extended equation using this assumption is as follows:

$$\text{value} = \frac{D_0(1 + g_c)^1}{(1 + k_e)^1} + \frac{D_0(1 + g_c)^2}{(1 + k_e)^2} + \frac{D_0(1 + g_c)^3}{(1 + k_e)^3} + \dots + \frac{D_0(1 + g_c)^\infty}{(1 + k_e)^\infty}$$

Thank goodness this equation simplifies to:

$$\text{value} = \frac{D_0(1 + g_c)}{k_e - g_c} = \frac{D_1}{k_e - g_c}$$

This is the infinite period dividend discount model.

Professor's Note: In much of the finance literature, you will see this model referred to as the constant growth DDM, the constant growth dividend valuation model, or the Gordon Growth Model. Whatever you call it, D_1 over k minus g should be permanently tattooed on your brain. Note that our valuation model for preferred stock is the same as the constant growth model with no growth ($g = 0$).

Example: Infinite period DDM valuation

Calculate the value of a stock that paid a \$2 dividend last year, if dividends are expected to grow at 5% forever. The risk-free rate is 6%, the expected return on the market is 11%, and the stock's beta is 1.2.

Answer:

$$\text{Determine } D_1: D_0(1 + g_c) = \$2(1.05) = \$2.10$$

$$\begin{aligned} \text{Determine } k_e: & \text{RFR} + \beta(R_{\text{mkt}} - \text{RFR}) \\ &= 0.06 + 1.2(0.11 - 0.06) \\ &= 12\% \end{aligned}$$

$$\begin{aligned} \text{Calculate the stock's value} &= D_1 / (k_e - g_c) \\ &= \$2.10 / (0.12 - 0.05) \\ &= \$30.00 \end{aligned}$$

This example demonstrates that the stock's value is determined by the relationship between the investor's required rate of return on equity, k_e , and the projected growth rate of dividends, g_c .

Notice the critical relationship between k_e and g_c :

- As the difference between k_e and g_c widens, the value of the stock falls.
- As the difference narrows, the value of the stock rises.
- Small changes in the difference between k_e and g_c cause large changes in the stock's value.

Also, remember the assumptions of the infinite period DDM:

- The stock pays dividends, and they grow at a constant rate.
- The constant growth rate, g_c , is never expected to change.
- k_e must be greater than g_c . If not, the math will not work.

If any one of these assumptions is not met, the model breaks down.

Professor's Note: When doing stock valuation problems on the exam, watch for words like forever, infinitely, indefinitely, etc. This will tell you that the infinite period DDM should be used. Also watch for words like "just paid" or "recently paid." These will refer to the last dividend, D_0 . Words like "will pay" or "is expected to pay" refer to D_1 .

Value of a Common Stock for a Company Experiencing Temporary Supernormal Growth

A firm may temporarily experience a growth rate that exceeds the required rate of return on the firm's equity, but no firm can maintain this relationship indefinitely. We must assume the firm will return to a more sustainable rate of growth at some point in the future. Since the assumptions of the infinite period model (constant g and $k_e > g_c$) don't hold, the infinite period DDM cannot be used to value growth companies that are experiencing very rapid growth that will not continue forever.

A valuation approach for supernormal growth companies (and companies that don't currently pay dividends) is to combine the multi-period and infinite period models. This is referred to as the **multistage dividend discount model** in many finance textbooks.

$$\text{value} = \frac{D_1}{(1 + k_e)} + \frac{D_2}{(1 + k_e)^2} + \dots + \frac{D_n}{(1 + k_e)^n} + \frac{P_n}{(1 + k_e)^n}$$

where:

D_n = last dividend of the supernormal growth period

D_{n+1} = first dividend affected by the constant growth rate, g_c

$P_n = \frac{D_{n+1}}{k_e - g_c}$, the first period's dividend after constant growth begins

Steps in using the temporary supernormal growth model:

- Project the size and duration of the supernormal dividend growth rate, g^* .
- Using this supernormal growth rate, estimate dividends during the supernormal period.
- Forecast what the normal (constant) growth rate will be at the end of the supernormal growth period, g_c .
- Project the first dividend at the resumption of normal growth.
- Estimate the price of the stock at the end of the supernormal growth period.
- Determine the discount rate, k_e .
- Add the PV of all dividends and the terminal stock price.

Example: Supernormal growth

Consider a stock with dividends that are expected to grow at 20% per year for four years, after which they are expected to resume their normal growth rate of 5% per year, indefinitely. The last dividend paid was \$1.00, and $k_e = 10\%$. Calculate the value of this stock.

Answer:

Calculate the dividends during the supernormal growth period using g^* :

$$D_1 = D_0(1 + g^*) = 1.00(1.20) = \$1.20$$

$$D_2 = D_1(1 + g^*) = 1.20(1.20) = \$1.44$$

$$D_3 = D_2(1 + g^*) = 1.44(1.20) = \$1.73$$

$$D_4 = D_3(1 + g^*) = 1.73(1.20) = \$2.08$$

Calculate the first dividend at the resumption of normal constant growth using g_c :

$$D_5 = D_4(1 + g_c) = 2.08(1.05) = \$2.18$$

Find the value of the stock at the end of the supernormal growth period using the infinite period DDM:

$$P_4 = \frac{D_5}{k_e - g_c} = \frac{2.18}{0.10 - 0.05} = \$43.60$$

Remember, P_4 is the value at the end of period 4, which is the PV of all of the expected dividends from period 5 (D_5) through infinity. D_5 is the first dividend that grows at the normal, constant growth rate.

Calculate the PV of the cash flows (discounted at k_e):

$$\frac{1.20}{1.1} + \frac{1.44}{1.1^2} + \frac{1.73}{1.1^3} + \frac{2.08}{1.1^4} + \frac{43.60}{1.1^4} = \$34.78$$

Professor's Note: A common mistake with supernormal growth problems is to calculate the future price, P_4 in this example, then forget to discount it back to the present. Don't make this mistake because CFA Institute is sure to present this common error as one of the choices.

Example: Delayed dividend payments

This example reflects the fact that high growth firms normally don't pay dividends during their supernormal growth phase.

The firm will have three years of extraordinary growth during which no dividends will be paid. Beginning in year 4, earnings will stabilize and grow at a sustainable 5% rate indefinitely, and the firm will pay out 50% of its earnings in dividends. Given $E_4 = \$1.64$ and $k_e = 10\%$, calculate the value of this stock.

Answer:

Project the dividend that will be paid at the end of year 4:

$$D_4 = (\text{dividend payout ratio})(E_4) = (0.5)(1.64) = \$0.82$$

Find the value of the stock at the end of year 3. Remember, P_3 is the value of dividends 4 through infinity at the end of year 3, one period *before* the firm resumes normal growth.

$$P_3 = D_4 / (k_c - g_c) = \$0.82 / (0.1 - 0.05) = \$16.40$$

$$\text{Find } P_0: I/Y = 10\%; N = 3; FV = \$16.40; CPT \rightarrow PV = \$12.32 = P_0$$

Remember, there can be two types of supernormal growth problems:

- The company pays dividends, and there are two or more growth rates that are not zero. To work these problems, you find the PV of all the projected dividends, and the PV of $P_n = D_{n+1} / (k - g_c)$.
- The company initially pays no dividends but then pays out some or all of its earnings as dividends at the resumption of normal growth. In this type of problem, you find the PV of the future price, $P_n = D_{n+1} / (k - g_c)$, which is determined by the delayed dividend stream.

Professor's Note: I am placing subscript "c" under the constant growth g_c to help distinguish it from other growth rates. CFA Institute will not likely do this, so you should be sure that you identify which growth rate is the constant one on the exam when you are working with different growth rates.

LOS 59.d: Show how to use the DDM to develop an earnings multiplier model, and explain the factors in the DDM that affect a stock's price-to-earnings (P/E) ratio.

How does the DDM relate to the P/E ratio? Start with the general form of the infinite period DDM:

$$P_0 = \frac{D_1}{k - g}$$

Divide both sides of the equation by next year's projected earnings, E_1 :

$$\frac{P_0}{E_1} = \frac{D_1/E_1}{k - g}$$

This demonstrates that the P/E ratio is a function of:

- D_1/E_1 = the expected dividend payout ratio.
- k = the required rate of return on the stock.
- g = the expected constant growth rate of dividends.

Example: P/E valuation method

A firm has an expected dividend payout ratio of 60%, a required rate of return of 11%, and an expected dividend growth rate of 5%. Calculate the firm's expected P/E ratio. If you expect next year's earnings (E_1) to be \$3.50, what is the value of the stock today?

Answer:

Expected P/E ratio: $0.6 / (0.11 - 0.05) = 10$.

Value of the stock: $(E_1)(P/E_1) = (\$3.50)(10) = \35.00 .

What you should know about the earnings multiplier approach to valuation is that:

- The main determinant of the size of the P/E ratio is the difference between k and g , which, as shown earlier, has a significant impact on stock price.
- The relevant P/E ratio you should study is the expected (P_0/E_1) ratio, *not* the historical (P_0/E_0) ratio.
- The P/E ratio is just a restatement of the DDM, so anything that influences stock prices in the DDM will have the same effect on the P/E ratio.

There are several problems with using P/E analysis:

- Earnings are historical cost accounting numbers and may be of differing quality.
- Business cycles may affect P/E ratios. Currently reported earnings may be quite different from your expectations of earnings in the future (E_1).
- Also, like the infinite growth model, when $k < g$, the model cannot be used.

LOS 59.e: Explain the components of an investor's required rate of return (i.e., the real risk-free rate, the expected rate of inflation, and a risk premium) and discuss the risk factors to be assessed in determining a country risk premium for use in estimating the required return for foreign securities.

As we have discussed, the required rate of return on equity, k , is influenced by:

- The real risk-free rate (RFR_{real}), which is determined by the supply and demand for capital in the country. The real risk-free rate is the rate investors would require if there were absolutely no risk or inflation.
- An inflation premium (IP), which investors require to compensate for their expected loss of purchasing power.
- A risk premium (RP) to compensate investors for the uncertainty of returns expected from an investment. Since different investments have different patterns of return and different guarantees, risk premiums can differ substantially.

$$k = \text{required rate of return} = (1 + RFR_{real})(1 + IP)(1 + RP) - 1$$

$$k = \text{required rate of return (approximate)} \approx RFR_{real} + IP + RP$$

The real risk-free rate and the inflation premium together comprise the nominal risk-free rate, $RFR_{nominal}$. That is:

$$RFR_{nominal} = (1 + RFR_{real})(1 + IP) - 1$$

This may be approximated as:

$$RFR_{nominal} \approx RFR_{real} + IP$$

Professor's Note: A real rate is a rate that does not include inflation, while a nominal rate does. If a rate is not specified as being a real rate on the exam, it is safe for you to assume that it is a nominal rate.

The risk premium, RP, is a premium demanded for internal and external risk factors. *Internal risk factors* are diversifiable and include business risk, financial risk, liquidity risk, exchange-rate risk, and country risk. *External risk factors*, known as market risk factors, are macroeconomic in nature and are nondiversifiable.

Example: Computing the nominal risk-free rate

Calculate the nominal risk-free rate if the real risk-free rate is 4% and the expected inflation rate is 3%.

Answer:

$$\begin{aligned} RFR_{nominal} &= (1.04)(1.03) - 1 \\ &= 1.0712 - 1 \\ &= 7.12\% \end{aligned}$$

Alternatively, the nominal rate is frequently approximated by summing the real rate and expected inflation:

$$RFR_{\text{nominal}} = 4\% + 3\% = 7\%$$

The required rate of return on *any* investment is a combination of the nominal risk-free rate plus a risk premium. For equity investments, the risk premium can be determined by reference to a risk premium curve or by using the capital asset pricing model (CAPM):

$$k = RFR_{\text{nominal}} + RP$$

Using the CAPM, we have:

$$k = RFR + \beta[E(R_{\text{mkt}}) - RFR]$$

Professor's Note: Notice here that RFR is a nominal rate.

Estimating the Required Return for Foreign Securities

Security valuation models and their variables are essentially the same all over the world. However, there are significant differences in the determination of these variables.

To estimate the required rate of return for foreign securities, we can calculate the real risk-free rate, adjust it for the expected inflation rate, then determine the risk premium.

The **country risk premium** is estimated with consideration of five types of risk that will differ substantially from country to country.

- *Business risk* represents the variability of a country's economic activity, along with the degree of operating leverage for firms within the country.
- *Financial risk* will be different in countries throughout the world.
- *Liquidity risk* is often found in countries with small or inactive capital markets.
- *Exchange rate risk*, the uncertainty in exchange rates, must always be taken into account when considering foreign investments.
- *Country risk* arises from unexpected economic and political events.

LOS 59.f: Estimate the implied dividend growth rate, given the components of the required return on equity and incorporating the earnings retention rate and current stock price.

Assuming past investments are stable and dividends are calculated to allow for maintenance of past earnings power, the firm's earnings growth rate, g , can be defined as the firm's earnings plowback or retention rate (RR) times the return on the equity (ROE) portion of new investments.

$$g = (RR)(ROE)$$

Note that if RR is the earnings retention rate, $(1 - RR)$ must be the firm's dividend payout rate.

Professor's Note: Recall that we used the DuPont method to decompose ROE into its component parts: net profit margin \times asset turnover \times financial leverage = ROE. You can use these components, along with the retention rate, to calculate $ROE \times RR = g$, the implied (sustainable) growth rate.

Let's work through an example to illustrate why g equals $RR \times ROE$ for a stable but expanding company.

