

## Financial Planning Answer Book by Jeffrey H. Rattiner, In General

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A thorough understanding of the equities market is essential to the financial planner. This Chapter provides an overview of the securities market, and includes the technical knowledge necessary to invest successfully in equities.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:1, What is the primary market?

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The *primary market* is composed of government bonds, municipal bonds, and common stocks as they are originally sold. An initial public offering (known as an IPO) occurs when a security is sold to the public for the first time. The IPO often involves an investment banker introducing a new security to the public. Investment bankers generally specialize in selling securities in the primary market while simultaneously operating in the secondary markets, as discussed in [Q 4:2](#). The bankers tend to act as intermediaries between the issuer and the investors. The issuer sells securities to the investment bankers, who then sell the securities to the public in a process called *underwriting*. Sales of new common stock for a company whose shares are already traded in the market are called *seasoned issues*. In addition, under Rule 415 the Securities & Exchange Commission (SEC) permits companies to file a short-form registration for securities that are to be sold over a period of time. These are called *shelf offerings*. Shelf offerings provide cost savings and flexibility because securities can be sold when conditions are favorable and not sold when conditions are unfavorable.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:2, What is the secondary market?

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The secondary market is where securities are traded after the original sale. Secondary markets are very important to investors because they provide liquidity. The more liquidity a security has, the more willing an investor is to buy it. Therefore, investors are also more willing to buy securities in the primary market because those securities can later be sold in the secondary market. The transfer of securities may occur through an organized exchange, where the market price of securities is determined by buyers and sellers. Organized exchanges are auction markets, such as the New York Stock Exchange (NYSE), the American Stock Exchange (ASE), and other regional exchanges. Investors are represented by brokers who attempt to get the best possible price and act as intermediaries representing both buyers and sellers. In contrast, the "over the counter" (OTC) market is an unorganized market consisting of a network of dealers who buy and sell securities for their own accounts. Unlike brokers, dealers have a vested interest because the securities are bought and sold by the dealers. The dealers earn a profit between the buying and selling prices, which is called the *spread*. Most major OTC companies trade on the NASDAQ, an acronym for National Association of Security Dealers Automatic Quotation system. Consisting of a network of market makers competing freely with each other and unlike the NYSE, the NASDAQ does not have a specific location.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:3, What are the third and fourth markets?

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The *third market* is not a location but a system in which NYSE-listed stocks are traded in the OTC market. The third market provides investors with the flexibility to trade while the NYSE is closed. These trades are usually large—consisting of blocks of 10,000 shares or more. The participants are often institutional investors such as pension plans, mutual funds, or insurance companies. The institutional investors work through large brokerage firms who match buyers and sellers and sometimes take positions themselves to facilitate trading.

The *fourth market* involves transactions between financial institutions without the use of a broker dealer. The fourth market is a communication network between investors consisting of larger block trades. There are several privately owned networks in which to trade, with the largest being a computerized network called the Instinet (institutional network). Instinet is always open for trading stocks, thereby saving investors on transaction costs. Instinet also allows large traders to bypass brokers and prevent leaks about who is transacting the trade.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:4, What does it mean to “sell short”?

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A *short sell* is the sale of borrowed securities in anticipation of a price drop. The short seller profits by selling the securities first with the intention of purchasing them back at a lower price. For example, an investor sells 100 shares on XYZ short at \$100 and later buys those shares back at \$70, resulting in a \$3,000 profit.

## **Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:5, When should an investor sell short?**

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An investor should sell short when he or she believes a stock is overpriced and expects the price to drop. The investor does not own the securities that are being sold short. These securities are sold short with a contract for future delivery. In effect, the broker borrows shares held in a margin account and lends them to the short seller (shares held in a cash account cannot be lent to a short seller). These shares are sold in the open market. The proceeds are not delivered to the seller; they are held by the broker. These proceeds are used at a later date to buy back the shares (covering the short). In addition, the short seller must deposit money to cover the margin requirement for buying the shares back. The money is returned to the short seller minus any losses or plus any gains when the short position is covered.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:6, What are the technical points affecting short sales?

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Three technical points affect short sales. First, if the price of a stock moves up from the previous trade, it is called an *uptick*. If the price of a stock declines from the previous trade, it is called a *downtick*. If the price of a stock does not change from a previous uptick, it is called a *zero uptick*. Investors may sell short only when the last trade for a stock is an uptick or zero uptick, which is called the uptick rule. The reason for this rule is to prevent traders from manipulating the market. Without the rule, short sellers could borrow large quantities of stock to sell short, thereby driving down the market. Second, short sellers must pay all dividends that are owed to the lender of the security. Third, the short seller must deposit margin money to guarantee the repurchase of the security. For example, assume the margin requirement is 50 percent. If an investor sells short 100 shares of XYZ at \$70, the initial deposit must be  $\$7,000 \times 50$  percent, or \$3,500. This money is returned to the short seller with any gain or loss when the short position is covered.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:7, How is stock bought on margin?

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When an investor purchases stock on margin, he or she makes an initial payment similar to a down payment on a house and borrows the remaining funds necessary to make the purchase. The investor is buying securities with borrowed money. The minimum required equity position is called the *margin requirement* and is set by the Federal Reserve Bank. For example, if the initial margin requirement is 35 percent, this means that the borrower must provide 35 percent of the funds, and the brokerage firm lends the remaining 65 percent. The investor pays interest on the borrowed funds. Buying on margin provides significant leverage to an investor. If the price of a stock goes up, the customer's profits accumulate much faster. If the price of a stock drops, the percentage of the loss is greater. The leverage factor can be calculated as  $1 \div \text{margin \%}$ . For example, at a 35 percent margin requirement, the leverage rate is 2.85 ( $1 \div .35$ ). If the rate of return on the stock is 10 percent, the rate of return using a 2.85 leverage rate is 28.5 percent or 185 percent more.



## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:8, How is the rate of return calculated on a margin transaction?

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Assume the investor purchases 100 shares of XYZ at \$70 per share. The 100 shares of XYZ stock are later sold at \$90 per share. The investor's return is 28 percent  $((\$90 \div \$70) - 1 \times 100)$ . Assuming the same shares were purchased with an initial margin requirement of 50 percent, the cost of the investment is \$3,500  $(\$7,000 \times 50\%)$ . The shares are later sold at \$90. The position is worth \$5,500  $(\$9,000 - \$3,500)$ . The return is 57 percent on the investment  $((\$5,500 \div \$3,500) - 1 \times 100)$ .

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:9, What is the maintenance margin and how is a maintenance call calculated?

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The *maintenance margin* is the minimum equity required for a margin position. If the customer's balance drops below the maintenance margin, the investor will get a margin call and must deposit additional funds or sell shares of the stock to cover the call. The maintenance margin protects the firm from being exposed to too much risk. The following formulas are used to indicate what stock price will trigger a margin call. [Schweser, 2000]

$$\text{Long} = \frac{[\text{original price} (1 - \text{initial margin \%})]}{1 - \text{maintenance margin \%}}$$

$$\text{Short} = \frac{[\text{original price} (1 + \text{initial margin \%})]}{1 + \text{maintenance margin \%}}$$

For example, an investor buys stock at \$50. The initial margin requirement is 50 percent, and the maintenance margin requirement is 35 percent. If the stock drops to \$38 the investor will get a margin call. The calculation is

$$\text{Long} = \frac{\$50 (1 - .50)}{1 - .35} = \$38.50$$

## **Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:10, What are American depository receipts?**

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Foreign firms are permitted to have their shares traded on U.S. exchanges. One way is to have their shares directly available for trading by listing them on the exchanges. These shares are traded exactly like those of any U.S. company. The other way that foreign firms may trade is by issuing American depository receipts (ADRs). ADRs represent indirect ownership in shares of a foreign company. ADRs are tradable receipts issued by U.S. banks that have physical possession of shares held on deposit by correspondent banks in the home country of the company whose shares are issued. The correspondent bank holding the shares receives the dividends and converts them into U.S. dollars after paying all foreign withholding taxes. ADRs are an effective way to invest in foreign companies without having to worry about currency risks.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:11, What is a price-weighted series?

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A price-weighted series is the arithmetic average of current values. Two stock prices are considered equal regardless of the number of shares outstanding. The price-weighted series will add the price of all stocks and divide it by the total number of stocks. For example, a \$10 stock and \$20 stock have an average price of \$15 ( $\$10 + \$20 \div 2$ ). A price-weighted series is adjusted for stock splits. The denominator would adjust downward to make sure the \$15 value is maintained. The adjustment for a split is calculated by the following:

<u>Stock</u>	<u>Prices</u>	<u>Prices</u>
A	\$10	\$10
B	\$20	\$10 (2:1 stock split)
	\$30	\$20

The new index value equals the current stock price divided by the number of stocks adjusted for splits. The price-weighted average before the split is  $\$30 \div 2 = \$15$ . After the split, the price-weighted average is still  $\$20 \div X = \$15$ , therefore,  $X = 1.3333$  ( $X$  is the new divisor).

The major problem with this series is that higher-priced stocks tend to carry more weight than lower-priced stocks. The problem is more evident with rapidly growing stocks that split often, because the denominator is adjusted downward to look the same as before the split. Therefore, fast-growing successful firms lose weight in the index because of stock splits. The Dow Jones industrial average is a price-weighted index. See [Q 4:39](#). The following example represents why the Dow Jones is not a good indicator of stock movement:

<u>Stock</u>	<u>Price</u>	<u>Shares Outstanding</u>	<u>Market Value</u>
A	\$100	100	\$10,000
B	\$ 1	10,000	\$10,000

The price-weighted index equals \$50.50 (*i.e.*,  $(\$100 + \$1) \div 2$ ). If stock A doubles, the index goes to \$100.50 (*i.e.*,  $(\$200 + \$1) \div 2$ ). If stock B doubles, the index goes to \$51 (*i.e.*,  $(\$100 + \$2) \div 2$ ). Both stocks have the same market value; they differ only in shares outstanding. However, if A doubles in value, the index goes up 50 points; while if B doubles in value it goes up only 0.50 points. In general, this is a poor indicator of market movement. However, if an investor's portfolio contains an equal number of shares of each stock, it can be measured against a price-weighted index.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:12, What is a value-weighted series in an index?

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A value-weighted index allows for a stock's total number of outstanding shares to be used in a series. The value is derived by taking the market value of all stocks. Market value equals current market price multiplied by total number of shares outstanding. The current market value is compared to the prior "base" value to determine the percentage of change, which then is applied to a beginning index value. The value is often considered a base and is assigned an index value of 100 (or it can be 10, 50, etc.). The new index value is shown in the following equation. [Reilly & Brown, 2000]

$$\frac{\text{Market price today} \times \text{total number of outstanding shares}}{\text{Market price in base year} \times \text{total number of outstanding shares in base year}} \times \text{Beginning Index Value}$$

An example is

<u>Stock</u>	<u>Share Price</u>	<u>Number of Shares</u>	<u>Market Value</u>
Prior Year Market Value			
A	\$ 8	12,500,000	\$100,000,000
B	\$40	10,000,000	<u>\$400,000,000</u>
			\$500,000,000
Current Market Value (After 2-for-1 stock split by Stock B)			
A	\$10	12,500,000	\$125,000,000
B	\$20	20,000,000	<u>\$400,000,000</u>
			\$525,000,000

$$\text{New Index Value} = \frac{\text{Current Market Value}}{\text{Market Value in Base Year}} \times \text{Beginning Index Value}$$

$$= \frac{\$525,000,000}{\$500,000,000} \times 100 = 105$$

Therefore, the value-weighted percentage return is 5 percent (*i.e.*,  $(105 \div 100 - 1) \times 100$ ). This shows that there is an automatic adjustment for splits in a value-weighted series. In a value-weighted series, wealth is equally influenced by price changes in stocks. The following example demonstrates this relationship. [Schweser, 2000]

<u>Stock</u>	<u>Price</u>	<u>Shares Outstanding</u>	<u>Market Value</u>
A	\$100	100	\$10,000
B	\$ 1	10,000	\$10,000

Assume market value in base year equals \$20,000.

The market value – weighted index equals  $\frac{\$20,000}{\text{Base of } \$20,000} \times 100 = 100$

If stock *A* doubles, the index equals  $\frac{\$30,000}{\text{Base of } \$20,000} \times 100 = 150$

If stock *B* doubles, the index equals  $\frac{\$30,000}{\text{Base of } \$20,000} \times 100 = 150$

However, the problem with a market value-weighted series is if the market capitalization for stock *A* and *B* is different, then the index is biased in the direction of the larger company. If a portfolio is built as a weighting of shares purchased by capitalization, then performance can be measured against a value-weighted index. Value-weighted indexes include Standard & Poor's 500 Index, New York Stock Exchange Index, Nasdaq Index, AMEX Market Value Index, Wilshire 5000 Equity Index, and Russell 2000 Index.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:13, What is an unweighted (equal-weighted) price indicator series?

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An unweighted price indicator series assumes that an equal dollar amount is invested in each stock. For example, assume \$100 is invested in each stock. That is, 10 shares for a \$10 stock, and 5 shares for a \$20 stock. The total cost of 15 shares is \$200.

Thus:

$$\frac{\$200}{15} = \$13.33$$

If the stocks rise to \$17 and \$25, respectively, the value changes to:

$$\$170 + \$125 = \$295$$

Therefore, the new average value is  $\$295 \div 15 = \$19.67$ .

If a portfolio is built by buying the equal dollar amount for each stock, then it can be measured against an equal weighted index. The value line composite average is an equally weighted geometric average.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:14, How does the geometric average compare to the arithmetic average?

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A geometric mean is found by multiplying the different stock prices and then taking the  $n$ th root, where  $n$  equals the number of stocks. The geometric mean tends to produce a downward bias in the index when compared to the arithmetic mean. This is illustrated by taking two stocks priced at \$10 and \$20:

The geometric average is  $(\$10 \times \$20)^{1/2} = \$14.14$

The arithmetic average is  $\frac{\$10 + \$20}{2} = \$15$

We find that the geometric average is lower than the arithmetic average. Most annual returns are calculated using the geometric average because  $n$  represents the number of compounding periods. Compounding allows for the true yearly return to be determined. The value line composite average uses the geometric mean to average its stock returns.



## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:15, Why are dividends important?

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Dividends are important because they signify management's ability to generate income. They also play a large part in the valuation process. Dividend growth is a component of stock valuation models used by analysts to find the intrinsic value of a company. Dividends may also influence external financing plans by financial managers. If too many dividends are paid out by the firm, this can lead to fewer internal funds for growing the business. In return, management may have to go to external sources to raise capital, such as new stock or bond issues. This can change the firm's capital structure and cost of capital. Therefore, it is important for management to find a balance between what the firm pays out in dividends to attract investors and what the firm reinvests in internal sources to maximize the price of the firm's stock. Finally, because management seeks to maximize investor wealth, it must determine who may earn a greater return on the funds. If management earns a greater return on the funds, then reinvesting the earnings makes more sense than paying them out.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:16, What is the dividend yield?

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The dividend yield is the relationship between the current dividend payment and the current price of the stock.

$$\text{Current dividend yield} = \frac{\text{Current dividend}}{\text{Current price of stock}}$$

If a company pays out \$5 in dividends and is trading at \$100, the dividend yield is 5 percent (\$5 ÷ \$100). The yield is often compared with other yields in the same industry to see if it is comparable to others.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:17, How is the growth rate of dividends obtained?

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First, it is important to understand the role of dividends in determining the value of a stock. The value of a stock is often found by using the *constant dividend growth model*. The model assumes that current dividends ( $D_0$ ) will grow ( $g$ ) at the same rate each year to infinity. Therefore, when calculating the value of common stock ( $V_0$ ), it is necessary to estimate the growth rate of dividends. In addition, the required rate of return or discount rate ( $k$ ) also needs to be estimated to be used in the model. Finally, the dividend ( $D_0$ ) is adjusted for one year's growth. The equation is

$$V_0 = \frac{D_0(1+g)}{k-g} \quad \text{or} \quad \frac{D_1}{k-g}$$

where  $V_0$  is the price of the stock,  $D_0$  is the latest dividend paid per share,  $D_1$  is the expected dividend per share for Year 1,  $k$  is the required rate of return on the stock, and  $g$  is the expected growth rate of dividends. The stock's present value is the current dividend multiplied by the growth rate in earnings and dividends divided by the required rate of return.

The discount rate ( $k$ ) can be calculated by using the capital asset pricing model (CAPM) equation:

$$K_{\text{stock}} = R_{\text{risk free}} + \text{Beta}_{\text{stock}} (R_{\text{market}} - R_{\text{risk free}})$$

The growth rate of dividends can be calculated two ways.

### Method 1

Valuation models for common stocks depend heavily on the growth rate for estimating a stock's price. Growth is influenced by how well a company utilizes retained earnings and how much is paid out in dividends. The growth rate of earnings is equal to the percentage of net earnings retained times the rate of return on equity capital.

$$\text{Growth Rate (g)} = \text{Return on Equity} \times \text{Retention Rate}$$

where

$$\text{Retention rate} = 1 - \text{Payout ratio}$$

$$\text{Payout ratio} = \frac{\text{Dividends}}{\text{Earnings}}$$

$$\text{Return on Equity (ROE)} = \frac{\text{Net Income}}{\text{Equity}}$$

The relationship between growth, the retention rate, and return on equity is summarized by the following example:



### EXAMPLE 4-1

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The firm earns \$2, distributes \$0.85 in dividends, and retains only \$1.15. The payout ratio is 42 percent, and the retention ratio is 58 percent. The return on equity is 20 percent. The growth rate is

$$g = .58 \times .20 = 11.6\%$$

This means that future earnings (and future dividends) are expected to grow at 11.6 percent. There are some interesting dynamics resulting from this relationship. If the firm increases its return on equity, the dividend can be increased without a corresponding increase in the growth rate. For example, if the return on equity increases to 33.14 percent, the firm can distribute 65 percent of its earnings and still achieve an 11.6 percent growth rate. If the firm were to increase the dividend without a corresponding increase in the return on equity, the growth rate would decrease because fewer earnings are retained for future business needs. If the firm distributes \$1.25 in dividends and retains only \$0.75 in earnings, the retention ratio becomes 38 percent and, correspondingly, the growth rate drops to 7.6 percent. Therefore, an increase in return on equity will increase the rate of growth, and the spread between the required return ( $k$ ) minus rate of growth ( $g$ ) will decrease. Alternatively, a firm may increase its growth rate by increasing its retention rate. The result is a rising stock price.

#### *Method II*

An alternative way to estimate the growth rate is to compute the historical growth rate using time value. Assume that dividends increased from \$0.20 to \$.85 over a 10-year period. To calculate the growth rate using a calculator

$$PV = -.28; FV = .85; PMT = 0; N = 10; \text{Solve } I$$

The growth rate given is 11 percent. Note that the growth rate is the same as that computed in Method I when using a future value table for 10 years.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:18, How is the payout ratio found and how is it used in valuation? [Groppelli & Nikbakht, 2000]

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The payout ratio is found by comparing dividends per share to earnings per share.

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

Assume that Company A pays a \$2.50 dividend and Company B pays \$1.50. Company A's EPS are \$5.00 and Company B's are \$2.00. To solve:

$$\text{Payout ratio of Company A} = \frac{\$2.50}{\$5.00} = 50\%$$

$$\text{Payout ratio of Company B} = \frac{\$1.50}{\$2.00} = 75\%$$

Company A pays out 50 percent of earnings and Company B pays out 75 percent. The payout ratio is used to determine the price/earnings ratio (P/E) of a stock. The calculation is

$$P/E = \frac{\text{Payout ratio}}{k - g}$$

where  $k$  is the required rate of return on the stock and  $g$  is the expected growth rate of dividends. The payout ratio should be used in conjunction with the discount rate and growth rate. If both companies had the same  $g$  and  $k$ , then Company B would have a higher P/E than Company A.

$$P/E_a = \frac{.50}{.15 - .10} = 10 \text{ times} \quad P/E_a = \frac{.75}{.15 - .10} = 15 \text{ times}$$

The payout ratio varies from company to company and industry to industry. Generally speaking, fast-growing companies pay few to no dividends. In this case, the payout ratio may be very low. The opposite can be said about utility companies, who pay a large amount of earnings as dividends.

The payout ratio may not be a good indication of earnings and dividend stability. When business is bad, the payout ratio may greatly increase because companies try to pay out the same amount in dividends even though earnings are falling. However, a stable dividend policy sends a message that the company is able to generate income, and the dividend is not going away even in tough times. This can result in a loyal base of investors in the company's stock. Erratic dividends create uncertainty about a firm's future. Also, reducing dividends may send a negative signal to the capital markets and improperly drive the stock price down.

Before setting the dividend policy, management should (1) determine the growth of future earnings and cash flows (operating income  $(1 - \text{tax rate}) + \text{depreciation}$ ); (2) find out how sensitive earnings are to economic influences and changes in the business cycle; and (3) calculate the dividend yields and payouts of other firms in the industry. Cash flows reflect more accurately than earnings the ability of a company to pay dividends. Setting the right dividend policy is very important for determining stock value. The ultimate goal is to signal that dividends will be maintained even in tough times. However, the dividend policy chosen must be in conjunction with the firm's capital structure and investment goals.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:19, What are the declaration date, ex-dividend date, and payment date?

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**Declaration Date.** The declaration date is the date when the board of directors passes a resolution to pay a dividend.

**Ex-Dividend Date.** In return, brokerage firms and stock exchanges establish the ex-dividend date to make sure the right people get the dividend. The ex-dividend date is two business days before the date of record. If an investor buys the stock before the ex-dividend date, he or she is entitled to receive the dividend. If the investor buys the stock after this date, he or she will not receive the dividend. Before the date, the stock trades "cum dividend."

The price of the stock declines by the amount of the dividend per share on the ex-dividend date. Assume a \$100 priced stock that pays a \$1.00 dividend. On the ex-dividend date, the stock's price will drop to \$99, but the stockholder will receive \$1.00 in dividends, so there is no change in overall value to the stockholder. A firm's balance sheet will be adjusted too. Both cash and retained earnings decline by the amount of dividends paid.

**Date of Record.** The corporation prepares a list of all individuals believed to be stockholders. The date of record is then the date on which holders of record are designated to receive the dividend.

**Date of Payment.** The date of payment is when dividends are mailed out to stockholders.

## **Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:20, What changes occur when a stock is split?**

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A stock split is an increase in a firm's number of shares outstanding and is expressed as a ratio. For example, a two-for-one stock split means that a stockholder who has owned 100 shares will now own 200 shares. A three-for-two stock split means that 100 shares increase to 150 shares  $((3 \div 2) \times 100)$ .



## **Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:21, What is a stock dividend and when is it paid?**

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A stock dividend is a payment made by the firm in the form of additional shares instead of cash and is expressed as a percentage. For example, a 20 percent stock dividend means that shareholders receive one new share for every five shares owned. Therefore, an investor who owns 100 shares will now have 120 shares. The result is a 20 percent increase in the total number of outstanding shares. Shareholders do not gain value after a stock dividend or split because the price of the stock declines by the same percentage as the stock dividend or split.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:22, What is the effect of noncash dividends on the balance sheet?

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Cash and stock dividends produce different results on the balance sheet, and stock splits have no effect on the capital structure of a firm. Cash dividends result in a reduction in cash and a corresponding reduction in retained earnings. Stock dividends increase the total number of outstanding shares, increase the total value of common stock par and paid-in-capital surplus, and reduce retained earnings. Please note that the par value of a stock is an arbitrary amount, and the paid-in capital surplus is the difference between what the firm originally sold the shares for and the par value. Stock splits reduce par value but do not change the common equity part of the balance sheet. The shares are increased but there is a counterbalancing decline in par value. The following explains the effect of a 10 percent stock dividend on the balance sheet. [Groppelli & Nikbakht, 2000]

	<u>Before Stock Dividend</u>	<u>After Stock Dividend</u>
Common stock (\$1 par, 1,000,000 shares outstanding)	\$ 1,000,000	
Common stock (\$1 par, 1.1,000,000 shares outstanding)		\$ 1,100,000
Capital in excess of par value	10,000,000	13,400,000
Retained earnings	<u>6,000,000</u>	<u>2,500,000</u>
Total stockholder's equity	\$17,000,000	\$17,000,000

Assume the market value of a share of stock is \$35. The number of new shares is 100,000 ( $1,000,000 \times .10$ ), and the value of the new shares is \$3.5 million ( $100,000 \times \$35$ ). The \$3.5 million is divided into \$100,000 ( $100,000 \text{ shares} \times \$1 \text{ par value}$ ) added to common stock, with the remaining \$3.4 million ( $\$3,500,000 - \$100,000$ ) going to capital surplus. Additionally, \$3.5 million comes out of retained earnings. Total shareholder equity is left unchanged because no cash has come in or out. The following explains the effect of a two-for-one stock split on the balance sheet.

	<u>Before Stock Dividend</u>	<u>After Stock Dividend</u>
Common stock (\$1 par, 1,000,000 shares outstanding)	\$ 1,000,000	
Common stock (\$.50 par, 2,000,000 shares outstanding)		\$ 1,000,000
Capital in excess of par value	\$10,000,000	\$10,000,000
Retained earnings	<u>6,000,000</u>	<u>6,000,000</u>
Total stockholder's equity	\$17,000,000	\$17,000,000

There is a reduction in the par value from \$1 to \$0.50, and the number of outstanding shares doubles to \$2.0 million. However, there is no change in the capital structure of the firm. Total shareholder equity is left unchanged.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:23, How can a company increase shareholder value by buying back the company stock?

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A firm with excess cash may decide to buy back some of its shares through a repurchase program. When a firm buys back shares it decreases the number of shares outstanding and increases the earnings per share because the earnings are spread over fewer shares. As a result of increasing earnings, the return on equity (ROE) will also increase. The return on equity is a component of growth.

$$\text{Growth rate (g)} = \text{ROE} * (1 - \text{Payout ratio})$$

An increase in growth should cause a corresponding increase in the company's stock price.

To see how ownership interest increases, assume a company has 10.0 million shares outstanding and an investor owns 1.0 million shares, which equals a 10 percent ownership in the company. If the company decides to buyback 3.0 million shares over the next several years, shares outstanding will decrease to 7.0 million. However, the stockholder's ownership increased from 10 percent to 14.2 percent without spending a single dime of new money. The company used its own capital to increase stockholder ownership interest. If the company had paid out cash dividends, the stockholder would be responsible for paying taxes on those dividends, resulting in less money to invest. The investor has secured a larger ownership interest by doing nothing.

Stock repurchase programs may also allow a firm to hide poor results. For example, assume a firm had net earnings of \$100 million and 10.0 million shares outstanding, resulting in per share earning of \$10 (\$100 million ÷ 10 million). Over the next 10 years, the company implemented a \$5 million buyback program, reducing the number of outstanding shares to 5 million. The company only reports net earnings of \$75 million, resulting in per share earnings of \$15 (\$75 million ÷ 5 million). Therefore, in 10 years the company effectively increased per share earnings from \$10 to \$15 even though actual net earnings dropped from \$100 million to \$75 million.

To determine what is causing the increase in per share earnings, simply compare the company's actual net earnings against per share earnings, using an annual compounding growth rate. In the example, earnings per share increased 4.13 percent, but actual net earnings had a loss of 2.83 percent. Therefore, the conclusion is that the increase in earnings per share was not a result of increasing earnings but merely the result of a stock repurchase program.

## **Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:24, What is meant by capital markets being efficient?**

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Efficient capital markets are based on several assumptions including (1) a large number of competing participants are analyzing securities; (2) new information comes to the market in a random way; (3) investors adjust to new information rapidly in an unbiased way (not necessarily correctly); and (4) expected returns implicitly include risk.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:25, What is the efficient market hypothesis and what are its three forms?

