

Hedge funds are largely unregulated and are not required to report their performance to index providers. It is often the case that those funds that report are the funds that have been successful, as the poorly performing funds do not choose to report their performance. This results in an upward bias in index returns, with hedge funds appearing to be better investments than they actually are.

MARKET EFFICIENCY

Cross-Reference to CFA Institute Assigned Reading #47

An **informationally efficient capital market** is one in which the current price of a security fully and quickly reflects all available information about that security without bias.

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

Market efficiency increases with:

- Larger numbers of market participants.
- More information available to investors.
- Fewer impediments to trading such as restrictions on short sales.
- Lower transactions costs.

Forms of the Efficient Markets Hypothesis

1. The *weak form* of the hypothesis states that current stock prices fully reflect all price and trading volume (market) information. If weak-form efficiency holds, purely technical analysis has no value.
2. The *semistrong form* of the hypothesis holds that public information cannot be used to beat the market. If stock prices are semistrong-form efficient, neither technical nor fundamental analysis has any value in stock selection.
3. *Strong-form* efficiency states that stock prices fully reflect all information, both public and private. If markets were strong-form efficient, even private (inside) information would be of no value in selecting securities.

Identified Market Pricing Anomalies

A **market anomaly** is something that would lead us to reject the hypothesis of market efficiency.

- The **January effect** or **turn-of-the-year effect** is the finding that during the first five days of January, stock returns, especially for small firms, are significantly higher than they are the rest of the year.
- The **overreaction effect** refers to the finding that firms with poor stock returns over the previous three or five years (losers) have better subsequent returns than firms that had high stock returns over the prior period.
- **Momentum effects** have also been found where high short-term returns are followed by continued high returns.
- The **size effect** refers to evidence that small-cap stocks outperform large-cap stocks. This effect could not be confirmed in later studies, suggesting that either investors had traded on, and thereby eliminated, this anomaly or that the initial finding was simply a random result for the time period examined.
- The **value effect** refers to the finding that value stocks have outperformed growth stocks. Some researchers attribute the value effect to greater risk of value stocks that is not captured in the risk adjustment procedure used in the studies.

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

Portfolio management based on previously identified anomalies will likely be unprofitable. Investment management based solely on anomalies has no sound economic basis.

Behavioral Finance

Behavioral finance examines investor behavior, its effect on financial markets, how cognitive biases may result in anomalies, and whether investors are rational.

- **Loss aversion** refers to the tendency for investors to dislike losses more than they like gains of equal amounts.
- **Investor overconfidence**. Securities will be mispriced if investors overestimate their ability to value securities. However, it appears that this mispricing may be hard to predict, may only be temporary, may not be exploitable for abnormal profits, and may only exist for high-growth firms.

- **Representativeness.** Investors assume good companies or good markets are good investments.
- **Mental accounting.** Investors classify different investments into separate mental accounts instead of viewing them as a total portfolio.
- **Conservatism.** Investors react slowly to changes.
- **Narrow framing.** Investors view events in isolation.

Although investor biases may help explain the existence of security mispricing and anomalies, it is not clear that they are predictable enough so that abnormal profits could be earned by exploiting them.

STUDY SESSION 14: EQUITY ANALYSIS AND VALUATION

OVERVIEW OF EQUITY SECURITIES

Cross-Reference to CFA Institute Assigned Reading #48

Types of Equity Securities

- **Common shares** represent a residual claim (after the claims of debt holders and preferred stockholders) on firm assets.
- **Callable common shares** give the firm the right to repurchase the stock at a pre-specified call price.
- **Putable common shares** give the shareholder the right to sell the shares back to the firm at a specific price.
- **Preference shares** (or **preferred stock**) have features of both common stock and debt. As with common stock, preferred stock dividends are not a contractual obligation, the shares usually do not mature, and the shares can have put or call features. Like debt, preferred shares typically make fixed periodic payments to investors and do not usually have voting rights.
- **Cumulative preference shares** require that current period dividends and any dividends that were not paid must be made up before common shareholders can receive dividends. The dividends of **non-cumulative preference shares** do not accumulate over time when they are not paid, but dividends for the current period must be paid before common shareholders can receive dividends.
- Investors in **participating preference shares** receive extra dividends if firm profits exceed a predetermined level and may receive a value greater than the par value of the preferred stock if the firm is liquidated. **Non-participating preference shares** have a claim equal to par value in the event of liquidation and do not share in firm profits.
- **Convertible preference shares** can be exchanged for common stock at a conversion ratio determined when the shares are originally issued.

