# INTRODUCTION TO INDUSTRY AND COMPANY ANALYSIS

## EXAM FOCUS

This topic provides a great deal of material on industry analysis. Understand the effects of business cycles and the stage of an industry's life cycle. Porter's five forces and two competitive strategies are very important to know. Beyond these, make sure that you know the effects on price competition and profitability of the items considered in industry analysis and of the various firm characteristics discussed.

## INDUSTRY ANALYSIS

### Explain uses of industry analysis and the relation ofindustry analysis to company analysis.

Industry analysis is important for company analysis because it provides a framework for understanding the firm. Analysts will often focus on a group of specific industries so that they can better understand the business conditions the firms in those industries face.

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.

In an active management strategy, industry analysis can identify industries that are undervalued or overvalued in order to weight them appropriately. Some investors engage in **industry rotation**, which is overweighting or underweighting industries based on the current phase of the business cycle. A firm's industry has been found to be as important as its home country in determining its performance.

In performance attribution analysis, the sources of portfolio return are determined relative to a benchmark. The industry representation within a portfolio is often a significant component of attribution analysis.

### Compare methods by which companies can be grouped.

One way to group companies into an industry 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. Hospitals, doctors, pharmaceutical firms, and other industries are included in the health care sector. Systems that are grouped by products

and services usually use a firm's **principal business activity** (the largest source of sales or earnings) to classify firms. Examples of these systems are discussed in the following and include the Global Industry Classification Standard (GICS), Russell Global Sectors (RGS), and Industry Classification Benchmark.

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

*Statistical methods*, such as cluster analysis, can also be used. This method groups firms that historically have had highly correlated returns. The groups (i.e., industries) formed will then have lower returns correlations between groups.

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 statistical error (i.e., firms can be grouped by a relationship that occurs by chance, or not grouped together when they should be).

## Explain the factors that affect the sensitivity of a company to the business cycle and the uses and limitations of industry and company descriptorssuch as "growth," "defensive," and "cyclical."

A **cyclical firm** is one whose earnings are highly dependent on the stage of the business cycle. These firms have high earnings volatility and high operating leverage. Their products are often expensive, non-necessities whose purchase can be delayed until the economy improves. Examples of cyclical industries include basic materials and processing, consumer discretionary, energy, financial services, industrial and producer durables, and technology.

In contrast, 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, telecommunications, and consumer staples.

Sectors can also be classified by their sensitivity to the phase of the business cycle. 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.

Descriptors such as "growth," "defensive," and "cyclical" should be used with caution. The term **growth cyclical** is used to describe firms with strong long-term growth potential that have revenue that is quite sensitive to economic cycles. Cyclical industries, which are supposed to be dependent on the business cycle, often include growth firms that are less dependent on the business cycle. Non-cyclical industries can be affected by severe recessions, as was the case in the 2008–09 downturn. Defensive industries may not

always be safe investments. For example, grocery stores are classified as defensive, but they are subject to intense price competition that reduces earnings. Defensive industries may also contain some truly defensive and some growth firms. Because business cycle phases differ across countries and regions, two cyclical firms operating in different countries may be simultaneously experiencing different cyclical effects on earnings growth.

**Describe current industry classification systems, and identify how acompany should be classified, given a description of its activities and the classification system.**

Classifying firms by industry provides a method of examining trends and firm valuations. It also allows analysts to compare firms in different countries on a similar basis. The following are the industry classification systems currently available to investors.

## Commercial classifications

Several index providers classify firms. Some use three levels of classification, while others use four levels. The providers generally use firm fundamentals such as revenue to classify firms. Although the nomenclature differs among providers, the broadest category is generally the sector level, followed by industry and sub-industry.

Commercial industry classifications include the Global Industry Classification Standard developed by Standard & Poor's and MSCI Barra, Russell Global Sectors, and the Industry Classification Benchmark developed by Dow Jones and FTSE.

Sectors and firm compositions representative of those used by commercial providers are as follows.

*Basic materials and processing* firms produce:

- Building materials.
- Chemicals.
- Paper and forest products.
- Containers and packaging.
- Metals, minerals, and mining.

*Consumer discretionary* firms are cyclical and sell goods and services in industries such as:

- Automotive.
- Apparel.
- Hotels and restaurants.

*Consumer staples* firms are less cyclical and sell goods and services in industries such as:

- Food.
- Beverage.
- Tobacco.
- Personal care products.

*Energy* firms are involved in:

- Energy exploration.
- Refining.
- Production.
- Energy equipment.
- Energy services.

*Financial services* firms include firms involved in:

- Banking.
- Insurance.
- Real estate financing.
- Asset management.
- Brokerage.

*Health care* includes:

- Pharmaceuticals.
- Biotech.
- Medical devices.
- Health care equipment.
- Medical supplies.
- Health care services.

*Industrial and producer durables* firms produce capital goods for commercial services industries including:

- Heavy machinery and equipment.
- Aerospace.
- Defense.
- Transportation.
- Commercial services and supplies.

*Real estate* firms are involved in the development, management, and operation of real properties, including:

- Real estate investment trusts (REITs).
- Real estate services firms.

*Technology* firms sell or produce:

- Computers.
- Software.
- Semiconductors.
- Communications equipment.
- Internet services.
- Electronic entertainment.
- Consulting and services.

*Telecommunications* firms include wired and wireless service providers. *Utilities* includes electric, gas, and water utilities. Some industry classification providers include telecommunication and utilities in the same group, while others separate them.

To classify a firm accurately, an analyst should have detailed knowledge about the firm and the delineation of industry classifications.

## Government classifications

Several government bodies also provide industry classification of firms. They frequently do so to organize the economic data they publish. A main thrust of their systems is to make comparisons of industries consistent across time and country. The main systems are similar to each other.

- *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 United States, Canada, and Mexico.

The methodologies that government providers use in their compilation of industry groups differ from those used by commercial providers. Most governments do not identify individual firms in a group, so an analyst cannot know the groups' exact composition. Commercial providers identify the constituent firms. Government systems are updated less frequently; for example, the NAICS is updated every five years. Governments do not distinguish between small and large firms, for-profit and not-for-profit organizations, or private and public firms. Commercial providers only include for-profit and public firms and can delineate by the size of the firm.

An analyst should not assume that two firms in the same narrowest industry classification can be compared with each other for fundamental analysis and valuation. Instead, the analyst should construct *peer groups*.

**Explain how a company's industry classification can be used to identify apotential "peer group" for equity valuation.**

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A **peer group** is a set of similar companies an analyst will use for valuation comparisons. More specifically, a peer group will consist 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.