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The premise of the efficient market hypotheses (EMH) is that investors cannot consistently outperform the market on a risk-adjusted basis because security prices fully reflect all available information and are consistent with the risk involved. The EMH does not state that an individual cannot outperform the market. It states that an individual cannot outperform the market on a risk-adjusted basis over an extended period of time.

EMH is divided into the weak-form EMH, semistrong-form EMH, and strong-form EMH. The weak-form EMH assumes that stock prices *fully reflect all available stock market information*. The weak-form EMH assumes that security returns are independent of each other and that correlation between stock prices over time is virtually nothing. The weak form can be explained by the random walk theory. Therefore, historical price behavior or technical indicators cannot produce superior returns. Information used in technical analysis has no predictive value. However, the weak-form EMH does state that using good research may produce superior returns, and fundamental analysis may have value.

The semistrong-form EMH states stock prices *fully reflect all public information*. This includes a company's past history and information learned from studying financial statements, the industry, and economic environment. Therefore, an investor cannot expect to achieve superior returns using fundamental analysis. The semistrong-form EMH does not assume that an individual cannot achieve superior returns; it only assumes that superior returns should not be expected.

The strong-form EMH states that stock *prices fully reflect all public and private information*. Therefore, not even access to inside information can produce superior returns. It assumes that inside information cannot be kept inside. As stated before, this does not assume an investor cannot be expected to achieve success; only that success should not be assumed. If investors have success using inside information in one situation, they most likely will fail in other situations. In the end, they are not expected to produce superior results using inside information. This being said, an investor who accepts both the semistrong-form and strong-form EMH will generally avoid all active managers because superior returns cannot be expected.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:26, How is an asset valued?

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The value of any asset is the present value of the asset's expected future cash inflows. Future cash inflows are discounted back to the present value at the required rate of return that reflects given levels of risk.

Price of an asset = Present value of its future cash inflows

The resulting valuation is compared to the stock's current price to determine if a stock is overvalued or undervalued. If present value is greater than market price, the stock is bought or held. If present value is less than market price, the stock is avoided or sold.

The cash inflow of a common stock is measured by its annual dividends and the change in its stock price. Cash inflows for a bond are the amount of interest received by the bondholder in a given year plus the change in the bond's price. Three conditions must exist for an asset to increase in value:

1. The asset must continuously produce cash inflows;
2. Cash inflows must have a positive rate of growth (increasing over time); and
3. Risk must be controlled.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:27, How does one value a stock with no dividend growth?

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When a company pays a constant annual dividend, the price of a common stock can be determined by the following:

$$V_0 = \frac{D_1}{(1+k)^1} + \frac{D_2}{(1+k)^2} + \frac{D_3}{(1+k)^3} + \dots + \frac{D_{\infty}}{(1+k)^{\infty}}$$

where  $V_0$  denotes the value or price of a common stock,  $D$  is the constant annual dividend, and  $k$  is the required rate of return on the stock. The equation can be simplified further as

$$V = \frac{D_0}{k}$$

This model is the same equation as that used to value a preferred stock. The only difference is the required rate of return on the common stock, which tends to account for more risk than that of a preferred stock.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:28, How does one value a stock with constant dividend growth? (Mayo, 2000)

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The constant growth dividend discount model assumes that dividends may increase at a fixed rate on an annual basis in the future. For example, if the latest dividend is \$1 and dividends grow at an annual rate of 5 percent, the dividend next year is

$$\$1(1 + .05)^1 = \$1.05$$

The dividend in the second year is

$$\$1(1 + .05)^2 = \$1.10$$

The pattern of 5 percent growth is expected to continue into the future.

The value of a common stock with a constant rate of growth can be determined by discounting future dividends at the required rate of return as follows:

$$V_0 = \frac{D_0(1+g)^1}{(1+k)^1} + \frac{D_0(1+g)^2}{(1+k)^2} + \frac{D_0(1+g)^3}{(1+k)^3} + \dots + \frac{D_0(1+g)^\infty}{(1+k)^\infty}$$

Fortunately, this equation can be simplified as

$$V = \frac{D_0(1+g)}{k-g} \quad \text{or} \quad \frac{D_1}{k-g}$$

where  $D_0$  is the latest dividend paid per share,  $D_1$  is the expected dividend per share for Year 1,  $k$  is the required rate of return on the stock, and  $g$  is the expected growth rate of dividends. The stock's present value is the current dividend multiplied by the growth rate in earnings and dividends divided by the required rate of return.

### **EXAMPLE 4-2**

What is the value of a stock that paid a \$2 dividend last year and that is expected to grow annually at 5 percent? The risk-free rate is 4 percent and the expected return on the market is 10 percent. The stock's beta is 1.7. See [Q 4:58](#) et seq.

$$k_{\text{stock}} = R_{\text{risk free}} + \text{Beta}_{\text{stock}} (R_{\text{market}} - R_{\text{risk free}})$$

$$k_{\text{stock}} = 4\% + 1.7(10\% - 4\%) = 14.2\%$$

Once  $k$  is determined, the value of a stock is found by applying the constant dividend discount model.

$$V = \frac{\$1.05}{.142 - .05} = \$22.82$$



Therefore, if the stock is bought at a lower price than \$22.82, its expected return will exceed 14.2 percent. If the stock is bought at a higher price than \$22.82, its expected return will not exceed 14.2 percent. For example, if the stock price is currently \$25, the anticipated return is

$$E(r) = \frac{E(D)}{P} + E(g)$$

where  $E(r)$  is the expected return (as a percentage);  $E(D)$  is the expected dividend;  $P$  is the price of the asset; and  $E(g)$  is the expected growth. The expected return on an investment in the stock is

$$E(r) = \frac{\$2}{\$25} + 0.05 = 13\%$$

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:29, How does one value stock with unusual dividend growth? [Mayo, 2000]

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There are situations where dividends are not always fixed or maintained. Dividends may increase or decrease over time, and the model summarized for solving a constant dividend stream cannot be used. In addition, supernormal growth companies tend to have very high growth rates in their early years before slowing down in later years. The supernormal growth in the beginning years often exceeds the required rate of return. Therefore, if  $k < g$ , the dividend discount model cannot be used. In such cases, the multiple growth discount model is used to value a stock. A numerical approach will clarify the procedure:



### EXAMPLE 4-3

The current dividend is \$1.00 and is expected to grow at a higher rate of 15 percent for four years, after which time the new growth rate will be 7 percent a year. The required rate of return is 11 percent. The first step is to determine the dollar dividend in each year of super growth. This is found by compounding the beginning dividend by 15 percent for each of four years.

$$\begin{aligned}D_0 &= \$1.00 \\D_1 &= \$1.00(1.15) = \$1.15 \\D_2 &= \$1.00(1.15)^2 = \$1.32 \\D_3 &= \$1.00(1.15)^3 = \$1.52 \\D_4 &= \$1.00(1.15)^4 = \$1.74\end{aligned}$$

After the dividend stream is found, it must be discounted to the present using the required rate of return of 11 percent. The present value can easily be found using a calculator:

#### Calculator Solution

PV  $D_1$ :  $N = 1$ ,  $i = 11$ ,  $FV = \$1.15$ ,  $PMT = 0 \rightarrow CPT PV = \$1.04$

PV  $D_2$ :  $N = 2$ ,  $i = 11$ ,  $FV = \$1.32$ ,  $PMT = 0 \rightarrow CPT PV = \$1.07$

PV  $D_3$ :  $N = 3$ ,  $i = 11$ ,  $FV = \$1.52$ ,  $PMT = 0 \rightarrow CPT PV = \$1.11$

PV  $D_4$ :  $N = 4$ ,  $i = 11$ ,  $FV = \$1.74$ ,  $PMT = 0 \rightarrow CPT PV = \$1.15$

$$V_{1-4} = \$1.0 + \$1.04 + \$1.07 + \$1.11 + \$1.15 = \$4.47$$

The dividend growth model applies from Year 5 on, when constant growth is expected, so the value of the stock during normal growth is

$$V_{5-\infty} = \frac{D_4(1+g)}{k-g} = \frac{\$1.74(1.07)}{.11 - .07} = \$30.63$$

The \$30.63 is the expected price of the stock at the beginning of Year 5 (end of Year 4); therefore, it must be discounted backwards to find the present value of a cash stream. The present value factor is four years and 11 percent. This solution is found using a calculator.

#### Calculator Solution

$N = 4$ ,  $i = 11$ ,  $FV = \$30.63$ ,  $PMT = 0 \rightarrow CPT PV = \$20.18$

The value of the stock is the sum of all future cash flows.

$$V = V_{1-4} + V_{5-\infty} = \$4.47 + 20.18 = \$24.65$$

When using the dividend growth model, notice that  $g$  cannot be greater than  $k$ . In addition, it is important to note that if the gap between  $k$  and  $g$  widens, a stock's intrinsic value will fall. If the difference between  $k$  and  $g$  narrows, a stock's intrinsic value will grow. Small changes in  $k$  and  $g$  cause great changes in a stock's intrinsic value. However, if the growth rate increases, the valuation exceedingly increases until it becomes undefined (where growth rate equals required return).

By using the dividend discount model, the intrinsic value of a company can be found. Therefore, if the intrinsic value is greater than current market price, the stock is undervalued and should be bought or held if already owned. If the intrinsic value is less than current market value, the stock is overvalued and should be avoided, or sold if already owned. If intrinsic value equals current market price, then the stock is correctly priced.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:30, How is the required return ( $k$ ) for a stock determined?

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To value a common stock, the analyst will need to determine the required rate of return, which is made up of the real rate of interest, the inflation premium, and the risk premium. The following shows this relationship:

$$\text{Required rate of return } (k) = R_{\text{real rate}} + I_{\text{inflation rate}} + P_{\text{risk premium}}$$

The  $R_{\text{real rate}}$  and  $I_{\text{inflation rate}}$  are called the nominal risk-free rate of interest, known as  $R_{\text{risk free}}$ :

$$\text{Nominal } R_{\text{risk free}} = (1 + R_{\text{real rate}})(1 + I_{\text{inflation premium}}) - 1$$

If the real rate is 5 percent and the expected inflation rate is 3 percent, then the nominal risk-free rate is

$$(1.05)(1.03) - 1 = 8.15\%$$

The nominal rate is usually estimated by adding the real rate to the inflation premium. The estimate of the nominal risk-free rate is

$$5\% + 3\% = 8\%$$

The risk premium is the added return that investors require over the nominal risk-free rate to compensate for a security's many uncertainties. There are many sources of uncertainties, including both systematic and unsystematic risk. Systematic risk is nondiversifiable risk such as market risk, interest rate risk, reinvestment rate risk, purchasing power risk, and exchange rate risk. Unsystematic risk is diversifiable risk, which includes business risk and financial risk.

The required rate of return can also be found by using the capital asset pricing model (CAPM). See [Q 4:17](#). The required return is comprised of the risk-free rate an investor can earn by investing in a riskless security such as a U.S. Treasury bill and the risk premium. According to the CAPM, the risk premium is both the additional return an investor earns above the risk-free rate and the volatility of a particular security to that of the market. Therefore, the required rate ( $k$ ) of return is

$$K_{\text{stock}} = R_{\text{risk free}} + \text{Beta}_{\text{stock}} (R_{\text{market}} - R_{\text{risk free}})$$

If the difference between the market rate and risk-free rate widens, a stock's risk premium will grow. This is an important concept in stock valuation. The larger risk premium causes the stock's intrinsic value to decrease unless the stock can grow faster to keep up with the added risk. If growth cannot keep up with the high risk premium, the stock's current value may come crashing down.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:31, How is the P/E ratio or earnings multiplier used to value stocks? (Reilly & Brown, 2000)

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The earnings multiplier, also referred to as the P/E ratio, is used by many investors to determine the value of a stock. The earnings multiplier tells an investor the price being paid for each \$1 of earnings. For example, a stock earning \$5 per share with a 15 P/E ratio means an investor is willing to pay \$75 a share for the stock. The earnings multiplier is identified by:

$$P_0 = \text{Current market price} = \frac{E_0 \times P_0}{E_0}$$

The expected earnings multiplier is used to value a stock by estimating earnings for the next 12 months. The equation then becomes:

$$P_0 = \text{Current market price} = \frac{E_0 \times P_0}{E_0}$$

The P/E ratio is really just a restatement of the dividend discount model. The dividend discount model is

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

where  $P_0$  is the current price,  $D_1$  is the dividend expected to be received at the end of Year 1,  $k$  is the required rate of return on the stock, and  $g$  is the expected growth rate of dividends. The firm's dividend is related to earnings and the portion distributed. When dividing both sides of the formula by expected earnings for the next 12 months,  $E_1$ , the result is

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

This equation indicates that a P/E ratio depends on the same factors to value a stock as that achieved through the use of the dividend discount model. The factors include: (1) the dividend payout ratio (dividend divided by earnings,  $D/E$ ); (2) the required rate of return ( $k$ ); (3) the expected growth rate of dividends ( $g$ ).

The use of the P/E ratio instead of the dividend discount model has one major advantage and one major disadvantage. The advantage is that P/E ratios can be applied to stock that are not paying cash dividends. The dividend discount model assumes the firm is paying or going to pay a cash dividend. The disadvantage is that the P/E ratio does not tell if a stock is overvalued or undervalued to its market price. Investors are required to

draw inferences to historical P/E ratios in determining if a ratio is high or low. The dividend discount model allows for comparison to determine if a stock is overvalued or undervalued to its actual price. However, the estimated value of a stock can be determined by using the P/E ratio and applying it to estimated earnings for the next year ( $E_1$ ). Consider the following:

#### **EXAMPLE 4-4**

A firm has an expected payout ratio of 50 percent, a required rate of return of 11 percent, and an expected dividend growth rate of 6 percent. Earnings for the current year ( $E_0$ ) are \$2.00.