Private Equity

Private equity is usually issued to institutional investors via private placements. Private equity markets are smaller than public markets but are growing rapidly.

Compared to public equity, private equity has the following characteristics:

- Less liquidity because no public market for the shares exists.
- Share price is negotiated between the firm and its investors, not determined in a market.
- More limited firm financial disclosure because there is no government or exchange requirement to do so.
- Lower reporting costs because of less onerous reporting requirements.
- Potentially weaker corporate governance because of reduced reporting requirements and less public scrutiny.
- Greater ability to focus on long-term prospects because there is no public pressure for short-term results.
- Potentially greater return for investors once the firm goes public.

The three main types of private equity investments are venture capital, leveraged buyouts, and private investments in public equity.

Voting Rights

In a **statutory voting** system, each share held is assigned one vote in the election of each member of the board of directors. Under **cumulative voting**, shareholders can allocate their votes to one or more candidates as they choose.

A firm may have different classes of common stock (e.g., “Class A” and “Class B” shares). One class may have greater voting power and seniority if the firm’s assets are liquidated. The classes may also be treated differently with respect to dividends, stock splits, and other transactions with shareholders.

Foreign Equity

Direct investing in the securities of foreign companies simply refers to buying a foreign firm’s securities in foreign markets. Some obstacles to direct foreign investment are that:

- The investment and return are denominated in a foreign currency.
- The foreign stock exchange may be illiquid.
- The reporting requirements of foreign stock exchanges may be less strict, impeding analysis.
- Investors must be familiar with the regulations and procedures of each market in which they invest.

Methods for Investing in Foreign Companies

Depository receipts (DRs) trade like domestic shares but represent an interest in shares of a foreign firm that are held by a bank in the country in which they trade. When the foreign firm is involved with the issue, they are termed **sponsored DRs**, and investors receive the voting rights for the shares their DRs represent. When the foreign firm is not involved, they are termed **unsponsored DRs**, face less strict reporting requirements, and the depository bank retains the voting rights on the shares.

Global depository receipts (GDRs) are issued outside the U.S. and the issuer's home country, are traded primarily on the London and Luxembourg exchanges, are usually denominated in U.S. dollars, and can be sold to U.S. institutional investors.

American depository receipts (ADRs) are denominated in U.S. dollars and trade in the United States.

Global registered shares (GRS) are traded in different currencies on stock exchanges around the world.

A basket of listed depository receipts (BLDR) is an exchange-traded fund (ETF) that is a collection of DRs. ETF shares trade in markets just like common stocks.

Equity Risk and Return Characteristics

The risk of equity securities is most commonly measured as the standard deviation of returns. Preferred shares are less risky than common stock because preferred shares pay a known, fixed dividend. Because they are less risky, preferred shares have lower average returns than common shares.

Cumulative preferred shares have less risk than non-cumulative preferred shares.

For both common and preferred shares, putable shares are less risky and callable shares are more risky compared to shares with neither option.

Callable shares are the most risky because if the market price rises, the firm can call the shares, limiting the upside potential of the shares.

Market and Book Value of Equity

A firm's **book value of equity** is the value of the firm's assets on the balance sheet minus its liabilities.

The **market value of equity** is the total value of a firm's outstanding equity shares based on market prices and reflects the expectations of investors about the firm's future performance.

A key ratio used to determine management efficiency is the **accounting return on equity**, usually referred to simply as the **return on equity** (ROE):

$$ROE_t = \frac{NI_t}{\text{average } BV_t} = \frac{NI_t}{(BV_t + BV_{t-1}) / 2}$$

A firm's **cost of equity** is the expected equilibrium total return (including dividends) on its shares in the market.