The following are steps an analyst would use to form a peer group:

- Use commercial classification providers to determine which firms are in the same industry.
- Examine firms' annual reports to see if they identify key competitors.
- Examine competitors' annual reports to see if other competitors are named.

- Use industry trade publications to identify competitors.
- Confirm that comparable firms have similar sources of sales and earnings, have similar sources of demand, and are in similar geographic markets.
- Adjust financial statements of non-financial companies for any financing subsidiary data they include.

## Describe the elements that need to be covered in a thorough industryanalysis.

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.

## Describe the principles of strategic analysis of an industry.

Industries differ markedly in profitability because of differences in economic fundamentals, industry structure, and degree of competition. In some industries, competition is intense and few firms earn economic profits. **Economic profits**, the return on invested capital minus its cost, are greater than 20% in some industries and negative in others. The degree of economic profits depends in part on pricing power (elasticity of demand for the firm's products). An analyst should understand that industry conditions and profits can change dramatically over time, so industry analysis should be forward-looking.

One component of an analyst's industry analysis should be **strategic analysis**, which examines how an industry's competitive environment influences a firm's strategy. The analysis framework developed by Michael Porter[1] delineates five forces that determine industry competition.

1. *Rivalry among existing competitors*. Rivalry increases when many firms of relatively equal size compete within an industry. Slow growth leads to competition as firms fight for market share, and high fixed costs lead to price decreases as firms try to operate at full capacity. For example, the high fixed costs in the auto industry from capital investments and labor contracts force firms to produce a large number of vehicles that they can only sell at low margins. Industries with products that are undifferentiated or have barriers (are costly) to exit tend to have high levels of competition.
2. *Threat of entry*. Industries that have significant barriers to entry (e.g., large capital outlays for facilities) will find it easier to maintain premium pricing. It is costly to enter the steel or oil production industries. Those industries have large barriers to entry and thus less competition from newcomers. An analyst should identify factors that discourage new entrants, such as economies of scale.
3. *Threat of substitutes*. Substitute products limit the profit potential of an industry because they limit the prices firms can charge by increasing the elasticity of demand. Commodity-like products have high levels of competition and low profit margins. The more differentiated the products are within an industry, the less price competition there will be. For example, in the pharmaceutical industry, patents protect a producer from competition in the markets for patented drugs.
4. *Power of buyers*. Buyers' ability to bargain for lower prices or higher quality influences industry profitability. Bargaining by governments and ever-larger health care providers have put downward pressure even on patented drugs.
5. *Power of suppliers*. Suppliers' ability to raise prices or limit supply influences industry profitability. Suppliers are more powerful if there are just a few of them and their products are scarce. For example, Microsoft is one of the few suppliers of operating system software and thus has pricing power.

The first two forces deserve further attention because almost all firms must be concerned about the threat of new entrants and competition that would erode profits. Studying these forces also helps the analyst better understand the subject firm's competitors and prospects. The following summary describes how these two factors influence the competitive environment in an industry:

- Higher barriers to entry reduce competition.
- Greater concentration (a small number of firms control a large part of the market) reduces competition, whereas market fragmentation (a large number of firms, each with a small market share) increases competition.
- Unused capacity in an industry, especially if prolonged, results in intense price competition. For example, underutilized capacity in the auto industry has resulted in very competitive pricing.
- Stability in market share reduces competition. For example, loyalty of a firm's customers tends to stabilize market share and profits.
- More price sensitivity in customer buying decisions results in greater competition.
- Greater maturity of an industry results in slowing growth.

# PRICING POWER AND COMPANYANALYSIS

**Explain the effects of barriers to entry, industry concentration, industry capacity, and market share stability on pricing power and price competition.**

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## Barriers to Entry

High barriers to entry benefit existing industry firms because they prevent new competitors from competing for market share and reducing the existing firms' return on capital. In industries with low barriers to entry, firms have little pricing power and competition reduces existing firms' return on capital. 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 among existing firms. This

is more likely when the products sold are undifferentiated and commodity-like or when high barriers to exit result in overcapacity. For example, an automobile factory may have a low value in an alternative use, making firm owners less likely to exit the industry. They continue to operate even when losing money, hoping to turn things around, which can result in industry overcapacity and intense price competition.

Low barriers to entry do not ensure success for new entrants. Barriers to entry may change over time, and so might the competitive environment.

## 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. A firm may have a 50% market share, but if a single competitor has the other 50%, their 50% share would not result in a great degree of pricing power. Return on capital is limited by intense competition between the two firms.
- Conversely, a firm that has a 10% market share when no competitor has more than 2% may have a good degree of pricing power and high return on capital.
- If industry products are undifferentiated and commodity-like, then consumers will switch to the lowest-priced producer. The more importance consumers place on price, the greater the competition in an industry. Greater competition leads to lower return on capital.
- Industries with greater product differentiation in regard to features, reliability, and service after the sale will have greater pricing power. Return on capital can be higher for firms that can better differentiate their products.
- If the 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 does usually result in strong competition. When there are many industry members, firms cannot coordinate pricing, firms will act independently, and because each member has such a small market share, any incremental increase in market share may make a price decrease profitable.

## Industry 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 and higher return on capital. Overcapacity, with supply greater than demand at current prices, will result in downward pressure on price and lower return on capital.

An analyst should be familiar with the industry's current capacity and its planned investment in additional capacity. Capacity is fixed in the short run and variable in the long run. In other words, given enough time, producers will build enough factories and raise enough capital to meet demand at a price close to minimum average cost. However, producers may overshoot the optimal industry capacity, especially in cyclical markets. For example, producers may start to order new equipment during an economic expansion

to increase capacity. By the time they bring the additional production on to the market, the economy may be in a recession with decreased demand. A diligent analyst can look for signs that the planned capacity increases of all producers (who may not take into account the capacity increases of other firms) sum to more output than industry demand will support.

Capacity is not necessarily physical. For example, an increase in demand for insurance can be more easily and quickly met than an increase in demand for a product requiring physical capacity, such as electricity or refined petroleum products.

If capacity is physical and specialized, overcapacity can exist for an extended period if producers expand too much over the course of a business cycle. Specialized physical capacity may have a low liquidation value and be costly to reallocate to a different product. Non-physical capacity (e.g., financial capital) can be reallocated more quickly to new industries than physical capacity.