Example: Sustainable growth

Assume ROE is constant and that new funds come solely from earnings retention. Calculate the firm's growth rate, given that the firm earns 10% on equity of \$100 per share and pays out 40% of earnings in dividends.

Answer:

Period 1 per share earnings = $EPS_1 = ROE \times \text{Equity per share} = (0.10)(\$100) = \$10$ per share

Period 1 dividend per share = $D_1 = \text{payout} \times EPS_1 = (0.40)(\$10) = \$4.00$ per share

Period 1 retained earnings = $RR_1 \times EPS_1 = (\$10)(1 - 0.4) = \6.00 per share

so,

Period 2 earnings per share = $(0.10)(\$100) + (0.10)(\$6) = \$10.60$ per share

Period 2 dividend per share = $D_2 = (0.40)(\$10.60) = \4.24 per share

Analysis of growth:

Earnings growth = $(EPS_2 - EPS_1) / EPS_1 = (\$10.60 - \$10) / \$10 = 6\%$

Dividend growth = $(\$4.24 - \$4) / \$4 = 6\%$

Analysis of stock price: assume $k = 10\%$

Price at the beginning of period 1 = $D_1 / (k - g_c) = \$4.00 / (0.10 - 0.06) = \100

Price at the beginning of period 2 = $D_2 / (k - g_c) = \$4.24 / (0.10 - 0.06) = \106

The stock's price will grow at a 6% rate, just as earnings and dividends will.

$$\text{growth} = g_c = (ROE)(\text{Retention rate}) = (0.1)(1 - 0.4) = 6\%$$

The growth rate here, $g_c = ROE \times RR$, is called the *internal* or *sustainable* growth rate—the rate of growth sustainable without resorting to external sources of capital (relying on retained earnings only).

So, what we know about dividend growth can be summarized as follows:

- If a firm's profit margin increases, ROE will increase.
- If ROE increases, g , which is $(ROE)(RR)$, will increase.
- If g increases, the difference between k and g will decrease.
- If $k - g$ decreases, the price of the stock will increase.

LOS 59.g: Describe a process for developing estimated inputs to be used in the DDM, including the required rate of return and expected growth rate of dividends.

As we have indicated, the DDM holds that the value of a share of stock is the present value of its cash flows. Thus, the DDM requires the following three inputs:

- An estimate of the stock's future cash flows, which are dividends and future price.
- A dividend growth rate, g .
- A discount rate, which is the appropriate required return on equity, k .

Once the present value of the asset has been estimated, compare it to the current market price.

Example: Application of DDM

Assume you are analyzing the XYZ company. Its current stock price is \$18.00. After reviewing XYZ's financial data, you find that last year's earnings were \$2.00 per share. The firm's ROE is 10%, and you expect

it to stay that way for the foreseeable future. The firm has a stable dividend payout policy of 40%. The current nominal risk-free rate is 7%, the expected market return is 12%, and XYZ's beta is 1.2. Calculate the value of XYZ and indicate whether this stock is a "buy" based on your estimate.

Answer:

Step 1: Determine the required rate of return:

$$k = 0.07 + 1.2(0.12 - 0.07) = 13\%$$

Step 2: Determine the growth rate:

$$\text{Step 2a: } RR = (1 - \text{dividend payout}) = 1 - 0.4 = 0.6$$

$$\text{Step 2b: } g = (RR)(ROE) = (0.6)(0.10) = 0.06 \text{ or } 6\%$$

Step 3: Determine last year's dividend:

$$D_0 = E_0(\text{dividend payout ratio}) = \$2(0.4) = \$0.80$$

Step 4: Determine next year's dividend:

$$D_1 = D_0(1 + g_c) = \$0.80(1 + 0.06) = \$0.85$$

Step 5: Estimate the value:

$$V_0 = D_1/(k - g_c) = \$0.85/(0.13 - 0.06) = \$12.14$$

Professor's Note: Rounding differences may occur, not unlike those you might encounter on the exam.

Step 6: Compare the stock's value to its current market price:

$$\$12.14 \text{ vs. } \$18.00$$

Do not buy and possibly sell this stock short.

If estimated value > market price → buy

If estimated value < market price → don't buy

LOS 60: Describe how structural economic changes (e.g., demographics, technology, politics, and regulation) may affect industries.

An analyst should take into account how broad structural changes will affect specific industries over time. Four types of structural changes are:

- **Demographics.** Demographic factors include age distribution and population changes, as well as changes in income distribution, ethnic composition of the population, and trends in the geographical distribution of the population. As a large segment of the population reaches their twenties, residential construction, furniture, and related industries see increased demand. An aging of the overall population can mean significant growth for the health care industry and developers of retirement communities.
- **Lifestyles.** Examples of the effect of changing lifestyles on industry growth prospects are the increases in meals consumed outside the home and catalog sales, as the percentage of families with two employed spouses has increased. Consumption patterns are also affected by current perceptions of what is "in style" and trends in consumer tastes in recreation, entertainment, and other areas of discretionary expenditure.

- **Technology.** Changes in technology have had very important consequences for many industries over time. Change in the technology of transportation and communications has certainly had important effects on these industries, both in terms of products and services consumed but also in their production and pricing. Technological advances in computers and microprocessors in general have lead to sweeping changes in how inventory is managed and how products are distributed in many industries, particularly in the retailing industry.
- **Politics and regulation.** Changes in the political climate and changes in specific government regulations can also have significant effects on particular industries. The imposition of tariffs on steel will lead to increased domestic production and profitability; the rise of terrorist activity has helped some industries and imposed costs on others, such as the airline and shipping industries; and requirements of a minimum wage and the widespread expectation of employment benefits packages have affected hiring practices and production methods, especially in labor intensive industries. Regulation of the introduction and sale of everything from new drugs to genetically engineered crops has important implications for many industries as well.

KEY CONCEPTS

1. The top-down approach to security valuation has three steps:
 - Forecast the influence of the general economy on the securities markets.
 - Analyze the prospects for the various industries under your economic forecast.
 - Analyze the individual firms in the industries under your economic forecast.
2. The returns from any investment can be measured as price change (capital gain/loss), cash income (i.e., interest, dividends, rental income, etc.), earnings, or a variety of cash flow measures for equities.
3. The preferred stock valuation model: $P_0 = V_0 = \frac{D_{ps}}{K_{ps}}$
4. The calculation of the value of common stock can take different forms:
 - One period stock valuation model: $P_0 = V_0 = \frac{D_1}{1 + k_e} + \frac{P_1}{1 + k_e}$
 - A multiple-year holding period:

$$\text{stock value} = \frac{D_1}{(1 + k_e)^1} + \frac{D_2}{(1 + k_e)^2} + \dots + \frac{D_n}{(1 + k_e)^n} + \frac{P_n}{(1 + k_e)^n}$$
 - Infinite period model: $P_0 = V_0 = \frac{D_0 \times (1 + g)}{k_e - g}$ or $\frac{D_1}{k_e - g}$
5. For a firm with supernormal growth (g_1) over n periods followed by a constant growth rate of dividends forever (g_2) can be valued as:

$$\frac{D_1}{1 + k_e} + \frac{D_2}{(1 + k_e)^2} + \dots + \frac{D_n}{(1 + k_e)^n} + \frac{\frac{D_{n+1}}{k_e - g_2}}{(1 + k_e)^n}$$

$$\text{where: } D_1 = D_0(1 + g_1) \dots D_n = D_0(1 + g_1)^n \\ \text{and } D_{n+1} = D_n(1 + g_2)$$

6. By dividing both sides of the infinite period DDM by E_1 , it can be used as an earnings multiplier model:

$$\frac{P_0}{E_1} = \frac{\frac{D_1}{E_1}}{k - g}$$

7. The relationship between the nominal risk-free rate, the real risk-free rate, and the expected rate of inflation is: nominal risk-free rate = $(1 + \text{real risk-free rate})(1 + \text{expected inflation}) - 1$.
8. The firm's internal or sustainable growth rate, g , is equal to $\text{ROE} \times \text{RR}$. RR is the firm's retention rate, so $(1 - \text{RR})$ is the firm's dividend payout rate.
9. The following five factors are used to estimate a country's risk premium:
- Business risk.
 - Financial risk.
 - Liquidity risk.
 - Exchange rate risk.
 - Specific country risk that arises from unexpected economic and political events.
10. An analyst should consider structural changes in the economy and how they will affect the growth and profitability of specific industries.

CONCEPT CHECKERS: AN INTRODUCTION TO SECURITY VALUATION AND INDUSTRY ANALYSIS

1. Which of the following describes the flow of the top-down valuation process?
 - A. Economic analysis, industry analysis, company analysis.
 - B. Company analysis, industry analysis, economic analysis.
 - C. Economic analysis, company analysis, industry analysis.
 - D. Pick the best stocks regardless of the industry and economic conditions.
2. An analyst used the infinite period valuation model to determine that XYZ Corporation should be valued at \$20. The current market price is \$30. The analyst should do which of the following?
 - A. Issue a buy recommendation on XYZ.
 - B. Issue a sell recommendation on XYZ.
 - C. Issue a hold recommendation on XYZ.
 - D. Do nothing since the results conflict each other.
3. What would an investor be willing to pay for a share of preferred stock that paid an annual \$7 dividend if the yield on preferred was 25 basis points *below* the A bond yield of 8%?
 - A. \$77.50.
 - B. \$87.50.
 - C. \$90.32.
 - D. \$110.71.
4. An analyst projects that a stock will pay a \$2 dividend next year and that it will sell for \$40 at year-end. If the required rate of return is 15%, what is the value of the stock?
 - A. \$25.00.
 - B. \$33.54.
 - C. \$36.52.
 - D. \$43.95.
5. An analyst expects a stock selling for \$25 per share to increase to \$30 by year-end. The dividend last year was \$1, but the analyst expects next year's dividend to be \$1.50. What is the expected holding period yield on this stock?
 - A. 20.00%.
 - B. 21.67%.
 - C. 24.00%.
 - D. 26.00%.
6. A stock paid a \$2 dividend last year. An investor projects that next year's dividend will be 10% higher and that the stock will be selling for \$40 at the end of the year. The risk-free rate of interest is 8%, the market return is 13%, and the stock's beta is 1.2. Determine the value of the stock.
 - A. \$35.
 - B. \$37.
 - C. \$39.
 - D. \$42.
7. A stock will pay a \$2 dividend next year, \$2.25 the year after, and \$2.50 the following year. An investor believes that she can then sell the stock for \$50 at the end of a 3-year holding period. The risk-free rate of interest is 7%, the market return is 13%, and the stock's beta is 1. What is the value of the stock?
 - A. \$35.76.
 - B. \$37.44.
 - C. \$39.92.
 - D. \$47.99.

8. The infinite period dividend discount model (DDM) implies that a stock's value will be greater:
- A. the larger its expected dividend.
 - B. the higher the expected growth rate.
 - C. the lower the required rate of return.
 - D. all of the above.
9. Holding all other factors constant, which of the following is expected to grow at the same rate as dividends in the infinite period DDM?
- A. Sales.
 - B. ROE.
 - C. Stock price.
 - D. All of the above.
10. The infinite period DDM assumes which of the following?
- A. $g < k$.
 - B. $g = k$.
 - C. $g > k$.
 - D. $g \neq k$.
11. What is the intrinsic value of a company's stock if next year's expected dividend is projected to be 5% greater than today's \$1 dividend? The sustainable growth rate is 5%, and investor's required rate of return for this stock is 10%.
- A. \$20.00.
 - B. \$21.00.
 - C. \$21.05.
 - D. \$22.05.
12. Next year's dividend is expected to be \$2; $g = 7\%$; and $k = 12\%$. What is the stock's intrinsic value?
- A. \$16.67.
 - B. \$28.57.
 - C. \$40.00.
 - D. \$42.80.
13. A stock paid a \$1 dividend last year. The risk-free rate is 5%; the expected return on the market is 12%; and the stock's beta is 1.5. If dividends are expected to grow at a 5% rate forever, what is the value of the stock?
- A. \$10.00.
 - B. \$15.25.
 - C. \$21.50.
 - D. \$25.75.
14. The XX Company paid a \$1 dividend last year. The company is expecting dividends to grow at a 6% rate into the future. What is the value of this stock if an investor requires a 15% rate of return on stocks of this risk class?
- A. \$10.60.
 - B. \$11.11.
 - C. \$11.78.
 - D. \$12.78.

15. If a company currently has a high and unsustainable g that exceeds k , what is the appropriate valuation model?
- A. Book value model.
 - B. Infinite growth DDM.
 - C. Price earnings multiple.
 - D. Temporary supernormal growth (multistage) DDM.
16. Assume that a stock is expected to pay dividends at the end of year 1 and year 2 of \$1.25 and \$1.56, respectively. Dividends are expected to grow at a 5% rate thereafter. Assuming that k_e is 11%, the value of the stock is *closest* to which of the following?
- A. \$22.30.
 - B. \$23.42.
 - C. \$24.55.
 - D. \$30.11.
17. An analyst feels that Brown Company's earnings and dividends will grow at 25% for two years, after which growth will fall to a market-like rate of 6%. If the projected discount rate is 10% and Brown's most recently paid dividend was \$1, value Brown's stock using the supernormal growth (multistage) dividend discount model.
- A. \$31.25.
 - B. \$33.54.
 - C. \$34.22.
 - D. \$36.65.
18. Firms with abnormally high return on equity (ROE) will probably do which of the following?
- A. Go out of business.
 - B. Pay out all earnings in dividends.
 - C. Retain a large portion of their earnings.
 - D. Be indifferent between retention and payout.
19. How would an investor *best solve* for the intrinsic value of a stock that currently pays no dividends but is expected to start in five years?
- A. Use the P/E ratio.
 - B. Equate the intrinsic value to the market price.
 - C. Use the infinite period (constant growth) DDM.
 - D. Use the temporary supernormal growth (multistage) DDM.
20. The ABC Company will experience a 25% growth rate over the next three years and pay no dividends over that time period. Growth will then fall to 6%, at which time the company will institute a 40% payout ratio. If the expected dividend in year 4 is projected to be \$2 per share and the required return is 10%, the firm's intrinsic value today is *closest* to:
- A. \$37.57.
 - B. \$41.66.
 - C. \$48.00.
 - D. \$50.00.
21. A firm has an expected dividend payout ratio of 60% and an expected future growth rate of 7%. What should the firm's price-to-earnings (P/E) ratio be if the required rate of return on stocks of this type is 15%?
- A. 5.0X.
 - B. 7.5X.
 - C. 10.0X.
 - D. 15.5X.