INTRODUCTION TO INDUSTRY AND COMPANY ANALYSIS

Cross-Reference to CFA Institute Assigned Reading #49

Industry analysis is important for company analysis because it provides a framework for understanding the firm. Understanding a firm's business environment can provide insight about the firm's potential growth, competition, and risks. For a credit analyst, industry conditions can provide important information about whether a firm will be able to meet its obligations during the next recession.

Industry Classification Systems

One way to group companies into an industry group is by the *products and services* they offer. For example, the firms that produce automobiles constitute the auto industry. A **sector** is a group of similar industries. Systems that group firms by products and services usually use a firm's **principal business activity** (the largest source of sales or earnings) to classify firms.

Sectors representative of those used by commercial providers include the following:

- Basic materials and processing.
- Consumer discretionary.
- Consumer staples.
- Energy.
- Financial services.
- Health care.
- Industrial and producer durables.
- Technology.
- Telecommunications and utilities.

Several government bodies provide industry classification of firms.

- *International Standard Industrial Classification of All Economic Activities* (ISIC) was produced by the United Nations in 1948 to increase global comparability of data.
- *Statistical Classification of Economic Activities in the European Community* is similar to the ISIC, but is designed for Europe.
- *Australian and New Zealand Standard Industrial Classification* was jointly developed by those countries.
- *North American Industry Classification System* (NAICS) was jointly developed by the U.S., Canada, and Mexico.

Other Classification Methods

Firms can be classified by their *sensitivity to business cycles*. This system has two main classifications: cyclical and non-cyclical firms.

A **cyclical firm** is one whose earnings are highly dependent on the stage of the business cycle.

A **non-cyclical firm** produces goods and services for which demand is relatively stable over the business cycle. Examples of non-cyclical industries include health care, utilities, and food and beverage.

Cyclical sector examples include energy, financials, technology, materials, and consumer discretionary. Non-cyclical sector examples include health care, utilities, and consumer staples.

Non-cyclical industries can be further separated into defensive (stable) or growth industries. **Defensive industries** are those that are least affected by the stage of the business cycle and include utilities, consumer staples (such as food producers), and basic services (such as drug stores). **Growth industries** have demand so strong they are largely unaffected by the stage of the business cycle.

Statistical methods, such as cluster analysis, can also be used. This method groups firms that historically have had highly correlated returns.

This method has several limitations:

- Historical correlations may not be the same as future correlations.
- The groupings of firms may differ over time and across countries.
- The grouping of firms is sometimes non-intuitive.
- The method is susceptible to a central issue in statistics, i.e., firms can be grouped by a relationship that occurs by chance or not grouped together when they should be.

Peer Groups

A **peer group** is a set of companies with similar business activities, demand drivers, cost structure drivers, and availability of capital.

To form a peer group, an analyst will often start by identifying companies in the same industry classification, using the commercial classification providers previously described. Usually, the analyst will use other information to verify that the firms in an industry are indeed peers. An analyst might include a company in more than one peer group.

Elements of an Industry Analysis

A thorough industry analysis should include the following elements:

- Evaluate the relationships between macroeconomic variables and industry trends using information from industry groups, firms in the industry, competitors, suppliers, and customers.
- Estimate industry variables using different approaches and scenarios.
- Compare with other analysts' forecasts of industry variables to confirm the validity of the analysis, and potentially find industries that are misvalued as a result of consensus forecasts.
- Determine the relative valuation of different industries.
- Compare the valuations of industries across time to determine the volatility of their performance over the long run and during different phases of the business cycle. This is useful for long-term investing as well as short-term industry rotation based on the current economic environment.
- Analyze industry prospects based on **strategic groups**, which are groups of firms that are distinct from the rest of the industry due to the delivery or complexity of their products or barriers to entry. For example, full-service hotels are a distinct market segment within the hotel industry.
- Classify industries by **life-cycle stage**, whether it is embryonic, growth, shakeout, mature, or declining.
- Position the industry on the **experience curve**, which shows the cost per unit relative to output. The curve declines because of increases in productivity and economies of scale, especially in industries with high fixed costs.
- Consider the forces that affect industries, which include demographic, macroeconomic, governmental, social, and technological influences.
- Examine the forces that determine competition within an industry.