## Market Share Stability

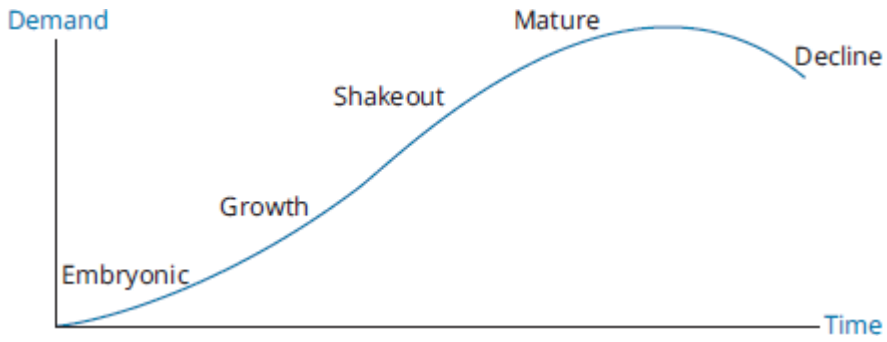
An analyst should examine whether firms' market shares in an industry have been stable over time. Market shares that are highly variable likely indicate a highly competitive industry in which firms have little pricing power. More stable market shares likely indicate less intense competition in the industry.

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. Switching costs, such as the time and expense of learning to use a competitor's product, tend to be higher for specialized or differentiated products. High switching costs contribute to market share stability and pricing power.

Describe industry life-cycle models, classify an industry as to life-cyclestage, and describe limitations of the life-cycle concept in forecasting industry performance.

**Industry life cycle** analysis should be a component of an analyst's strategic analysis. An industry's stage in the cycle has an impact on industry competition, growth, and profits. An industry's stage will change over time, so the analyst must monitor the industry on an ongoing basis. The five phases of the industry life-cycle model are illustrated in Figure

**Figure** **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.

An analyst should determine whether a firm is "acting its age" or stage of industry development. Growth firms should be reinvesting in operations in an attempt to increase product offerings, increase economies of scale, and build brand loyalty. They are not yet worried about cost efficiency. They should not pay out cash flows to investors but save them for internal growth. On the other hand, mature firms focus on cost efficiency because demand is largely from replacement. They find few opportunities to introduce new products. These firms should typically pay out cash to investors as dividends or stock repurchases because cash flows are strong but internal growth is limited. An analyst should be concerned about firms that do not act their stage, such as a mature firm that is investing in low-return projects for the sake of increasing firm size.

Although life-cycle analysis is a useful tool, industries do not always conform to its framework. Life-cycle stages may not be as long or short as anticipated, or they might be skipped altogether. An industry's product may become obsolete quickly due to technological change, government regulation, societal change, or demographics. Life-cycle analysis is likely most useful during stable periods, not during periods of upheaval when conditions are changing rapidly. Furthermore, some firms will experience growth and profits that are dissimilar to others in their industries due to competitive advantages or disadvantages.

## Describe macroeconomic, technological, demographic, governmental, social, and environmental influences on industry growth, profitability, and risk.

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. An example of a structural economic factor is the education level of the work force. More education can increase workers' productivity and real wages, which in turn can increase their demand for consumer goods.

*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. For example, the aging of the post-World War II Baby Boomers is an example of demographics that will increase demand in these industries.

*Governments* have an important and widespread effect on businesses through various channels, including taxes and regulation. The level of tax rates certainly affects industries, but analysts should also be aware of the differential taxation applied to some goods. For example, tobacco is heavily taxed in the United States. Specific regulations apply to many industries. Entry into the health care industry, for example, is controlled by governments that license doctors and other providers. Governments can also empower self-regulatory organizations, such as stock exchanges that regulate their members. 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. workforce, the restaurant industry benefitted because there was less cooking at home. Child care, women's clothing, and other industries were also dramatically affected.

*Environmental influences*, such as climate change and concerns about environmental sustainability of some industries, continue to grow in importance as a factor in industry growth and profitability. Three primary considerations are as follows:

1. Consumer perceptions about industries and specific companies can have a significant impact on growth and profitability.
2. Increased government regulation of some industries will produce profound changes in how they operate and the drivers of demand for products in those industries.
3. Changing weather patterns and shortages of water and energy will affect various industries, such as agriculture and utilities.

Some examples of industries and businesses affected by environmental factors are the following:

- Perceptions that raising cattle may be cruel to animals, produces significant greenhouse gases, and require a disproportionately large amount of resources is changing that industry. Other businesses, notably producers of plant-based meat substitutes, have experienced tremendous growth.
- Other types of agriculture will likely be significantly affected by environmental concerns and resource shortages—and quite possibly by the near-term effects of climate change.
- Airlines have been criticized for their large contribution to carbon emissions.
- The automobile industry is changing rapidly, with government regulation increasing and some outright bans on internal combustion vehicles in favor of electric-powered vehicles on the horizon. There is an associated perception that oil producers will find themselves facing a much smaller industry.
- Relatedly, the electric vehicle segment of the auto and truck industry is growing rapidly, along with battery manufacture, the construction of vehicle charging stations, and the alternative energy industry in general.
- Energy producers may face increasing regulation, especially related to fracking and the release of natural gas into the atmosphere.
- New businesses (and possibly industries) focused on combating climate change, improving sustainability, and reducing the negative effects of economic activity on the environment will likely experience rapid growth in the coming decades.

## Compare characteristics of representative industries from the variouseconomic sectors.

To illustrate the long list of factors to be considered in industry analysis, we use the following strategic analysis of the candy/confections industry.

- *Major firms*: Cadbury, Hershey, Mars, and Nestle.
- *Barriers to entry and success*: Very high. Low capital and technological barriers, but consumers have strong brand loyalty.
- *Industry concentration*: Very concentrated. Largest four firms dominate global market share.
- *Influence of industry capacity on pricing*: None. Pricing is determined by strength of brand, not production capacity.
- *Industry stability*: Very stable. Market share changes slowly.
- *Life cycle*: Very mature. Growth is driven by population changes.
- *Competition*: Low. Lack of unbranded candy makers in market reduces competition. Consumer decision is based on brand awareness, not price.
- *Demographic influences*: Not applicable.
- *Government influence*: Low. Industry is largely unregulated, but regulation arising from concerns about obesity is possible.
- *Social influence*: Not applicable.
- *Technological influence*: Very low. Limited impact from technology.
- *Business cycle sensitivity*: Non-cyclical and defensive. Demand for candy is very stable.

## Describe the elements that should be covered in a thorough companyanalysis.

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. The strategy may be defensive or offensive.