The *future earnings multiplier* is computed as

$$P/E_{\text{future ratio}} = \frac{.50}{.11 - .06} = 10 \times$$

Current earnings are \$2.00 and  $g$  is 6 percent, so

$$EPS_{\text{estimate}} = 2.00(1.06) = \$2.12$$

The future value of the stock is estimated as

$$V_1 = (EPS_{\text{estimate}})(P/E_{\text{future}}) = \$2.12 \times 10 = \$21.20$$

Compare this estimated value (at the end of Year 1) of the stock to its market price to determine if the stock should be bought or sold. To accurately compare it to its current price, the price and ending dividend must be discounted by the required rate of return of 11 percent. If the present value of the future stock value and dividend payments are greater than the current market price, the stock is underpriced and should be bought. If the present value of the future stock value and dividend payments is less than the current market price, the stock is overpriced and should be avoided.

There is a relationship between the P/E ratio and all components of the dividend discount model. The higher the payout ratio, the higher the P/E. Second, the higher the expected growth rate,  $g$ , the higher the P/E. Finally, the higher the required rate of return,  $k$ , the lower the P/E. The spread between  $k$  and  $g$  is the main determinant of the P/E ratio, but the dividend payout ratio does have an impact. The expected ( $P_0/E_1$ ) earnings multiplier is what should be used when valuing stocks, not the historical ( $P_0/E_0$ ) ratio.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:32, How does one measure management's ability to use retained earnings?

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To increase per share earnings, a company must have the capacity to retain earnings and invest those earnings in business ventures that can generate more earnings per share. For example, saving \$10,000 each year will result in \$100,000 after 10 years. However, investing \$10,000 in a stock earning 10 percent compounded annually results in \$159,000 after 10 years. Retained earnings should add value to a company's net worth, as long as the company kept more than it paid out in dividends. However, most companies use their retained earnings for maintaining the status quo, such as applying the retained earnings to research and development or replacement of plant and equipment. If a company can use its retained earnings to produce above average returns, then it may be better off keeping those earnings instead of paying them out. We measure management's ability to use retained earnings by taking the earnings per share increase over a 10-year period and dividing by the per share amount of retained earnings over the same 10-year period.



### EXAMPLE 4-5

If a company earns \$0.25 a share and 10 years later earns \$1.35 a share, then per share earnings rose by \$1.10. Total earnings add up to \$7.50 per share during the same 10-year period, in which \$2.00 was paid out in dividends. The company retained earnings of \$5.50 a share (\$7.50 – \$2.00 dividend), and the \$5.50 in retained earnings produced \$1.10 in additional income. The firm earned a return of 20 percent ( $\$1.10 \div \$5.50$ ) on the \$5.50 a share in retained earnings.

The higher return the better. Investors should compare firms within the same industry to get a sense of expected returns.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:33, How is the relative value to a Treasury bond used to value a stock?

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All investments compete with each other. When bond yields go up, stock prices go down and vice versa. A way to value stocks is to divide the relative per share earnings by the yield on a 10-year Treasury bond. This compares the rate of return for a company to a Treasury bond. If a company earns \$0.40 per share and the rate of return for a 10-year Treasury bond is 5.11 percent, then the relative value is \$7.82 a share ( $.40 \div .0511$ ). Therefore, paying \$7.82 for a share of stock will give a return equal to a 10-year Treasury bond. Consequently, buying a stock for lower than its relative value yields an investment that is earning more than 5.11 percent. For a firm to equal a 5.11 percent bond yield, its P/E would have to be 19.5 ( $1 \div 5.11$ ). If the P/E (19.5) is multiplied by forward earnings of \$0.50 per share (instead of current earnings), the fair value for the stock is \$9.75. Using forward earnings is preferable to current earnings if an analyst can accurately predict the forward earnings.



## **Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:34, What is price-to-book value?**

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The price-to-book value is defined as the firm's stock price divided by its per-share book value. The book value is the sum of stock, additional paid-in capital, and retained earnings on a firm's balance sheet. A low ratio suggests a stock is undervalued, and a high ratio suggests it is overvalued. What is considered high or low depends on the discretion of the analyst but should be used in comparison to other stocks. It has become an important measure of relative value among stocks.

## **Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:35, What is the price-to-sales ratio?**

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The price-to-sales (P/S) ratio is defined as the firm's stock price divided by its per share sales. This is often used in place of the P/E ratio for firms that have no earnings. However, it is a meaningful tool as well for firms that do have earnings, and should be used for comparison purposes. Earnings and cash flows are directly related to sales of a firm that makes this a useful ratio. A low P/S ratio indicates low valuation; whereas a high P/S ratio indicates high valuation.

## **Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:36, What is the price-to-cash flow ratio?**

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The price-to-cash flow ratio is defined as the market value of the firm divided by its per share cash flow. The ratio is often used in conjunction with the P/E ratio because emphasis is placed on growth in cash flows versus earnings; earnings are often subject to accounting manipulation, whereas cash flows are often more stable. Cash flows are often used to predict financial strength and potential problems.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:37, What information do contrarians use in technical analysis? [Reilly & Brown, 2000]

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Contrarians follow the rule of doing the opposite of what the general investor does. Therefore, contrarians believe the majority of traders, investors, and institutional advisors are wrong most of the time. The hard part is determining if these investors are bearish or bullish in order to take the opposite side. There are several tools used by contrarians that are covered in this heading.

**Mutual Fund Cash Positions.** Contrarian investors feel mutual fund cash positions are a good indicator to institutional investor behavior, which they feel is usually wrong at picking bottoms or tops in the market. The mutual fund ratio is

$$\text{Mutual Fund Ratio (MFR)} = \frac{\text{Mutual fund cash}}{\text{Total fund assets}}$$

In general, a higher ratio means mutual funds are holding cash and are bearish on the market. Contrary opinion investors would view this as a time to buy. Why? Because this implies that institutional investors have a lot of cash on the sideline ready to buy stocks.

A lower ratio implies mutual funds have very little in cash positions and are bullish on the market. Contrarian investors would consider this a time to sell. Why? Because institutional investors would have little cash left to continue buying in order to sustain an upward market cycle.

**Investor Credit Balances in Brokerage Accounts.** Contrary opinion technicians feel that individual investors are poor predictors of market movement. They feel that rising balances indicate that investors are very bearish, which they consider a bullish signal. The more cash left on the sidelines, the greater chance that it will be put to use to move the market higher. Falling balances means that investors are bullish, so contrarians will be bearish and sell into the market. The reason in this case is that investors have little cash to move the market higher.

**Investment Advisory Opinion.** This theory states that when most financial advisors become bearish on the market, that is the time to buy stocks. The time to sell stocks is when most financial advisors become bullish on the market. The index is calculated as

$$\text{Investment Advisor Ratio} = \frac{\text{Bearish Opinions}}{\text{Total Opinions}}$$

If the investment advisor ratio is high, it signals that advisors are bearish on the market. In this case, contrarians are bullish and buy. If the investment advisor ratio is low, it signals that most advisors are bullish. Therefore, contrary opinion technicians are bearish and sell. The reason as to why investment advisors are wrong is because they seem to react to trends rather than to forecast them. Therefore, they report on what is happening instead on what is going to happen.

**OTC vs. NYSE Volume.** Contrarians believe that OTC issues are more speculative than NYSE issues. High trading volume on the NYSE is a bullish signal; whereas high trading volume on the OTC is a bearish signal. The ratio is

$$\text{Volume Ratio} = \frac{\text{OTC Volume}}{\text{NYSE Volume}}$$

High volume ratio signals investors are bullish, and contrarians are bearish and sell. A high ratio generally indicates heavy speculative trading. If the volume ratio is low, then investors are bearish, and contrarians are bullish and buy. A low ratio indicates an oversold market and low speculative trading.

**CBOE Put/Call Ratio.** Contrarians believe that options are a speculative game and those that play in the option market are almost always consistent losers. Therefore, speculators tend to buy calls when they expect prices to rise and buy puts when they expect prices to fall. In general, option players are often more optimistic than pessimistic about the market, and the ratio is usually below 1.0; indicating that more calls than puts are bought. If the put/call ratio increases, investors are more bearish on the market. If the put/call ratio decreases, investors are more bullish on the market. The formula is

$$\text{Put/Call Ratio} = \frac{\text{Puts}}{\text{Calls}}$$

If the put/call ratio is equal to or greater than .50, option traders are bearish but contrarians are bullish and ready to buy. If the put/call ratio is equal to or less than .35, option traders are bullish but contrarians are bearish and ready to sell. However, these numbers are not always true if emotional sentiment is moving the market. In addition, investors tend to look at a five-day average for the put/call ratio before making a decision. Therefore, if the put/call ratio is equal to or greater than .50 for a five-day average, this may signal a time to buy. If it is equal to or less than .35 for a five-day average, this may signal a time to sell.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:38, What technical indicators do smart money technicians use? (Reilly & Brown, 2000)

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Some technical analysts follow the money movement of what they consider to be sophisticated traders. Smart money traders follow a different logic than contrary opinion technicians. These investors have developed several tools to indicate where smart money is moving.

**The Confidence Index.** The confidence index is found in Barron's, and is the ratio of Barron's average yield on 10 top-grade corporate bonds to the yield on the Dow Jones average of 40 bonds. This is shown by

$$\text{Confidence Index (CI)} = \frac{\text{Barron's Average Yield on 10 Top Grade Corporate Bonds}}{\text{Dow - Jones Average 40 Bonds}}$$

The confidence index measures the difference between high-quality bonds and a large cross-section of bonds. It is also stated as

$$\text{CI} = \frac{\text{Quality Bond Yield}}{\text{Average Bond Yield}}$$

The spread on high-quality bonds is always lower than the spread on a large cross-section of bonds: this ratio should never exceed 100. The spreads between both sets of bonds get smaller as the ratio approaches 100. When investors are confident about the economic and market outlook, they sell high-quality bonds and buy lower-quality bonds. When high-quality bonds are sold, prices fall and yields rise. When lower-grade bonds are purchased, prices rise and yields drop. The confidence index then rises during periods of confidence as the yield spread narrows and drops during periods of pessimism as the yield spread widens. Therefore, the confidence index moves in the opposite direction of yield spreads. Spreads narrow when the confidence index gets bigger, and spreads widen when the confidence index drops.

**T-Bill Yields and Eurodollar Rates.** To determine investor attitude on a global front, technicians often look at T-bill yields and Eurodollar rates. Technicians believe the spread widens in times of international crisis because money flows into safe U.S. T-bills.

**Short Sales by Specialists.** Technical traders often watch what specialists do on exchanges to follow the movement of smart money. The information for total short sales on the NYSE appears in Barron's. Specialists often sell stocks short to manage markets, but they exercise discretion in areas when they feel strong about market movements. The ratio is

$$\text{Specialist Short Sales Ratio} = \frac{\text{Specialist Short Sales}}{\text{Total Short Sales on the NYSE}}$$

If the ratio is low, it is a bullish sign for a technical trader indicating that specialists are buying. If the ratio is high, it is a bearish sign indicating that specialists are selling. The ratio is very short-term-sided, and will not predict long-term movements in the market. In addition, this ratio has become very unreliable in recent years because of specialists using stock index futures and options to hedge positions.

**Margin Debit Balances in Brokerage Accounts.** Technicians believe that margin borrowing is an indicator of knowledgeable investors. A high margin balance is a bullish indicator, and a low margin balance is a bearish sign. Monthly data on margin debt are found in Barron's. A potential problem with using this information as an indicator of market movement is that it may be difficult to interpret because it is an absolute value.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:39, What market indicators are used in technical analysis? (Reilly & Brown, 2000)

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**Breadth of the Market.** The breadth of market measures the number of advancing stocks to the number of decreasing stocks. Technical investors argue that indexes only provide a limited number of companies, which often influence the direction of the market. In other words, an index may move upward when in fact the broad market is moving downward because of many medium to small-sized companies. This often misleads the direction of the market.

The breadth of the market is determined by using the advance-decline line. The advance-decline line is a sum of advancing stocks to declining stocks on the NYSE. If the advance-decline line and the market index move together, then movement is broad-based across the market. To a technical trader, the broad-based move is interpreted as a strong sign of market direction. A divergence between the trend for the index and the advance-decline line would signal a market peak or bottom. For example, near a peak in the market, the Dow Jones industrial average (DJIA) continues to move up while the daily advance-decline ratio turns negative and the advance-decline series begins to flatten out and decline. In contrast, near a market bottom, the DJIA continues to move down while the daily advance-decline ratio turns positive and the advance-decline series begins to level off and turn upward before the market index. Technicians often believe a true bottom in a bear market is not reached until the daily advance-decline ratio becomes very negative, indicating that declining stocks far outnumber advancing stocks. It is at this point that investors toss in their towels and give up on the market. Only then can the market start to move back up.

**Short Interest Ratio.** The short interest ratio measures the cumulative number of shares sold short by investors and not divided by the daily volume of trading on an exchange. The formula is

$$\text{Short Interest Ratio} = \frac{\text{Outstanding Short Interest}}{\text{Average Daily Volume on Exchange}}$$

As an example, if the outstanding short interest of the NYSE was 750 million shares and the average daily volume on the exchange was 250 million, the short interest ratio is 3 ( $750 \div 250$ ). The means that outstanding short interest is three days' trading volume.

Technicians often consider a high number as a bullish sign because there is potential demand to buy back the short positions. In contrast, a low number is a bearish sign because there is potential for short selling. The ratio has often increased over time.

**Stocks above Their 200-Day Moving Average.** Computing the number of stocks above their 200-day moving average is often used by technicians to determine market movement. If more than 80 percent of stocks are trading above their 200-day moving average, the market is considered overbought and technicians will sell stocks. If less than 20 percent of stocks are trading above their 200-day moving average, the market is considered oversold and should be bought.