External Influences on Industries

The external influences on industry growth, profitability, and risk should be a component of an analyst's strategic analysis. These external factors include macroeconomic, technological, demographic, governmental, and social influences.

Macroeconomic factors can be cyclical or structural (longer-term) trends, most notably economic output as measured by GDP or some other measure. Interest rates affect financing costs for firms and individuals, as well as financial institution profitability. Credit availability affects consumer and business expenditures and funding. Inflation affects costs, prices, interest rates, and business and consumer confidence.

Technology can change an industry dramatically through the introduction of new or improved products. Computer hardware is an example of an industry that has undergone dramatic transformation. Radical improvements in circuitry were assisted by transformations in other industries, including the computer software and telecommunications industries. Another example of an industry that has been changed by technology is photography, which has largely moved from film to digital media.

Demographic factors include age distribution and population size, as well as other changes in the composition of the population. As a large segment of the population reaches their twenties, residential construction, furniture, and related industries see increased demand. An aging of the overall population can mean significant growth for the health care industry and developers of retirement communities.

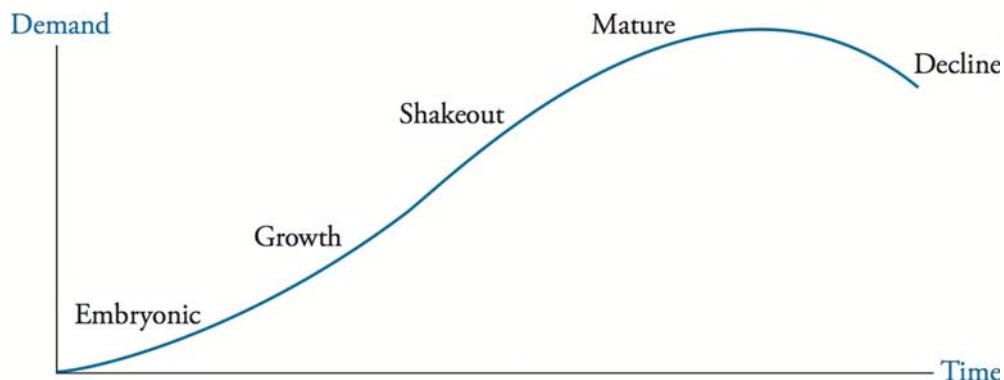
Governments have an important effect on businesses through taxes and regulation. Entry into the health care industry, for example, is controlled by governments that license providers. Some industries, such as the U.S. defense industry, depend heavily on government purchases of goods and services.

Social influences relate to how people work, play, spend their money, and conduct their lives; these factors can have a large impact on industries. For example, when women entered the U.S. work force, the restaurant industry benefitted because there was less cooking at home. Child care, women's clothing, and other industries were also dramatically affected.

Industry Life Cycle

Industry life cycle analysis should be a component of an analyst's strategic analysis. The five phases of the industry life-cycle model are illustrated in Figure 1.

Figure 1: Stages of the Industry Life Cycle



In the **embryonic stage**, the industry has just started. The characteristics of this stage are as follows:

- *Slow growth*: customers are unfamiliar with the product.
- *High prices*: the volume necessary for economies of scale has not been reached.
- *Large investment required*: to develop the product.
- *High risk of failure*: most embryonic firms fail.

In the **growth stage**, industry growth is rapid. The characteristics of this stage are as follows:

- *Rapid growth*: new consumers discover the product.
- *Limited competitive pressures*: The threat of new firms coming into the market peaks during the growth phase, but rapid growth allows firms to grow without competing on price.
- *Falling prices*: economies of scale are reached and distribution channels increase.
- *Increasing profitability*: due to economies of scale.

In the **shakeout stage**, industry growth and profitability are slowing due to strong competition. The characteristics of this stage are as follows:

- *Growth has slowed*: demand reaches saturation level with few new customers to be found.
- *Intense competition*: industry growth has slowed, so firm growth must come at the expense of competitors.
- *Increasing industry overcapacity*: firm investment exceeds increases in demand.
- *Declining profitability*: due to overcapacity.
- *Increased cost cutting*: firms restructure to survive and attempt to build brand loyalty.
- *Increased failures*: weaker firms liquidate or are acquired.