22. An investor is analyzing a firm that has a historical earnings retention rate of 60%, which is projected to continue into the future, and a constant ROE of 15%. The stock's beta is 1.2. The nominal risk-free rate is 8%, and the expected market return is 13%. If the investor thinks that next year's earnings will be \$3 per share, the stock's value would be *closest* to:
- \$15.
 - \$24.
 - \$35.
 - \$55.
23. If a company has an earnings retention rate of zero, the firm's P/E ratio will be which of the following?
- $1 / g$.
 - $1 / k$.
 - $D / P + g$.
 - $D / k - g$.
24. A stock's P/E ratio based on the DDM is which of the following?
- $(1 - RR) / [k - RR(ROE)]$.
 - $(1 + RR) / [k - RR(ROE)]$.
 - $(1 + RR) / [k + RR(ROE)]$.
 - $(1 - RR) / [k + (RR)(ROE)]$.
25. Which of the following yields the growth rate of dividends?
- Adding the firm's earnings retention rate to the ROE.
 - Subtracting the earnings retention ratio from the ROE.
 - Dividing the firm's earnings retention rate by the ROE.
 - Multiplying the firm's earnings retention rate by the ROE.
26. A stock just paid a dividend of \$1. The dividend for the next three years is expected to grow at a 30% rate, after which the dividend in the fourth year and all future years is expected to grow at a rate consistent with an ROE of 10% and a dividend payout ratio of 60%. If the discount rate is 14%, the value of the stock is *closest* to:
- \$19.37.
 - \$20.89.
 - \$22.90.
 - \$25.10.
27. Eisen Company paid a \$1 dividend last year and is expected to continue to pay out 30% of its earnings as dividends in the foreseeable future. The firm's ROE 10%. What is the value of Eisen stock if you require a 13% return on stocks in Eisen's risk class?
- \$10.70.
 - \$17.83.
 - \$19.56.
 - \$35.67.
28. The imposition of a tariff on imported aluminum will *most likely* benefit:
- domestic aluminum producers.
 - foreign aluminum producers.
 - domestic airframe manufacturers.
 - Brazilian airlines.

ANSWERS – CONCEPT CHECKERS: AN INTRODUCTION TO SECURITY VALUATION AND INDUSTRY ANALYSIS

Professor's Note: Although your answer may vary slightly from the given choices, this is often the case on the actual CFA exam. Pick the closest one and move on!

1. A Top-down analysis works from the macro to the micro level—economic analysis, industry analysis, company analysis.
2. B Because the stock is selling for more than its intrinsic value, the stock is overvalued. The analyst should issue a sell recommendation.
3. C Preferred stock uses the PV of perpetuity model. Required return = $0.08 - 0.0025 = 0.0775$.
 $7.0 / 0.0775 = \$90.32$.
4. C $(\$40 + \$2) / 1.15 = \$36.52$.
5. D $(\$31.50 / \$25) - 1 = 0.26$.
6. B Required return using CAPM = $0.08 + 1.2(0.13 - 0.08) = 14\%$. $[\$40 + \$2(1.1)] / 1.14 = \$37.02$.
7. C $k = 0.07 + 1(0.13 - 0.07)$, $V_0 = (\$2 / 1.13) + [\$2.25 / (1.13)^2] + [(\$2.50 + \$50) / (1.13)^3] = \$39.92$.
8. D A larger expected dividend, a higher expected growth rate, and lower required return will all increase the expected value of a stock.
9. C The infinite period DDM implies that the stock price will grow at the (constant) growth rate of dividends. A crucial assumption of the DDM is that ROE is constant; sales growth rate could be the same as the growth rate of dividends and earnings, but this is not required.
10. A For the infinite period DDM, the constant growth rate must be less than the required rate of return or else the math will not work. *Note:* The choice $g \neq k$ is a "trick" distractor. It is incorrect because if $g > k$, the formula does not work.
11. B Using the infinite period DDM, $\$1(1.05) / (0.1 - 0.05) = \21.00 .
12. C Using the infinite period DDM, $\$2 / (0.12 - 0.07) = \40.00 .
13. A $k = 0.05 + 1.5(0.12 - 0.05) = 15.5\%$, $V_0 = \$1(1.05) / (0.155 - 0.05) = \10.00 .
14. C Using the infinite period DDM, $\$1(1.06) / (0.15 - 0.06) = \11.78 .
15. D Companies may sometimes have temporary supernormal growth where $g > k$. If this is the case, the temporary supernormal growth DDM is appropriate.
16. C $(\$1.25 / 1.11) + (\$1.56) / (1.11)^2 + (\$1.56)(1.05) / (0.11 - 0.05) / (1.11)^2 = \24.55 .
17. D $1.25 / 1.1 + [\$1(1.25)^2 / (1.1)^2] + [\$1(1.25)^2(1.06) / (0.1 - 0.06) / (1.1)^2] = \36.65 .
18. C Firms with abnormally high return on equity will likely retain a high portion of their earnings because the firm will likely be able to earn higher returns by reinvesting those earnings than investors could earn if the earnings were paid out in dividends.
19. D If a company does not pay dividends but is expected to in the future, the temporary supernormal growth DDM would be the best method to use. Work with earnings to find the PV of the future price that is determined by the future projected revenue stream.

20. A Note that this problem gives you more information than you need. Simply use the period 4 dividend with the infinite period DDM, and discount that (time 3) value back to the present. $[\$2 / (0.10 - 0.06)] / (1.1)^3 = \37.57 .
21. B Using the earnings multiplier model, $0.6 / (0.15 - 0.07) = 7.5X$.
22. B $g = 0.6 \times 0.15 = 9\%$; $k = 0.08 + 1.2(0.13 - 0.08) = 14\%$; $P_0 = (\$3 \times 0.4) / (0.14 - 0.09) = \24.00 .
23. B If a company is paying out all of its earnings as dividends, the constant growth DDM and earnings multiplier model simplify into the PV of a perpetuity formula $= 1/k$, because $g = 0$ (in the denominator) and payout $= 1$ (in the numerator).
24. A The earnings multiplier model calculates P/E as follows: payout / $k - g$. Substituting terms, payout $= 1 - RR$, and $g = ROE(RR)$.
25. D $g = RR \times ROE$.
26. A $g = 0.4 \times 0.1 = 4\%$; $P_0 = \$1.30 / 1.14 + \$1.69 / (1.14)^2 + \$2.20 / (1.14)^3 + [\$2.20(1.04) / (0.14 - 0.04)] / (1.14)^3 = \19.37 .
27. B $g = 0.7 \times 0.1 = 7\%$; $P_0 = \$1(1.07) / (0.13 - 0.07) = \17.83 .
28. A A structural change involving the imposition of a tariff will benefit domestic producers.

The following is a review of the Analysis of Equity Investments principles designed to address the learning outcome statements set forth by CFA Institute®. This topic is also covered in:

EQUITY: CONCEPTS AND TECHNIQUES

Study Session 14

EXAM FOCUS

This topic review focuses on the analysis of global industries and provides a framework for this analysis. You should be able to describe the stages of the business cycle and the stages of the industry life cycle and recognize a stage if given descriptive information about the business environment or industry conditions. There are two measures of industry

concentration that you need to be able to interpret. Finally, you should know the risk factors to consider in global industry analysis, and you *must* know Porter's five factors (memorize these) to consider when evaluating the intensity of competition and the nature of competition for profits along the value chain.

LOS 61.a: Classify business cycle stages and identify, for each stage, attractive investment opportunities.

Five stages of the business cycle can be identified. They are:

- *Recovery*—the economy begins to show signs that a recession is ending. Attractive investments include cyclicals, commodities, and commodity-linked equities.
- *Early expansion*—the recovery takes hold and the momentum of the recovery increases. Attractive investments include stocks in general and real estate.
- *Late expansion*—the recovery has continued, and confidence and momentum are high. Attractive investments include bonds and interest-sensitive stocks.
- *Slowing, entering recession*—growth has turned flat and then negative. Attractive investments include bonds and interest-sensitive stocks.
- *Recession*—typically, the money supply will be expanded, but recovery may take time. Attractive investments include commodities and stocks.

LOS 61.b: Discuss, with respect to global industry analysis, the key elements related to return expectations.

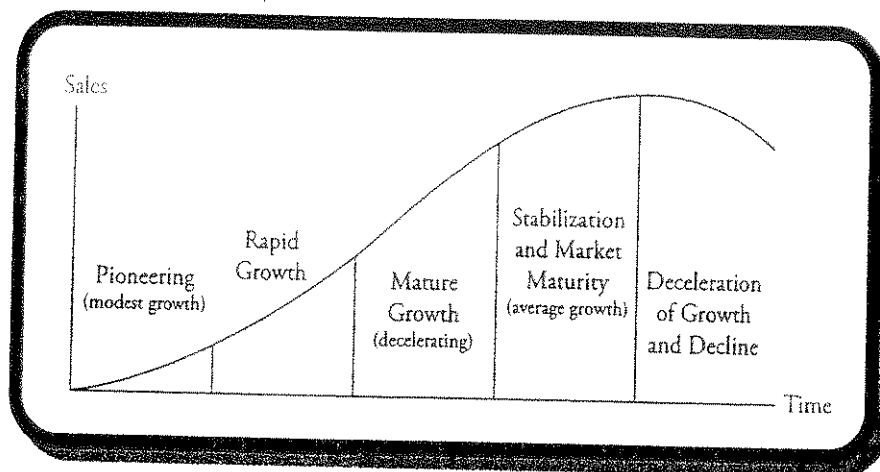
Returns, more specifically return on equity (ROE) compared to the cost of capital, and growth opportunities are the key drivers of value creation. Returns expectations are therefore an important element in identifying value and opportunities. Returns expectations depend on:

- *Demand*. The analyst must estimate worldwide demand in global industry analysis, which will involve an analysis of the countries that are most important to a firm's business and the relation of product demand to factors such as expected GDP growth and monetary conditions.
- *The value chain*. Creation of value by a firm will likely come from specific stages of the value chain. Value creation takes place in many steps, from the production of raw materials to equipment production (which may involve several intermediate steps), to the production of final goods, and culminating with sales and distribution to consumers or other producers and service after the sale. Where the profits lie along this chain of value creation can change over time. An analyst must be aware of this and form an opinion about a firm's plans to expand upstream or downstream along the value chain and its ability to exploit profitable opportunities, either within the industry or by extending its product line.

LOS 61.c: Describe the industry life cycle and identify an industry's stage in its life cycle.

Figure 1 depicts a general illustration of the industry life cycle. This figure shows sales on the vertical axis and the phases of a firm's life cycle on the horizontal axis.

Figure 1: Industry Life Cycle



The following descriptions can be used to identify an industry's stage in its life cycle.

- *Pioneering phase.* This is the start-up phase, where the industry experiences limited growth in sales and low, or even negative, profit margins. Demand is low, and firms in the industry are faced with substantial developmental costs.
- *Rapid accelerating growth phase.* During this stage, markets develop for the industry's products, and demand grows rapidly. There is limited competition among the few firms in the industry, and sales growth and profit margins are high and accelerating.
- *Mature growth phase.* Sales growth is still above normal but ceases to accelerate. Competitors enter the market, and profit margins start to decline.
- *Stabilization and market maturity phase.* This is the longest phase. Industry sales growth rates approach the average growth rate of the economy. Fierce competition produces slim profit margins, and ROE becomes normal.
- *Deceleration of growth and decline.* Demand shifts away from the industry. Growth of substitute products causes declining profit margins.

Professor's Note: While we are focused on a sales estimate, please be aware that industry life cycle analysis can also provide us with insights into profit margins and earnings growth.

LOS 61.d: Interpret and explain the significance of a concentration ratio and a Herfindahl index.

A concentration ratio is calculated as the percentage market share of the N largest firms in an industry. We would express it as, "the four-firm concentration ratio is 78% for the automobile industry," for example. Knowing that the four largest firms in the industry account for 78% of sales gives us an idea of the competition structure in the industry.

An alternative concentration measure is the Herfindahl index. It is calculated as the sum of the squared market shares of the N largest firms (an N -firm Herfindahl index) or of all the firms in the industry (Herfindahl index for the entire industry).

Example: Calculation of concentration ratios

An industry has four firms with market shares of 40%, 30%, 20%, and 10%. Calculate the three-firm concentration ratio and the Herfindahl index for this industry.

Answer:

The three-firm concentration ratio is $0.4 + 0.3 + 0.2 = 90\%$.

The Herfindahl index is $0.4^2 + 0.3^2 + 0.2^2 + 0.1^2 = 0.3$

In practice, an analyst will use both of these measures to get a picture of the structure of competition in the industry. Overall, a Herfindahl index less than 0.1 indicates a lack of concentration in the industry; values between 0.1 and 0.18 indicate some concentration; and values above 0.18 suggest a highly concentrated industry.