**Blocking the Uptick-Downtick Ratio.** Over the years, exchanges have become dominated by institutional investors who often trade large blocks. If the block trade is above the prior trade, it is an uptick. If the block trade is below the prior trade, it is a downtick. In general, it is thought that an uptick results from buying and a downtick from selling. See [Q 4:6](#). The block uptick-downtick ratio is believed to reflect institutional investor sentiment, which indicates the flow of smart money. The ratio is calculated as



$$\text{Block Uptick – Downtick Ratio} = \frac{\text{\# of Block Uptick Transactions}}{\text{\# of Block Downtick Transactions}}$$

A low ratio is a bullish signal because it indicates an oversold condition. In contrast, a high ratio is a bearish signal because it indicates an overbought condition.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:40, What are the stock price and volume techniques used in technical analysis?

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**Dow Theory.** The Dow theory is one of the oldest methods available for predicting what direction the market will take. It was founded by Charles Dow, who published The Wall Street Journal. Dow recognized three movements in security markets: major trends, intermediate trends, and short-term trends. Major trends are broad market movements lasting several years. Intermediate trends, occurring within the major trends, are influenced through current events and resemble waves lasting for several weeks or months. Short-term trends are daily ripples that have no significance.

It is up to the technician to properly calculate the direction of the major trend. The term *bull market* is used to indicate an upward major trend, and the term *bear market* is a downward major trend. Bull markets exist when upward trends rally past prior highs, whereas declines stay above previous lows. Therefore, a major decline occurs when successive rallies do not penetrate previous highs, and previous lows are penetrated. The intermediate trends give rise to *technical corrections*. This term is often used when markets are considered to be overbought or oversold, and an adjustment to offset the excess occurs.

Dow theory employs the DJIA and the Dow Jones transportation average. If the averages are moving upward together, it signals a strong bull market. In contrast, if both are moving downward together, it suggests a bear market. If they are moving in opposite directions, there is uncertainty as to the direction of the market. A trend continues as long as the averages confirm each other.

**Importance of Volume.** Price movement in one direction shows the net effect on the price in that direction. However, price movement alone does not show how widespread the excess demand or supply is for a security. This is where volume comes into play. Low volume tells us nothing about market movement. High volume tells how widespread interest and demand are in a stock. Therefore, a price increase on high volume is a very bullish indicator, whereas a price decrease on strong volume is a very bearish indicator.

Technicians often use a ratio of upside-downside volume. The ratio is defined as

$$\text{Upside-Downside Volume Ratio} = \frac{\text{Volume of stocks that increased}}{\text{Volume of stocks that decreased}}$$

The data is reported in the Wall Street Journal and in Barron's. A value of 1.50 or more is a bearish signal indicating the market is overbought. If the ratio is 0.75 or lower, it is a bullish signal indicating the market is oversold. The ratio ranges between 0.50 and 2.00.

**Support and Resistance Levels.** Stocks generally trade in ranges. The lower limit is a stock's support level, and the higher limit is its resistance level. The support level is when technicians feel a stock should be purchased, whereas the resistance level is when a stock should be sold. Technicians state that if a stock is to break its support level, rapid decline will occur before another support level is defined. The previous support is now its resistance level. Alternatively, if a stock were to penetrate its resistance level, it would quickly move to the upside before reaching a new resistance level. The previous resistance level is now a support level.

**Moving Average Lines.** Moving averages allow technicians to find trends in stock prices. Stocks will trade above their moving average if the trend is up and will trade below the moving average if the trend is down. If the price of a security breaks through its moving average on heavy volume, this indicates a reversal of the long-term trend. The most often used average to determine long-term trends in a security or industry group is the 200-day moving average. Typically, the terms *overbought* and *oversold* are indicative of how far the price is from the 200-day moving average. Technicians believe that stocks will tend to gravitate back to their 200-day moving average when extended too far from the average.

**Relative Strength Ratio.** Technicians believe that once a trend begins, it must continue until an event happens to stop it. The relative strength indicator indicates if the trend is stock-specific or is caused by market movements. If the ratio increases over time, technicians expect superior performance to continue. The ratio works in declining markets too. If the price of the stock does not decline as much as the rest of the market, the stock's relative strength ratio will increase. Technicians believe if the ratio remains stable or rises in down markets, the stock should do very well in rising markets. It is defined as

$$\text{Relative Strength Ratio} = \frac{\text{Stock Price}}{\text{Market Price}}$$

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:41, What is the difference between open-end and closed-end investment companies?

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**Closed-end investment companies.** Closed-end investment companies issue a specified number of shares comprised of stock or a combination of stock and debt. The shares cannot be redeemed, and new shares are not issued after the initial offering. These shares trade on the open market.

A closed-end investment company may trade at a price that is greater or less than net asset value (NAV). If the price is less than NAV, it is selling at a discount. If it is greater than NAV, it is selling at a premium. The reason for the market price to be different from the NAV is because of supply and demand. However, some investors use market price relative to NAV as a guide for determining when to purchase or sell a closed-end fund. For example, if the shares are selling at a discount, an investor may view this as an opportune time to buy the fund. In contrast, an investor may sell the shares if they are trading at a premium.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:42, How do investors pay fees to a closed-end investment company?

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Investors pay fees several ways in a closed-end investment company. They pay brokers' commissions when buying and selling shares, as with any other kind of stock. They pay management fees that are subtracted from the income earned by the assets. Finally, investment companies pay brokerage fees for buying and selling securities within the close-end fund, and these fees are passed on to the investors.

**Open-End Investment Companies.** In contrast to closed-end investment companies, open-end investment companies are not traded on the secondary markets. Open-end investment companies are also called mutual funds. Shares of a mutual fund are purchased directly from the fund at the net asset value plus any applicable sales charge. A no-load fund charges no sales fee when buying and selling shares. Conversely, a load fund charges a sales fee to the investor. The investor pays the offering price. The loading charge is stated as a percentage of the offering price. It is determined as

$$\text{Offering Price} = \frac{\text{NAV}}{(1 - \text{load})}$$



### EXAMPLE 4-6

Assume an investor is looking to purchase an open-end fund with a load of 5.5 percent and net asset value of \$10. The offer price is

$$\frac{\$10}{(1 - .055)} = \$10.58 \text{ per share}$$

When the mutual fund receives money from an investor, it issues new shares and purchases additional assets. If an investor sells the shares, they are redeemed and the fund pays the investor from its cash holdings. In some instances, a fund may have to sell shares within the fund to pay the investor.

The sources of return are similar between a closed-end and open-end investment company except in one way. The market value of a closed-end fund may rise or drop relative to the net asset value. The price of a mutual fund is equal to and sometimes greater than the net asset value (*i.e.*, there may be a sales charge) but the price is never less than the net asset value. Therefore, an investor is able to use the open market to buy closed-end funds at a discount and sell them at a premium. This possibility does not exist with open-end investment companies.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:43, What is net asset value?

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The NAV is the asset value of all shares owned by the investment company. It is total assets (stock, bonds, cash) minus total liabilities (accrued fees) divided by the number of shares outstanding.



### EXAMPLE 4-7

The NAV is calculated as:

Stock owned	\$1,000,000
Debt owned	+ \$800,000
Cash	+ \$200,000
Total assets	\$2,000,000
Liabilities	- 100,000
Net Worth	\$1,900,000
Number of shares outstanding	500,000
Net asset value per share	\$3.80

## **Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:44, What is a unit investment trust (UIT)?**

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A unit investment trust represents a fixed portfolio of assets and is sold to investors in units of \$1,000. The assets of a unit investment trust are frozen. That means no new securities are purchased. In addition, the securities already purchased are seldom sold. The trust is self-liquidating. After a period of time, the portfolio is sold and the funds are distributed to the stockholders. When funds are received, they are not reinvested into the trust. Unit investment trusts are designed to meet specific objectives, such as interest income. Expenses are lower than closed-end and open-end funds because the portfolio is fixed. This generally means that there is no management fee.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:45, How do fees and expenses affect returns for mutual funds?

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There are many expenses that come with owning a mutual fund. One expense is a *load charge*, which is part of the offering price. The load charge is a one-time commission on mutual funds. It is applied when a fund is purchased, when it is sold, or a combination of both. A *no-load* fund sells at its net asset value. *No-load* does not mean that there are no expenses. There are other annual expenses such as 12b-1 fees, management fees, operating expenses, and transaction costs. All mutual funds pay annual fees. These fees are not always obvious to the investor. They are collected by mutual fund companies by reducing the per share price of a fund. However, there is no evidence that funds with loads perform better than no-load funds.

Expenses and fees differ among mutual funds and have a large impact on an investor's overall return. A considerable difference is evident when comparing an actively managed fund to an unmanaged stock index fund. The following table indicates the difference in portfolio value:

**Assume \$500 monthly investment at 11 percent annual return:**

<b><u>End of Year</u></b>	<b><u>Value of managed fund with fees of 2.25%</u></b>	<b><u>Value of unmanaged stock index fund with fees of 0.25%</u></b>	<b><u>Lost dollars because of fees</u></b>
1	\$ 6,292	\$ 6,361	\$ 69
5	\$ 37,738	\$ 39,849	\$ 2,111
10	\$ 96,097	\$ 107,897	\$ 11,800
15	\$186,340	\$ 224,098	\$ 37,758
20	\$325,891	\$ 422,527	\$ 96,636
25	\$541,688	\$ 761,370	\$219,682
30	\$875,392	\$1,339,988	\$464,596

This indicates that over a 30-year period, the difference (or lost dollars) from investing in a mutual fund with higher expenses and fees is \$464,596. Mutual fund expenses and fees can substantially reduce an investor's portfolio value. Investors should always consider these costs before purchasing a mutual fund. In addition, funds that have a high turnover ratio generate more transaction costs, which are assumed by the investor.



## **Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:46, What is a 12b-1 fee?**

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A 12b-1 fee is the marketing cost assigned to a mutual fund. These are common fees for no-load funds and have a large impact on a portfolio's value. For example, if the 12b-1 fee is 50 percent for a no-load fund, it takes eight years for the 12b-1 fee to exceed a 4 percent load fund. However, it's important to understand that load funds can also have 12b-1 fees.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:47, What tax considerations are there when buying mutual funds?

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Investment companies receive favorable tax treatment: They do not pay federal income taxes. Earnings are passed through to the investors. Mutual fund distributions are subject to income and capital gains taxation. It is the investor who ultimately pays taxes. The investor pays all taxes on profits realized by a fund even if these profits are received in cash or reinvested into additional funds. In addition, the investor is responsible for taxes if the shares are sold.

Mutual funds contain hidden capital gains that an investor is responsible for even without receiving the capital gains as income. If a fund is initially offered at \$10 and rises to \$15 over a period of two years, no taxes are paid by its stockholders if the fund did not redeem shares. However, suppose an investor purchases the shares at the net asset value of \$15. If the next day the fund sells its securities and distributes the capital gains, the investor who just purchased the shares must pay the necessary capital gains tax. In addition, many funds indicate a date when capital gains and income are distributed to shareholders. Investors should be aware of this date. The majority of funds make two distributions. The first is a mid-year income distribution. The second distribution occurs at year-end and consists of income and capital gains. In the example above, assume the investor purchases the shares just prior to the distribution date. The investor is the holder of record and is responsible for paying any tax on income and capital gains even though the rise in price occurred much earlier. It then makes sense to delay the purchase and buy shares when the fund goes ex-dividend. See [Q 4:19](#).

The net asset value adjusts according to the capital gain distribution. In the previous example, the net asset value declines to \$10 per share (\$15 – \$5). The investor may offset capital gains by selling the shares. This results in a loss of \$5. However, the investor still loses because of fees and expenses that are paid in the process.

Hidden capital gains result in unexpected taxes, but hidden capital losses offer tax-free gains. For example, if the fund's per share price drops from \$10 to \$5, the fund has an unrealized loss of \$5. Assume an investor purchases the shares at the net asset value of \$5. If the shares rise to \$10 and are redeemed by the fund, the investor does not incur any capital gains tax as long as the shares continue to be held. However, unrealized losses are not always an opportunity if the price decline is a result of poor management.

The return of a mutual fund is stated before tax. However, the investor only gets to keep the after-tax return. Tax efficiency is defined as the ability to generate returns without generating large amounts of tax obligations. There is no tax obligation if a fund does not receive income or realize capital gains. Conversely, if a fund sells securities within its portfolio, each sale results in a taxable event. If these are short-term sales, then tax is paid at the stockholder's marginal federal income tax rate. If a fund rarely sells its investments, the likelihood of long-term gains is greater.

Tax efficiency is an index that converts before-tax returns to an after-tax return. It gives the after-tax return as a percentage of the before-tax return.

### **EXAMPLE 4-8**

Assume a net asset value of \$30. The fund appreciates 10 percent and gains are distributed by the fund. The fund increases to \$33 and after the \$3 distribution, its price declines to \$30. The shares are reinvested by the individual into 0.1 shares. The investor originally had 1 share, and now has 1.1 shares valued at \$33. If the capital gain rate is 20 percent, then the individual pays \$0.60 in taxes ( $.20 \times \$3.00$ ). The before-tax return is 10 percent, whereas the after-tax return is 8 percent ( $\$2.40/\$3.00$ ). Therefore, the tax efficiency index is 80 ( $8\%/10\%$ ). This value is compared to other funds when determining which one is more tax-efficient.

The tax efficiency index has several flaws. First, it is difficult to find the composition of returns and the appropriate tax rates when the returns were earned. Second, a high ratio may imply more taxes in the future even though it indicates lower taxes in the past. A high tax efficiency index is achieved when capital gains are not paid. If a fund is ready to sell out of several positions, there may be tax consequences to the stockholders even though the fund had a high tax efficiency index.

A fund's turnover ratio is another measure of tax efficiency. In general, funds with a greater portfolio turnover ratio generate more tax consequences for their investors. The mutual fund turnover ratio identifies the amount of buying and selling happening in a specified mutual fund. A turnover ratio of 50 percent means that a fund is expected to replace 50 percent of its investments over a year. If a turnover ratio is 100 percent, then a fund replaces 100 percent of its investments over a year. If the entire portfolio is turned over in a year, any gains are most likely short-term.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:48, Does the size of the fund affect the return?