In the **mature stage**, there is little industry growth and firms begin to consolidate. The characteristics of this stage are as follows:

- *Slow growth*: market is saturated and demand is only for replacement.
- *Consolidation*: market evolves to an oligopoly.
- *High barriers to entry*: surviving firms have brand loyalty and low cost structures.
- *Stable pricing*: firms try to avoid price wars, although periodic price wars may occur during recessions.
- *Superior firms gain market share*: the firms with better products may grow faster than the industry average.

In the **decline stage**, industry growth is negative. The characteristics of this stage are as follows:

- *Negative growth*: due to development of substitute products, societal changes, or global competition.
- *Declining prices*: competition is intense and there are price wars due to overcapacity.
- *Consolidation*: failing firms exit or merge.

Industry Concentration

High industry concentration does not guarantee pricing power.

- Absolute market share may not matter as much as a firm's market share relative to its competitors.
- If industry products are undifferentiated and commodity-like, then consumers will switch to the lowest-priced producer. Firms in industries with greater product differentiation in regard to features, reliability, and service after the sale will have greater pricing power.
- If an industry is capital intensive, and therefore costly to enter or exit, overcapacity can result in intense price competition.

Tobacco, alcohol, and confections are examples of highly concentrated industries in which firms' pricing power is relatively strong. Automobiles, aircraft, and oil refining are examples of highly concentrated industries with relatively weak pricing power.

Although industry concentration does not guarantee pricing power, a fragmented market usually does result in strong price competition.

Ease of Entry

High barriers to entry benefit existing industry firms because they prevent new competitors from competing for market share. In industries with low barriers to entry, firms have little pricing power. To assess the ease of entry, the analyst should

determine how easily a new entrant to the industry could obtain the capital, intellectual property, and customer base needed to be successful. One method of determining the ease of entry is to examine the composition of the industry over time. If the same firms dominate the industry today as ten years ago, entry is probably difficult.

High barriers to entry do not necessarily mean firm pricing power is high. Industries with high barriers to entry may have strong price competition when the products sold are undifferentiated or when high barriers to exit result in overcapacity.

Capacity

Industry capacity has a clear impact on pricing power. Undercapacity, a situation in which demand exceeds supply at current prices, results in pricing power. Overcapacity, with supply greater than demand at current prices, will result in downward pressure on price.

Market Share Stability

An analyst should examine whether firms' market shares in an industry have been stable over time. Market shares that are highly variable likely indicate a highly competitive industry in which firms have little pricing power. More stable market shares likely indicate less intense competition in the industry.

Factors that affect market share stability include barriers to entry, introductions of new products and innovations, and the **switching costs** that customers face when changing from one firm's products to another. High switching costs contribute to market share stability and pricing power.

Five Forces that Determine Industry Competition

The analysis framework developed by Michael Porter¹ delineates five forces that determine industry competition.

1. Rivalry among existing competitors.
2. Threat of entry.
3. Threat of substitutes.
4. Power of buyers.
5. Power of suppliers.

1. Michael Porter, "The Five Competitive Forces That Shape Strategy," *Harvard Business Review*, Volume 86, No. 1: pp. 78–93.

Industry competition is less intensive and firm profitability is greater when there is (1) less rivalry among existing industry firms, (2) less threat of new entrants, (3) less threat of substitute products, (4) less bargaining power of buyers (customers), and (5) less bargaining power of suppliers.

Company Analysis

Having gained understanding of an industry's external environment, an analyst can then focus on **company analysis**. This involves analyzing the firm's financial condition, products and services, and **competitive strategy**. Competitive strategy is how a firm responds to the opportunities and threats of the external environment.

Porter has identified two important competitive strategies that can be employed by firms within an industry: a **cost leadership (low-cost) strategy** or a **product or service differentiation strategy**. According to Porter, a firm must decide to focus on one of these two areas to compete effectively.

In a *low-cost strategy*, the firm seeks to have the lowest costs of production in its industry, offer the lowest prices, and generate enough volume to make a superior return. In **predatory pricing**, the firm hopes to drive out competitors and later increase prices. A low-cost strategy firm should have managerial incentives that are geared toward improving operating efficiency.