An alternative way to interpret the index is to view its reciprocal, $\frac{1}{0.3} = 3.33$ for the above example, as the equivalent number of equal-sized firms in the industry. The Herfindahl index can distinguish between two industries that have the same concentration ratio but different market shares for the largest firms, because it puts more weight on the market shares of the largest firms by its construction.

LOS 61.e: Discuss, with respect to global industry analysis, the elements related to risk, and describe the basic forces that determine industry competition.

The elements related to risk in global industry analysis area:

- *Competition in markets:* Looking at the relation of price to average cost can provide information about the strategies that firms are following in an industry. The viability of strategies to keep new competitors out of an industry or to drive existing competitors out of an industry can be a source of risk.
- *Competition along the value chain:* Profits and high rates of return may lead to efforts to share in these profits by labor, suppliers of intermediate products, distributors, buyers, or outsourcing partners.
- *Governmental policies:* Some companies are subsidized or otherwise advantaged by the policies and institutions of the governments in their home countries. In other instances, governmental regulation, such as minimum wage laws or restrictions on the work week, may disadvantage a company. Such governmental participation can be an important factor in the competitive environment of an industry.
- *Market risk factors:* Risk can also be gauged by the returns-based measures of total risk and market risk (covariance risk). These measures may change over a business cycle or in response to a changed competitive structure within the industry. Other standard measures of risk, such as leverage or ROE variability, are incorporated here since they will affect total risk and market risk.

Forces That Determine Industry Competition

In addition to life cycle analysis, industry sales (and earnings) forecasts should be preceded with an evaluation of the competitive structure of the industry. This is necessary because the profitability of a specific firm in an industry is heavily influenced by the competitive environment in which it does business and the profitability of the industry as a whole.

A widely cited author, Michael Porter, believes that the competitive environment of an industry determines the ability of firms within that industry to sustain above-average rates of return on invested capital. In his widely cited book, *Competitive Strategy: Techniques for Analyzing Industries and Competitors* (New York: Free Press, 1980), Porter described five factors for determining the intensity of competition within an industry.

Porter's five factors that determine industry competition are:

- *Rivalry among the existing competitors.* Rivalry is high when many equal-sized firms compete within an industry. Slow growth leads to competition when firms fight for market share, and high fixed costs lead to price cutting as firms try to operate at full capacity.
- *Threat of new entrants.* The easier it is to enter the market, the greater the potential for competition. Barriers to entry (e.g., very high startup costs, regulation, economies of scale) help limit competition.
- *Threat of substitute products.* The profit potential in an industry is limited when many substitute products exist. This availability of substitute products restricts the price that firms may charge. There are higher levels of competition and lower profit margins for more commodity-like products.
- *Bargaining power of buyers.* A limited number of buyers or a high concentration of buyers relative to sellers places the buying firms in an advantageous position over sellers. This means the buying firms have significant control over prices.
- *Bargaining power of suppliers.* A limited number of selling firms or a high concentration of sellers relative to buyers places the selling firms in an advantageous position over buyers. This means the selling firms have significant control over prices. Suppliers are more powerful if there are just a few of them or if they are more concentrated than the buying firms. This enables sellers to control prices.

KEY CONCEPTS

1. The five stages of the business cycle are recovery, early expansion, late expansion, slowing, and recession. Commodities, stocks, and cyclical are attractive investments during recession and recovery, while bonds and interest-sensitive stocks are attractive investments as expansion slows and interest rates are expected to decline.
2. Returns expectations are based on demand analysis, the sources of value creation, a firm's ability to expand profitably up or down the value chain, and the nature and intensity of competition within an industry.
3. The stages of the industry life cycle are pioneering, rapid growth, mature growth, market maturity, and decline.
4. An N-firm concentration ratio is the total market share of the N largest firms in an industry, and an N-firm Herfindahl index is the sum of the squared market shares of the N largest firms in an industry.
5. Risk analysis focuses on the viability of a firm's competitive strategy, the nature of competition for profits along the value chain, governmental participation as it positively or negatively affects a firm's competitive position, and market risk factors.
6. The five forces that can be used to analyze industry competition are rivalry among competitors, bargaining power of buyers, bargaining power of sellers, the threat of new entrants, and the threat of the introduction of substitute products.

CONCEPT CHECKERS: EQUITY: CONCEPTS AND TECHNIQUES

1. During the late expansion phase of the business cycle, which of the following would be the *most attractive* investment?
 - A. Real estate.
 - B. Commodities.
 - C. Cyclical stocks.
 - D. Interest sensitive stocks.
2. Return expectations can be *best determined* by examining:
 - A. company leverage.
 - B. market risk.
 - C. demand.
 - D. past cash flows.
3. The phase of the industry life cycle where new entrants to the market arrive and begin to erode profit margins is the:
 - A. mature growth phase.
 - B. decline.
 - C. market maturity.
 - D. rapid growth phase.
4. An industry has four firms with market shares of 60%, 20%, 15%, and 5%. The four-firm Herfindahl index for this industry is *closest* to:
 - A. 1.
 - B. 0.425.
 - C. 2.35.
 - D. 0.283.
5. Efforts by unions to secure wage increases can be *best viewed* as:
 - A. market competition.
 - B. competition along the value chain.
 - C. downstream expansion.
 - D. competition by suppliers.
6. Which of the following is NOT one of Porter's "five factors" that determine the intensity of industry competition?
 - A. Threat of government regulation.
 - B. Threat of substitutes.
 - C. Rivalry among competitors.
 - D. The bargaining power of buyers.
7. The three largest firms in a \$200 billion industry have revenues of \$50 billion, \$30 billion, and \$20 billion. Assuming that there are ten other equal-size firms in the industry, calculate the three-firm concentration ratio and the Herfindahl index for the entire industry.

<u>Concentration</u>	<u>Herfindahl</u>
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ANSWERS – CONCEPT CHECKERS: EQUITY: CONCEPTS AND TECHNIQUES

1. D As the expansion ends and the economy declines, monetary easing and a decreased demand for capital should cause interest rates to go down.
2. C Demand analysis is the primary factor in estimating ROE. Past cash flows may be a starting point, but they do not provide expected returns in the future since business cycles and country-specific factors in the firm's primary markets must be considered to estimate future returns on equity.
3. A In the mature growth phase, sales growth is still above normal, but the arrival of competition begins to erode profit margins.
4. B $0.6^2 + 0.2^2 + 0.15^2 + 0.05^2 = 0.425$
5. B There is competition along all the steps in value creation from the producers of raw materials, through the various production steps, to distributors and buyers. Union activity is better described as cooperation among suppliers (of labor) than as competition by suppliers.
6. A The threat of government regulation is not one of the five factors.
7. B Three-firm concentration ratio = $\frac{50 + 30 + 20}{200} = 0.50$

$$\text{Herfindahl} = \left(\frac{50}{200}\right)^2 + \left(\frac{30}{200}\right)^2 + \left(\frac{20}{200}\right)^2 + 10 \times \left(\frac{10}{200}\right)^2 = 0.12$$

The following is a review of the Equity Investments principles designed to address the learning outcome statements set forth by CFA Institute®. This topic is also covered in:

COMPANY ANALYSIS AND STOCK VALUATION

Study Session 14

EXAM FOCUS

This topic review applies estimated P/Es and earnings to the valuation process for an individual common stock. Candidates should note that the formulas and process behind the calculations are identical whether we are

talking about market and industry indices or individual companies. Note well the distinction between “good” companies and “good” (undervalued) stocks.

COMPANY VS. STOCK ANALYSIS

After analyzing the economy and determining which industries offer the most promise, the next step in the top-down approach is selecting stocks. This is not simply a matter of identifying a “good company,” defined as one with solid earnings and growth potential.

Company analysis might identify the best firms, but it does not necessarily identify the best investments. A good company might be overpriced in the market, while a bad company might be underpriced and represent a better investment. To select the best stocks, the investor must answer two questions: (1) What are the best companies in the best industries? (2) Are the stocks of these companies priced correctly? This is where the valuation techniques that we have learned come into play.

LOS 62.a: Differentiate between 1) a growth company and a growth stock, 2) a defensive company and a defensive stock, 3) a cyclical company and a cyclical stock, 4) a speculative company and a speculative stock and 5) a value stock and a growth stock.

Growth company vs. growth stock. A *growth company* is one whose management has the ability to consistently select investments (projects) that earn higher returns than required by their risk. A *growth stock* is one that earns higher returns than other stocks of equivalent risk.

Even though a firm might be recognized as a growth company, its price may already reflect those growth expectations, and the stock will earn only the risk-adjusted required return. In addition, investor enthusiasm regarding the stock may be excessive, and this excess buying pressure may have pushed the price too high. In this case, even though the firm earns above-normal returns, its stock can actually earn below-normal returns.

Regardless of whether the firm is defined as a growth company, if a firm's stock price is below its intrinsic value, it can be a *growth stock*. Assuming the market estimates the correct value at some point, the stock price will rise, and the stock will (temporarily) earn above-normal risk-adjusted returns.

Defensive company vs. defensive stock. A *defensive company* has earnings that are relatively insensitive to downturns in the economy. Utility companies and retail grocery chains are good examples of defensive companies. These types of firms typically have low business risk and moderate financial risk. A *defensive stock* is a stock that will not decline as much as the market when the overall market declines. The returns of defensive stocks have a low correlation with the returns of the market. Recalling our review of portfolio theory, defensive stocks are characterized by low betas.

Professor's Note: This terminology is specific to Reilly and Brown¹ as far as I know. In the rest of the known universe, a growth stock is one with rapidly growing earnings. See "growth stock versus value stock" below.

Cyclical company vs. cyclical stock. A *cyclical company* has earnings that tend to follow the business cycle. Steel, automobile, and heavy equipment producers are good examples of cyclical companies. Cyclical companies often have high levels of fixed costs (business risk) or leverage (financial risk). A *cyclical stock* is a stock with rates of return that will change more than the return on the overall market. These are stocks with betas greater than one, indicating more than a one-to-one reaction to changes in the return on the market.

Speculative company vs. speculative stock. A *speculative company* has assets that are very risky, but the assets have the potential to generate very large earnings. Companies that are involved with diamond mining, oil exploration, or some types of real estate are good examples of speculative companies. A *speculative stock* is a stock that is highly likely to have very low or negative returns because it is almost always overpriced. These stocks have a low probability of a return near that of the market but a slight probability of an enormous return.

Growth stock vs. value stock. Often the term "growth stock" is used to mean something different than the definition we used in contrasting growth stocks with growth companies. In the context of growth versus value, "growth" refers to the earnings growth rate. The S&P 500/Barra Growth Index[®] and S&P 500/Barra Value Index[®] separate the stocks in the S&P 500 index into growth stock and value stock portfolios. Operationally, this is done based on price-book ratios, but separating index stocks based on their price-earnings ratios would also be a good approximation for this purpose.

The shares of firms with high earnings growth rates tend to have both higher price-book and higher price-earnings ratios than slower-growing firms. The term *value stock* is used to describe stocks that are priced low in relation to their current earnings (rather than expected growth in their earnings) or in relation to the value of their fixed assets, real estate, or cash. Value stocks are characterized by low price-book ratios, low price-earnings ratios, and often, high dividends.

LOS 62.b: Describe and estimate the expected earnings per share (EPS) and earnings multiplier for a company.

Estimated EPS. A firm's earnings per share (EPS) can be estimated using the following equation:

$$\text{Expected EPS} = [(\text{sales})(\text{EBITDA}\%) - \text{depreciation} - \text{interest}](1 - \text{tax rate})$$

Note that sales, depreciation, and interest are estimated per-share values.

Estimated P/E. A firm's expected earnings multiplier (P/E) can be calculated using either of two methods:

Macroanalysis of the Earnings Multiplier. This approach estimates the company's P/E ratio by comparing it to industry and market P/E ratios.

Microanalysis of the Earnings Multiplier. Calculate a point estimate of the firm's expected P/E ratio.

- Estimate the firm's projected dividend payout ratio, D_1/E_1 . This is done with comparative analysis of the firm's payout history, stated goals, and industry.
- Estimate the firm's required rate of return on equity: $k = \text{RFR} + \beta (\text{R}_{\text{mkt}} - \text{RFR})$
- Estimate the firm's expected growth rate: $g = (\text{retention rate})(\text{ROE})$
- Compute the firm's future earnings multiplier: $(\text{P/E})_1 = (D_1/E_1) / (k - g)$

1. Frank K. Reilly and Keith C. Brown, *Investment Analysis and Portfolio Management*, 8th ed. (Dryden Press, 2005).

LOS 62.c: Calculate and compare the expected rate of return (based on the estimate of intrinsic value) to the required rate of return.

One way to evaluate the purchase of a stock is to compare the intrinsic value (based on the present value of expected dividends or cash flows) to the current market price. An alternative is to assume that the market price will move to the intrinsic value over some period and then compare the expected total return over the period to the investor's required rate of return. The following example illustrates this method.

Example: Expected return based on intrinsic value

Apton Corp. shares are currently trading at \$32.00/share and are expected to pay a dividend of \$0.96 over the coming year. Based on an expected growth rate of 12%, an analyst calculates the intrinsic value of Apton shares at \$36. Should an investor with a required rate of return of 14.5% purchase Apton shares based on this analysis?

Answer:

If the price of Apton shares is \$36 at year end, the total return will be:

$$\frac{36 - 32 + 0.96}{32} = 15.5\%$$

The investor should purchase the shares since the return of 15.5% is greater than the required return of 14.5%.