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. The strategy can be used defensively to protect market share or offensively to gain market share. If industry competition is intense, pricing can be aggressive or even predatory. In **predatory pricing**, the firm hopes to drive out competitors and later increase prices. Although there are often laws prohibiting predatory pricing, it can be hard to prove if the firm's costs are not easily traced to a particular product. 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).

Analysts often use **spreadsheet modeling** to analyze and forecast company fundamentals. The problem with this method is that the models' complexity can make their conclusions seem precise. However, estimation is performed with error that can compound over time. As a check on a spreadsheet model's output, an analyst should consider which factors are likely to be different going forward and how this will affect the firm. Analysts should also be able to explain the assumptions of a spreadsheet model.

# EQUITY VALUATION:CONCEPTS AND BASIC TOOLS

## DIVIDENDS, SPLITS, ANDREPURCHASES

### Evaluate whether a security, given its current market price and a value estimate, is overvalued, fairly valued, or undervalued by the market.

Recall from the topic review of Market Efficiency that **intrinsic value** or **fundamental value** is defined as the rational value investors would place on the asset if they had full knowledge of the asset's characteristics. Analysts use valuation models to estimate the intrinsic values of stocks and compare them to the stocks' market prices to determine whether individual stocks are overvalued, undervalued, or fairly valued. In doing valuation analysis for stocks, analysts are assuming that some stocks' prices deviate significantly from their intrinsic values.

To the extent that market prices deviate from intrinsic values, analysts who can estimate a stock's intrinsic value better than the market can earn abnormal profits if the stock's market price moves toward its intrinsic value over time. There are several things to consider, however, in deciding whether to invest based on differences between market prices and estimated intrinsic values.

1. The larger the percentage difference between market prices and estimated values, the more likely the investor is to take a position based on the estimate of intrinsic value. Small differences between market prices and estimates of intrinsic values are to be expected.
2. The more confident the investor is about the appropriateness of the valuation model used, the more likely the investor is to take an investment position in a stock that is identified as overvalued or undervalued.
3. The more confident the investor is about the estimated inputs used in the valuation model, the more likely the investor is to take an investment position in a stock that

is identified as overvalued or undervalued. Analysts must also consider the sensitivity of a model value to each of its inputs in deciding whether to act on a difference between model values and market prices. If a decrease of one-half percent in the long-term growth rate used in the valuation model would produce an estimated value equal to the market price, an analyst would have to be quite sure of the model's growth estimate to take a position in the stock based on its estimated value.

4. Even if we assume that market prices sometimes deviate from intrinsic values, market prices must be treated as fairly reliable indications of intrinsic value. Investors must consider why a stock is mispriced in the market. Investors may be more confident about estimates of value that differ from market prices when few analysts follow a particular security.
5. Finally, to take a position in a stock identified as mispriced in the market, an investor must believe that the market price will actually move toward (and certainly not away from) its estimated intrinsic value and that it will do so to a significant extent within the investment time horizon.

### Describe major categories of equity valuation models.

Analysts use a variety of models to estimate the value of equities. Usually, an analyst will use more than one model with several different sets of inputs to determine a range of possible stock values.

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 to 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.

### Describe regular cash dividends, extra dividends, stock dividends, stock splits, reverse stock splits, and share repurchases.

**Cash dividends**, as the name implies, are payments made to shareholders in cash. They may be regularly scheduled dividends or one-time special dividends. **Regular dividends** occur when a company pays out a portion of profits on a consistent schedule (e.g., quarterly). A long-term record of stable or increasing dividends is widely viewed by investors as a sign of a company's financial stability. **Special dividends** are used when favorable circumstances allow the firm to make a one-time cash payment to shareholders, in addition to any regular dividends the firm pays. Many cyclical firms (e.g.,

automakers) will use a special dividend to share profits with shareholders when times are good but maintain the flexibility to conserve cash when profits are poor. Other names for special dividends include *extra dividends* and *irregular dividends*.

**Stock dividends** are dividends paid out in new shares of stock rather than cash. In this case, there will be more shares outstanding, but each one will be worth less. Total shareholders' equity remains unchanged. Stock dividends are commonly expressed as a percentage. A 20% stock dividend means every shareholder gets 20% more stock.

**Stock splits** divide each existing share into multiple shares, creating more shares. There are now more shares, but the price of each share will drop correspondingly to the number of shares created, so there is no change in the owner's wealth. Splits are expressed as a ratio. In a 3-for-1 stock split, each old share is split into three new shares. Stock splits are currently more common than stock dividends.

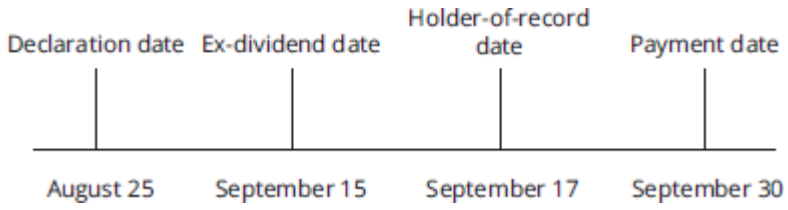
**Reverse stock splits** are the opposite of stock splits. After a reverse split, there are fewer shares outstanding but there is a higher stock price. Because these factors offset one another, shareholder wealth is unchanged.

A **share repurchase** is a transaction in which a company buys outstanding shares of its own common stock. Share repurchases are an alternative to cash dividends as a way of distributing cash to shareholders, and they have the same effect on shareholders' wealth as cash dividends of the same size. A company might repurchase shares to support their price or to signal that management believes the shares are undervalued. Share repurchases may also be used to offset an increase in outstanding shares from the exercise of employee stock options. In countries that tax capital gains at lower rates than dividends, shareholders may prefer share repurchases to dividend payments as a way to distribute cash to shareholders.

## Describe dividend payment chronology.

The dates relevant to dividend payments are shown in fig

**Dividend Payment Chronology**




**Declaration date.** The date the board of directors approves payment of a dividend, specifying the per-share dividend amount, the date shareholders must own the stock to receive the dividend (record date), and the date the dividend payment will be made(payment date).

**Ex-dividend date.** The first day on which a share purchaser will not receive the next dividend. The ex-dividend date is one or two business days before the holder-of-record date, depending on the settlement period for stock purchases. If you buy the share on orafter the ex-dividend date, you will not receive the dividend.

**Holder-of-record date (record date).** The date on which all owners of shares becomeentitled to receive the dividend payment on their shares.