In a *differentiation strategy*, the firm's products and services should be distinctive in terms of type, quality, or delivery. For success, the firm's cost of differentiation must be less than the price premium buyers place on product differentiation. The price premium should also be sustainable over time. Successful differentiators will have outstanding marketing research teams and creative personnel.

A company analysis should include the following elements:

- Firm overview, including information on operations, governance, and strengths and weaknesses.
- Industry characteristics.
- Product demand.
- Product costs.
- Pricing environment.
- Financial ratios, with comparisons to other firms and over time.
- Projected financial statements and firm valuation.

A firm's return on equity (ROE) should be part of the financial analysis. The ROE is a function of profitability, total asset turnover, and financial leverage (debt).

EQUITY VALUATION: CONCEPTS AND BASIC TOOLS

Cross-Reference to CFA Institute Assigned Reading #50

Categories of Equity Valuation Models

In **discounted cash flow models** (or **present value models**), a stock's value is estimated as the present value of cash distributed to shareholders (*dividend discount models*) or the present value of cash available to shareholders after the firm meets its necessary capital expenditures and working capital expenses (*free cash flow to equity models*).

There are two basic types of **multiplier models** (or **market multiple models**) that can be used estimate intrinsic values. In the first type, the ratio of stock price to such fundamentals as earnings, sales, book value, or cash flow per share is used to determine if a stock is fairly valued. For example, the price to earnings (P/E) ratio is frequently used by analysts.

The second type of multiplier model is based on the ratio of **enterprise value** to either earnings before interest, taxes, depreciation, and amortization (EBITDA) or revenue. Enterprise value is the market value of all a firm's outstanding securities minus cash and short-term investments. Common stock value can be estimated by subtracting the value of liabilities and preferred stock from an estimate of enterprise value.

In **asset-based models**, the intrinsic value of common stock is estimated as total asset value minus liabilities and preferred stock. Analysts typically adjust the book values of the firm's assets and liabilities to their fair values when estimating the market value of its equity with an asset-based model.

Preferred Stock Valuation

The dividend is fixed and the income stream (dividends) theoretically continues forever so we use the formula for the present value of a perpetuity.

$$\text{preferred stock value} = \frac{D_p}{k_p}$$

Dividend Discount Models (DDM)

All of the valuation models here are based on taking the present value of expected future cash flows.

One-year holding period:

For the purposes of this valuation model, we assume that dividends are received annually at the end of the year; so, if you hold the stock one year, you will receive the dividend and the estimated sale price P_1 . To calculate the present value of these cash flows one year from now:

$$\text{one-period model: } P_0 = \frac{\left(\begin{array}{l} \text{dividend to} \\ \text{be received} \end{array} \right)}{(1 + k_e)} + \frac{\left(\begin{array}{l} \text{year -} \\ \text{end price} \end{array} \right)}{(1 + k_e)} \text{ or } P_0 = \frac{D_1 + P_1}{(1 + k_e)}$$

Be sure to use the *expected* dividend, D_1 , in the calculation.

Multiple-year holding periods:

With a multiple-year holding period, estimate all the dividends to be received as well as the expected selling price at the end of the holding period.

$$\text{n-period model: } P_0 = \frac{D_1}{(1 + k_e)^1} + \frac{D_2}{(1 + k_e)^2} + \dots + \frac{D_n}{(1 + k_e)^n} + \frac{P_n}{(1 + k_e)^n}$$

Infinite period model (constant growth model):

We can take the present value of an infinite stream of dividends that grows at a *constant rate* as long as the assumed growth rate, g_c , is less than the appropriate discount rate, k_e .

$$\text{constant growth model: } P_0 = \frac{D_1}{k_e - g_c}, \text{ note that } D_1 = D_0(1 + g_c)$$

Other things held constant, the higher the growth rate and the higher the dividend, the greater the present value.

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In practice, however, increasing the dividend will decrease retained earnings and the firm's sustainable growth rate, so we cannot assume that a firm that increases its dividend will increase firm value.

Temporary supernormal growth or multi-stage DDM:

This model assumes that a company's dividends will grow at a high rate for a period of time before declining to a constant growth rate. To calculate the stock price, discount each of the dividends during the high growth period individually and then use the formula for the infinite growth model to find the terminal stock value at the end of the supernormal growth period. Finally, add together the present values of all dividends and of the terminal stock value.