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A fund grows over time by issuing new shares. As the fund gets larger, it becomes less efficient at selling and buying blocks of stock. For example, a smaller fund is able to quickly buy and sell smaller blocks. Larger funds need more time to establish or liquidate a position. The extra time needed may result in lower prices when selling and higher prices when buying, resulting in lower returns.

Another drawback to large funds is the inability to sustain growth. For example, a 15 percent increase in value for a \$1 billion portfolio is more difficult than the same increase for a \$1 million portfolio because of the sheer size of the portfolio. If one of the stocks in the former generates above-average performance, it would have little impact on the overall portfolio. In contrast, the price of one stock in a smaller fund may have a substantial impact on the total value.

There are benefits that a large fund has over a small fund. Large funds have a proven track record, whereas small funds do not. An investor can determine how well management has performed. In most cases, management for a smaller fund has not been tested in bear and bull markets. Large fund managers generally have experienced up and down markets and have made it through them. However, investors should ask themselves if management can continue to sustain growth because past performance does not necessarily indicate future performance.

## **Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:49, What is a real estate investment trust?**

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A real estate investment trust (REIT) is a publicly traded closed-end investment company that invests in a managed, diversified portfolio of real estate or real estate mortgages and construction loans. Think of a REIT as a real estate mutual fund. REITs are traded on exchanges and can sell for premium or discounts to the NAV.

Investors must pay the tax on the REIT's earnings as they are distributed. Distributed income is taxed as ordinary income. Capital gains and losses from the sale of assets in the REIT portfolio retain their character and are taxed as gains and losses when distributed. The advantages of REITs include: (1) limited liability, (2) ability to leverage, (3) use as collateral, (4) liquidity, (5) diversification in the real estate portfolio, and (6) inflation hedge.

The disadvantages of REITs include: (1) loss of control, (2) lower potential returns, (3) management fees and administrative charges, and (4) no flowthrough of tax benefits—losses cannot be passed through.

## **Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:50, What is an exchange-traded fund?**

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An exchange-traded fund (ETF) offers purchasers the ability to invest in a basket of stocks that mirror closely an underlying benchmark index. They trade daily on exchanges and are priced continuously by the marketplace throughout the day. The funds rely on an arbitrage mechanism to keep the prices at which they trade roughly in line with the net asset values of their underlying portfolios.

## **Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:51, What is systematic risk?**

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Systematic risk is a broad category or composite of risk that affects the entire market rather than unique to a particular security. In effect, all securities tend to move together in a systematic manner in response to these risks. As a result, systematic risk is nondiversifiable, as it effects the entire market, regardless of which stocks an investor owns. Examples include market risk, interest rate risk, purchasing power risk, foreign currency risk, and reinvestment risk. Systematic risk cannot be eliminated through diversification, or minimized because it affects the entire market. Beta is a measure by which systematic risk is determined. Beta is only an accurate measure of systematic risk when calculated for a diversified portfolio.

## **Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:52, What is unsystematic risk?**

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Unsystematic risk is unique to a single business or industry, such as operations and methods of financing. These risks include business risk and financial risk. Unlike systematic risk, since this risk is not a risk of the entire market, unsystematic risk can be eliminated through diversification. Several studies have found that unsystematic risk has been significantly reduced with portfolios of 10 to 15 stocks. As more stocks are added to a portfolio, the fewer losses that one company in the portfolio will have to cause a negative impact on the total performance of the group of securities. Examples of unsystematic risk include business risk, financial risk, default risk, and regulatory risk.



## **Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:53, Why is the price range of a stock not a good measure of risk?**

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The range in the price of a stock is really a measure of risk. A stock with a greater range tends to be more risky than a stock with a smaller range. However, two stocks with equal ranges may not have the same degree of risk. For example, a stock that trades from \$20 to \$40 has the same range as one that trades from \$90 to \$110. The percentage move from \$20 to \$40 is 100 percent, whereas the percentage move from \$90 to \$110 is only 22 percent. Therefore, the latter would dictate a more stable price but both securities have equal risk according to their ranges. Clearly, there is an inherent problem in the above scenario when considering range as a measure of risk. This is resolved by analyzing dispersion around an average value. Dispersion considers all possible outcomes from the average. The greater dispersion around the average return implies that a stock carries more risk. Dispersion is measured by standard deviation.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:54, What is standard deviation?

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Standard deviation measures how actual values differ from the expected values for a given series of values. It is a measure of variability of returns of an asset compared to its mean or expected value. The standard deviation measures total risk (systematic and unsystematic risk). The larger the dispersion around a mean value, the greater the risk and the larger the deviation for a security. Therefore, calculating standard deviation allows for more selectivity when choosing individual securities for a given level of risk. There is a direct relationship between standard deviation ( $\sigma$ , omega) and risk.

Observations will tend to cluster around the expected mean, and the bell-shaped curve is often used to represent the dispersion. The standard deviation is a measure of this dispersion or *variability*.

Approximately 68 percent of outcomes fall within  $\pm 1\sigma$  of the mean.

Approximately 95 percent of outcomes fall within  $\pm 2\sigma$  of the mean.

Approximately 99 percent of outcomes fall within  $\pm 3\sigma$  of the mean.



### EXAMPLE 4-9

The standard deviation for stock A is 1 and the standard deviation for B is 3. If Stock A has an average return of 15 percent, then 68 percent of all returns fall within 14 and 16 percent. For stock B, if its average return is also 15 percent, then 99 percent of all returns fall within 9 percent ( $-2*3\sigma$  of the mean) and 21 percent ( $+2*3\sigma$  of the mean). The larger standard deviation for B indicates more variability.

Standard deviation is an absolute measure of dispersion. That is, it can be influenced by the magnitude of the original numbers. If stock A and stock B have different returns, a comparison of standard deviation may not indicate that B is more diverse. Other measures of risk are useful complements to standard deviation.

The steps to calculating *historical* standard deviation are:

1. For each observation, take the difference between the individual observation and the average return.
2. Square the difference.
3. Total the squared differences.
4. For sample  $\sigma$ , divide this sum by one less than the number of observations. For population  $\sigma$ , divide this sum by the total number of observations (for CFP, assume sample unless stated differently).
5. Take the square root.



### EXAMPLE 4-10

Capital Assets, Inc., has an average return of 12 percent and the following individual returns for the corresponding time periods listed below. What is the standard deviation for Capital Assets, Inc.?

<u>Year</u>	<u>Actual return</u>	<u>Average return</u>	<u>Difference</u>	<u>Difference squared</u>
1	12%	6.8%	5.2	27.04
2	10	6.8	3.2	10.24
3	-5	6.8	11.8	139.24
4	7	6.8	.2	.04
5	10	6.8	3.2	10.24
Sum of squared differences =				186.80

The standard deviation is  $(186.80 \div (5 - 1))^{\frac{1}{2}} = 6.83\%$

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:55, What is the coefficient of variation?

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To compare a series of very different values, the coefficient of variation is preferred to using only standard deviation. Where standard deviation is a measure of absolute dispersions, the coefficient of variation is a measure of relative dispersions. The coefficient of variation is defined as the ratio of the standard deviation divided by the mean. The larger value indicates greater dispersion relative to the arithmetic mean of the return.



### EXAMPLE 4-11

Stock *A* has standard deviation of 7 and an average rate of return of 5 percent. In contrast, stock *B* has a standard deviation of 10 and an average rate of return of 12 percent. The standard deviation expresses that stock *B* has greater risk than stock *A* because of a higher standard deviation. However, the relative dispersion is less for stock *B* than for *A*. Investment *A* has a 1.4 ( $7 \div 5$ ) coefficient of variation, whereas investment *B* has only a .83 ( $10 \div 12$ ) coefficient of variation. Considering the relative dispersion, investors seeking less risk would consider purchasing stock *B* instead of stock *A*.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:56, What is covariance?

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Sometimes it is desirable to determine how a return varies from other returns instead of its own return. This variability is measured by the covariance. A positive covariance indicates that variables move in the same direction, and a negative covariance indicates they move in opposite directions. Larger numbers indicate a stronger relationship and smaller numbers indicate a weaker relationship. However, covariance is an absolute number and can be difficult to interpret. It is often converted into the correlation coefficient, which is easier than covariance to interpret.

The covariance between the returns of securities 1 and 2 is

$$\text{cov}_{1,2} = (R_{1,2})(\sigma_1)(\sigma_2)$$

where

$R_{1,2}$  is the correlation coefficient.

$\sigma_1$  is the standard deviation of stock 1.

$\sigma_2$  is the standard deviation of stock 2.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:57, What is the correlation coefficient?

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The correlation coefficient is a measure of how different returns vary for different stocks. The numerical values of the correlation coefficient range from +1 to -1. If two variables move exactly together, the value of the correlation coefficient is 1. This indicates perfect positive correlation. If two variables move exactly opposite to each other, the value of the correlation coefficient is -1. Low numerical values indicate little relationship between the two variables, such as -0.10 or +0.15.

The maximum amount of risk reduction is predetermined by the correlation coefficient. The correlation coefficient is the engine that drives the whole theory of portfolio diversification. There is an inverse relationship between correlation and diversification. The lower the correlation, the greater the diversification. If the correlation coefficient between securities is less than 1, then the risk of a portfolio will always be less than the simple weighted average of the individual risks of the stocks in the portfolio. Diversification requires that asset returns not be highly correlated. Risk is erased when returns are perfectly negatively correlated. However, the elimination of risk does not eliminate positive returns.



### EXAMPLE 4-12

If the return for XYZ yields 20 percent and YYY yields -10 percent, the net is 5 percent. If, in the next period, XYZ yields -5 percent and YYY yields 15 percent, the net is still 5 percent. The swing in return for XYZ is +20 to -5, while the swing in return for YYY is -10 to +15. The correlation coefficient is -1.0 because of negative correlation, but the return on a portfolio equally invested in the two securities is 5 percent. Risk is reduced by a lower positive correlation and a greater negative correlation among the returns.

An important concept comes into play: the individual asset's return and risk are important, but the asset's impact on the portfolio as a whole is even more important. The asset's return and variability should be looked at in the context of the portfolio. It is very likely that a highly positive asset will reduce the risk in a given portfolio because the asset has a return that is negatively correlated with the returns offered by the other assets of the portfolio. Therefore, failure of an investor to consider the relationship among the assets in a portfolio can prove to be counterproductive. Diversification reduces the investor's risk exposure without necessarily reducing a portfolio's average return.

The correlation coefficient between the returns of securities 1 and 2 is

$$R_{1,2} = (\text{cov}_{1,2}) / \sigma_1 \sigma_2$$

where

$\text{cov}_{1,2}$  is the covariance between stocks.

$\sigma_1$  is the standard deviation of stock 1.

$\sigma_2$  is the standard deviation of stock 2.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:58, What is the beta coefficient?

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The beta coefficient is a measure of systematic risk and should be used for a diversified portfolio. In the construction of a well-diversified portfolio, all unsystematic risk is removed. A diversified portfolio is a portfolio of systematic risk, and the beta coefficient is a measure of *volatility* for a diversified portfolio—that is, the volatility of some return relative to a benchmark. In many cases, the benchmark is the S&P 500 Index. In contrast, standard deviation is a measure of *variability*. Variability is the variation of returns from average return.

If the stock has a beta of 1.0, the implication is the stock moves exactly with the market. A beta of 1.2 is 20 percent riskier than the market and a beta of 0.8 is 20 percent less risky than the market. However, the investor must understand that the beta coefficient for an *individual security* may be unstable over time. Therefore, it is not an accurate predictor of future movements in stock prices. On the other hand, the beta coefficient for a *portfolio of securities* is fairly stable over time. For portfolios of securities, as one stock's beta increases, another tends to decrease, thus averaging each other out over time. Therefore, a portfolio's historical beta coefficient can be used as an indicator of future portfolio volatility. However, beta has little meaning if the returns between the fund and the market are weak. If there is a strong relationship between the return of a stock and the return of a market, the beta coefficient is significant. Therefore, the coefficient of determination is used to determine if beta is meaningful.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:59, What is the coefficient of determination?

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The coefficient of determination is often referred to as  $R^2$ . It gives the variation in one variable explained by another and is an important statistic in investments. No causality is claimed by the coefficient of determination. It is the job of the investor to interpret it.

The beta coefficient reports the volatility of some return relative to the market (S&P 500). In the case of mutual funds, it is the return of a fund relative to the return of the market. The strength of the relationship is indicated by  $R^2$ . Let's assume that  $R^2$  equals .15. An investor can assume that beta has little meaning because the variation in the return is caused by something other than the movement in the market. In other words, there is substantial unsystematic risk. If  $R^2$  equals .95, it can be concluded that the variability of the returns is primarily a result of variability of the market. Therefore, the portfolio's primary source of risk is systematic. In this case, the beta coefficient would be a good measure of risk.

The coefficient of variation is systematic risk. Unsystematic risk is  $1 - R^2$ . In order to compare mutual funds, it is necessary to use the appropriate benchmark. Assume the following:

	<b>S&amp;P 500</b>		<b>5-Year Schwab Small Cap Index</b>		
	$\beta$	$R^2$	Return	$\beta$	$R^2$
XYZ small cap fund	.75	25	14.3%	1.15	89
ABC small cap fund	.81	19	17.9%	1.30	71

This indicates that the S&P 500 index is not the appropriate benchmark to use. It compares apples to oranges. To compare apples to apples, it is necessary to use an appropriate small cap index when evaluating these mutual funds. Therefore, the Schwab Small Cap Index is used. This information further explains that ABC's larger return (and risk) is a result of the manager's willingness to allocate more to speculative small cap stocks. For an investor looking for less risk, the choice is XYZ because of a higher  $R^2$ .

The coefficient of determination is not a good or bad number. It indicates the strength of the relationship and is no greater than 100. As  $R^2$  drops, the beta for a diversified portfolio becomes less significant. As a rule of thumb, a minimum  $R^2$  of 75 should be used when evaluating the significance of measures for a diversified portfolio.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:60, What is the holding period return?