**Payment date.** The date dividend checks are mailed to, or payment is madeelectronically to, holders of record.

On the ex-dividend date, the share price will decrease from the previous day's closing price by approximately the amount of the dividend, in the absence of other factors affecting the stock price. Consider shares that are trading at $25 on the day prior to theex-dividend date and will pay a $1 dividend. Purchasing a share on the day prior to the ex-dividend date will give the owner a share of stock and the $1 dividend on the paymentdate. Purchasing a share on the ex-dividend date will entitle the owner only to the share; the dividend payment will go to the seller.

## DIVIDEND DISCOUNT MODELS

**Explain the rationale for using present value models to value equity and describe the dividend discount and free-cash-flow-to-equity models.**

The **dividend discount model** (DDM) is based on the rationale that the intrinsic value of stock is the present value of its future dividends.

The most general form of the model is as follows:

$$V_0 = \sum_{t=1}^{\infty} \frac{D_t}{(1 + k_e)^t}$$

where:
$V_0$ = current stock value
$D_t$ = dividend at time $t$
$k_e$ = required rate of return on common equity

**One-year holding period DDM.** For a holding period of one year, the value of the stock today is the present value of any dividends during the year plus the present value of the expected price of the stock at the end of the year (referred to as its **terminal value**).

The one-year holding period DDM is simply:

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

EXAMPLE: **One-period DDM valuation**

Calculate the value of a stock that paid a $1 dividend last year, if next year's dividend will be 5% higher and the stock will sell for $13.45 at year-end. The required return is 13.2%.

**Answer:**

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

$$D_1 = D_0 \times (1 + \text{dividend growth rate}) = \$1.00 \times (1 + 0.05) = \$1.05$$

The present value of the expected future cash flows is:

$$\text{dividend: } \frac{\$1.05}{1.132} = \$0.93$$
$$\text{year-end price: } \frac{\$13.45}{1.132} = \$11.88$$

The current value based on the investor's expectations is:

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

**Multiple-year holding period DDM.** With a multiple-year holding period, we simply sum the present values of the estimated dividends over the holding period and the estimated terminal value.

For a two-year holding period, we have:

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

PROFESSOR'S NOTE

It is useful to think of the subscript t on dividends ($D_t$) and prices ($P_t$) as the end of period *t*. For example, in the preceding equation, $P_2$ is the price at the end of Year 2. Think of it as the selling price of a share, immediately after $D_2$ is received.

EXAMPLE: **Multiple-period DDM valuation**

A stock recently paid a dividend of $1.50 which is expected to grow at 8% per year. The required rate of return of 12%. Calculate the value of this stock assuming that it will be priced at $51.00 three years from now.

**Answer:**

Find the PV of the future dividends:

$D_1 = \$1.50(1.08) = \$1.62$

$D_2 = \$1.50(1.08)^2 = \$1.75$

$D_3 = \$1.50(1.08)^3 = \$1.89$

PV of dividends $= \$1.62 / 1.12 + \$1.75 / (1.12)^2 + \$1.89 / (1.12)^3 = \$4.19$

Find the PV of the future price:

$\$51.00 / (1.12)^3 = \$36.30$

Add the present values. The current value based on the investor's expectations is $\$4.19 + \$36.30 = \$40.49$.

The most general form of the DDM uses an infinite holding period because a corporation has an indefinite life. In an infinite-period DDM model, the present value of all expected future dividends is calculated and there is no explicit terminal value for the stock. In practice, as we will see, a terminal value can be calculated at a time in the future after which the growth rate of dividends is expected to be constant.

**Free cash flow to equity** (FCFE) is often used in discounted cash flow models instead of dividends because it represents the potential amount of cash that could be paid out to common shareholders. That is, FCFE reflects the firm's capacity to pay dividends. FCFE is also useful for firms that do not currently pay dividends.

FCFE is defined as the cash remaining after a firm meets all of its debt obligations and provides for the capital expenditures necessary to maintain existing assets and to purchase the new assets needed to support the assumed growth of the firm. In other words, it is the cash available to the firm's equity holders after a firm meets all of its other obligations. FCFE for a period is often calculated as:

FCFE = net income + depreciation − increase in working capital − fixed capital investment (FCInv) − debt principal repayments + new debt issues

FCFE can also be calculated as:

FCFE = cash flow from operations − FCInv + net borrowing

In the second formula, **net borrowing** is the increase in debt during the period (i.e., amount borrowed minus amount repaid) and is assumed to be available to shareholders.

Fixed capital investment must be subtracted because the firm must invest in assets to sustain itself. FCFE is projected for future periods using the firm's financial statements.

Restating the general form of the DDM in terms of FCFE, we have:

$$V_0 = \sum_{t=1}^{\infty} \frac{FCFE_t}{(1+k_e)^t}$$

## Estimating the required return for equity

The capital asset pricing model (CAPM) provides an estimate of the required rate of return ($k_i$) for security *i* as a function of its systematic risk ($\beta_i$), the risk-free rate ($R_f$), and the expected return on the market [$E(R_{mkt})$] as:

$$k_i = R_f + \beta_i[E(R_{mkt}) - R_f]$$

There is some controversy over whether the CAPM is the best model to calculate the required return on equity. Also, different analysts will likely use different inputs, so there is no single number that is correct.

Recall from the topic review of Cost of Capital that for firms with publicly traded debt, analysts often estimate the required return on the firm's common equity by adding a risk premium to the firm's current bond yield. If the firm does not have publicly traded debt, an analyst can add a larger risk premium to a government bond yield.

### Calculate the intrinsic value of a non-callable, non-convertible preferredstock.

**Preferred stock** pays a dividend that is usually fixed and usually has an indefinite maturity. When the dividend is fixed and the stream of dividends is infinite, the infinite period dividend discount model reduces to a simple ratio:

$$\text{preferred stock value} = \frac{D_p}{(1+k_p)^1} + \frac{D_p}{(1+k_p)^2} + \ldots + \frac{D_p}{(1+k_p)^x} = \frac{D_p}{k_p}$$

EXAMPLE: **Preferred stock valuation**

A company's $100 par preferred stock pays a $5.00 annual dividend and has a required return of 8%. Calculate the value of the preferred stock.

**Answer:**

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

### Calculate and interpret the intrinsic value of an equity security based onthe Gordon (constant) growth dividend discount model or a two-stage dividend discount model, as appropriate.