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

D_n is the last dividend of the supernormal growth period.

$$P_n = \frac{D_{n+1}}{k_e - g_c}, \text{ where } D_{n+1} \text{ is expected to grow at the constant/normal rate}$$

Earnings multiplier model (P/E ratio):

Understand how the DDM relates to the fundamental P/E ratio.

Start with the DDM and then divide both sides of the equation by next year's projected earnings, E_1 :

$$\text{If constant growth DDM holds: } P_0 = \frac{D_1}{k-g} \text{ then } \frac{P_0}{E_1} = \frac{D_1 / E_1}{k-g}$$

Other things held constant, the P/E ratio:

- Increases with D_1/E_1 , the dividend payout ratio.
- Increases with g , the growth rate of dividends.
- Decreases with increases in k , the required rate of return.
- Increases with ROE, since $g = \text{ROE} \times \text{retention ratio}$.

$$\text{ROE} = (\text{net income} / \text{sales})(\text{sales} / \text{total assets})(\text{total assets} / \text{equity})$$

Problems with using P/E analysis:

- Earnings are historical accounting numbers and may be of differing quality.
- Business cycles may affect P/E ratios. Currently reported earnings may be quite different from expected future earnings (E_1).
- As with the infinite growth model, when $k < g$, the P/E implied by the DDM is meaningless.

Estimating the Growth Rate in Dividends

To estimate the growth rate in dividends, the analyst can use three methods:

1. Use the historical growth in dividends for the firm.
2. Use the median industry dividend growth rate.
3. Estimate the sustainable growth rate.

The **sustainable growth rate** is the rate at which equity, earnings, and dividends can continue to grow indefinitely assuming that ROE is constant, the dividend payout ratio is constant, and no new equity is issued.

$$\text{sustainable growth} = (1 - \text{dividend payout ratio}) \times \text{ROE}$$

The quantity $(1 - \text{dividend payout ratio})$ is referred to as the **retention rate**, the proportion of net income that is not paid out as dividends and goes to retained earnings, thus increasing equity.

Some firms do not currently pay dividends but are expected to begin paying dividends at some point in the future. A firm may not currently pay a dividend because it is in financial distress and cannot afford to pay out cash, or because the return the firm can earn by reinvesting cash is greater than what stockholders could expect to earn by investing dividends elsewhere.

For firms that do not currently pay dividends, an analyst must estimate the amount and timing of the first dividend in order to use the Gordon growth model. Because these parameters are highly uncertain, the analyst should compare the estimated value from the Gordon growth model with value estimates from other models.

Using Price Multiples to Value Equity

Because the dividend discount model is very sensitive to its inputs, many investors rely on other methods. In a **price multiple** approach, an analyst compares a stock's price multiple to a benchmark value based on an index, industry group of firms, or a peer group of firms within an industry.

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Common price multiples used for valuation include price-to earnings, price-to-cash flow, price-to-sales, and price-to-book value ratios. Many of these ratios have been shown to be useful for predicting stock returns, with low multiples associated with higher future returns.

When we compare a price multiple, such as P/E, for a firm to those of other firms based on market prices, we are using price multiples based on comparables. By contrast, price multiples based on fundamentals tell us what a multiple should be based on some valuation models.

One criticism of price multiples is that they reflect only the past because historical (trailing) data are often used in the denominator. For this reason, many practitioners use forward (leading or prospective) values in the denominator (sales, book value, earnings, etc.) The use of projected values can result in much different ratios. An analyst should be sure to use price multiple calculations consistently across firms.

Trailing P/E uses earnings over the *most recent* 12 months in the denominator. The *leading P/E ratio* (also known as forward or prospective P/E) uses expected earnings for the next four quarters or fiscal year.

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

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

The *price-to-book (P/B) ratio* is calculated as:

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

A common adjustment is to use *tangible book value*, which is equal to book value of equity less intangible assets (e.g., goodwill, patents).