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The holding period return (HPR) is determined by taking the total return divided by the initial cost of the investment. It is the following:

$$\text{HPR} = \frac{P_1 - P_0 + D}{P_0}$$

Where,  $P_1$  is the sale price,  $P_0$  is the purchase price, and  $D$  is the dividend paid. For example, an individual buys a stock for \$10 and collects a \$2 dividend and later sells it for \$15 dollars, the HPR is

$$\frac{\$15 - \$10 + \$2}{\$10} = 70\%$$

There is a major weakness in using the holding period. It does not consider how long it took to earn the return.



## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:61, What is the rate of return?

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The correct way to calculate the return is to solve for the rate of return. The rate of return is commonly known as the time value of money. The equation that answers the previous question is

$$P_0(1 + r)^n = P_n$$

where  $P_0$  is the purchase price of the security,  $r$  is the rate of return for the period,  $n$  is the number of periods, and  $P_n$  is the price at which the security is sold. To find the rate of return, assume a stock was purchased at \$50 and later sold at the end of the fifth year at \$85. The rate of return is easily solved using a calculator:

### Calculator Solution

PV = -\$50, FV = \$85, N = 5 → Solve for  $i$  = 11.19%

The rate of return is 11.19 percent. The rate of return is superior to the holding period return.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:62, What is the geometric average?

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Another way to determine the rate of return over a period of years is to use the geometric average. The standard formula for the geometric average is

The geometric average can be calculated using the annual rate of returns:

$$G = \sqrt[n]{X_1 \times X_2 \times X_3 \times \dots \times X_n}$$

<u>Year</u>	<u>Rate of Return</u>
1	10%
2	20
3	-10
4	-3
5	15

In this example, the returns are redefined to make them positive. This is done by adding 1.0 to the returns. The term  $(1 + R_t)$  represents the year-end value relative to the initial investment at the beginning of the year.

$$[(1.10)(1.20)(0.90)(0.97)(1.15)]^{1/5} - 1 = .0579 \text{ or } 5.79\%$$

The arithmetic mean and the geometric mean produce very different results.



### EXAMPLE 4-13

A stock is bought at \$100 and at the end of one year it is selling at \$125, but then it is sold in the second year at \$100. The rate of return is not what is expected when using the average rate of return. In the first year the stock indicates a gain of 25 percent ( $\$25 \div \$100$ ). In the second year the stock indicates a loss of 20 percent ( $-\$25 \div \$125$ ). The average rate of return is

$$(25\% - 20\%) \div 2 = 2.5\%$$

Using the arithmetic mean, the investor earned 2.5 percent even though the stock produced neither gain nor loss. The geometric average is

$$((1.25)(0.80))^{1/2} - 1 = 0\%$$

The geometric mean accurately reflects the ending value in Year 2 equal to the starting value in Year 1. The compounded rate of return is 1 percent.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:63, What is the internal rate of return?

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The internal rate of return is the discounted rate that makes the present value of the cash outflows equal to initial cash inflows such that the net present value is equal to zero. Assume an investor bought a stock for \$35, collected \$4.00 in dividends for four years, and later sold the stock at \$55. The return is found by solving for the internal rate of return (IRR).

$PV = -\$35$ ,  $FV = \$55$ ,  $PMT = 1$ ,  $N = 4 \rightarrow$  Solve for  $i = 14.40\%$

The IRR has two problems. First, it assumes all cash flows received during the period are reinvested at the IRR. If the investor receives a higher rate of return on the first-year dividend, the true return will exceed the IRR. In contrast, the true return will be less than the IRR if the first-year dividend was invested at a lower rate of return. Second, it is difficult to calculate the IRR with more than one purchase of the specified security.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:64, What is the dollar-weighted rate of return?

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The dollar-weighted rate of return applies the concept of IRR to investment portfolios. The dollar-weighted rate of return is defined as the IRR of a portfolio, taking into account all cash inflows and outflows.



### EXAMPLE 4-14

An investor buys one share of stock for \$50 at the beginning of the first year and buys another share for \$55 at the end of the first year. The investor earns \$1 in dividends in the first year and \$2 in the second year. What is the IRR if the shares are sold at the end of the second year for \$65 each?

There are two cash outflows: \$50 at time period  $t = 0$  and \$55 at time period  $t = 1$ . There are also two cash inflows: \$1 at time period  $t = 1$  and \$132 (\$2 dividends plus \$130 proceeds) at time period  $t = 2$ . The next step is to group net cash flow by time. The  $t = 0$  net cash flow is  $-50$ , and  $t = 1$  net cash flow is  $-54$  ( $-\$55 + 1$ ), and the  $t = 2$  net cash flow is \$132 ( $\$130 + \$2$ ). The net cash flows can be entered on the calculator to solve the IRR. The IRR is 17.21 percent. This is also called the dollar-weighted rate of return because it weighs the amount of all dollars flowing into and out of a portfolio during each time period.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:65, What is the time-weighted rate of return?

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The time-weighted rate of return method does not weigh the amount of all dollar flows during each time period. It computes the return for each period and takes the average of the results by finding the holding period for each period and averaging the returns. If the investment is for more than one year, the geometric mean of the annual returns should be computed to find the time-weighted rate of return for the measurement period.

From the previous example, the return for the first year is

$$(\$55 - \$50 + \$1) \div \$50 = 12\%$$

The return for the second year is

$$(\$130 - \$110 + \$2) \div \$110 = 20\%$$

The arithmetic average return is

$$((1.12)(1.20))^{1/2} - 1 = 15.9\%$$

In the investment management industry, the time-weighted return is the preferred method of performance measurement because it is not affected by the timing of cash flows. If a client adds funds to an investment portfolio at an unfavorable time, the dollar-weighted return will tend to be depressed. If funds are added at a favorable time, the dollar-weighted return will tend to be elevated. The time-weighted rate of return is less than the dollar-weighted rate of return because the stock performed better in the second year, when the investor owned more shares. In contrast, if the stock performed better in the first year, when the investor had fewer shares, the time-weighted return would have been more than the dollar-weighted return.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:66, What is the real return (inflation adjusted)?

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The real return is the earnings from an investment that are above the inflation rate. For investors to achieve their financial goals, they must overcome the loss of purchasing power caused by inflation. The real return is determined by the following formula:

$$\frac{1 + \text{nominal rate}}{1 + \text{inflation rate}} - 1 \times 100$$

where the nominal rate is the absolute return, and the inflation rate is the rate of inflation for the period.



### EXAMPLE 4-15

An individual invests \$1,000 at the beginning of the year and earns 10 percent. The resulting balance is \$1,100. The inflation over the period is 3 percent. Therefore, the initial investment of \$1,000 is equal to \$1,030 at the end of the year. The real return is the difference between the earnings (\$100) and increase in value as a result of inflation (\$30). The difference of \$70 is divided by the initial investment adjusted for inflation (\$1,030). The real return equals 6.8 percent. It is also found by the following formula:

$$\frac{1.10}{1.03} - 1 \times 100 = 6.79\%$$

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:67, What is the required rate of return?

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The CAPM determines the required rate of return for any risky asset. It specifies that the return on an investment (r) depends on the return the individual earns on a risk-free asset and a risk premium. The return of a U.S. Treasury bill is used as the risk-free asset. The risk adjusted return is expressed as

$$r = r_f + (r_m - r_f) \text{ beta}$$

where  $r_f$  is the risk-free asset and  $r_m$  is the return on the market. The risk premium, which is the additional return of the market over the risk-free rate of return ( $r_m - r_f$ ) is adjusted by the systematic risk associated with that asset, the beta coefficient.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:68, What is the expected rate of return?

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The expected return is the anticipated growth from an investment. It is the return that is expected to occur for the amount of risk undertaken. The expected return is calculated as

$$E(r) = \frac{E(D)}{P} + E(g)$$

where  $E(r)$  is the expected return (as a percentage),  $E(D)$  is the expected dividend (current dividend  $\times$  (1+ expected growth rate)),  $P$  is the price of the asset, and  $E(g)$  is the expected growth.



### EXAMPLE 4-16

If the stock is selling at \$50 and is expected to pay a \$3 dividend, which is expected to grow 5 percent per year, then the expected return is:

$$\frac{\$3}{\$50} + .05 = 11\%$$



## **Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:69, Why use the risk-adjusted return?**

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When determining the various returns earned by a portfolio, a higher return by itself is not necessarily indicative of superior performance. Alternatively, a lower return is not indicative of inferior performance. A return from a money market fund would be less than a return from a stock, because an investor takes on more risk with a stock. Essentially, money market returns should not be compared to stock returns. In addition, earning 10 percent from a low-risk portfolio is better than earning 10 percent from a high-risk portfolio. An investor does not standardize for differences in risk when comparing absolute returns and needs to adjust for risk to find the optimal return for a portfolio. Upon making the risk adjustment, an investor is able to determine if a given portfolio outperformed the market or another portfolio.

The expression "beat the market" is often misleading as it implies that a fund outperformed the market return. The expression does not specify what market or benchmark was used and the level of risk assumed. To really outperform the market, an investor must have superior market timing to sell when securities are considerably overvalued and to buy when securities are undervalued. Alternatively, portfolios need diversification to eliminate unsystematic risk because the market does not reward such risk. An investor can measure how well a fund is managed or diversified by correlating returns from a portfolio to those of an appropriate market benchmark. The benchmark often used for comparisons is the S&P 500 Index because it is a proxy for the market. However, it becomes difficult to quantify performance on a risk-adjusted basis.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:70, How is risk measured?

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There are three major composite equity portfolio measures that combine risk and return to give a quantifiable risk-adjusted number. These composite performance measures are the Treynor index, the Sharpe index, and the Jensen index. Investors may use these measures together to determine if a portfolio or fund manager actually "beat the market." All three measures provide the actual risk-adjusted return. The differences among them rest with the measures of risk and the calculation process; however, all three are part of the CAPM.

The CAPM determines the required rate of return for any risky asset. It specifies that the return on an investment ( $r$ ) depends on the return the individual earns on a risk-free asset and a risk premium. The return on a U.S. Treasury bill is used as the risk-free asset. The risk-adjusted return is expressed as

$$r = r_f + (r_m - r_f) \text{ beta}$$

where  $r_f$  is the risk-free asset and  $r_m$  is the return of the market. The risk premium, which is the additional return of the market over the risk-free rate of return ( $r_m - r_f$ ) is adjusted by the systematic risk associated with that asset, the beta coefficient.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:71, What is the Treynor performance index?

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The Treynor index uses a portfolio's beta to measure risk and is expressed as

$$T_t = \frac{r_p - r_f}{\text{beta}}$$

where  $r_p$  is the realized return of the portfolio and  $r_f$  is the risk-free rate. The extent to which the realized return exceeds the risk-free rate is divided by the portfolio's beta. The risk-variable beta measures systematic risk and indicates nothing about the diversification of a portfolio. It implicitly assumes a completely diversified portfolio. The Treynor index standardizes the return in excess of the risk-free rate by the volatility of the return. To understand how to interpret the Treynor index, consider the example below:



### EXAMPLE 4-17

The S&P 500 earns 10 percent when a government T-bill earns 7 percent. Portfolio X earns a 12 percent return with a beta of 1.2, and portfolio Y earns 14 percent with a beta of 1.9. Using that information, the Treynor index is calculated for the market portfolio and each portfolio as follows:

$$T_m = \frac{0.10 - 0.07}{1.00} = 0.030$$

$$T_x = \frac{0.12 - 0.07}{1.2} = 0.042$$

$$T_y = \frac{0.14 - 0.07}{1.9} = 0.037$$

This indicates that X and Y outperformed the market on a risk-adjusted basis, and portfolio X performed better than portfolio Y. The Treynor index must be computed for the market to determine if a particular portfolio outperformed the market. However, the results do not indicate by how much each portfolio outperformed the market.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:72, What is the Sharpe performance index?

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Another measure of performance is the Sharpe index, which is the following equation:

$$S_t = \frac{r_p - r_f}{SD_p}$$

The new input is  $SD_p$ , which represents the standard deviation of the portfolio. The composite measure is similar to the Treynor index, but it measures the total risk of the portfolio by including standard deviation instead of only the systematic risk. It does not implicitly assume that a portfolio is well diversified. The Sharpe index standardizes the return in excess of the risk-free rate by the variability of the returns.



### EXAMPLE 4-18

Assume the previous examples are continued and portfolio X has a standard deviation of 30 percent and portfolio Y has a standard deviation of 20 percent. In this case, portfolio X equals 0.17 and portfolio Y equals 0.35. Because portfolio Y has a higher score, its performance is superior to that of portfolio X. It is safe to assume that the additional return (*i.e.*, 14 versus 12 percent) more than compensates for the additional risk.

In the example, the Sharpe index produces a ranking that is the opposite of the Treynor index. The difference in ranking occurs because the measure of risk is different. Consider a utility fund with an average return of 10 percent and a standard deviation of 15 percent. This means that 68 percent of the time, the return ranges from negative 5 percent to positive 25 percent. This represents a great amount of variability. However, the same fund may have a beta of 0.7, indicating less volatility than the market returns.

It is important to understand that variability and volatility mean different things. Variability refers to how much a return changes from year to year to its average return. Volatility compares a return relative to a benchmark, such as the S&P 500. The utility fund has a low beta. Therefore, its return does not change more than the market. However, there is a large variation from year to year in the fund's return, even though it is less volatile compared to the market. There is a large amount of unsystematic risk unique to the utility fund and only a slight amount of systematic risk.

The Treynor index gives a superior risk-adjusted return when a low beta is used, and the Sharpe index gives an inferior risk-adjusted return when there is excessive diversifiable risk. In comparison with the Treynor index, the Sharpe index does not indicate if a portfolio outperformed the market without calculating for the market. It does not tell how much a portfolio outperformed or underperformed the market.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:73, What is the Jensen performance index?