KEY CONCEPTS

1. We must distinguish between *companies* with earnings that grow, are cyclical, are defensive, or are speculative, and *stocks* with values that grow, are cyclical, are defensive, or are speculative.
2. If a company with rapidly growing earnings is priced to reflect its earnings growth rate, it is not likely a growth stock—it won't provide returns above its required rate of return.
3. In common usage, a *growth stock* has high expected earnings growth, a high P/E ratio, and a high price-book ratio. In contrast, a *value stock* is characterized by slower growth, a lower P/E ratio, a lower price-book ratio, and often a relatively high dividend yield.
4. To estimate a firm's expected earnings per share, an analyst needs to determine the company's sales forecast and profit margin and use the following equation: $EPS = [(sales\ per\ share)(EBITDA\%) - D - I](1 - t)$.
5. The two methods for estimating a firm's earnings multiplier $(P/E)_1$ are:
 - Estimate the firm's P/E ratio by comparing it to the market and industry P/E ratios.
 - Calculate point estimates for projected payout ratio, required rate of return, and growth rate in dividends, and use this equation: $(P/E)_1 = \frac{D_1/E_1}{k - g}$.
6. An analyst can compare his estimate of intrinsic value to the current share price to make the purchase decision, or calculate the expected holding period return assuming the stock price moves to intrinsic value over the period and compare that to the required rate of return on the stock.

CONCEPT CHECKERS: COMPANY ANALYSIS AND STOCK VALUATION

1. Which of the following could be a growth stock?
 - A. Expected return = required return.
 - B. Expected return < required return.
 - C. Required return = market return.
 - D. Required return < expected return.
2. Which of the following statements about company and stock analysis is FALSE? A:
 - A. growth stock always indicates a growth company.
 - B. growth company's stock can have below-average risk-adjusted returns.
 - C. weak firm can experience temporary above-average risk-adjusted returns.
 - D. growth stock earns higher returns than stock of equivalent risk.
3. Which of the following statements is FALSE? A growth:
 - A. company can be over- or undervalued.
 - B. stock is overvalued relative to its risk.
 - C. company has above-average investment opportunities.
 - D. stock has a higher rate of return than comparable firms.
4. An analyst gathered the following financial information about a firm:

• Estimated sales per share	\$200
• An EBITDA profit margin estimate	20%
• Estimated depreciation per share	\$15
• Interest per share	\$5

If the firm's tax rate is 30%, calculate the firm's estimated earnings per share (EPS).

 - A. \$6.
 - B. \$14.
 - C. \$22.
 - D. \$28.
5. An analyst gathered the following financial information about a firm:

• Estimated EPS	\$10 per share
• Dividend payout ratio	40%
• Required rate of return	12%
• Expected long-term growth rate of dividends	5%

What would the analyst's estimate of the future value of this company's stock be?

 - A. \$33.
 - B. \$57.
 - C. \$80.
 - D. \$86.
6. Which of the following statements about stock valuation is FALSE?
 - A. If estimated value < the market price, sell the stock; it's overpriced.
 - B. If estimated value < the market price, buy the stock; it's underpriced.
 - C. If the expected rate of return > the required rate, buy the stock; it's underpriced.
 - D. If the expected rate of return < the required rate, don't buy the stock; it's overpriced.

7. Which of the following statements is FALSE? A speculative:
- A. stock is usually underpriced.
 - B. company has highly risky assets.
 - C. company can be over- or undervalued.
 - D. stock has a low probability of earning a market rate of return.
8. An analyst has made the following estimates for a stock:
- Dividends over the next year \$0.60
 - Long-term growth rate 13%
 - Intrinsic value \$24

The shares are currently priced at \$22.

Assuming the stock price moves to intrinsic value over the next year, what is the expected return on the stock?

- A. 9.1%.
- B. 11.8%.
- C. 13.0%.
- D. 15.7%.

ANSWERS – CONCEPT CHECKERS: COMPANY ANALYSIS AND STOCK VALUATION

1. D If the required return is less than the expected return, the stock is underpriced and should temporarily earn above-normal risk-adjusted returns.
2. A Classifying a stock as a growth stock means it is expected to earn above-average risk-adjusted returns, regardless of whether it is issued by a strong or weak firm.
3. B It is true that a growth company can be overvalued or undervalued; a growth company is characterized by above-average investment opportunities and typically has a higher rate of return than comparable firms. A growth stock is not necessarily overvalued—it can be over- or undervalued.
4. B Expected EPS = [(sales)(EBITDA%) – depreciation – interest] (1 – t)
$$= [(200)(0.20) - 15 - 5](1 - 0.3) = \$14$$
5. B $(P/E)_1 = (D_1/E_1) / (k - g) = (0.4) / (0.12 - 0.05) = 5.7$
$$P_1 = \$10(5.7) = \$57$$
6. B Buy (sell) a stock when the estimated value is more (less) than the market price.
7. A Speculative stocks are almost always overpriced.
8. B
$$\frac{24 - 22 + 0.60}{22} = 11.8\%$$

TECHNICAL ANALYSIS

Study Session 14

EXAM FOCUS

This topic review introduces the “story” that underlies technical analysis, and you should understand how this differs from the fundamental analysis view. You should learn what the technical indicator names mean. Confusion regarding which indicators are contrarian indicators and which are smart money indicators is normal. I suggest you try to remember which are the smart money indicators because there are only four of

them; then you will know that the others are contrarian indicators. The real distinction here is whose actions are driving the indicator. For smart money indicators, the “smart” people driving the indicator values are bond traders (confidence index and TED spread), exchange specialists (specialist short sale ratio), and investors buying on margin (margin debt).

LOS 63.a: Explain the underlying assumptions of technical analysis and explain how technical analysis differs from fundamental analysis.

Underlying all of technical analysis are the following assumptions:

- Values, and thus prices, are determined by supply and demand.
- Supply and demand are driven by both rational and irrational behavior.
- Security prices move in trends that persist for long periods.
- While the causes of changes in supply and demand are difficult to determine, the actual shifts in supply and demand can be observed in market price behavior.

The major challenge to technical analysis is the efficient markets hypothesis (EMH). Followers of the EMH believe that all available information associated with both fundamental and technical analysis is impounded in current security prices. EMH followers argue that technical trading rules require too much subjective interpretation and that decision variables change over time.

Fundamental analysts believe that a security's price is determined by the supply and demand for the underlying security based on its economic fundamentals, such as expected return and risk. Fundamentalists believe they can forecast value changes by analyzing earnings and other publicly available data.

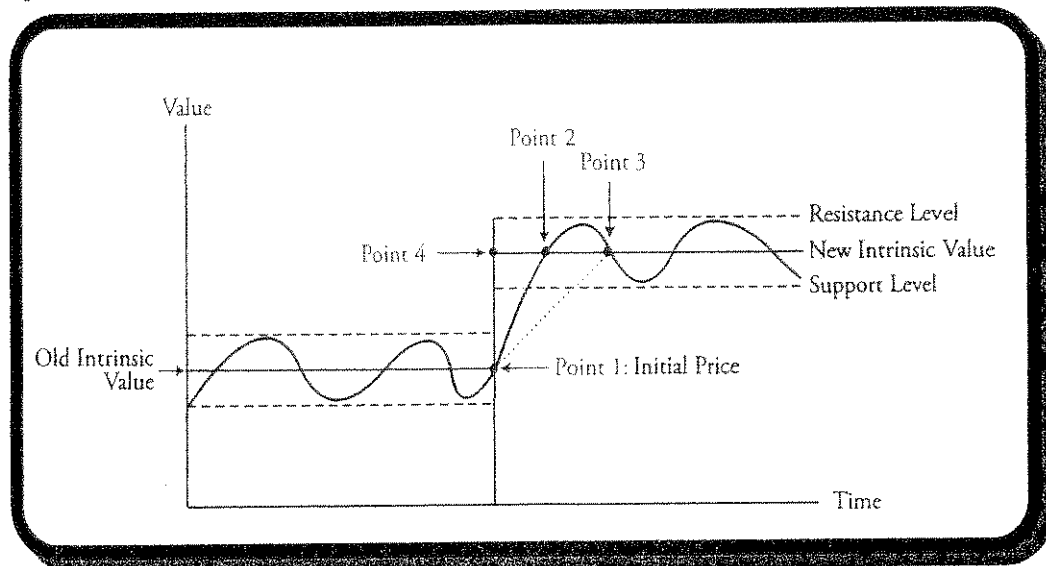
The difference between fundamental analysis and technical analysis is the assumption about the speed at which new information is impounded into prices. Technicians believe the reaction is slow, while fundamentalists believe prices adjust quickly. In addition, efficient market hypothesis analysts feel the price adjustment happens almost instantaneously.

Fundamentalists, through their research, look for changes in the basis of value, which eventually leads to changes in the supply and demand for the stock. Technicians look for evidence of changes in supply and demand through market signals and indicators. Efficient market followers say all this looking is a hopeless and profitless exercise, since prices will change very rapidly in response to new information.

The difference in the three views is illustrated in Figure 1, where the following interpretations can be made:

- Fundamentalists look for reasons why the valuation band will shift upward. The shift will happen when they find it. Price changes will occur over a period of days or weeks as analysts determine the situation. The fundamentalists' price-adjustment process is described by the path from Point 1 to Point 2.
- Technicians look for signs that the valuation band has moved. Technicians base their strategies on the premise that price changes will occur over a long period, as indicated by the path from Point 1 to Point 3.
- EMH advocates hold that when the value band shift happens, the price will shift rapidly. This adjustment process is described by the path from Point 1 to Point 4.

Figure 1: Technical, Fundamental, and EMH Price Adjustment Process



LOS 63.b: Discuss the advantages and challenges of technical analysis.

Technical analysis offers the following advantages:

- It is quick and easy.
- It does not involve accounting data and analytical adjustments for differences in accounting methods.
- It incorporates psychological as well as economic reasons behind price changes.
- It tells *when* to buy (not *why* investors are buying).

The major challenge to technical analysis is the *efficient market hypothesis*. Efficient market analysts feel all available information is impounded in the current security price. They argue that technical relationships may not be repeated. Technical analysis is also challenged by the argument that technical rules require too much subjective interpretation and that technical decision variables change over time.

Technical analysis often involves some sort of trading rule. Some of the challenges to technical trading rules are:

- Almost without exception, EMH studies using autocorrelation and runs tests have found no evidence that prices move in trends (i.e., past price patterns may not be repeated in the future). EMH followers say that the market appears to react quickly and completely to the release of new information.
- If technical trading rules worked, the price movements would become a self-fulfilling prophecy. That is, if enough people believe the price is going to rise \$5 per share once a specific breakout price is reached, the buying pressure at the breakout price will cause the \$5 price increase, although it will likely be temporary.
- If technical trading proved to be successful, others would copy it. As more traders implemented the strategy, its value would be neutralized.
- Interpreting the rules is too subjective, and the decision variables change over time.

LOS 63.c: Identify examples of each of the major categories of technical indicators.

Professor's Note: The wording of this LOS does not ask you to calculate these measures, only to identify them. Focus your attention on what high and low values of the indicators suggest to an analyst, not on the actual numeric values that are identified as bullish or bearish values.

Technical trading rules fall into two broad classes:

- General market movement indicators.
- Individual stock selection indicators (graphs and moving averages).

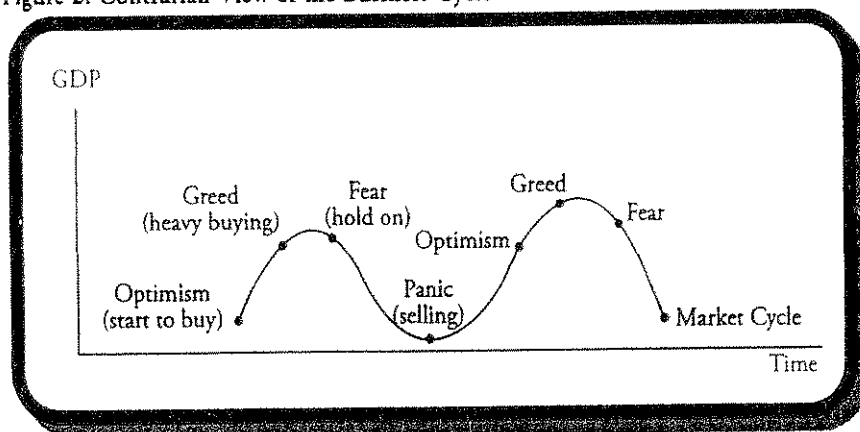
When analyzing general markets, technicians tend to take one of two views:

- The *contrarian* view. Contrary-opinion technicians (contrarians) argue that the majority is generally wrong, so they recommend doing the opposite of what the majority of investors are doing.
- *Follow the smart money* view. Technicians feel that smart investors know what they are doing, so they suggest "jumping on the bandwagon" while there is still time.

Contrarian View

Contrarians feel that the majority of investors are always wrong. They wait to see what the investing public is doing and do the opposite. The contrarian strategies are based on the "greed/panic" view of the investment process shown in Figure 2. A market advance instills the fear in the investing public that they will be left behind. Their greed tells them to buy. Later, investors panic as the market plunges, fearing that they won't be able to get out. This fear motivates them to sell. In the end, investors tend to buy at the peaks and sell at the troughs. Thus, a wise contrary-opinion technician does the opposite of what the general public is doing.