Furthermore, balance sheets should be adjusted for significant off-balance-sheet assets and liabilities and for differences between the fair and recorded values of assets and liabilities. Finally, book values often need to be adjusted for differences in accounting methods to ensure comparability.

Price-to-sales (P/S) ratios are computed by dividing a stock's price per share by sales or revenue per share or by dividing the market value of the firm's equity by its total sales:

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

Given one of the definitions of cash flow, the *price-to-cash-flow (P/CF) ratio* is calculated as:

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

where:

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

Enterprise Value Multiples

Enterprise value (EV) is a measure of total company value and can be viewed as what it would cost to acquire the firm.

$$\text{EV} = \text{market value of common stock} + \text{market value of debt} - \text{cash and short-term investments}$$

Cash and short-term investments are subtracted because an acquirer's cost for a firm would be decreased by the amount of the target's liquid assets. Although an acquirer assumes the firm's debt, it receives the firm's cash and short-term investments.

Enterprise value is appropriate when an analyst wants to compare the values of firms that have significant *differences in capital structure*.

EBITDA (earnings before interest, taxes, depreciation, and amortization are subtracted) is probably the most frequently used denominator for EV multiples; operating income can also be used. An advantage of using EBITDA instead of net income is that EBITDA is usually positive even when earnings are not. A disadvantage of using EBITDA is that it often includes non-cash revenues and expenses.

Asset-Based Valuation Models

Asset-based models are appropriate when equity value is the market or fair value of assets minus the market or fair value of liabilities. Because market values of firm assets are usually difficult to obtain, the analyst typically starts with the balance sheet to determine the values of assets and liabilities. In most cases, market values are not equal to book values. Possible approaches to valuing assets are to value them at their depreciated values, inflation-adjusted depreciated values, or estimated replacement values.

Applying asset-based models is especially problematic for firms that have a large amount of intangible assets, on or off the balance sheet. The effect of the loss of the current owners' talents and customer relationships on forward earnings may be quite difficult to measure. Analysts often consider asset-based model values as floor or minimum values when significant intangibles, such as business reputation, are involved.

Asset-based model valuations are most reliable when the firm has primarily tangible short-term assets, assets with ready market values (e.g., financial or natural resource firms), or when the firm will cease to operate and is being liquidated.

Advantages and Disadvantages of Valuation Models

Advantages of discounted cash flow models:

- They are based on the fundamental concept of discounted present value and are well grounded in finance theory.
- They are widely accepted in the analyst community.

Disadvantages of discounted cash flow models:

- Their inputs must be estimated.
- Value estimates are very sensitive to input values.

Advantages of comparable valuation using price multiples:

- Evidence that some price multiples are useful for predicting stock returns.
- Price multiples are widely used by analysts.
- Price multiples are readily available.
- They can be used in time series and cross-sectional comparisons.
- EV/EBITDA multiples are useful when comparing firm values independent of capital structure or when earnings are negative and the P/E ratio cannot be used.

Disadvantages of comparable valuation using price multiples:

- Lagging price multiples reflect the past.
- Price multiples may not be comparable across firms if the firms have different size, products, and growth.
- Price multiples for cyclical firms may be greatly affected by economic conditions at a given point in time.
- A stock may appear overvalued by the comparable method but undervalued by a fundamental method, or vice versa.
- Different accounting methods can result in price multiples that are not comparable across firms, especially internationally.
- A negative denominator in a price multiple results in a meaningless ratio. The P/E ratio is especially susceptible to this problem.

Advantages of price multiple valuations based on fundamentals:

- They are based on theoretically sound valuation models.
- They correspond to widely accepted value metrics.

Disadvantages of price multiple valuations based on fundamentals:

- Price multiples based on fundamentals will be very sensitive to the inputs (especially the $k - g$ denominator).

Advantages of asset-based models:

- They can provide floor values.
- They are most reliable when the firm has primarily tangible short-term assets, assets with ready market values, or when the firm is being liquidated.
- They are increasingly useful for valuing public firms that report fair values.

Disadvantages of asset-based models:

- Market values are often difficult to obtain.
- Market values are usually different than book values.
- They are inaccurate when a firm has a high proportion of intangible assets or future cash flows not reflected in asset values.
- Assets can be difficult to value during periods of hyperinflation.