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The Jensen measure is similar to the Treynor and Sharpe indexes because it is based on the CAPM. The Jensen index determines how much the realized return differs from the required return. The following formula is used to find alpha:

$$a = r_p - [r_f + (r_m - r_f) \text{ beta}]$$

In the equation, the  $a$  (referred to as alpha) value indicates whether a portfolio manager is superior or inferior in market timing and stock selection. A positive alpha indicates a superior manager, and a negative alpha indicates an inferior manager.



### EXAMPLE 4-19

Assume a return of 15 percent with a beta of 1.2 for manager X when the market return is 14.3 percent and the risk-free rate is 7 percent. The alpha is expressed as

$$a = 0.15 - [0.07 + (0.143 - 0.07)1.2] = -0.0076$$

The negative result indicates inferior performance. If portfolio manager Y earns a return of 12.5 percent with a beta of 0.7, the alpha is expressed as

$$a = 0.125 - [0.07 + (0.143 - 0.07)0.7] = 0.0039$$

This indicates superior performance because it is positive. The absolute return for manager X is higher, but the risk-adjusted return for manager Y is greater, denoting superior performance. Therefore, manager Y not only outperformed manager X but also outperformed the market return on a risk-adjusted basis.

In the example, portfolio X performed 0.76 percent worse than the market, while portfolio Y performed 0.39 percent better than the market. As shown in the above example, the Jensen index computes the absolute value. Conversely, the Treynor and Sharpe indexes compute a relative value.

## **Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:74, How do the different types of risk-adjusted measurements compare?**

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Like the Treynor index, the Jensen index does not evaluate the ability of a portfolio manager to diversify because it uses beta, which calculates risk premium in terms of systematic risk. These are usually safe measures to use when comparing a diversified portfolio of mutual funds. The Sharpe index uses the standard deviation of returns as a measure of risk. Therefore, the Sharpe index scores a portfolio manager on both rate of return and diversification. A completely diversified portfolio has identical rankings for Treynor and Sharpe measures because total variance is a result of systematic risk, indicating a completely diversified portfolio. Alternatively, a poorly diversified portfolio may have a high ranking using Treynor and Jensen measures and a low ranking using the Sharpe index. The differences in ranking are directly the result of diversification.

All three performance indicators are complementary to each other but provide different information. Each measure provides very similar rankings when dealing with a diversified portfolio of mutual funds. However, in such a portfolio, the Jensen or Treynor index is preferred. If such a portfolio existed, then each mutual fund would represent only part of an investor's total risk. Investors are more concerned with the nondiversifiable risk associated with the portfolio, so beta is an appropriate measure of risk. The Jensen and Treynor indicators are not good measures of performance for specialized sector funds. If the specific portfolio constitutes all of an individual's assets, then total risk is a more appropriate measure.

## **Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:75, What are liquidity ratios?**

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Liquidity ratios measure how quickly a firm can convert assets into cash without incurring a loss. It is important to compare this ratio with the firm's industry and to determine if internal trends are developing.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:76, What is the current ratio?

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The current ratio is

$$\frac{\text{Current Assets}}{\text{Current Liabilities}}$$

It is desirable to have more current assets than current liabilities. A general rule of thumb is to have a ratio of 2:1. This means that a firm's current asset can decrease by half and still meet short-term obligations.



## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:77, What is the quick ratio?

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The quick ratio is

$$\frac{\text{Cash} + \text{Marketable Securities} + \text{Receivables}}{\text{Current Liabilities}}$$

This ratio indicates the amount of highly liquid assets available to meet current liabilities.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:78, What is the cash ratio?

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The cash ratio is

$$\frac{\text{Cash and Marketable Securities}}{\text{Current Liabilities}}$$

The cash ratio is the most conservative of all the liquidity ratios.

## **Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:79, What are activity ratios?**

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Activity ratios measure how quickly a firm is converting its inventory and accounts receivable into cash. The more rapidly it can do this, the quicker the firm receives cash. As with all ratios, activity ratios should be compared with competing firms and analyzed for internal trends.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:80, What is receivables turnover?

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The receivable turnover ratio is

$$\frac{\text{Net Annual Sales}}{\text{Average Receivables}}$$

The ratio measures how fast account receivables are paid to get cash for paying off current liabilities. The ratio uses average receivables from beginning receivables plus ending receivables divided by two.



### EXAMPLE 4-20

The firm's receivables level was \$50.5 this year and \$65.4 last year. The average for both years is \$57.95  $(\$50.5 + \$65.4/2)$ . If net sales are \$575.00, then the receivables turnover ratio is

$$\frac{\$575.00}{\$57.95} = 9.9$$

This means that annual sales are almost 10 times the level of receivables. Inventory turns over about every 37 days. The average receivable collection period is

$$\frac{365}{\text{Annual Receivables Turnover}} = \frac{365}{9.92} = 36.7 \text{ days}$$

The receivables turnover ratio is a value that a firm does not want to sway too far from the norm for the industry.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:81, What is inventory turnover ratio?

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The inventory turnover ratio is

$$\frac{\text{CGS}}{\text{Average Inventory}}$$

The inventory ratio uses average inventory for the year. It can be calculated using net sales instead of cost of goods sold (CGS), but the latter is the preferred way.

The average inventory processing time is

$$\frac{365}{\text{Annual Inventory Turnover}}$$

The inventory turnover ratio follows the same conclusions as those drawn from the receivables turnover ratio. A very low number and long processing time relative to the industry implies that capital is tied up in inventory far beyond the firm's needs. Conversely, a very high number and short processing time relative to the industry imply scarce inventory levels, which lead to back orders and sluggish delivery. The inventory turnover ratio is a value that should not deviate too far from the competition.

## **Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:82, What are operating efficiency ratios?**

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Efficiency ratios measure how well a firm uses its capital and assets.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:83, What is total asset turnover?

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The total asset turnover ratio is

$$\frac{\text{Net Sales}}{\text{Average Total Net Assets}}$$

An exceptionally high number relative to the industry implies lack of productivity to meet demand or assets that are fully depreciated and out of date. A very low number relative to the industry implies that capital is tied up in assets extending beyond the firm's needs.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:84, What is net fixed asset turnover?

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The net fixed asset turnover is

$$\frac{\text{Net Sales}}{\text{Average Net Fixed Assets}}$$

An exceptionally high number relative to the industry implies lack of productivity to meet demand or the use of assets that are fully depreciated and out of date. A very low number relative to the industry implies that capital is tied up in excessive fixed assets.



## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:85, What is equity turnover?

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The equity turnover ratio is

$$\frac{\text{Net Sales}}{\text{Average Equity}}$$

Equity includes common and preferred stock, paid-in capital, and retained earnings. The ratio is different from the total asset turnover ratio in that it does not include current liabilities and long-term debt. The equity turnover ratio is improved by increasing the proportion of debt capital in a firm's capital structure.

## **Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:86, What are operating profitability ratios?**

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Operating profitability ratios indicate profits as a percentage of sales and as a percentage of capital.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:87, What is gross profit margin?

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The gross profit margin is

$$\frac{\text{Gross Profit}}{\text{Net Sales}}$$

Gross profit is net sales minus cost of goods sold. Therefore, gross profit margin measures the percentage earned on sales after deducting cost of goods sold. For example, if the gross margin is 25 percent, the firm earned \$0.25 on every dollar of sales before deducting sales, general, and administrative (SG&A) expenses. The ratio indicates the firm's relative cost-price position when compared to other firms in the industry.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:88, What is operating profit margin?

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The operating profit margin is

$$\frac{\text{Operating Profit}}{\text{Net Sales}}$$

Operating profit is gross profit minus SG&A expenses. Therefore, operating margin is the percentage earned on sales before adjusting for interest and taxes. In addition, some firms add back depreciation and amortization expenses to compute a profit margin consisting of earnings less interest, taxes, depreciation, and amortization (EBITDA). The operating margin then uses all controllable expenses. The variability of the ratio indicates the business risk for a firm.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:89, What is the net profit margin?

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The net profit margin is

$$\frac{\text{Net Income}}{\text{Net Sales}}$$

The net income used is earnings after interest and taxes but before dividends. The ratio should use earnings from continuous operations, not discontinued operations.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:90, What is return on owner's equity?

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The return on owner's equity is

$$\frac{\text{Net Income} - \text{Preferred Dividend}}{\text{Average Common Equity}}$$

The net income used is earnings after interest and taxes but before preferred dividends. The equity is the sum of common stock, additional paid-in capital, and retained earnings minus preferred stock. This identifies how much a firm is earning on the common shareholders' investment.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:91, What is return on equity?

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If an investor is concerned with the firm's total equity, preferred dividends and equity are added back into return on owner's equity. This ratio for return on equity (ROE) is

$$\frac{\text{Net Income}}{\text{Equity}}$$

The return on shareholders' equity shows how efficiently a company can make money and profitably use retained earnings to make more money for its shareholders. Return on equity can be increased by employing more debt financing and less equity financing, because earnings are applied to a smaller equity base, which increases the return on equity. The result is a firm having a small return on assets but a large return on equity. A substantial difference between return on equity and return on assets indicates the firm's ability to successfully utilize financial leverage.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:92, What is return on assets?

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Return on assets (ROA) is

$$\frac{\text{Net Income}}{\text{Total Assets}}$$

This is a measure that reveals what management is able to earn on all assets.



## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:93, What is business risk?

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Business risk is the risk associated with the nature of the business. It is uncertainty of earnings caused by variability in the firm's sales. It is measured by the variability of the operating income over a period of time. The variability is determined by standard deviation using historical operating earnings. The standard deviation is an absolute figure. Therefore, the standard deviation of operating earnings is divided by the mean operating earnings to find the coefficient of variation. The coefficient of variation provides a relative figure used to compare firms of different sizes.

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

A minimum series of 5 years to a maximum of 10 years is used to calculate the coefficient of variation from operating earnings. Operating earnings of less than 5 year is not meaningful, and a series of more than 10 years is out of date. Two factors contribute to the variability of earnings measured by business risk: sales variability and operating leverage.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:94, What is sales variability?

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Sales variability greatly affects a firm's earnings. It is influenced by customers, products, and advertising. The nature of the business and the current economic environment also affect a firm's sales. The variability of a firm's sales is measured by the coefficient of variation for the past 5 to 10 years. It is the standard deviation of sales divided by the mean sales for a period.

$$\text{Sales Variability} = \frac{\text{Standard Deviation of Sales}}{\text{Mean Sales}} = f (\text{Coefficient of Variation of Sales})$$

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:95, What is operating leverage?

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Operating leverage is a comparison of variable costs to fixed costs. If a firm has a high operating leverage, a large percentage of the firm's costs are fixed. Fixed production costs cause more variation in operating income than sales. Operating leverage means that a small change in sales results in a large change in operating income. Profits decline by a greater percentage than sales during bad times. Conversely, profits increase by a greater percentage than sales during boom times.

$$\text{Operating Leverage} = \frac{\sum_{i=1}^n \left| \frac{\% \Delta OE}{\% \Delta S} \right|}{N}$$

The operating leverage is a percentage change in operating earnings (earnings before interest and taxes) relative to the percentage change in sales over a period of time.

The degree of operating leverage (DOL) is the percentage change in operating income that results from a percentage change in sales.

$$\text{Degree of Operating Leverage} = \frac{\text{Percentage Change in EBIT}}{\text{Percentage Changes in Sales}}$$

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:96, What is financial risk?

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Financial risk is the risk related to a firm's sources of financing. It reflects the use of fixed income securities, including debt and preferred stock. An increase in financial leverage for a firm causes an increase in financial risk. The amount of financial risk that is acceptable for a firm depends on the business risk. A firm is receptive to more financial risk if the business risk is low. In contrast, a firm is unwilling to accept more financial risk if the business risk is high. The degree of financial leverage (DFL) is the percentage change in earnings per share that results from a percentage change in earnings before interest and taxes (EBIT).

$$\text{Degree of Financial Leverage} = \frac{\text{Percentage Change in EPS}}{\text{Percentage Change in EBIT}}$$

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:97, What is the debt-equity ratio?

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The debt-equity ratio is

$$\frac{\text{Total Long - Term Debt}}{\text{Total Equity}}$$

The numerator is composed of all long-term obligations, including convertible bonds. The denominator includes common stock, retained earnings, and preferred stock, although some analysts exclude preferred stock. The larger the debt figure, the more financial risk a firm has assumed. The higher the number gets, the increased likelihood of volatile earnings because of greater financial risk.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:98, What is long-term debt/total capital ratio?

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The long-term debt/total capital ratio is

$$\frac{\text{Total Long - Term Debt}}{\text{Total Long - Term Capital}}$$

Long-term capital includes all long-term debt, total equity, and preferred stock.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:99, What is the interest coverage?

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The interest coverage ratio is

$$\frac{\text{Income Before Interest and Taxes (EBIT)}}{\text{Debt Interest Charge}}$$

$$\frac{\text{Net Income} + \text{Income Taxes} + \text{Interest Expense}}{\text{Interest Expense}}$$

This measures a firm's ability to service debt. It reveals how much a firm is earning relative to what is owed. For example, a ratio of 3 indicates that the firm has \$3 of operating income for every \$1 in interest expense.

The number 1 minus the reciprocal of the interest coverage reveals how low earnings can decline before a firm is unable to pay interest expenses. For example, if the coverage ratio is 3, then earnings can decline by 67 percent ( $1 - \frac{1}{3}$ ), and the firm would still be able to pay interest expenses.

## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:100, What is the cash flow coverage ratio?

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The cash flow coverage ratio is

$$\frac{\text{Net Income} + \text{Depreciation Expense} + \text{Change in Deferred Taxes}}{N}$$

Cash flow coverage equals net income plus depreciation expense plus a change in deferred taxes (if there is an increase) for the period ( $N$ ).



## Financial Planning Answer Book by Jeffrey H. Rattiner, Q 4:101, What is the cash flow to long-term debt ratio?

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The cash flow to long-term debt ratio is

$$\frac{\text{Net Income} + \text{Depreciation Expense} + \text{Change in Deferred Taxes}}{\text{Book Value of Long - Term Debt}}$$