Figure 2: Contrarian View of the Business Cycle



Contrary-opinion technicians use the following six technical indicators:

1. **Cash position of mutual funds.** The mutual fund cash position is a function of investor expectations and the institution's view of market expectations. Contrary-opinion technicians feel that mutual fund cash positions are a good indicator of institutional investors' expectations and that they are usually wrong at picking the peaks and troughs of the market cycle.

$$\text{Mutual fund ratio} = \frac{\text{mutual fund cash}}{\text{total fund assets}}$$

- If the mutual fund ratio (MFR) is greater than 13%, it implies funds are holding cash and are therefore bearish on the market. In this case, contrary-opinion technicians are bullish.
- If the MFR is less than 5%, it implies funds are investing cash and are therefore bullish on the market. Contrary-opinion technicians are therefore bearish.

Professor's Note: Another way to look at this is that when the mutual fund cash ratio is high, contrarians are bullish because these cash holdings indicate potential future buying power in the market.

- Investor credit balances in brokerage accounts. The following is the contrarian view:
 - Falling credit balances mean "normal" investors are bullish, so contrarians will be bearish and sell.
 - Rising credit balances mean "normal" investors are bearish, so contrarians will be bullish and buy.
 - Note that a technical view of a build-up in credit balances would be that there is an increase in potential future buying power in the market, which is considered to be bullish.

- Opinions of investment advisory services. The bearish sentiments index is used to indicate the level of bearish sentiment among investment advisors. It is expressed as the investment advisor ratio (IAR), or:

$$\text{IAR} = \frac{\text{bearish opinions}}{\text{total opinions}}$$

- If the IAR is greater than or equal to 60%, it implies the market is bearish. Therefore, contrarians are bullish.
 - If the IAR is less than or equal to 20%, it implies advisors are bullish. Therefore, contrarians are bearish and sell.
- Over-the-counter vs. NYSE volume. Over-the-counter (OTC) issues are more speculative than NYSE issues, and speculative trading increases at market peaks. The level of speculative trading is measured using the volume ratio:

$$\text{volume ratio} = \frac{\text{OTC volume}}{\text{NYSE volume}}$$

- If the volume ratio (VR) is equal to or greater than 112%, speculation is high. Therefore, contrarians are bearish, since they feel that the market has peaked.
 - If the VR is equal to or less than 87%, investors are bearish. Therefore, contrarians are bullish and buying.
 - You should note that the VR limits (112% and 87%) vary significantly over time. Currently, the direction of the VR is used as a guide for the degree of speculative trading.
- CBOE put/call ratio. Contrarians use the put/call ratio (PCR) as an indicator of investors' bearishness. As such, contrary-opinion technicians become bullish as the PCR ratio increases.

$$\text{put call ratio} = \frac{\text{puts}}{\text{calls}}$$

- If the PCR is equal to or greater than 0.50, the market is bearish, so contrarians are bullish.
- If the PCR is less than or equal to 0.35, the market is bullish, so contrarians are bearish.

6. **Stock index futures.** Some contrarians track the relative number of futures traders who are bullish. These contrarians believe that:
- When 75% or more of speculators are bullish, contrarians become bearish.
 - When 25% or less of speculators are bullish, contrarians become bullish.

Smart Money Technicians

Smart money technicians use the following four indicators to help them determine what the smart investors are doing.

1. **Confidence index.**

$$CI = \frac{\text{Barron's average yield on 10 top grade corporate bonds}}{\text{Dow Jones Average 40 bonds}} \text{ or } CI = \frac{\text{quality bond yields}}{\text{average bond yields}}$$

Note: this ratio is always less than one.

In periods of confidence, investors sell high-quality bonds and buy lower-quality bonds to increase yields. Quality bond prices will fall and their yields rise. Lower-grade bond prices rise and their yields fall. Thus, the confidence index (CI) ratio will increase during periods of confidence (e.g., from $0.07 / 0.10 = 0.7$ to $0.08 / 0.09 = 0.89$). Note that the CI moves in the opposite direction of yield spreads. In periods of confidence, yield spreads narrow and the CI gets bigger. In periods of pessimism, spreads widen and the CI falls.

2. **T-bill—eurodollar yield spread.** Some technicians believe that spreads will often widen during times of international crisis as money flows to a safe haven in U.S. T-bills. An increasing “TED” spread is a bearish indicator.
3. **Short sales by specialists.** Smart money technicians use short sales by specialists as an indicator of future market behavior as follows:

$$\text{specialist short sale ratio} = \frac{\text{specialists' short sales}}{\text{total short sales on the NYSE}}$$

- If this ratio falls below 30%, it's a bullish sign. Specialists are buying.
 - If this ratio goes above 50%, it's a bearish sign. Specialists are selling.
4. **Debit balances in brokerage accounts (margin debt).** Debit balances in brokerage accounts represent the level of margin trading, which is usually only done by knowledgeable investors and traders.
- An increase in debit balances would indicate an increase in purchasing by astute buyers. This is a bullish sign for smart money technicians.
 - A decline in debit balances would indicate astute traders are selling stocks. This is a bearish sign for smart money technicians.

Other Indicators of Market Direction

Breadth of market. The technician's story in this case is that:

- The indices represent a few large companies, not the whole market.
- The market has many medium and small companies.
- Frequently the index goes one way while smaller issues go the other. Broad market moves include both large and small companies. How do you gauge the strength of market support, i.e., the breadth of the market? Compare the advance-decline line with the market index.

The advance-decline line is a running total of the daily advances less the declines on the NYSE. If the advance-decline line and the index move together, the movement is broadly based across the market. A divergence between the trend in the index and the advance-decline line would signal that the market has hit a peak or trough.

An alternative to the advance-decline line is the diffusion index. The diffusion index is a 5-week moving average of all of the stocks that advanced during a day plus 50% of the number that remained unchanged, divided by the number of issues traded during the day.

Short interest ratio. Short interest is the cumulative number of shares that have been sold short and not covered by a subsequent purchase. The short interest ratio (SIR) is used to measure the extent of short interest:

$$\text{SIR} = \frac{\text{outstanding short interest}}{\text{average daily volume on exchange}}$$

The SIR is calculated by the NYSE and NASD.

- If the SIR is high (6.0 or above), there is potential demand, a bullish sign.
- If the SIR is low (4.0 or below), there is potential for short selling, a bearish sign.

Stocks above their 200-day moving average. The market is believed to be overbought—a bearish indicator—when over 80% of the stocks are selling above their 200-day moving averages. Similarly, the market is considered to be oversold—a bullish indicator—if less than 20% of the stocks are selling above their 200-day-moving averages.

Block uptick-downtick ratio. Recall that upticks refers to a stock selling at a price above its most recent trade. When blocks of stocks are trading at an uptick price, the market is considered to be a buyer's market. Blocks trading on downticks (prices below the previous price), are an indication of a seller's market.

$$\text{uptick-downtick ratio} = \frac{\text{number of block uptick transactions}}{\text{number of block downtick transactions}}$$

- This indicator is a measure of institutional investor sentiment.
- If the ratio is close to 0.70, it is bullish; if the ratio is close to 1.10, it is bearish.

Stock Price and Volume Techniques

Dow Theory. The Dow Theory states that stock prices move in trends. There are three types of trends: major trends, intermediate trends, and short-run movements. Technicians look for reversals and recoveries in major market trends.

Importance of volume. Price alone does not tell the story. Technicians attempt to gauge market sentiment as well as direction to determine changes in supply and demand. Thus, they look at the volume that accompanies price movements. Price changes on low volume tell us little. Price changes on high volume tell us whether suppliers or demanders are driving the change.

$$\text{upside-downside volume ratio} = \frac{\text{volume of stocks that increased}}{\text{volume of stocks that declined}}$$

- If the upside-downside (U-D) ratio is 1.50 or more, it indicates that the market is overbought. This is a bearish signal.
- If the U-D ratio is 0.75 or lower, it reflects that the market is oversold. This is a bullish signal.

Support and resistance levels. Most stock prices remain relatively stable and fluctuate up and down from their true value. The lower limit to these fluctuations is called a support level—the price where a stock appears cheap and attracts buyers. The upper limit is called a resistance level—the price where a stock appears expensive and initiates selling.

Moving averages lines. Technicians believe stock prices move in trends. However, random fluctuations in prices mask these trends. By using moving averages (10 to 200 days), technicians can eliminate the minor blips from graphs but retain the overall long-run trend in prices.

Relative strength. When prices of an individual stock or industry change, it is difficult to tell if the change is stock-specific or caused by market movements. If the stock price and the market index value are changing at the same rate, the ratio created by dividing one by the other will remain constant. This ratio is called the relative strength ratio:

$$\text{relative strength} = \frac{\text{stock price}}{\text{market index value}}$$

- If the ratio increases over time, the stock is outperforming the market, a positive trend.
- If the ratio declines over time, the stock is underperforming the market, a negative trend.

Graphs. Some technical analysts are called chartists due to their extensive reliance on charts and graphs to indicate market directions.

- *Bar charts.* Price is plotted against time.
- *Point-and-figure charts.* Price is plotted on the y-axis, but movement along the x-axis is only plotted if a preset price reversal occurs.

Technicians read charts looking for patterns. Why? Technicians feel that history repeats itself, so by looking at past trends, they will be able to identify the beginning of new trends.

KEY CONCEPTS

1. The following are the underlying assumptions of technical analysis:
 - The market price of securities is determined solely by supply and demand.
 - Supply and demand are influenced by rational and irrational factors.
 - Security prices move in trends that persist for appreciable lengths of time.
 - Shifts in supply and demand can be determined by the actions of the market itself.
2. Fundamentalists believe that prices react quickly to changing stock values, while technicians believe that the reaction is slow. Technicians look for changes in supply and demand, while fundamentalists look for changes in value.
3. The advantages of technical analysis are:
 - It is quick and easy.
 - It is not heavily dependent on financial accounting statements.
 - It incorporates psychological as well as economic reasons behind price changes.
4. Challenges to technical trading rules include:
 - The efficient market hypothesis says price adjustments happen too quickly to trade on.
 - The behavior of past prices and market variables may not be repeated in the future.
 - Interpreting technical data requires too much subjective judgment to be usable.
 - The standard values that signal investment decisions can change over time.

5. Contrarian indicators, based on a belief that the majority opinion at a point in time is generally wrong, are:
 - Mutual fund cash position.
 - Investor credit balances in brokerage accounts.
 - Investment advisory opinions.
 - OTC vs. NYSE volume.
 - CBOE put/call ratio.
 - Futures traders bullish on stock index futures.
6. Smart money indicators include:
 - Barron's confidence index.
 - T-bill to Eurodollar yield spread.
 - Short sales by specialists.
 - Debit balances in brokerage accounts.

CONCEPT CHECKERS: TECHNICAL ANALYSIS

1. Which of the following statements is NOT an advantage of technical analysis?
 - A. It's quick and easy.
 - B. It tells the analyst when to buy.
 - C. It tells the analyst why investors are buying.
 - D. It incorporates psychological as well as economic reasons for price changes.
2. Which one of the following statements about technical analysis is TRUE? Technical analysis:
 - A. requires very little subjective judgment.
 - B. has been shown to outperform fundamental analysis.
 - C. is not heavily dependent on financial accounting statements.
 - D. only works if technicians can obtain new information before other investors and process it correctly and quickly.
3. When the Investment Advisory "Sentiment" Index exceeds a 60% negative opinion rating, contrary-opinion technicians will do which of the following?
 - A. Sell.
 - B. Buy.
 - C. Hold.
 - D. Investment advisory "sentiment" is not a contrary-opinion signal.
4. When the relative over-the-counter (OTC) to NYSE volume ratio is high—that is, the OTC volume exceeds 112% of NYSE volume—contrary-opinion technicians would do which of the following?
 - A. Hold.
 - B. Be bearish and sell.
 - C. Be bullish and buy.
 - D. This is not a signal to contrary-opinion technicians.
5. If the Barron's confidence index (CI) increases (and the implied yield spread narrows), investors are doing which of the following?
 - A. Selling quality bonds.
 - B. Buying quality bonds.
 - C. Selling common stocks.
 - D. Buying common stocks.
6. When investors are pessimistic, the CI will do which of the following?
 - A. Increase.
 - B. Decrease.
 - C. Remain constant.
 - D. Increase sharply then decrease sharply.
7. When debit balances (i.e., margin debt) in brokerage accounts increase, which of the following statements is TRUE?
 - A. Smart money technicians interpret this as a bearish sign.
 - B. Smart money technicians interpret this as a bullish sign.
 - C. Contrary-opinion technicians interpret this as a bullish sign.
 - D. No information content is contained in the debit balances in brokerage accounts.

8. Technicians feel that which of the following statements is TRUE?
 - A. Stock prices move in trends.
 - B. History tends to not repeat itself.
 - C. Trends continue over short periods.
 - D. Prices adjust quickly to new information.
9. Which of the following would be a bullish sign to a smart money technician?
 - A. The Barron's confidence index increases.
 - B. The T-bill Eurodollar yield spread widens.
 - C. The specialist short sale ratio goes above 50%.
 - D. Debit balances in brokerage accounts decline.
10. If the relative strength ratio (stock price over market price) increases, which of the following statements is TRUE? The market index:
 - A. is outperforming the stock.
 - B. price increase equals the stock price increase.
 - C. price percentage increase is less than the stock price percentage increase.
 - D. price percentage increase is greater than the stock price percentage increase.
11. Which one of the following is a bearish signal to a smart money technical analyst?
 - A. The T-bill Eurodollar yield spread narrows.
 - B. The Barron's confidence index increases.
 - C. The specialist short sale ratio falls below 30%.
 - D. Debit balances in brokerage accounts fall.
12. Which of the following is considered a bullish indicator to a contrarian?
 - A. Low/falling credit balances in brokerage accounts.
 - B. High OTC volume ratio.
 - C. High put/call ratio.
 - D. Low mutual fund cash ratio.