The **Gordon growth model** (or **constant growth model**) assumes the annual growth rate of dividends, $g_c$, is constant. Hence, next period's dividend, $D_1$, is $D_0(1 + g_c)$, the second year's dividend, $D_2$, is $D_0(1 + g_c)^2$, and so on. The extended equation using this assumption gives the present value of the expected future dividends ($V_0$) as:

$$V_0 = \frac{D_0(1+g_c)}{(1+k_e)} + \frac{D_0(1+g_c)^2}{(1+k_e)^2} + \frac{D_0(1+g_c)^3}{(1+k_e)^3} + \ldots + \frac{D_0(1+g_c)^\infty}{(1+k_e)^\infty}$$

When the growth rate of dividends is constant, this equation simplifies to the Gordon (constant) growth model:

$$V_0 = \frac{D_0(1+g_c)}{k_e - g_c} = \frac{D_1}{k_e - g_c}$$

The assumptions of the Gordon growth model are:

- Dividends are the appropriate measure of shareholder wealth.
- The constant dividend growth rate, $g_c$, and required return on stock, $k_e$, are never expected to change.
- $k_e$ must be greater than $g_c$. If not, the math will not work.

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

EXAMPLE: **Gordon growth model valuation**

Calculate the value of a stock that paid a $1.50 dividend last year, if dividends are expected to grow at 8% forever and the required return on equity is 12%.

**Answer:**

Determine $D_1$: $D_0(1 + g_c) = \$1.50(1.08) = \$1.62$

Calculate the stock's value $= D_1 / (k_e - g_c)$
$= \$1.62 / (0.12 - 0.08)$
$= \$40.50$

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

rate of dividends, $g_C$:

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

Because the estimated stock value is very sensitive to the denominator, an analyst should calculate several different value estimates using a range of required returns and growth rates.

An analyst can also use the Gordon growth model to determine how much of the estimated stock value is due to dividend growth. To do this, assume the growth rate is zero and calculate a value. Then, subtract this value from the stock value estimated using a positive growth rate.

EXAMPLE: **Amount of estimated stock value due to dividend growth**

Using the data from the previous example, calculate how much of the estimated stock value is due to dividend growth.

**Answer:**

The estimated stock value with a growth rate of zero is:

$$V_0 = D / k = \$1.50 / 0.12 = \$12.50$$

The amount of the estimated stock value due to estimated dividend growth is:

$$\$40.50 - \$12.50 = \$28.00$$

## 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 sold.

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

The quantity (1 − dividend payout ratio) is also 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.

EXAMPLE: **Sustainable growth rate**

Green, Inc., is expected to pay dividends equal to 25% of earnings. Green's ROE is 21%. Calculate and interpret its sustainable growth rate.

**Answer:**

$$g = (1 - 0.25) \times 21\% = 15.75\%$$

With long-run economic growth typically in the single digits, it is unlikely that a firm could sustain 15.75% growth forever. The analyst should also examine the growth rate for the industry and the firm's historical growth rate to determine whether the estimate is reasonable.

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 these firms, 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 check the estimate from the Gordon growth model against estimates made using other models.

EXAMPLE: **A firm with no current dividend**

A firm currently pays no dividend but is expected to pay a dividend at the end of Year 4. Year 4 earnings are expected to be $1.64, and the firm will maintain a payout ratio of 50%. Assuming a constant growth rate of 5% and a required rate of return of 10%, estimate the current value of this stock.

**Answer:**

The first step is to find the value of the stock at the end of Year 3. Remember, $P_3$ is the present value of dividends in Years 4 through infinity, calculated at the end of Year 3, one period *before* the first dividend is paid.

Calculate $D_4$, the estimate of the dividend that will be paid at the end of Year 4:

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

Apply the constant growth model to estimate $V_3$:

$$V_3 = D_4 / (k_e - g_c) = \$0.82 / (0.10 - 0.05) = \$16.40$$

The second step is to calculate the current value, $V_0$:

$$V_0 = 16.40 / 1.1^3 = \$12.32$$

## Multistage Dividend Growth Models

A firm may temporarily experience a growth rate that exceeds the required rate of return on the firm's equity, but no firm can maintain this relationship indefinitely. A firm with an extremely high growth rate will attract competition, and its growth rate will eventually fall. We must assume the firm will return to a more sustainable rate of growth at some point in the future in order to calculate the present value of expected future dividends.

One way to value a dividend-paying firm that is experiencing temporarily high growth is to add the present values of dividends expected during the high-growth period to the present value of the constant growth value of the firm at the end of the high-growth period. This is referred to as the **multistage dividend discount model**.

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

where $P_n = \frac{D_{n+1}}{k_e - g_c}$ is the terminal stock value, assuming that dividends at $t = n + 1$ and beyond grow at a constant rate of $g_c$.

Steps in using the multistage model:

- Determine the discount rate, $k_e$.
- Project the size and duration of the high initial dividend growth rate, $g^*$.
- Estimate dividends during the high-growth period.
- Estimate the constant growth rate at the end of the high-growth period, $g_c$.
- Estimate the first dividend that will grow at the constant rate.
- Use the constant growth value to calculate the stock value at the end of the high-growth period.
- Add the PVs of all dividends to the PV of the terminal value of the stock.

EXAMPLE: **Multistage growth**

Consider a stock with dividends that are expected to grow at 15% per year for two years, after which they are expected to grow at 5% per year, indefinitely. The last dividend paid was \$1.00, and $k_e = 11\%$. Calculate the value of this stock using the multistage growth model.

**Answer:**

Calculate the dividends over the high-growth period:

$$D_1 = D_0(1 + g^*) = 1.00(1.15) = \$1.15$$
$$D_2 = D_1(1 + g^*) = 1.15(1.15) = 1.15^2 = \$1.32$$

Although we increase $D_1$ by the high growth rate of 15% to get $D_2$, $D_2$ will grow at the constant growth rate of 5% for the foreseeable future. This property of $D_2$ allows us to use the constant growth model formula with $D_2$ to get $P_1$, a time = 1 value for all the (infinite) dividends expected from time = 2 onward.

$$P_1 = \frac{D_2}{k_e - g_c} = \frac{1.32}{0.11 - 0.05} = 22.00$$

Finally, we can sum the present values of dividend 1 and of $P_1$ to get the present value of all the expected future dividends during both the high- and constant growth periods:

$$\frac{1.15 + 22.00}{1.11} = \$20.86$$

## Identify characteristics of companies for which the constant growth or a multistage dividend discount model is appropriate.

The Gordon growth model uses a single constant growth rate of dividends and is most appropriate for valuing stable and mature, non-cyclical, dividend-paying firms.