ANSWERS – CONCEPT CHECKERS: TECHNICAL ANALYSIS

1. C Technical analysis is quick and easy. It gives signals when to buy, and incorporates psychological and economic reasons for price changes. Technical analysis does not have any explanatory power—it does not give a reason why investors are buying or selling.
2. C Technical analysis does require subjective judgment to interpret its rules; it has not been shown to outperform fundamental analysis, and it works based on what other investors are doing. Technical analysis relies on price patterns and does not incorporate accounting data.
3. B When the majority of people are negative, as the sentiment index indicates, contrary-opinion technicians take the opposite opinion and will be bullish and buy.
4. B The OTC market is more speculative than the NYSE market. When people are buying more speculative issues, the majority of people are bullish. Contrary-opinion technicians will take the opposite stance—they will be bearish and sell.
5. A In periods of confidence, investors sell higher-quality bonds and buy lower-quality bonds looking for yield. This happens when the confidence index rises or when spreads narrow.
6. B When investors are pessimistic, the confidence index falls.
7. B When margin debt in brokerage account balances increase, smart money technicians will see this as a bullish sign that investors are buying. Contrary-opinion technicians will take the opposite stance and will be bearish.
8. A Technicians believe that stock prices move in trends, that history does tend to repeat itself, and that the trends continue over long periods.
9. A A smart money technician will follow the behavior of other investors. Bullish signs would be increases in the confidence index, a narrowing of the T-bill Eurodollar spread, the specialist short sale ratio below 30%, and increases in brokerage account debit balances.
10. C If the relative strength ratio (stock price/market index value) increases, the percentage increase in the stock price must be greater than the percentage increase in the market index value.
11. D A smart money technician will follow the behavior of other smart investors. Bearish signals would be a wider T-bill Eurodollar spread, a falling Barron's confidence index, a specialist short sale ratio above 50%, and falling debit balances (margin debt) in brokerage accounts.
12. C A high put/call ratio indicates investors are bearish, which would be a bullish indicator to a contrarian.

INTRODUCTION TO PRICE MULTIPLES

Study Session 14

EXAM FOCUS

This review covers the estimation of several market-based price multiples. Specifically, this review addresses the pros and cons of using the price to earnings ratio, price to book value ratio, price to sales ratio, and the price to cash flow ratio. You should be familiar with the advantages and drawbacks of each of

these price multiples. You should also know how to compute each of these multiples, given the relevant market and firm financial information. As you read the material, remember that an analyst doesn't have to pick a ratio but can use the information in all of them. Just understand their strengths and weaknesses.

LOS 64.a: Discuss the rationales for the use of price to earnings (P/E), price to book value (P/BV), price to sales (P/S), and price to cash flow (P/CF) in equity valuation and discuss the possible drawbacks to the use of each price multiple.

LOS 64.b: Calculate and interpret P/E, P/BV, P/S, and P/CF.

Professor's Note: This review is organized according to the types of price multiples. The LOSs are addressed within each category.

Rationales for using price-to-earnings (P/E) ratios in valuation:

- Earnings power, as measured by earnings per share (EPS), is the primary determinant of investment value.
- The P/E ratio is popular in the investment community.
- Empirical research shows that P/E differences are significantly related to long-run average stock returns.

The drawbacks of using the P/E ratio are:

- Earnings can be negative, which produces a useless P/E ratio.
- The volatile, transitory portion of earnings makes the interpretation of P/E difficult for analysts.
- Management discretion within allowed accounting practices can distort reported earnings and thereby lessen the comparability of P/E ratios across firms.

We can define two versions of the P/E ratio: trailing and leading P/E. The difference between the two is how earnings (the denominator) are calculated. *Trailing P/E ratios* use earnings over the most recent 12 months in the denominator. The *leading P/E ratio* (also known as forward or prospective P/E) uses "next year's expected earnings," which is defined as either expected EPS for the next four quarters or expected EPS for the next fiscal year.

$$\text{trailing P/E} = \frac{\text{market price per share}}{\text{EPS over previous 12 months}}$$

$$\text{leading P/E} = \frac{\text{market price per share}}{\text{forecast EPS over next 12 months}}$$

Professor's Note: The trailing P/E is what we see published in much of the popular financial press. The leading P/E, P_0 / E_1 , is the one we calculated from the dividend discount model (DDM).

Example: Calculating a P/E ratio

Byron Investments, Inc., reported €32 million in earnings during fiscal year 2006. An analyst forecasts an EPS over the next 12 months of €1.00. Byron has 40 million shares outstanding at a market price of €18.00 per share. Calculate Byron's trailing and leading P/E ratios.

Answer:

$$2006 \text{ EPS} = \frac{€32,000,000}{40,000,000} = €0.80$$

$$\text{trailing P/E} = \frac{€18.00}{€0.80} = 22.5$$

$$\text{leading P/E} = \frac{€18.00}{€1.00} = 18.0$$

There are several issues to consider when calculating P/Es in practice. While price is observable, we can come up with several different numbers which are all arguably EPS.

When calculating trailing EPS an analyst should focus on that portion of earnings that are expected to be recurring. The footnotes to the financial statements must be used to exclude gains, and possibly losses, on asset sales, foreign currency gains and losses included in net income, and any other items with an effect on earnings better described as transitory than permanent (likely to recur).

Firms may have cyclical earnings. P/Es will be high when earnings are at the bottom of a cycle and low when earnings are cyclically high. One method to adjust for earnings cyclicalities is to use "normalized earnings" based on a full cycle or, equivalently, a normalized P/E averaged over a full business cycle. Alternatively, an analyst can estimate normal earnings by using the firm's average ROE over a cycle times the current value of shareholders' equity as an estimate of normalized earnings.

Analysts must also adjust earnings for differences in accounting methods among firms in order to be able to judge their relative valuations based on P/Es. A firm that is capitalizing expenses or using FIFO inventory accounting during a period of rising prices will report higher earnings than a firm that does not, and its trailing P/Es will be lower as a result. Finally, significant differences can exist between P/Es calculated with basic EPS and those calculated using fully diluted EPS.

Advantages of using the price-to-book value ratio (P/BV) include:

- Book value is a cumulative amount that is usually positive, even when the firm reports a loss and EPS is negative. Thus, P/BV can typically be used when P/E cannot.
- Book value is more stable than EPS, so it may be more useful than P/E when EPS is particularly high, low, or volatile.
- Book value is an appropriate measure of net asset value for firms that primarily hold liquid assets. Examples include finance, investment, insurance, and banking firms.
- P/BV can be useful in valuing companies that are expected to go out of business.
- Empirical research shows that P/BV ratios help explain differences in long-run average returns.

Disadvantages of using P/BV include:

- P/BV ratios do not recognize the value of nonphysical assets such as human capital.
- P/BV ratios can be misleading when there are significant differences in the asset intensity of production methods among the firms under consideration.
- Different accounting conventions can obscure the true investment in the firm made by shareholders, which reduces the comparability of P/BV ratios across firms and countries. For example, research and development costs (R&D) are expensed in the U.S., which can understate investment and overstate income over time.
- Inflation and technological change can cause the book and market value of assets to differ significantly, so book value is not an accurate measure of the value of the shareholders' investment. This makes it more difficult to compare P/BV ratios across firms.

The P/BV ratio is defined as:

$$P/BV = \frac{\text{market value of equity}}{\text{book value of equity}} = \frac{\text{market price per share}}{\text{book value per share}}$$

where:

$$\begin{aligned} \text{book value of equity} &= \text{common shareholders' equity} \\ &= (\text{total assets} - \text{total liabilities}) - \text{preferred stock} \end{aligned}$$

We often make adjustments to book value that allow the P/BV ratio to more accurately measure the value of the shareholders' investment and to create more useful comparisons across different stocks.

A common adjustment is to use *tangible book value*, which is equal to book value of equity less intangible assets. Examples of intangible assets include goodwill from acquisitions (which makes sense because it is not really an asset) and a patent (which is more questionable since the asset and patent are separable). Furthermore, balance sheets should be adjusted for significant off-balance-sheet assets and liabilities and for differences between the fair and recorded value of assets and liabilities. Finally, book values often need to be adjusted to ensure comparability. For example, companies using the first in, first out (FIFO) inventory accounting method cannot be accurately compared with peers using the last in, first out (LIFO) method. Thus, book values should be restated on a consistent basis.

Example: Calculating a P/BV ratio

Based on the information in the table, calculate the current P/BV for Alpha Corp. and Beta Corp.

Figure 1: Data for Alpha Corp. and Beta Corp.

Company	Book Value of Equity 2006 (USD millions)	Sales 2006 (USD millions)	Shares Outstanding 2006 (millions)	Price 08/14/06
Alpha Corp.	28,039	18,878	7,001	\$17.83
Beta Corp.	6,320	9,475	5,233	\$12.15

Answer:

Alpha Corp.:

$$\text{book value per share} = \frac{\text{book value of equity}}{\text{number of shares outstanding}} = \frac{\$28,039}{7,001} = \$4.00$$

$$P/BV = \frac{\text{market price per share}}{\text{book value per share}} = \frac{\$17.83}{\$4.00} = 4.46$$

Beta Corp.:

$$\text{book value per share} = \frac{\text{book value of equity}}{\text{number of shares outstanding}} = \frac{\$6,320}{5,233} = \$1.21$$

$$P/BV = \frac{\text{market price per share}}{\text{book value per share}} = \frac{\$12.15}{\$1.21} = 10.04$$

The rationales for using the price to sales (P/S) ratio include:

- P/S is meaningful even for distressed firms, since sales revenue is always positive. This is not the case for P/E and P/BV ratios, which can be negative.
- Sales revenue is not as easy to manipulate or distort as EPS and book value, which are significantly affected by accounting conventions.
- P/S ratios are not as volatile as P/E multiples. This may make P/S ratios more reliable in valuation analysis.
- P/S ratios are particularly appropriate for valuing stocks in mature or cyclical industries and for start-up companies with no record of earnings.
- Like P/E and P/BV ratios, empirical research finds that differences in P/S are significantly related to differences in long-term average stock returns.

The disadvantages of using P/S ratios are:

- High growth in sales does not necessarily indicate operating profits as measured by earnings and cash flow.
- P/S ratios do not capture differences in cost structures across companies.
- While less subject to distortion than earnings or cash flows, revenue recognition practices can still distort sales forecasts. For example, analysts should look for company practices that speed up revenue recognition. An example is sales on a bill-and-hold basis, which involves selling products and delivering them at a later date. This practice accelerates sales into an earlier reporting period and distorts the P/S ratio.

Calculating a P/S ratio. P/S multiples are computed by dividing a stock's price per share by sales or revenue per share, or by dividing the market value of the firm's equity by its total sales:

$$P/S \text{ ratio} = \frac{\text{market value of equity}}{\text{total sales}} = \frac{\text{market price per share}}{\text{sales per share}}$$

Example: Calculating a P/S ratio

Based on the information in the table, calculate the current P/S ratio for Alpha Corp. and Beta Corp.

Figure 2: Data for Alpha Corp. and Beta Corp.

Company	Book Value of Equity 2006 (USD millions)	Sales 2006 (USD millions)	Shares Outstanding 2006 (millions)	Intraday Price 08/14/06
Alpha Corp.	28,039	18,878	7,001	\$17.83
Beta Corp.	6,320	9,475	5,233	\$12.15

Answer:

Alpha Corp.:

$$\text{sales per share} = \frac{\text{sales}}{\text{number of shares outstanding}} = \frac{\$18,878}{7,001} = \$2.70$$

$$P/S = \frac{\text{market price per share}}{\text{sales per share}} = \frac{\$17.83}{\$2.70} = 6.60$$

Beta Corp.:

$$\text{sales per share} = \frac{\text{sales}}{\text{number of shares outstanding}} = \frac{\$9,475}{5,233} = \$1.81$$

$$P/S = \frac{\text{market price per share}}{\text{sales per share}} = \frac{\$12.15}{\$1.81} = 6.71$$

Rationales for using the price to cash flow (P/CF) ratio include:

- Cash flow is harder for managers to manipulate than earnings.
- Price to cash flow is more stable than price to earnings.
- Reliance on cash flow rather than earnings addresses the problem of differences in the quality of reported earnings, (a problem when using P/Es).
- Empirical evidence indicates that differences in P/CF ratios are significantly related to differences in long-run average stock returns.

There are two drawbacks to the P/CF ratio, both of which are related to the definition of cash flow used. We discuss the specific cash flow definitions next.

- Some items affecting actual cash flow from operations are ignored when the *EPS plus noncash charges estimate* is used. For example, noncash revenue and net changes in working capital are ignored.
- From a theoretical perspective, *free cash flow to equity* (FCFE) is probably preferable to cash flow. However, FCFE is more volatile than straight cash flow.

Professor's Note: FCFE is the cash flow available to common stockholders after all operating expenses, interest and principal payments, investment in working capital, and investments in fixed assets.

Calculating P/CF Ratios. There are at least four definitions of cash flow available for use in calculating the P/CF ratio: earnings-plus-noncash charges (CF), adjusted cash flow (adjusted CFO), free cash flow to equity (FCFE), and earnings before interest, taxes, depreciation, and amortization (EBITDA). Expect to see any one of them on the exam.

One commonly used proxy for cash flow is *earnings-plus-noncash charges* (CF):

$$CF = \text{net income} + \text{depreciation} + \text{amortization}$$

The limitation of this definition, as we mentioned previously, is that it ignores some items that affect cash flow, such as noncash revenue and changes in net working capital.

Another proxy for cash flow is *cash flow from operations* (CFO) from the cash flow statement. The limitation of CFO, however, is that it includes items related to financing and investing activities. Therefore, analysts often adjust CFO by adding back the after-tax interest cost:

$$\text{adjusted CFO} = \text{CFO} + [(\text{net cash interest outflow}) \times (1 - \text{tax rate})]$$

In addition, analysts sometimes further adjust CFO for items that are not expected to persist in the future.

Analysts also often use FCFE and EBITDA as proxies for cash flow. As we mentioned above, theory suggests that FCFE is the preferred way to define cash flow, but it is more volatile than straight cash flow. EBITDA is a pretax, pre-interest measure that represents a flow to both equity and debt. Thus it is better suited as an indicator of total company value than just equity value. Analysts typically use trailing price to cash, which relies on the most recent four quarters of cash flow per share.

Given one of the four definitions of cash flow, the P/CF ratio is calculated as:

$$\text{P/CF ratio} = \frac{\text{market value of equity}}{\text{cash flow}} = \frac{\text{market price per share}}{\text{cash flow per share}}$$

where:

cash flow = CF, adjusted CFO, FCFE, or EBITDA

Example: Calculating P/CF

Data Management Systems, Inc. (DMS) reported net income of \$32 million, depreciation and amortization of \$41 million, net interest expense of \$12 million, and cash flow from operations of \$44 million. The tax rate is 30%. Calculate the P/CF ratio using CF and adjusted CFO as proxies for cash flow. DMS has 25 million shares of common stock outstanding, trading at \$47 per share.

Answer:

$$\text{CF} = \$32 \text{ million} + \$41 \text{ million} = \$73 \text{ million}$$

$$\text{adjusted CFO} = \$44 \text{ million} + [(\$12 \text{ million})(1 - 0.30)] = \$52.4 \text{ million}$$

$$\text{market value of equity} = (25 \text{ million shares})(\$47 \text{ per share}) = \$1,175 \text{ million}$$

$$\text{P/CF} = \frac{\$1,175 \text{ million}}{\$73 \text{ million}} = 16.1$$

$$\text{P/adjusted CFO} = \frac{\$1,175 \text{ million}}{\$52.4 \text{ million}} = 22.4$$

KEY CONCEPTS

1. Advantages of using P/E ratios in valuation are:
 - Earnings power is the primary determinant of investment value.
 - The P/E ratio is popular in the investment community.
 - Empirical research shows that P/E differences are significantly related to long-run average stock returns.
2. Disadvantages of using P/E ratios in valuation are:
 - Earnings can be negative, which produces a useless P/E ratio.
 - The volatile, transitory portion of earnings makes the interpretation of P/E ratios difficult for analysts.
 - Management discretion within allowed accounting practices can distort reported earnings.
3. The following are advantages of using P/BV:
 - Book value is a cumulative amount that is usually positive even when EPS is negative.
 - Book value is more stable than EPS, so it may be more useful than P/E when EPS is particularly high, low, or volatile.
 - Book value is an appropriate measure of net asset value for firms that primarily hold liquid assets, including finance, investment, insurance, and banking firms.
 - P/BV can be useful in valuing companies that are expected to go out of business.
 - Empirical research shows that P/BV ratios help explain differences in long-run average returns.
4. The following are disadvantages of using P/BV:
 - P/BV ratios do not recognize the value of nonphysical assets such as human capital.
 - P/BV ratios can mislead when there are significant differences in the amount (i.e., size) of the assets used by the firms being compared.
 - Different accounting conventions can obscure the true investment in the firm made by shareholders.
 - Inflation and technological change can cause the book and market value of assets to differ significantly.
5. The following are advantages of using P/S ratios:
 - The ratio is meaningful even for distressed firms.
 - Sales figures are not as easy to manipulate or distort as EPS and book value.
 - P/S ratios are not as volatile as P/E multiples.
 - P/S ratios are particularly appropriate for valuing stocks in mature or cyclical industries, as well as start-up companies with no record of earnings.
 - Empirical research finds that differences in P/S are significantly related to differences in long-term average stock returns.
6. The following are disadvantages of using P/S ratios:
 - High sales do not necessarily indicate operating profits as measured by earnings and cash flow.
 - P/S ratios do not capture differences in cost structures across companies.
 - While less subject to distortion, revenue recognition practices can distort sales forecasts.
7. Advantages of using P/CF include:
 - Cash flow is harder for managers to manipulate than earnings.
 - Price to cash flow is more stable than price to earnings.
 - Using cash flow addresses the problem of differences in quality of earnings that arises when using P/Es.
 - Differences in price to cash flow are significantly related to differences in long-run average stock returns.
8. Disadvantages of using P/CF include:
 - Some items affecting actual cash flow from operations are ignored when the EPS plus noncash charges estimate is used. For example, noncash revenue and net changes in working capital are ignored.
 - FCFE rather than cash flow should be used. However, FCFE is more volatile than straight cash flow.
9. For the P/CF ratio, cash flow can be earnings plus noncash charges, adjusted CFO, FCFE, or EBITDA.

CONCEPT CHECKERS: INTRODUCTION TO PRICE MULTIPLES

1. Which of the following *least accurately* describes the advantages and disadvantages of valuation with the P/E multiple?
 - A. Advantage: P/E ratio is popular in the investment community.
Disadvantage: P/E ratios may not facilitate comparisons across firms.
 - B. Advantage: P/E differences are significantly related to long-run average stock returns.
Disadvantage: The volatile, transitory portion of earnings makes the interpretation of P/Es difficult for analysts.
 - C. Advantage: Earnings power is the primary determinant of investment value.
Disadvantage: Management discretion within allowed accounting practices can distort reported earnings.
 - D. Advantage: P/E valuation can accommodate negative earnings.
Disadvantage: P/E valuation is difficult to use for firms with relatively few fixed assets (e.g., service firms).
2. Which of the following *least accurately* describes the advantages and disadvantages of valuation with the P/S multiple?
 - A. Advantage: P/S is meaningful, even for firms in financial distress.
Disadvantage: P/S ratios are not as volatile as P/E multiples. This may make P/S ratios more reliable in valuation analysis.
 - B. Advantage: Sales forecasts are not susceptible to distortion from revenue recognition practices.
Disadvantage: Reported sales figures are easier to manipulate than earnings or book values.
 - C. Advantage: P/S ratios are particularly appropriate for valuing stocks in mature or cyclical industries, as well as start-up companies with no record of earnings.
Disadvantage: P/S ratios do not capture differences in cost structures across companies.
 - D. Advantage: Like P/E and P/BV ratios, empirical research finds that differences in P/S are significantly related to differences in long-term average stock returns.
Disadvantage: High growth in sales does not necessarily indicate operating profits as measured by earnings and cash flow.
3. Valuation using discounted cash flow techniques is preferred to the P/E multiples approach when:
 - A. earnings per share are negative.
 - B. the dividend payout is low.
 - C. the expected growth rate is very high.
 - D. the target firm has a normal capital structure.
4. The Larson Corp. had revenue per share of \$400 in 2002, earnings per share of \$5.00, and paid out 50% of its earnings as dividends. If the return on equity (ROE) and required rate of return of Larson are 15% and 11%, respectively, what is the appropriate P/S multiple for Larson?
 - A. 0.12.
 - B. 0.18.
 - C. 0.19.
 - D. 0.90.
5. Which of the following regarding the use of P/BV measures is FALSE?
 - A. Book value provides a relatively stable, intuitive measure of value.
 - B. Book values are not very meaningful for firms in service industries.
 - C. P/BV ratios can be compared across similar firms if accounting methods differ.
 - D. Book value is often positive, even when earnings are negative.

6. P/BV ratio analysis is *most suitable* for a firm:
- A. with accounting standards consistent with those of other firms.
 - B. with a negative book value.
 - C. in the service industry without significant fixed assets.
 - D. with accounting standards different from other firms.
7. Which of the following statements regarding the use of P/S multiples in stock valuation is FALSE?
- A. P/S multiples are positive, even when earnings and book value are negative.
 - B. Revenue is relatively easy to manipulate compared to earnings.
 - C. The use of P/S multiples facilitates analysis of the effects of changes in pricing policy and other corporate strategic decisions.
 - D. P/S multiples are not as volatile as P/E ratios.
8. An analyst gathered the following financial data about Argott, Inc.
- Market value \$500
 - Sales \$2,000
 - Earnings -\$50
 - Book value \$250
 - Cash flow \$50
- What is the price to book value ratio for Argott, Inc.?
- A. -0.10.
 - B. 0.10.
 - C. 0.25.
 - D. 2.00.
9. Which of the following statements about price multiples is FALSE?
- A. Cash flow figures are typically more stable than earnings figures.
 - B. P/BV and P/CF ratios should be used in conjunction P/E ratios in fundamental analysis.
 - C. Firms with low P/BV ratios tend to outperform high P/BV ratio firms on a risk-adjusted basis.
 - D. Firms with low P/BV ratios tend to underperform high P/BV ratio firms on a risk-adjusted basis.
10. Which of the following accounting variables is *least subject* to manipulation?
- A. Sales.
 - B. Earnings.
 - C. Inventory.
 - D. Cash flows.

Use the following data to answer Questions 11 through 13.

An analyst gathered the following information for JoJo Enterprises, Inc.

- Share price \$25.00
- Stockholders' equity \$100 million
- Retention rate 60%
- Return on equity (ROE) 10%
- Shares outstanding 10 million
- Expected sales \$36 million
- Total operating expenses \$17 million
- Operating expenses include \$1,400,000 in depreciation and amortization

11. JoJo's P/BV ratio is *closest* to:
 - A. 1.22.
 - B. 1.77.
 - C. 2.50.
 - D. 3.15.
12. JoJo's P/S ratio is *closest* to:
 - A. 4.18.
 - B. 5.31.
 - C. 6.27.
 - D. 6.94.
13. JoJo's P/CF ratio (using EBITDA for cash flow) is *closest* to:
 - A. 12.25.
 - B. 13.16.
 - C. 15.71.
 - D. 17.33.

ANSWERS – CONCEPT CHECKERS: INTRODUCTION TO PRICE MULTIPLES

1. D P/E is useless when earnings are negative. P/E may be effectively used to value firms in the services industry.
2. B It is an advantage of the P/S ratio that sales figures are not as easy to manipulate or distort as EPS and book value. A disadvantage of the P/S ratio is that revenue recognition practices can distort sales forecasts, although less so than P/E or P/BV.
3. A When the earnings per share are negative, the P/E ratio is not meaningful. This problem can be offset somewhat by using normalized or average EPS values.
4. C First, use the DDM to get the current price:

$$P_0 = \frac{D_1}{k-g} = \frac{D_0(1+g)}{k-g} = \frac{\$2.50(1.075)}{0.11-0.075} = \$76.79$$

where:

$$D_0 = E_0(\text{payout ratio}) = \$5.00(0.50) = \$2.50$$

$$g = \text{ROE}(\text{retention rate}) = 0.15(0.50) = 0.075$$

Then compute price-to-sales as: $\frac{P_0}{S_0} = \frac{\$76.79}{\$400.00} = 0.19$.
5. C Differences in accounting methods make comparisons based on P/BV problematic.
6. A P/BV ratios can uncover signs of misvaluation across firms that have consistently applied accounting standards.
7. B Relative to earnings, revenue is difficult to manipulate.
8. D Market value / book value = \$500 / \$250 = 2.
9. D On a risk-adjusted basis, firms with low P/BV ratios tend to outperform high P/BV ratio firms.
10. A Sales figures are not as easy to manipulate or distort as EPS and book value, which are significantly affected by accounting conventions.
11. C BV = \$100,000,000; BV/share = 10; P/BV = 25 / 10 = 2.50
12. D sales per share = 36,000,000 / 10,000,000 = 3.60; P/S = 25 / 3.60 = 6.94
13. A EBITDA/share = (36,000,000 – 17,000,000 + 1,400,000) / 10,000,000 = \$2.04; P/CF = 25 / 2.04 = 12.25

FORMULAS

$$\text{IRR: } 0 = CF_0 + \frac{CF_1}{(1 + \text{IRR})^1} + \frac{CF_2}{(1 + \text{IRR})^2} + \dots + \frac{CF_n}{(1 + \text{IRR})^n} = \sum_{t=0}^n \frac{CF_t}{(1 + \text{IRR})^t}$$

$$\text{NPV} = CF_0 + \frac{CF_1}{(1 + k)^1} + \frac{CF_2}{(1 + k)^2} + \dots + \frac{CF_n}{(1 + k)^n} = \sum_{t=0}^n \frac{CF_t}{(1 + k)^t}$$

$$\text{payback period} = \text{full years until recovery} + \frac{\text{unrecovered cost at the beginning of the last year}}{\text{cash flow during the last year}}$$

$$\text{AAR} = \frac{\text{average net income}}{\text{average book value}}$$

$$\text{PI} = \frac{\text{PV of future cash flows}}{CF_0}$$

$$\text{WACC} = (w_d)[k_d(1 - t)] + (w_{ps})(k_{ps}) + (w_{ce})(k_{ce})$$

cost of common equity:

$$k_{ce} = \frac{D_1}{P_0} + g$$

$$k_{ce} = \text{RFR} + \beta[E(R_m) - \text{RFR}]$$

$$k_{ce} = \text{bond yield} + \text{risk premium}$$

$$\text{after-tax cost of debt} = k_d(1 - t)$$

$$\text{cost of preferred stock} = k_{ps} = D_{ps} / P$$

$$\text{DOL} = \frac{\% \Delta \text{EBIT}}{\% \Delta \text{sales}}$$

$$\text{DOL} = \frac{Q(P - V)}{Q(P - V) - F} = \frac{S - \text{TVC}}{S - \text{TVC} - F}$$