For dividend-paying firms with dividends that are expected to grow rapidly, slowly, or erratically over some period, followed by constant dividend growth, some form of the multistage growth model should be employed. The important points are that dividends must be estimable and must grow at a constant rate after some initial period so that the constant growth model can be used to determine the terminal value of the stock. Thus, we can apply multistage dividend growth models to a firm with high current growth that will drop to a stable rate in the future or to a firm that is temporarily losing market share and growing slowly or getting smaller, as long as its growth is expected to stabilize to a constant rate at some point in the future.

One variant of a multistage growth model assumes that the firm has three stages of dividend growth, not just two. These three stages can be categorized as growth, transition, and maturity. A 3-stage model would be suitable for firms with an initial high growth rate, followed by a lower growth rate during a second, transitional period, followed by the constant growth rate in the long run, such as a young firm still in the high growth phase.

When a firm does not pay dividends, estimates of dividend payments some years in the future are highly speculative. In this case, and in any case where future dividends cannot be estimated with much confidence, valuation based on FCFE is appropriate as long as growth rates of earnings can be estimated. In other cases, valuation based on price multiples may be more appropriate.

# RELATIVE VALUATION MEASURES

**Explain the rationale for using price multiples to value equity, how the price to earnings multiple relates to fundamentals, and the use of multiples based on comparables.**

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. Common price multiples used for valuation include price-to-earnings, price-to-cash flow, price-to-sales, and price-to-book value ratios.

Price multiples are widely used by analysts and readily available in numerous media outlets. Price multiples are easily calculated and can be used in time series and cross-sectional comparisons. Many of these ratios have been shown to be useful for predicting stock returns, with low multiples associated with higher future returns.

A critique 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.

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 model and therefore are not dependent on the current market prices of other companies to establish value.

### Calculate and interpret the following multiples: price to earnings, priceto an estimate of operating cash flow, price to sales, and price to book value.

Price multiples used for valuation include:

- **Price-earnings (P/E) ratio:** The P/E ratio is a firm's stock price divided by earnings per share and is widely used by analysts and cited in the press.
- **Price-sales (P/S) ratio:** The P/S ratio is a firm's stock price divided by sales per share.
- **Price-book value (P/B) ratio:** The P/B ratio is a firm's stock price divided by book value of equity per share.
- **Price-cash flow (P/CF) ratio:** The P/CF ratio is a firm's stock price divided by cash flow per share, where cash flow may be defined as operating cash flow or free cash flow.

Other multiples can be used that are industry specific. For example, in the cable television industry, stock market capitalization is compared to the number of subscribers.

## Multiples Based on Fundamentals

To understand fundamental price multiples, consider the Gordon growth valuation model:

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

If we divide both sides of the equation by next year's projected earnings, $E_1$, we get

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

which is the leading P/E for this stock if it is valued in the market according to the constant growth DDM.

This P/E based on fundamentals is also referred to as a **justified P/E**. It is "justified" because, assuming we have the correct inputs for $D_1$, $E_1$, $k_e$, and $g$, the previous equation will provide a P/E ratio that is based on the present value of the future cash flows. We refer to this as a *leading P/E ratio* because it is based on expected earnings next period, not on actual earnings for the previous period, which would produce a lagging or *trailing P/E ratio*.

One advantage of this approach is that it makes clear how the firm's P/E ratio should be related to its fundamentals. It illustrates that the P/E ratio is a function of:

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

EXAMPLE: **P/E based on fundamentals**

A firm has an expected dividend payout ratio of 30%, a required rate of return of 13%, and an expected dividend growth rate of 6%. Calculate the firm's fundamental (justified) leading P/E ratio.

**Answer:**

expected P/E ratio: 0.3 / (0.13 – 0.06) = 4.3

The justified P/E ratio serves as a benchmark for the price at which the stock should trade. In the previous example, if the firm's actual P/E ratio (based on the market price and expected earnings) was 8, the stock would be considered overvalued. If the firm's market P/E ratio was 2, the stock would be considered undervalued.

P/E ratios based on fundamentals are very sensitive to the inputs (especially the denominator, k − g), so the analyst should use several different sets of inputs to indicate a range for the justified P/E.

Because we started with the equation for the constant growth DDM, the P/E ratio calculated in this way is the P/E ratio consistent with the constant growth DDM. We can see from the formula that, *other things equal*, the P/E ratio we have defined here will increase with (1) a higher dividend payout rate, (2) a higher growth rate, or (3) a lower required rate of return. So, if the subject firm has a higher dividend payout ratio, higher growth rate, and lower required return than its peers, a higher P/E ratio may be justified.

In practice, other things are not equal. An increase in the dividend payout ratio, for example, will reduce the firm's sustainable growth rate. While higher dividends will increase firm value, a lower growth rate will decrease firm value. This relationship is referred to as the **dividend displacement of earnings**. The net effect on firm value of increasing the dividend payout ratio is ambiguous. As intuition would suggest, firms cannot continually increase their P/Es or market values by increasing the dividend payout ratio. Otherwise, all firms would have 100% payout ratios.

EXAMPLE: **Fundamental P/E ratio comparison**

Holt Industries makes decorative items. The following figures are for Holt and its industry.

| | Holt Industries | Industry Average |
|---|---|---|
| Dividend payout ratio | 25% | 16% |
| Sales growth | 7.5% | 3.9% |
| Total debt to equity | 113% | 68% |

Which of these factors suggest a higher fundamental P/E ratio for Holt?

**Answer:**

- The higher dividend payout ratio supports Holt having a higher P/E ratio than the industry.
- Higher growth in sales suggests that Holt will be able to increase dividends at a faster rate, which supports Holt having a higher P/E ratio than the industry.
- The higher level of debt, however, indicates that Holt has higher risk and a higher required return on equity, which supports Holt having a lower P/E ratio than the industry.

## Multiples Based on Comparables

Valuation based on price multiple comparables (or comps) involves using a price multiple to evaluate whether an asset is valued properly relative to a benchmark. Common benchmarks include the stock's historical average (a time series comparison) or similar stocks and industry averages (a cross-sectional comparison). Comparing firms within an industry is useful for analysts who are familiar with a particular industry. Price multiples are readily calculated and provided by many media outlets.

The economic principle guiding this method is the **law of one price**, which asserts that two identical assets should sell at the same price, or in this case, two comparable assets should have approximately the same multiple.

The analyst should be sure that any comparables used really are comparable. Price multiples may not be comparable across firms if the firms are different sizes, are in different industries, or will grow at different rates. Furthermore, using P/E ratios for cyclical firms is complicated due to their sensitivity to economic conditions. In this case, the P/S ratio may be favored over the P/E ratio because the sales are less volatile than earnings due to both operating and financial leverage.

The disadvantages of using price multiples based on comparables are (1) a stock may appear overvalued by the comparable method but undervalued by the fundamental method, or vice versa; (2) different accounting methods can result in price multiples that are not comparable across firms, especially internationally; and (3) price multiples for cyclical firms may be greatly affected by economic conditions at a given point in time.

EXAMPLE: **Valuation using comparables**

The following figures are for Renee's Bakery. All figures except the stock price are in millions.

| Fiscal Year-End | 20X3 | 20X2 | 20X1 |
|---|---|---|---|
| Total stockholder's equity | $55.60 | $54.10 | $52.60 |
| Net revenues | $77.30 | $73.60 | $70.80 |
| Net income | $3.20 | $1.10 | $0.40 |
| Net cash flow from operations | $17.90 | $15.20 | $12.20 |
| Stock price | $11.40 | $14.40 | $12.05 |
| Shares outstanding | 4.476 | 3.994 | 3.823 |

Calculate Renee's lagging P/E, P/CF, P/S, and P/B ratios. Judge whether the firm is undervalued or overvalued using the following relevant industry averages for 20X3 and the firm's historical trend.

| Lagging Industry Ratios | 20X3 |
|---|---|
| Price-to-earnings | 8.6 |
| Price-to-cash flow | 4.6 |
| Price-to-sales | 1.4 |
| Price-to-book value | 3.6 |

$$\frac{\text{sales}}{\text{number of shares}} = \frac{\$77.30}{4.476} = 17.270$$

$$\frac{P}{S} = \frac{\$11.40}{17.3} = 0.7$$

| | 20X3 | 20X2 | 20X1 |
|---|---|---|---|
| P/E | 15.9 | 52.3 | 115.2 |
| P/CF | 2.9 | 3.8 | 3.8 |
| P/S | 0.7 | 0.8 | 0.7 |
| P/B | 0.9 | 1.1 | 0.9 |

| | |
|---|---|
| Company average P/E 20X1–20X3 | 61.1 |
| Company average P/CF 20X1–20X3 | 3.5 |
| Company average P/S 20X1–20X3 | 0.7 |
| Company average P/B 20X1–20X3 | 1.0 |

## Describe enterprise value multiples and their use in estimating equityvalue.

**Enterprise value** (EV) measures total company value. EV can be viewed as what it would cost to acquire the firm:

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

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 also 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. Because the numerator represents total company value, it should be compared to earnings of both debt and equity owners. An advantage of using EBITDA instead of net income is that EBITDA is usually positive even when earnings are not. When net income is negative, value multiples based on earnings are meaningless. A disadvantage of using EBITDA is that it often includes non-cash revenues and expenses.

A potential problem with using enterprise value is that the market value of a firm's debt is often not available. In this case, the analyst can use the market values of similar bonds or can use their book values. Book value, however, may not be a good estimate of market value if firm and market conditions have changed significantly since the bonds were issued.

EXAMPLE: **Calculating EV/EBITDA multiples**

Daniel, Inc., is a manufacturer of small refrigerators and other appliances. The following figures are from Daniel's most recent financial statements except for the market value of long-term debt, which has been estimated from financial market data.

| | |
|---|---|
| Stock price | $40.00 |
| Shares outstanding | 200,000 |
| Market value of long-term debt | $600,000 |
| Book value of long-term debt | $900,000 |
| Book value of total debt | $2,100,000 |
| Cash and marketable securities | $250,000 |
| EBITDA | $1,000,000 |

Calculate the EV/EBITDA multiple.

**Answer:**

First, we must estimate the market value of the firm's short-term debt and liabilities. To do so, subtract the book value of long-term debt from the book value of total debt: $2,100,000 – $900,000 = $1,200,000. This is the book value of the firm's short-term debt. We can assume the market value of these short-term items is close to their book value. (As we will see in the Study Session on fixed income valuation, the market values of debt instruments approach their face values as they get close to maturity.)

Add the market value of long-term debt to get the market value of total debt: $600,000 + $1,200,000 = $1,800,000.

The market value of equity is the stock price multiplied by the number of shares: $40 × 200,000 = $8,000,000.

The enterprise value of the firm is the sum of debt and equity minus cash: $1,800,000 + $8,000,000 – $250,000 = $9,550,000.

EV/EBITDA = $9,550,000 / $1,000,000 ≈ 9.6.

If the competitor or industry average EV/EBITDA is above 9.6, Daniel is relatively undervalued. If the competitor or industry average EV/EBITDA is below 9.6, Daniel is relatively overvalued.

## Describe asset-based valuation models and their use in estimating equityvalue.

Our third category of valuation model is **asset-based models**, which are based on the idea that 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 a firm that has 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. An analyst should consider supplementing an asset-based valuation with a more forward-looking valuation, such as one from a discounted cash flow model.

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. Asset-based models are often used to value private companies but may be increasingly useful for public firms as they move toward fair value reporting on the balance sheet.

EXAMPLE: **Using an asset-based model for a public firm**

Williams Optical is a publicly traded firm. An analyst estimates that the market value of net fixed assets is 120% of book value. Liability and short-term asset market values are assumed to equal their book values. The firm has 2,000 shares outstanding.

Using the selected financial results in the table, calculate the value of the firm's net assets on a per-share basis.

| | |
|---|---|
| Cash | $10,000 |
| Accounts receivable | $20,000 |
| Inventories | $50,000 |
| Net fixed assets | $120,000 |
| Total assets | $200,000 |
| | |
| Accounts payable | $5,000 |
| Notes payable | $30,000 |
| Term loans | $45,000 |
| Common stockholder equity | $120,000 |
| Total liabilities and equity | $200,000 |

**Answer:**

Estimate the market value of assets, adjusting the fixed assets for the analyst's estimates of their market values:

$10,000 + $20,000 + $50,000 + $120,000(1.20) = $224,000

Determine the market value of liabilities:

$5,000 + 30,000 + $45,000 = $80,000

Calculate the adjusted equity value:

$224,000 – $80,000 = $144,000

Calculate the adjusted equity value per share:

$144,000 / 2,000 = $72

## Explain advantages and disadvantages of each category of valuationmodel.

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 ata given point in time.
- A stock may appear overvalued by the comparable method but undervalued by afundamental method or vice versa.
- Different accounting methods can result in price multiples that are not comparableacross firms, especially internationally.
- A negative denominator in a price multiple results in a meaningless ratio. The P/Eratio 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.

Disadvantage 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 futurecash flows not reflected in asset values.
- Assets can be difficult to value during periods of hyperinflation.